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Energy Security in Central and Eastern Europe and the Operations of Russian State-Owned Energy Enterprises

Martin Jirušek and Tomáš Vlček

with

Hedvika Kodůusková, Roger W. Robinson, Jr.,
Anna Leshchenko, Filip Černoč,
Lukáš Lehotský, Veronika Zapletalová

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Foreword

Dear distinguished reader,

It is my utmost honor to present you the first volume of a series of energy security threat assessment studies stemming from the comprehensive, in-depth research of the Energy Security team at the Department of International Relations and European Studies of the Faculty of Social Studies of the Masaryk University conducted with the valuable support of, and in collaboration with, the Prague Security Studies Institute.

This study addresses the rapidly evolving energy sector of Central and Eastern Europe, a sensitive, vulnerable region with regard to present and past Russian efforts to exercise varying levels of control over infrastructure, supply and pricing. The authors examine the operations and behavioral characteristics of two key Russian state-owned enterprises in the natural gas and nuclear energy sectors, namely Gazprom JSC and Rosatom State Atomic Energy Corporation, and seek to detect specific patterns and determining factors that shape their decision-making.

The research team carefully monitored and analyzed the energy environments in all Central and Eastern European countries, notably Belarus, Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Moldova, Poland, Romania, Slovakia, and Ukraine. The data collection and analytical process included extensive field research in the countries being assessed and the use of an open-source intelligence tool called IntelTrak, that visually tracks and maps the global business footprints of the companies selected for the study (as well as all other state-owned enterprises of Russia and China) (<http://about-inteltrak.rwradvisory.com/>).

The second volume of this series will be published in 2017 and will cover the operations and behavioral characteristics of Russian state-owned enterprises operating in Southeastern Europe, with a focus on the Balkan Peninsula. Both the present study and that planned for 2017 aim to provide unbiased and comprehensive threat assessments of countries with energy sectors linked to the Russian Federation and together seek to cover much of the geopolitical landscape from the Baltic to the Mediterranean Sea. These countries also offer numerous case studies which can provide valuable insights into the independence or vulnerability of their respective energy sectors. This series of energy security threat assessments is designed to provide energy policy practitioners in the public and private sectors with a useful roadmap of the most pressing technical and policy issues and pitfalls as they seeks to rebalance traditional energy dependencies.

Břetislav Dančák

Dean of the Faculty of Social Studies of Masaryk University

Introduction

Martin Jirušek

The Ukrainian crisis not only raised concerns about security on the EU borders, but part of the public also considers it a reason to look carefully on future energy development in Central and Eastern Europe (CEE) which has always been sensitive with regard to past Russian influence. Such concerns also relate to the operations of two Russian energy giants – Gazprom and Rosatom - which are sometimes viewed as sources of geopolitical leverage.

Although positions of these two companies currently appear to be different, they both play a substantial role in energy sector of CEE and this role actually forms the basis for the aforementioned concerns. Gazprom holds the position of a major gas supplier with majority of CEE countries relying on Russian gas for more than 75% of their consumption, and several even 100% dependent. Given the importance of natural gas for industry and heating where any supply curtailments can have severe impact, this area has been a source of potential supply issues. The concerns were demonstrated in reality during 2006 and 2009 gas crises and by the current conflict in Ukraine,

where gas supplies have also been playing their part. In the nuclear sector, Rosatom finds itself in a position of a dominant supplier of technologies and fuel supplies to the region also thanks to the historically anchored ties to CEE countries. Simultaneously, nuclear energy is one of the major sources of power generation in CEE and given the dominance of Russian technology and plans to expand nuclear capacity in some CEE countries, the sector deserves attention with regard to the future development. Behaviour of both companies was also examined in Asia, which has been rising as the new “centre of gravity” not only in terms of energy, and can thus offer valuable comparison to the companies' conduct in CEE.

This study is designed to examine the operations and behavioural characteristics of these two Russian state-owned enterprises (SOEs). The aim of the research is to provide an in-depth analysis of Russian operations in the gas and nuclear sectors of Central and Eastern Europe. The research seeks to unearth whether Gazprom and Rosatom subscribe to specific patterns of conduct with regard to this business environment and if so, what are the determining factors of such behaviour. In the gas sector the study is theoretically based on the strategic approach to energy policy, which emphasizes geopolitical logic, traditional realistic thinking and influence-oriented objectives. Finding evidence of the strategic approach within the operations and performance record of Gazprom helps to answer the question whether this company acts strategically to maximize its influence on CEE markets. It may also indicate whether their patterns of behaviour are the same or differ among countries, and if so, what are the determining factors for such differences. Provided that majority of the states under

scrutiny established themselves as members of the European Union in last decade, the study will also assess the internal setting of the Union as a factor potentially influencing strategy of both companies. In this regard, the authors dedicated a special chapter to assessment of the EU's internal energy market rules and their impact on Gazprom's traditional strategy under which gas supplies have been conducted. Importance of precise assessment of the gas sector is not only highlighted by the 2006 and 2009 gas crises but also by the structural dependency of examined countries. By 'structural dependency' we mean foremost the nature of contracts (usually of a long-term nature), need for more or less uninterrupted flow of supplies (depending on the storage capacity), rigid infrastructure, limited means of transport, and for this reason also rather partitioned market providing opportunities for different pricing.

Despite the substantially different nature of nuclear sector requiring specific assessment, this sector also possesses certain features that attracted attention of the research team and justified its examination. The structural dependence in nuclear sector does not have the form of a need for uninterrupted flow or reliance on rigid transit infrastructure. Nevertheless, the predominance of a specific (Russian) technology, designs and fuel formed a strong path-dependence that is extremely hard and costly to change. Given the substantially different characteristics, highly strict technical regulations imposed on global level and technological and financial demands of nuclear sector, the authors examine this sector by assessing potential risks present in each part of the nuclear fuel cycle (see the respective chapter of the study). As application of

comprehensive theory on the nuclear sector is prevented by the mentioned features of the sector, authors assess the potential of exerted influence in individual cases with the help of step-by-step approach examining individual cases and potential influence exerted by players of Russian origin.

The involvement of the aforementioned Russian energy majors in Asia will also be reflected, as well as Moscow's efforts to establish closer ties with emerging market economies. The rising energy demand of Russia's Asian neighbours is important to monitor, as well as Russia's energy policy responses, as it may provide an alternative perspective on the behaviour of these Russian SOEs in a substantially different operating and geopolitical environment. Current activities of Russian energy majors in Asia and limited opportunities in respective sectors in Europe in combination with rather cold recent relations between the Western states and Russia provide additional reason for a closer examination of Russian activities in this rising part of the world. Such comparison will help us to understand whether there are some specific patterns of behaviour related exclusively to the region of CEE and whether strategies of Russian energy companies are undergoing some changes. This chapter employs the same methods of assessment as the respective chapters concerned with CEE states.

First chapter of the study offers an overview of the behavioural dichotomy of Russian SOEs with regard to broader political connotations. Then, the methodology and theoretical framework used for assessment of both nuclear and natural gas sector is introduced. This section is followed by chapters dedicated to the nuclear sector, which consist of individual case studies for Europe and Asia. The part concerned with nuclear

sector is followed by chapters analysing the natural gas sector. For the complex view of an environment within which Gazprom operates a chapter describing the influence of the legislation of the European Union (EU) has been included. Case studies examining natural gas sector in CEE and Asia follow. The study is further supplemented by a chapter analysing geopolitical background and consequences of activities conducted by examined companies.

Data used in this study were gathered from open sources and information provided within in-depth interviews conducted with consultants and insiders from examined countries. The research team also used IntelTrak, analytic tool capable of tracking and mapping global business footprints of selected companies¹.

¹ For more details on the program visit
<http://inteltrak.rwradvisory.com/#search/map?transactions%5Bany%5D=1>

Strategic Operations of Russian State-Owned Energy Enterprises

Roger W. Robinson, Jr.

2.1 Commercial Versus Strategic

A central question in assessing the foreign operations of Russian state-owned energy enterprises is determining which of their transactions and projects are more weighted in the strategic versus the commercial domain. In the vast majority of cases, both of these elements are in play in Kremlin and energy industry decision-making, hence the need to identify where the preponderance of evidence lies.

Since the Soviet era, Moscow's energy supply and pricing schemes have been "dual use" in nature, serving both as a hard currency revenue generator and a source of ever-expanding strategic leverage over consumer countries and their energy sectors. Indeed, it is this latter element that has helped transform a major Russian vulnerability – namely, inordinate reliance on the energy sector in its economic structure – into a strength (i.e., the ability to subtly, sometimes stealthily, achieve supply dominance in this strategic sector of NATO and EU economies (along with the leverage it implies). Accordingly, it would be shortsighted, if not perilous, to underestimate the

weight of strategic considerations in Moscow's management of its premiere state-owned energy enterprises.

2.2 Economic Backdrop

In a world awash with energy supplies and slower economic growth rates, Russia has had to struggle to maintain its budgeted revenue and spending levels. With a budgetary process predicated on oil prices at roughly \$90-\$100 per barrel, the current price of about \$50 per barrel represents a major blow to both, particularly when oil and gas exports still comprise some two-thirds of the country's export earnings and over 50% of state income. The reasons for the dramatic dip in global oil prices are already well-understood, principal among them being the U.S. shale gas and oil revolution.

Compounding these Kremlin headaches, the imposition of Ukraine-related Western sanctions (combined with deteriorating market conditions) have further damaged Russian economic growth and the appetite of some Western energy majors to partner in the extraction, processing and transmission of Russian hydrocarbon resources in less accessible areas (e.g., the Arctic, offshore drilling, etc.)

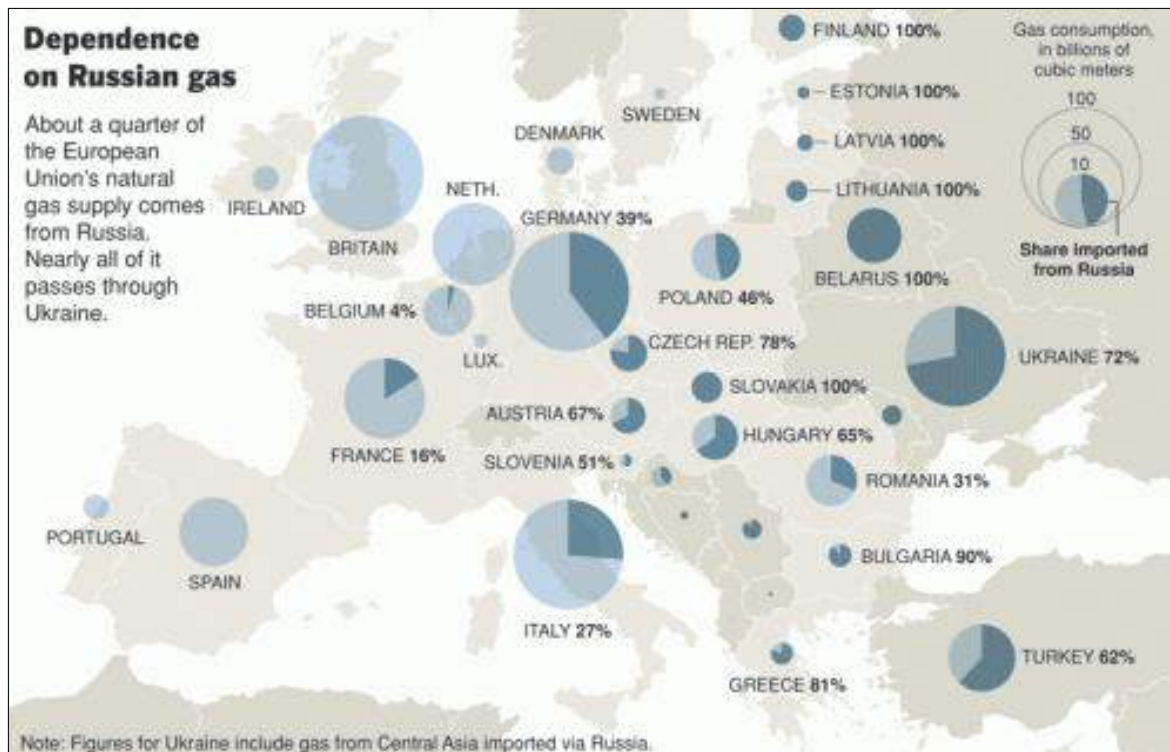
Although Russian leadership has made a fulsome effort to effect an Asian pivot with respect to their energy markets, China's own faltering growth rate, large-scale indebtedness (now over 300% of GDP), sluggish property and construction markets and other macro economic woes have led to implementation problems with respect to large-scale energy deals concluded between the two countries (e.g., Russia's \$400 billion gas deal with Beijing of November 2014). The Kremlin has also found itself in the uncomfortable role of supplicant vis-

à-vis China, resulting in unfavorable, and even harsh, terms and conditions insisted upon by the Chinese side.

2.3 The Strategic Dimensions of Russian Energy SOEs

Understanding that there are many other factors involved, Russia presently finds itself in a relatively weakened position in its all-important energy sector. Accordingly, Moscow is more determined than ever to preserve market share in Europe, particularly for its gas exports. This emphasis on market share, however, is based on far more than commercial and revenue considerations. It has as much or more to do with maintaining the above-mentioned strategic leverage over former Soviet states as well as select Western European nations, chief among them Germany.

Tab. 2.1: Dependence on Russian Gas



Source: Cunningham, 2014

It is these latter strategic considerations that are the focus of this chapter and how they shape Russian business development and behavior in Europe's energy markets, especially in Central and East European (CEE) countries. While it is true that the bulk of the research associated with this report (principally conducted by Masaryk University's energy experts), demonstrates that Russia's day-to-day business in these markets often remains within the bounds of Western market behavior (largely by necessity, not choice), there are an increasing number of occasions when the Kremlin's strategic agenda clearly dominates commercial considerations, often times in a heavy-handed manner.

It is also worth noting the panoply of methods deployed by Moscow to ensure that it emerges from certain tender competitions as the victor. These methods generally involve offers that their Western competitors cannot match, such as pricing discounts, higher percentages of subsidized financing, the willingness to waive standard contractual provisions, offers of substantial local subcontracting, pipeline transit deals and the lure of strengthened economic and financial relations with Russian entities more broadly.

It is these instances that differentiate the operations of Russian state-owned energy enterprises, like Gazprom and Rosatom, from their EU or American counterparts. They periodically offer a rude reminder of the risk and perils of sovereign customers' committing to long-term projects and supply arrangements with these and other Russian state-owned energy enterprises, often times in the naïve belief that market conditions will necessarily dictate the behavior of these entities.

Sometimes a point is best communicated by a brief, factual narrative. On March 5, 2014, President Putin and Deputy Prime Minister Rogozin (known for his uncompromising, hardline positions), in a fit of pique over the loss of their Ukrainian front man, Viktor Yanukovych, and the upheaval that followed, announced the Kremlin's intention to impose an embargo on Russian nuclear fuel deliveries for Ukraine's fifteen Russian-built reactors.¹ World nuclear experts decried this Putin sanction as being not only reckless, but dangerous for Ukraine. Eight days later (March 13, 2014), Rosatom's President, Sergei Kiriyyenko, repudiated the embargo decision publically and the whole episode was permitted to be discretely dropped in the flood of other news emanating from the Ukraine crisis.

Did Russia ever actually implement President Putin's new nuclear fuel embargo against Kiev? No. Was Rosatom sensitive to the damage being done to its reputation as reliable supplier of nuclear fuel and reactors every hour after President Putin's announcement? Yes. Was there any lasting damage to Rosatom's global market position in the nuclear industry? Not really. Should there have been? Yes. Was it President Putin's first instinct to lash out at Ukraine in the highly sensitive nuclear sector of its economy utterly dependent on Russian supply and good will? Yes, and that is the key point of this quick anecdote.

The extensive research conducted for this report factually demonstrates the periodic politicization — and some would say weaponization — of Gazprom and Rosatom by the Kremlin.

¹ According to sources associated with the Bellona Foundation, who are very knowledgeable concerning Rosatom's activities and personnel <http://bellona.org/news/nuclear-issues/2014-03-rosatom-vows-continue-nuclear-fuel-flow-ukraine-spite-putin-imposed-embargo>

Indeed, Moscow's strategic leveraging of Gazprom to extort and pressure neighboring countries (particularly former Soviet states) into compliance with Moscow's policy wishes is well-documented. Whether it is supply cut-offs to Ukraine in winter or pricing mechanisms that double as a barometer of how the Kremlin is perceiving its client politically, the importation of Russian natural gas can prove a risky proposition for any country that seeks to achieve or maintain genuine energy security and even a democratic system of government.

The Soviet legacy of supply dominance in Central and Eastern Europe, however, is resistant to change for a host of reasons, including existing pipeline infrastructure, easy access to the supplier and established business practices and relationships (even though often corrupt). It is primarily for these reasons — and the prospect of ever-expanding West European dependency on Soviet gas deliveries — that the alarm sounded in the Reagan White House in the early 1980s. President Reagan was determined to interdict the upward trajectory of Soviet gas supplies to the Continent even though, at the time, “pipeline politics” was not even in the lexicon of the U.S. and allied security communities and the Soviets had not yet exercised its growing strategic leverage in the energy sector.

Ironically, Nord Stream 2, a project presently pending that would reverse declining Russian market share in Europe, is, in effect, the second strand of the huge, two-strand Siberian gas pipeline project of the late 1970s and early 1980s. It was this second strand of this project that was terminated by President Reagan's relentless intervention in the West European gas markets to keep its percentage dependency on Moscow down to no more than 30% of total gas supplies (over fierce European objections).

It became abundantly clear, however, some years later when the Soviet Union employed the Gazprom cudgel to penalize — and bring to heel — Lithuania in April 1990. Since the Soviet collapse, there have been a number of other occasions (e.g., 2006, 2009, etc.) when Moscow used supply reductions or cut-offs as a strategic tool, often under the guise of price disputes and missed payments (particularly in the case of Ukraine). Not surprisingly, such cut-offs were largely avoided for those countries also behind on payments, but which had consistently acceded to Moscow's political directives. Today, the EU's Third Energy Package and new European Energy Union are largely based on the same strategic concerns President Reagan enunciated — and was vilified for — over three decades before.

Given this history, one can be forgiven for assuming that the Nord Stream 2 pipeline expansion project would be a non-starter in Europe, particularly given Moscow's annexation of Crimea, its ongoing disruption and violence in the Donbass region of Ukraine, and recent military intervention in Syria. Instead, the project is moving ahead at a brisk pace with the project managers seemingly confident that the requisite EU approvals will be forthcoming. Should the project proceed, it would be a new milestone in energy security myopia and a clear indicator that Europe still has a long way to go in forging a sustained, coordinated effort to free itself from inordinate and perilous dependency on Russian gas supplies.

2.4 Specific Strategic Transactions/Projects

To help illustrate the strategic dimensions of Rosatom's and Gazprom's activities in Europe, some specific cases are provided below which challenge the view that these companies are essentially opportunistic, market-based players much like their Western counterparts.

2.4.1 Rosatom

Paks Nuclear Power Plant

On January 14, 2014, Rosatom and Hungary signed a cooperation agreement for the construction of two new 1,200-megawatt (MW) blocks at Hungary's only nuclear power plant (NPP), Paks. The agreement covers fuel supplies and post-construction services and has Russia financing 80% (\$14 billion) of this 10-year building period underwritten by a 30-year loan. Hungarian Development Minister Zsuzanna Nemeth, Sergey Kiriyeenko, head of Rosatom, and the company that operates Paks, Hungarian Electricity Works (MVM), signed the accord. Rosatom subsequently signed a service contract to supply reactor equipment to the Paks power plant until 2020. According to the document, Rosatom will supply Hungary with 24 control rod guide assemblies for the main circulation pump of the plant.

Before the upgrade, the Soviet-designed Paks NPP maintained four power units with VVER-type (pressurized water) reactors operating at a total capacity of around 2,000 MW (40% of Hungary's electricity output). In total, the project is expected to cost over \$17 billion.

In March, 2015, the Hungarian parliament, led by President Viktor Orbán's Fidesz party and the Christian Democrats, passed a bill making all financial and technical details of the contract a state secret for the next 30 years. Tímea Szabó, a member of the Dialogue for Hungary party, said the decision to classify much of the contract information amounted to "the legalization of a gigantic robbery." The deal reportedly requires that only Russian fuel be used in the plant.

Tab. 2.2: The Location of Paks NPP in Hungary



Source: Thorpe, 2015

In December 2014, TVEL (a subsidiary of Rosatom) extended its nuclear fuel supply agreement with Hungary until 2035. Previously, TVEL had announced that the Paks Nuclear Power Plant will be operating henceforth on upgraded Russian nuclear fuel that has a 4.7 percent enrichment level, a 0.5 percent increase over previous supplies. In 2013, TVEL provided Paks with \$101 million in nuclear fuel. In 1999, Paks Nuclear Power Plant signed a nuclear fuel supply contract with

TVEL that was to be valid for as long as the reactors are operating. According to reports, the last reactor is expected to be shut down in 2037.

In March 2015, however, the European Union rejected the Russian nuclear fuel supply deal due to its lack of transparency and good governance. Surprisingly, the EU “rejection” only challenged the exclusive fuel rights, demanding that it be cut from twenty years to ten, and even then the EU did not focus on the sole-source, backroom deal that was made between President Putin and Prime Minister Orbán. The deal has come to symbolize Rosatom’s brand of “no bid” deal-making and non-market behavior, which is of growing concern to Hungary's fellow EU and NATO member states.

Bottom Line

The fact that the EU felt compelled to intervene in the nuclear fuel supply agreement, albeit in a half-hearted manner, by itself demonstrates the strategic concerns surrounding this large-scale transaction. Moscow will, no doubt, happily live with the EU requirement that 10 years be shaved off the original 20-year Russian nuclear fuel exclusive for the Paks project. The Kremlin has reason to be confident that Budapest will voluntarily choose to stay with Russian supplies after the 10-year timetable has lapsed.

This arrangement more or less guaranteed 100% Hungarian dependency on Russian nuclear energy production and fuel for the next 30 years or more and is precisely the kind of strategic leverage that Rosatom, on

behalf of the Kremlin, is seeking to secure among NATO and EU countries. It is no coincidence, for example, that Hungarian leadership has been persuaded to oppose Ukraine-related EU sanctions on Moscow, even if it has reluctantly gone along with them. This is the type of strategic political positioning that Moscow believes itself to be “buying” with subsidized financing and other non-market concessions.

Kaliningrad Nuclear Power Plant

Rosatom currently has a suspended plan to construct a nuclear power plant in its enclave of Kaliningrad – a move unambiguously driven by strategic, rather than commercial, impulses. The original announcement of this planned NPP construction was made at the very moment that Lithuania began its own plans to construct a nuclear power plant at Visaginas. This Rosatom initiative was especially suspect due to the fact that Kaliningrad is already energy independent, meaning that the electricity produced would be solely destined for export to the Baltic states and neighboring European countries. By deliberately offering lower electricity prices than those stemming from the planned Visaginas NPP, the Kalinigrad facility was designed to ensure continued dependency on Russian electrical power on the part of the Baltic states and Poland.

Bottom-Line

Thus far, Moscow's strategy has worked. The combination of more competitive electric power pricing out of Kaliningrad – a non-economic project – and the instant creation of Russian-financed environmental opposition to the Visaginas plant within Lithuania, resulted in the suspension of the Visaginas project. Not coincidentally, as soon as the Visaginas plant was suspended, so to was the Kaliningrad project.

2.4.2 Gazprom

Turk Stream

On December 1, 2014, Gazprom announced it had signed a Memorandum of Understanding (MoU) with BOTAS (Turkey's state energy company) outlining its intention to construct a natural gas pipeline that would connect Russia to Greece and southern Europe via Turkey. Named the Black Sea Pipeline (also referred to as Turk Stream), the announcement came directly on the heels of Russian President Vladimir Putin's announcement that his coveted South Stream pipeline project had been cancelled due to EU opposition. The proposed pipeline was originally to have a capacity of 63 bcm per year, of which 14 bcm would be delivered to Turkey annually.

Tab. 2.3: "Turkish Stream from", 2015



Source: "Turkish Stream project", 2015

The Russian government also announced that it would reduce the price of gas for Turkish customers by six percent beginning on January 1, 2015, and the discount could go as high as 15 percent, depending on negotiations between the two nations. Gazprom's Russkaya, a company established solely for the Turk Stream project, would be the owner of the pipeline. Greek Foreign Minister Nikos Kotzias signed a declaration of intent regarding Turk Stream in Budapest along with counterparts from Hungary, Serbia, Turkey and Macedonia on April 7, 2015.

With the construction of Turk Stream, Russia would be able to largely mitigate the adverse economic and geopolitical consequences of the loss of the South Stream pipeline. Turk Steam would enable not only an increase in Russia's energy

exports to Europe (providing Moscow with much needed hard currency revenues), but also strengthen the gas dependencies of several European states on Russia, similar to what would have occurred under South Stream.

In June 2015, Moscow and Athens signed a memorandum regarding the construction of Turk Stream through Greece providing a new gas supply route to Europe that bypasses Ukraine. Gazprom had earlier proposed to pay for the construction of a Greek pipeline extension in an effort to persuade it to cooperate with Turk Stream plans. As additional sweeteners, Russia is considering extending direct loans to Greece and is also encouraging Athens to apply to the BRICS Bank for new credits.

FGSZ, a Hungarian gas company, confirmed that the foreign ministers of Greece, Hungary, Macedonia and Serbia met in September 2015 to discuss their possible signing of a Memorandum of Understanding (MoU) on the construction of the Tesla pipeline from Turkey to Austria. Tesla would act as an extension of the Turk Stream pipeline, transporting Russian gas from Greece to the Baumgarten gas hub near Vienna. With an annual capacity of 27 bcm and a cost of \$4.45 billion, the pipeline could be completed by the end of 2019, if approved by the participating countries.

In May, Macedonia announced that it would not participate in the Turk Stream Project unless it was compliant with the EU's Third Energy Package. Such a demand by Bulgaria proved an insurmountable hurdle for the South Stream pipeline. Macedonia is a key transit country for Turk Stream if

Russia is to transport gas into Southern and Central Europe. Gazprom announced an official cost estimate for the pipeline of \$12.5 billion and the first line at \$4.7 billion.

Turk Stream, however, has not progressed without delay and difficulties. Turkey was reportedly seeking more than a 10.25% discount and only envisioned one of the four proposed pipelines necessary to support domestic supply. In late October, BOTAS announced that it would seek international arbitration in the International Chamber of Commerce (ICC) over the 10.25% price discount, which it asserts Gazprom promised it under a deal signed in February. Finally, new tensions have emerged between Russia and Turkey over the former's military intervention in Syria to prop up the Assad regime. This has led to open threats by Turkish President Erdogan that continued Russian violations of its airspace and military activities in Syria could put Turk Stream at risk.

Bottom Line

Clearly, Turk Stream was configured as a “work-around” resulting from cancellation of South Stream. Moscow needs large new pipelines into Europe that circumvent Ukraine, if Russia is to maintain its commanding position as a natural gas supplier to the Continent. It is providing an array of concessions and incentives to both Turkey and Greece (as well as other countries along the route of the Tesla pipeline extension) to accommodate the pipeline and to try to avoid the fate of its predecessor pipeline project. It can be reasonably expected that Gazprom, and its Kremlin supervisors, will make strenuous efforts to induce all the

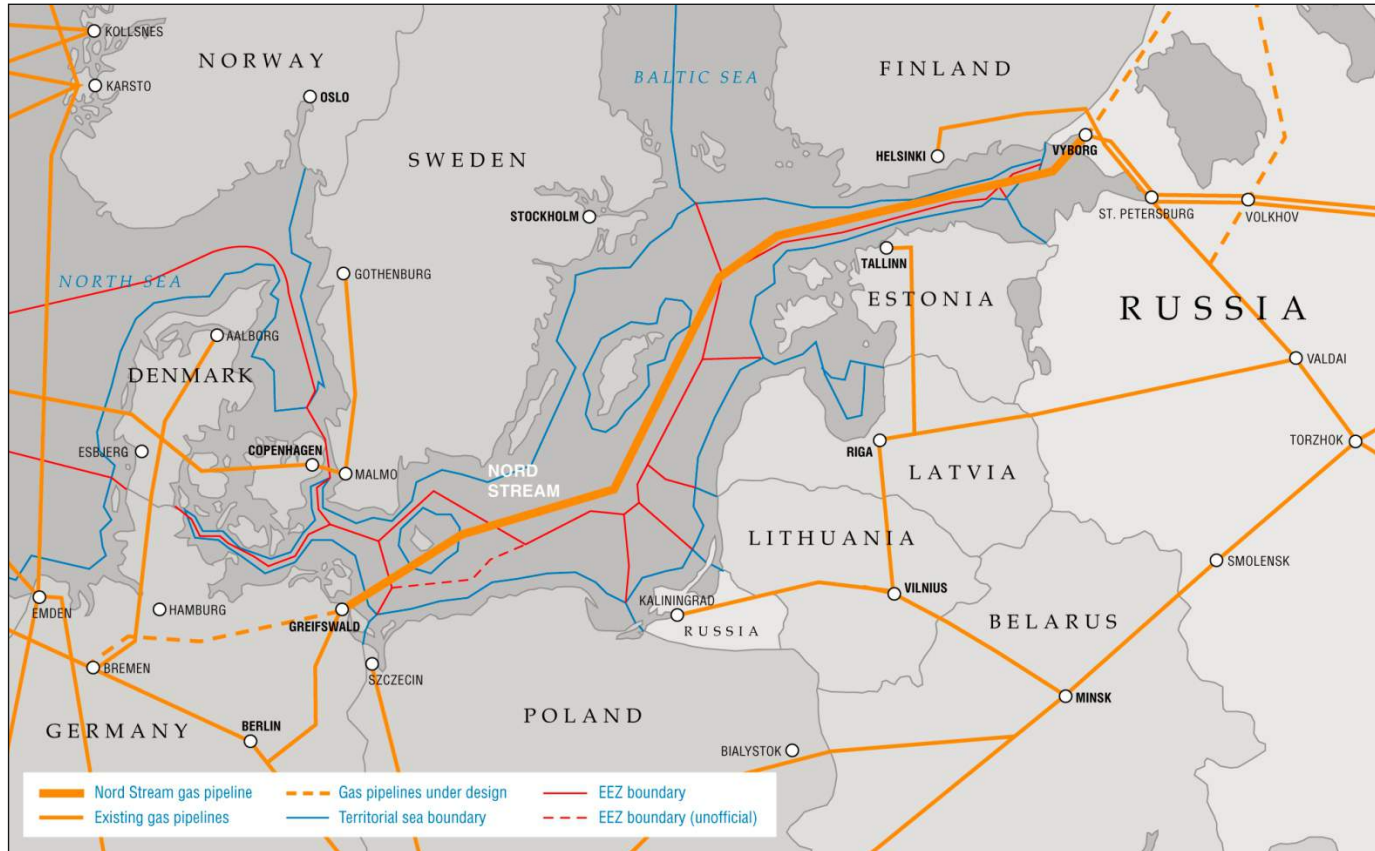
relevant European players to remain at the table, as this deal is more strategic than commercial.

Nord Stream 2

On September 3, 2015, Gazprom signed a binding shareholder agreement on Nord Stream 2 (a major expansion of the existing natural gas pipeline connecting Russia with Germany) at the Eastern Economic Forum in Vladivostok. The Nord Stream 2 project plans to add two additional gas pipelines to the existing Nord Stream pipeline, doubling its capacity and diminishing the need for Gazprom to utilize other avenues (including its pipelines traversing Ukraine) to deliver natural gas to the rest of Europe. Nord Stream 2 could be completed in a much quicker timeframe than other alternatives being pursued by Russia, including Turk Stream, but Moscow needs to raise \$11 billion to finance the project.

According to reports, Shell, OMV, E.On and Wintershall will each receive a 10% stake in the project company, while France's Engie would hold a 9% stake. Gazprom was to initially receive the remaining 51% ownership of the project, but this stake has recently been reduced to 50%, a symbolic move that does nothing to dilute Gazprom's control over the pipeline. OMV Chief Executive, Rainer Steele, has said that he expects the European Commission to approve the project.

Tab. 2.4: The Nord Stream Gas Pipeline



Source: Alexeev, 2013

To further strengthen the legitimacy of this agreement, OMV signed a memorandum of understanding (MoU) with Gazprom on October 23, under which OMV would consider the possibility of oil supplies from Gazprom. Earlier that month, Wintershall announced that they would be investing \$2.276 billion in the construction of the pipeline. Around the same time, Gazprom announced that it will hold a tender to choose a contractor for the pipe laying in 2016.

Bottom Line

This transaction represents a major milestone in Russian efforts to make this pipeline expansion a reality and contractually incentivize major European companies – and, in certain instances, their government stakeholders – to ensure that the project moves ahead expeditiously. In short, much of Europe’s efforts to diversify away from Gazprom’s deliveries to the Continent would be needlessly and knowingly undone. Worse still, the Nord Stream expansion would cost Slovenia and Ukraine billions of dollars each in lost transit fees, leaving them to wonder why the EU is pressuring them to decrease their Russian energy dependencies while at the same time strengthening their own.

That said, Russia faces certain obstacles, such as the present limitation on the amount of gas that the German pipeline, termed Opal, is prepared to take from Nord Stream, which is presently capped at 50% of its capacity (per EU regulations). Efforts are underway, however, to have this limit removed. Again, Russia is utterly committed to materializing Nord Stream 2 as a near-term opportunity to reverse its gas fortunes in Europe and serve as a critical hedge related to the successful completion of the Turk Stream line and other deals presently underway. It is fair to call Nord Stream “a strategic imperative” for Gazprom and the Kremlin that outweighs traditional commercial considerations.

BASF Asset Swap

In October 2015, a multi-billion dollar asset swap arrangement between Germany’s BASF and Gazprom was finalized after

being put on hold in December 2014 due to the Ukraine crisis. This deal saw BASF's subsidiary, Wintershall, gaining a 25% stake in the development of the Urengoy gas fields in western Siberia (containing some 274 bcm of gas). In exchange, Gazprom received a range of strategically significant assets in Western Europe that undermine Europe's ability to rid itself of undue dependence on Russian gas.

Gazprom gained full control over the gas storage and trading company, Wingas GmbH, a firm that generates some \$12 billion in annual revenues and owns and operates the largest underground natural gas storage facility in Western Europe. Gazprom also gained a stake in other Wingas assets, including a fiber optic cable network in Germany. Gazprom also received a 50% share in Wintershall's Nordzee BV business, which has oil and gas assets in the North Sea that produced revenues of some \$13.6 billion last year.

Surprisingly, this swap arrangement was approved by the European Commission prior to the escalation of the Ukraine crisis and, even following the raft of targeted sanctions against Russia following the annexation of Crimea, this deal is viewed as a permissible.

Naturally, the transaction was cast in commercial terms as an opportunity for Gazprom to improve its distribution business in Europe, especially as it has faced growing competition and regulatory pressure. The fact that this pressure has largely been the result of deliberate efforts by Europe to diversify away from Gazprom, however, has been absent from the narrative. More broadly, the business community is striving to have this deal be interpreted as an indication that a political rapprochement with Russia is underway.

Bottom Line

This transaction marks the first time that Gazprom has owned production assets in Western Europe, taking control of some 22 platforms, including Wingate in the UK's portion of the North Sea. Moscow did not intend to waste an opportunity to undermine EU progress in strictly limiting Gazprom's presence in the European energy industry. The strategic nature of the assets acquired and the political legitimacy that the deal bestowed on Russia at an awkward juncture in time were the dominant factors in the calculus of Gazprom's parent company — the Russian government.

Baltic Gas Storage

The Baltic states of Latvia, Lithuania and Estonia are working overtime to reduce their energy dependency on Russia, as evidenced by their efforts to expand connections with the EU gas and electricity grids. One of the main obstacles to achieving this goal is the current lack of control by Latvia over its Incukalns Underground Gas Storage Facility, the only such facility in the Baltic states. Latvia is currently planning to remove Russian control over Incukalns by April 2017 to remain compliant with the EU's Third Energy Package, however, Gazprom has management rights over the facility until 2030. Gazprom is also in control of the Latvian gas company Latvijas Gaze and fellow shareholder in Incukalns, Itera.

Gazprom's control over this facility positions it to remain a major player in the Baltic states, despite the new Klaipeda LNG terminal going operational that will allow for the import of significant amounts of non-Russian gas. Without necessary

storage facilities, these gas supplies cannot be as effectively used to reduce Gazprom's grip on the Baltic energy market. Indeed, the CEO of Lithuania's LNG importer, Litgas, commented on the current situation stating, "without clear rules of access to Inckalns, there will be no Baltics gas market. The European Commission said in October [2014] that Latvia should urgently establish clear rules for third-party access to Inckalns, including gas from the Lithuanian terminal, in case of Russian cuts to gas supplies." Moscow's determination to retain control over Incukalns stems not only from its desire to retain political leverage over the Baltic states, but also to ensure the flow of gas to Kaliningrad. In this connection, Russia is working to construct gas storage facilities in Kaliningrad that will hold up to a four-week supply.

Bottom Line

Concern on the part of the Baltic states and the EU over the strategic nature of this gas storage facility demonstrates the primacy of Gazprom's and the Kremlin's strategic motivations to retain ownership control of Incukalns. Russia is deeply entrenched in the Baltic gas market, owning stakes not only in Latvia's Latvijas, but also a 47% stake in Estonia's state owned gas companies Eesti Gaas and Vorguteenus Valdis. These were primarily strategic acquisitions at the time and will, no doubt, be useful in Moscow's strategy to thwart Latvia's effort (supported by its neighbors) to wrest Incukalns away from the clenched fist of Gazprom.

2.5 Conclusion

Fortunately, rules-based initiatives like the EU's Third Energy Package and the upcoming European Energy Union, have significantly advanced European Energy security and served to discipline Russian state-owned energy enterprises. Although Moscow still has the latitude to defy such rules (e.g., Hungary's Paks nuclear power plant, Nordstream 2, etc.), it is gradually becoming more difficult to do so. In this connection, Moscow's at least temporary abandonment of the South Stream pipeline project was a high water mark in EU resolve to end monopolistic practices by Gazprom that were once tolerated without objection.

Nonetheless, there remains a long way to go, especially as the Baltic states, Romania, Bulgaria and other countries actively seeking to free themselves from undue dependency on Russian energy supplies are heading for the exit doors. The Kremlin is not anxious for these diversification schemes to succeed and has thrown up an array of obstacles to delay or reverse these efforts. This disruptive behavior by Moscow is likely to intensify before it begins to recede. Signs that European resolve to preserve Ukraine-related sanctions against Moscow may be faltering will only embolden Russian leadership, which is skilled at testing the bounds of what is permissible in the energy sector.

Accordingly, it is important to understand the various market and non-market forces at work within the senior management of Russian energy SOEs and to gauge accurately the likelihood of strategically motivated behavior coming into play when doing business with them.

Among the standard due diligence inquiries that might usefully be made by Western would-be partners or sovereign customers prior to committing to transactions or projects with Russian state-owned energy enterprises are as follows:

- Has the SOE ever been identified as engaging in non-market practices on behalf of its government owner, including politically-inspired supply cut-offs or the threat of such cut-offs?
- Can instances be identified when pricing practices appeared more influenced by political considerations than market conditions? If so, how often has this behavior been exhibited and under what circumstances?
- Have any of the senior managers or Board members of the SOE or its subsidiaries been subject to sanctions by any Western government? If so, what were the specific circumstances?
- Has the SOE ever been charged, directly or indirectly, with any World Trade Organization or anti-trust violations and/or with providing any form of unfair financial or trade subsidies?
- Is the SOE doing any business in security-sensitive countries such as Syria, Sudan, Venezuela and North Korea? What is the scope and type of that business?
- Has the SOE solicited, or been the recipient of, stolen internal corporate information of Western competitors through the cyber crime/hacking activities or commercial intelligence collection on the part of their government owner?
- Does the SOE have any business with respect to the supply of equipment, technologies or services to the Russian military or intelligence services? What is the precise nature of any such relationships?

- Do any subsidiaries or affiliates of the SOE have any military/intelligence ties or involvement in the proliferation of weapons of mass destruction or ballistic missiles?
- Has the SOE or its subsidiaries/affiliates been involved in any corruption scandals? If so, what were the underlying details?
- Has the SOE been responsible for despoiling the environment or committing public safety violations?

This kind of energy security-minded assessment of the Russian entities in question prior to contract signing would be advisable. Not only would it help protect the corporate reputation and share value of Western companies doing business with firms like Rosatom and Gazprom (or their plethora of subsidiaries), it would also strengthen the likelihood that Western governments would adopt a longer-term view of the kind of ongoing vigilance required for true regional energy security to be realized.

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Research Methodology

Martin Jirušek

3.1 Introduction

To meet the goal of the study a hypothesis has been formulated as follows: „Russian energy companies in natural gas and nuclear sector act in order to maximize their influence on CEE markets and to strengthen Russian geopolitical influence in this region.“ Secondary goal here is to find out whether the determinants of the Russian companies differ according to various environments in the region or compared to Asia. The chapters providing overview of Asian gas and nuclear sector were included to address the growing importance of this region that has been highlighted by its growing importance in terms of economic growth and related consumption of energy resources and also by seemingly growing attractiveness for gas and nuclear contractors. This region may present a fruitful comparison for the situation in CEE, which is an area of the former Soviet might, and thus may show whether the strategy of Russian companies in these sectors differ.

Countries under scrutiny in the region of Central and Eastern Europe are the following: Czech Republic, Poland,

Slovakia, Hungary, Lithuania, Latvia, Estonia, Romania, Bulgaria, Moldova, Ukraine and Belarus. The core of the study therefore consists of series of case studies dedicated to each state under scrutiny. For making this possible, specific tools were developed by the research team. For nuclear sector, the team developed a set of research questions and indicators that helped to unveil the potential risks arising in each stage of nuclear fuel cycle with regards to the operation of Rosatom State Nuclear Energy Corporation and other Russian subjects. For gas sector a theoretical model of strategically motivated behaviour has been constructed. The gas sector model is characterized by a set of features and their manifestations in reality (indicators). The research team was searching for evidence of these indicators in order to answer the question to what extent Gazprom and its subsidiaries subscribe to the strategic approach in individual cases.

The studies concerned with the gas sector use principles of disciplined interpretative study, while the case studies concerned with nuclear sector use principles of individual (or intrinsic) case study (Stake, 2006, p. 2 – 16; Gerring, 2007, p. 17 – 63; Odell, 2004, p. 59). The individual case study seeks for deep understanding of individual case, while the disciplined interpretative study is a theory-driven approach, where a previously created model (strategic approach to energy policy, see below) or hypothesis is applied on specific cases (CEE countries) (Stake 2006, p. 2 - 16; Kořan, 2008, p. 34 – 39). The disciplined interpretative is able to provide complex understanding of certain phenomenon with regard to broader perspective represented by the theory searched for in individual cases. Cases here were specified as countries within the region

of Central and Eastern Europe, where Russian state-owned enterprises are active in nuclear and gas sectors. As the outcomes of each case study are structured, it is possible to compare and contrast individual cases and derive outcomes based on the common features (membership in international organizations, infrastructure setting, legislation, etc.).

For assessing the data, authors used methods of content analysis. It is a method searching for previously defined coding units in examined data sets (i.e. interviews, documents, articles, outcomes from analytic tool, etc.) as described, for instance, in Holsti (1969) or Krippendorff (2013). The coding units were defined (i.e. unitized) as pieces of information bearing the information on behaviour of Russian state-owned enterprises in respective sectors of individual countries (i.e. thematic distinction). With the help of surrounding information (i.e. contextual units) the coding units were then ascribed to individual features and indicators of strategic approach (see below).

The main outcome of this study is verification of the hypothesis and subsequently analysis of conduct of both companies in examined countries, upon which theoretical assumptions were abstracted. Thanks to the enormous amount of data processed by the research team and flexibility of the research models, the study can be used by policy practitioners and decision makers, and can also be further developed and updated by adding new data.

3.2 Model for Assessment of the Nuclear Sector

As mentioned above, the nuclear sector deserves a different approach. It is predominantly the strong regulation, highly advanced technology and consequent existence of only a few contractors, high up-front costs and also non-technical hurdles like public resistance, dependence on public policy discourse, etc. There are many other more immediate issues that need to be addressed. The capital cost of a nuclear reactor is high and has to be financed; the operation of a plant is a complex affair and must be managed with regard to output efficiency, cost effectiveness and safety; fuel must be imported and security of supply needs to be assured; waste needs to be disposed of carefully. Furthermore, all these need to be controlled by an experienced management team, which may not be available in a country new to nuclear sector.

There are also structural differences compared to the gas sector, since the nuclear sector is not, technically speaking, dependent on certain infrastructure and uninterrupted flow of energy supplies that cannot be taken from another supplier. These supplies are also of different nature than those in the gas sector. There is thus no logic for any efforts to control transit routes as there are no transit routes. One of the key structural differences from the gas sector is also the fact that the contracts are long-term by their very nature. In general, the construction of a nuclear power plant is a complex project that typically takes 5 to 7 years, not counting the procurement and permitting procedures. The project itself is constructed with the life-cycle of 30-60 years. In the nuclear sector, the choice of a particular design/contractor usually lays a foundation for bilateral relation

with the particular contractor for many years to come, since the nuclear power plant typically requires service infrastructure, training and educational centres, and other related facilities to be built so that the country would be able to secure the service period of the plant. Nevertheless, the rules and limitations imposed by multilateral regimes must be taken into account as they may affect the operation and behaviour of contractors.

These factors form the environment in a way that forces actors to behave differently and obey certain rules and thus the evidence of certain (i.e. strategically motivated, see below) behaviour is harder to unveil. Given the limited amount of contracts in the nuclear sector and the revenue implications of each one, contractors also need to proceed very carefully in order to protect their chances of winning the future projects. The contractors' competition during a procurement process is usually a sensitive process, and attempts to use a nuclear contract as leverage on a particular country would cause substantial damage to contractor's reputation, and would aggravate its position for the future contracts. Additionally, no contractor, including Rosatom, can afford to be found guilty of misusing particular project to assist the political goals of its domestic government, as it would essentially destroy not only its long term future but also its immediate market capitalization.

The nuclear energy sector issues are usually and ideally divided into the so called nuclear fuel cycle. Within the cycle they can be divided into three parts, the Front End, the Service Period and the Back End. These three parts cover the entire uranium cycle from exploration and mining to the final disposition of used nuclear fuel. The Front End of the cycle

consists of exploration, mining, milling, processing, enrichment, fuel fabrication and fuel assembly. The Service Period is basically the use of the fuel in the nuclear reactor, and the Back End consists of storing, reprocessing and final disposition of the used fuel. Besides these parts, one has to consider also two more stages, namely the initial stage when the plant is being planned and financing is being secured, and the decommissioning phase.

Speaking about the initial stage, only limited amount of nuclear power station contracts and nuclear contractors can be found worldwide, and it is thus natural that these contractors give each contract opportunity a very high priority, especially given the usual price of such contract. It is also not surprising that the governments from the contractors' homelands show significant support for their efforts, displayed in several different forms varying from rhetorical encouragement, visits by the state officials, support for partnership-building programs, or state guarantees and loan offers at conditions better than a standard financial institution would provide. This is clearly a sensitive part of any project, but in reality, also one of the very few occasions when political influence might be effective. Once the contract is granted and the financing is agreed, only very little room remains for exerting further pressure as the whole process becomes more technical and operational. The governmental support is industry-wide and cannot be attributed to Russian companies as some sort of specific behaviour. The decommissioning phase is a domestic financing- and safety-related issue with very small to no external political influence taking place in the process. Managing the waste disposal thus usually becomes rather an internal issue for the particular country regarding its ability to conduct politically and

technically demanding task of building nuclear waste depository.

Once the plant is completed, the risks of being exposed to external pressures are reduced sharply, as the market for uranium is global with active price competition, and the provision of fuel rods is also competitive. In reality, any dependence can be mitigated by increased fuel storage or by consumers encouraging alternative suppliers to invest in production capacity. Naturally, such strategy would not be possible without some additional costs, but the price of security of supply is one that needs to be addressed across all fuels in the European energy mix, not just in case of nuclear power. It thus depends on the consumer's discretion whether such price is acceptable. However, as things stand in the nuclear sector, the present balance of market and regulatory forces appear to be functioning adequately from the consumers' perspective.

The presented nature of the nuclear sector prompts us to assess the risks of potentially exerted influence in three different stages: (1) the initial stage, when the plant is being planned and financing is being secured; (2) the three sub-stages of the nuclear fuel cycle; and the (3) final stage, which is the decommission phase. The research team examines these three stages individually in order to identify potential risks of strategically motivated conduct of Russian companies. The same approach will be applied on a life-cycle of nuclear fuel. In this case, the origin of nuclear fuel, its supplies, usage and waste management is taken into account.

Tab. 3.1: Issues upon Which Nuclear Sector Has Been Examined

Issue	Part of the Nuclear Sector
Is there nuclear producing capacity present in the country?	Fuel cycle – service period
Is there a project to expand the capacity? What is the status of the project?	Initial stage
How was the project procured?	Initial stage
Who is the contractor in charge of the project?	Initial stage
How is the financing secured?	Initial stage
Who is the operator of the facility?	Fuel cycle – service period
Are there enough home-based experts to run the facility safely?	Fuel cycle – service period
Who is/will be in charge of decommissioning?	Decommissioning stage
Who provides nuclear fuel and under what conditions?	Fuel cycle – front end
What is the experience with the fuel being currently used? Is there any rationale or path-dependency behind the current contract?	Fuel cycle – service period
Is there any part of nuclear fuel industry present in the country? If so, how it contributes to country's nuclear fuel cycle?	Fuel cycle – front end
How is used fuel treated and who is in charge of this?	Fuel cycle – back end

Compilation: T. Vlcek, M. Jirusek

Although the study is primarily focused on CEE countries, relevant Asian players are also taken into account. The study focuses on countries where Russia realizes or aims to realize the contracts. Asian cases, in this regard, may well serve for comparison with the strategy that Rosatom realizes in Europe.

3.3 Theoretical Basis of the Model for Assessing the Gas Sector

For examination of the gas sector the research team has constructed a behavioural model based on the strategic approach to energy policy. This approach is defined by assumptions stemming out of the theoretical grounds of classical realism, neorealism and neoclassical realism. This theoretical basis is briefly described in the following section. The strategic approach can be simplified as behaviour that does not lead to capitalizing in short- and mid-term period of time and generally refuses the economic logic of behaviour as the main determining factor of energy policy.

3.3.1 Realist Tradition of Thinking as a Basis for the Assessment Model in Gas Sector

Classical Realism

Realist tradition of thinking in international relations is generally based on the concept of power. States are unitary actors superior to any other units in the system and driven by the universal goal to survive in the purely anarchical environment. In line with this thinking is also the perception of state as a 'black box', a unitary entity where its inner structure and policy-making processes are neglected. However, this assumption underwent substantial development in later versions of realism-based theories (see below). Power is the defining principle and the main goal of each actor in the system is to gain superiority over other actors (Donnelly, 2005, pp. 30 - 34). From that point of view, mutual relations are seen from the perspective of zero-sum game, which

means that one's gain is another one's loss¹. Military power is seen as crucial but other means of power are also important (Gilpin, 2001, pp. 17-19, 21-24). In this sense, economic power may be perceived as the most universal one since it may be converted to military power and is also a key determining factor for the overall state power. Realist tradition further suggests that all activities conducted by or on behalf of the state should be subordinated to the state's needs. Therefore, resources should be used with regard to state's prosperity as well as (typically state-owned) companies should act in state's well-being in sight. In this sense, SOEs are used as tools to maximize economic and thus also overall power of their home country. These demands are best met by state-driven economy rather than market-oriented principles. It also addresses the scarce nature of energy resources. As described by Robert Gilpin, this logic is also based on assumption suggesting that despite companies usually follow the economic logic of behaviour, it is also their state of origin that cannot be separated from the underlying rationale of their behaviour (*ibid.*). If these companies are owned by a state that sees the sector from the strategic perspective, their behaviour is formed to follow the state's perception of reality (see below in section dedicated to neoclassical realism). In the examined cases, these assumptions are highlighted by the fact that export of energy sources represents large part of Russian economy and that the former communist CEE countries are often vitally dependent on these sources. Worth mentioning are also personal links between Russian state administration and energy companies.

¹ Applied to energy resources, this means that given the scarcity and limited amount of traditional energy resources, if an actor manages to acquire certain energy sources for itself, these are lost for the others and therefore they become weaker.

In line with the realist theory, stronger state (i.e. state with greater capacities in terms of sources of power like, for instance, richer natural resources, greater population, stronger economy, larger army, etc.) cannot 'resist' the temptation of using power against weaker actors (states) and is thus very likely to (mis)use its dominance in spheres of power that appear the most suitable in a given situation. This assumption may be actually used to explain misusing energy commodities in international relations. While energy commodities are usually vital for a state's economy, they appear to be the number one choice for an actor, who controls these commodities or supply routes (Donnelly, 2005, pp. 29-34; Jackson & Sorensen, 2007, pp. 60-67).

Basic assumptions of classical realism

- Based on the concept of power
- States as unitary actors superior to any other units in the arena and driven by the universal goal to survive in the purely anarchical environment
- States are driven to gain superiority over other actors
- Relies on the logic of classical geopolitics (e.g. geographical determination that influences views on pipeline policy, transit chokepoints, etc.)
- Interstate relations are seen from the perspective of zero-sum game
- Military power is seen as the most important
- Other means of power are also important, economic power may be perceived as the most universal and can be converted to military power
- Energy is seen as non-normalized commodity vital for state's existence

- State involvement in the energy sector is essential.
- Market forces are not seen as reliable, states aim at maintaining control over resources and supply routes

Neorealist theory (structural realism)

The neorealist theory further developed the original realist theory. Unlike classical realism that emphasizes the role of individual actors, neorealism emphasizes the role of structure which is influenced by the actors, but in return influences these actors as well. Therefore, it is also often called 'structural realism'. The order within the structure is defined by either hierarchical order or anarchy. Whilst in an anarchical system there are neither roles ascribed to the states within the system, nor over-arching authority rules the system and all actors are fighting with each other for superiority, in the hierarchical order roles/functions are ascribed according to state characteristics, capacities or location. In such setting superiority and/or subordination usually occurs among actors (Donnelly, 2005, p. 34 - 35). It is also the number of centres of power that need to be taken into account. In this sense uni-, bi- or multipolarity may occur (Donnelly, 2005, pp. 38 - 39). Although this point is not exclusively tied to energy security, it may be used in order to explain perception of the system from Russian perspective.

In terms of energy security, implications may be twofold. First, it obviously assumes that state possessing energy resources is more likely to dominate over the others and is also likely to subordinate states with smaller capacities. Second, the distribution of energy resources and their use is basis for distributing roles within the supply chain. This basically addresses the distribution of roles between producing, transit

and also consuming states, where countries act according to their duties of transporting commodities and where hierarchical relations may occur, even if not explicitly formulated.

Within the neorealist theory, a twofold division occurs – offensive and defensive realism. Whilst according to offensive realism state focuses on relative gains over its competitors (i.e. expansion, short-term gains), defensive realism aims at conservation of the status quo and maximization of security (i.e. survival, long-term gains). For the purpose of our theoretical model, we use assumptions of offensive realism that would see state use of energy resources as a way to expand and exert power abroad, despite the fact that there is no imminent objective threat to the state's security. Offensive realism also understands that SOEs can be generally understood as foreign policy tools employed in order to get relative gains (Donnelly, pp. 43-44; Gilpin, 2001, p. 15– 24; Jackson & Sorensen, 2007, pp. 74-79; Waltz, 1979, pp. 79-101).

Neoclassical realism

The neoclassical realism shares the basic assumptions of classical realism but throws away the perception of the state as a 'black box' neglecting its inner structure and processes. In spite, it emphasises the importance of inner processes and individuals as factors that can substantially influence state's behaviour in the system. More importantly, it stresses personal views of the state's representatives and their abilities in political practice. Reactions and behaviour of states are thus strongly interlinked with the behaviour of state representatives, their values and aims. This may explain the discrepancy between behaviour of Western states, their expectations and reactions, and other

culturally and politically different countries. If a country feels that the system behaves in a hostile way, it may implement certain countermeasures regardless the objective reality. In our case, this may explain different perception of NATO expansion after the Cold War as well as the perception of the CEE region by Western states and Russia (Jackson & Sorensen, 2007, pp. 66-74).

Basic assumptions of neorealism and neoclassical realism

- Emphasizes the role of order and interactions between states
- Recognizes hierarchical order or anarchical order of international relations
- Roles/functions are ascribed according to state characteristics (producer, transit and consumer states) and their position in the system (superiority/subordination)
- Relative gains over its competitors (i.e. expansion, short-term gains)
- Energy resources as tools and reason for potential conflict
- Importance of inner processes within states, especially to self-perception of state representatives

Strategic approach

The aforementioned theories gave birth to the so called strategic approach to energy policy (see e.g. Klare, 2005; Klare, 2009 a; Luft & Korin, 2009; Moran, 2009). It emphasizes the anarchical nature of international relations and power which is based on material factors, including energy sources, which are necessary for the functioning of the economy and the military sector (see Donnelly, 2005: pp. 30-54). In combination with the theory of neorealism, it also accepts the role of the structure of

the system, insofar as that states may form alliances and organizations, but only as a tool of national politics (Waltz, 1979, pp. 79-101). Elements of classic geopolitics, which also belong among the sources of the strategic approach, highlight the importance of geographical advantages and disadvantages associated with energy (these assumptions are reflected in debates over energy autarky, pipeline policy, or choke points, see (Klare, 2014).

Implementation of this approach leads to consideration of the energy sector as a strategically sensitive area, whereby a state's monitoring, and to a certain extent its active engagement, is necessary for the securing of such commodities essential for national survival. The practical consequence of this thinking is the legitimization of direct state action and of the distinctive position of the energy sector in the economy. Market forces are seen as unable to secure flows of energy; states' energy policies are thus developed through resource nationalism, or resource mercantilism. Producers attempt to strengthen control over their deposits of oil or natural gas; importer countries, on the other hand, work to gain exclusive rights to foreign extraction or to strengthen ties with producers by direct government engagement (Leverett, 2009, p. 214). Energy sources are thus understood not only as a means in conflict, but also as a possible cause (Ciuta, 2010, pp. 129-130). The combination of strategic perceptions of energy sources, their gradual exhaustion, and the increasing disputes about these resources are the focus of one of the most prolific proponents of the strategic approach, Michael T. Klare. Klare argues that using the means of government to obtain energy-related resources is comparable to other means of ensuring national security (Klare, 2005; Klare, 2009a; Klare,

2009b). The relationship between consumers and producers of energy resources is thus a zero-sum game (see for instance Tunsjø, 2010, p. 27). Risks resulting from disruption of such relations create incentives for diversification of transit means and source countries, as well as diversification of the consuming country's overall energy mix.

Market-based approaches – opposition to strategic measures

For the sake of complex assessment, we need to define also opposing theoretical approach. This approach can be basically characterized as an opposition to strategic features and its ideational scaffold, on which this idea was built, can be found in writings concerning neoclassical and neo-institutional economics and the liberal theory of international relations. From this point of view, it is the market and market forces that most effectively allocate energy sources. Rationally informed actors select the optimal strategy of securing energy resources, and governmental influence is seen as a negative and ineffective disruption of this mechanism (see for instance Nordhaus, 2009). Debates over security of the energy supply actually worsen the situation, as they essentially prevent a functioning market from working properly (Chester, 2009). Economic factors are more important than those of a political or geopolitical nature; energy commodities are not perceived as particularly unique, and they can and should be seen as standard goods. Efforts by the state to achieve independence lead to disturbances in the system and increase tension. Fears of an anarchistic and unfriendly international system weaken international institutions and economic cooperation (Ciuta, 2010). The basic premise of the entire approach, the rationality of an actor (the metatheoretical

perspective of this approach is the theory of rational choice), strongly questions the necessity of unending confrontation and tends to support cooperation and gains for all participating sides. Fears of the resource scarcity expressed by proponents of the strategic approach are addressed by Morris Adelman. He argues that supplies of energy resources are only a function of prices; price increases lead to new technologies (Adelman, 1973, p. 73; Yergin, 2005; Yergin, 2006). Also the use of energy sources as tools in foreign policy is seen as ineffective (Carter & Nivola, 2009).

Strategic vs. Market-oriented Approach - Summary

Naturally, the foreshadowed approaches are ideal models and thus in their clear form define the uttermost points of an axis defined by the dichotomy between state-guided and market-guided energy policy. In reality though, a policy could be found rather somewhere along the axis. Worth mentioning is the fact that the aforementioned approaches are in certain case-specific forms being adopted by different actors. While the strategic approach can be mainly traced in state policies of producing states, the market-based approach is being implemented mostly by consumer states. The finest example would be a confrontation of approaches of the Russian Federation and European Union. While the first is a unitary actor with state-owned energy companies being accused for serving state's needs, the latter is a quasi-state organization of sovereign state that try to enhance their position by creating common area within which risks of import dependence are shared and addressed. It is also this area within which market-based approach is being implemented. A quote of the former

European Commissioner for Energy, Günther Oettinger, is a crystal-clear expression of the EU's dedication to the market-based approach: “The internal energy market today is our fundamental and most effective tool to provide security of supply. Only a fully functioning market is able to take adequate corrective measures in case of a disruption” (European Commission, 2011, p. 8).

The main differences between both approaches are for the sake of clarity outlined in the table 3.2.

Tab. 3.2: Strategic and the Market-Based Approaches – a Comparison

	The Strategic Approach	The Market-Based Approach
Theoretical Basis	The Realist tradition in IR, classic geopolitics	The Liberal tradition in IR, neoclassical and neo-institutional economics
General approach to energy policy in international relations	The need for independence from external supplies of energy	Energy independence is impossible, attempts to achieve it disrupt inter-state relations
Management of energy resources	Scarcity, which leads to resource nationalism	Market ensures efficient allocation
Role of energy policy in international relations	Used to influence international relations	Politicization of energy affairs leads to poor allocation and a less effective system
Defining of the limits of energy policy	Emphasis on securing adequate and secure supply, especially for oil and natural gas	Complex view, looking at all resources, and looking at the functioning of markets, infrastructure, and influence
Nature of the game and distribution of resources	Zero-sum game, attempts at relative victory	Non-zero-sum game, attempts for absolute victory
Style of international relations	International relations founded on bilateral relations; such style is more predictable and influential	Cooperation with international organizations, multilateral relations

Positioning of actors in the international system	States as the main and only relevant actors	Multiple influential actors (including firms, international organizations, interest groups)
Role of the market	High risk of market failure, substantial role of the state	Supplies allocated effectively without state interference
Positioning of energy resources	Subject of the strategic interests of the state. They require special attention	Common market commodity.
Future development	Possible conflict over energy resources and transit infrastructure.	Scarcity of resources is best solved by cooperation among participating actors in the system
Optimal solutions	Independence or expansion	Interdependence by market means

Sources: Adelman, 1973: p. 73; Carter and Nivola, 2009; Chester, 2009: pp. 889-892; Ciuta, 2010: p. 128; Dannreuther, 2003, pp. 200-201; Donnelly, 2005: pp. 30-54; Fattouh, 2012; Klare, 2005; Klare, 2009a; Klare 2009b; Leverett, 2009: pp. 213-227; Kodůusková et al., 2012.; Moran, 2009, pp. 19-23; Nordhaus, 2009; Tunsjø, 2010: pp. 25-45; Waltz, 1979: pp. 79-101. Compilation: the authors

3.4 Theoretical model for assessing natural gas sector

From the theoretical basis and differences between strategic and market- oriented approaches described above, the research team derived a set of features and indicators of the strategic behaviour that will be used for the purpose of the gas sector assessment. These indicators have been searched for in data set gathered from open sources and gathered during semi-structured interviews with selected analysts and officials in examined countries.

The research team is aware of the fact that any research model is rather an ideal case that can hardly exist in reality and thus examined cases can only approximate to this model

meeting only certain conditions/indicators. Nevertheless, even the types of indicators present in certain cases may be revealing in some way. The research therefore took specific features into account and also compared examined countries between each other to derive differences between strategies that Gazprom implemented in individual cases and environments. In individual case studies, only relevant indicators were elaborated.

Tab. 3.3: Features and Indicators of Energy Policy Defined by Strategic Approach

Feature	Indicator
Energy as a state's tool - economy as a basis for state's power	<ul style="list-style-type: none"> -Russian state representatives actively supporting state-owned energy enterprises and their activities in a respective country -The foreign supplier rewarding certain behaviour and linking energy prices to the client state's foreign policy orientation -Abusing infrastructure (e.g. pipelines) and offering different pricing to exert pressure on the client state
Energy resources perceived as strategically important and deserving special treatment	<ul style="list-style-type: none"> -Efforts to take control of energy resources, transit routes and distribution networks of the client state -Disrupting (through various means) alternative supply routes/sources of supply -Restrictions placed on influence of homeland and foreign private actors
Relative gains – one's gain is another's loss (not favouring cooperation)	<ul style="list-style-type: none"> -Efforts to gain a dominant market position in the client country -Efforts to eliminate competitive suppliers -Acting against liberalization
Relying on bilateral relations/agreements	<ul style="list-style-type: none"> -Preference for long-term bilateral agreements and „take-or-pay“contracts -Diminishing the importance and influence of multilateral regimes like that of the EU

Undesirable dependence (while increasing dependency of others)	Attempts to control the entire supply chain (regardless of commercial rationale)
Emphasis on strategic issues (over economic logic)	Taking economically irrational steps in order to maintain a certain position in the client state's market

Compilation: Martin Jirusek

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Sector of Nuclear Energy in Central and Eastern Europe

4.1 Country Case Study: Belarus

Tomáš Vlček

4.1.1 Introduction

Belarus is a landlocked country bordering with Russian Federation, Ukraine, Poland, Lithuania and Latvia. Belarus declared independence at the end of the WWI just to be occupied by Soviet troops shortly after and eventually incorporated to USSR as Belarusian Soviet Socialist Republic from 1919. After the Russian-Polish war the country was divided between these two states. The USSR has taken back the Polish part in 1939 and Belarus was not an independent state until July 1990 when Republic of Belarus was created. In 1994, Alexander Lukashenko was elected president of Belarus; he was reelected again for the second term (2001-2006), the third term (2006-2011) and also the fourth term (2011-2016). The election process especially for the fourth term had been criticized as flawed by most EU and OSCE countries. As a result, Lukashenko and his associates are forbidden to travel to EU member countries. Belarus is also very well known for his authoritative leadership (sometimes called as Europe's last dictatorship), oppression and corruption.

Belarusian economy has been steadily growing since 1996 due to socially oriented economic policy of the state, favorable market conditions in the Russian Federation and EU countries for the export of Belarusian goods and an increase in labor productivity (Energy Charter Secretariat, 2013, p. 20).

Belarusian energy sector is heavily reliant on hydrocarbons, especially natural gas consisting 66% of Belarus' TPES and 97.1% of electricity generation share in 2010. Natural gas is imported explicitly from Russian Federation through Yamal-Europe gas pipeline. Belarus is also a crucial transit country for both natural gas and crude oil supplies to Europe. The Yamal-Europe gas pipeline and the Druzhba crude oil pipeline continue through CEE countries and end in Germany and the Czech Republic.

Tab. 4.1.1: Key Energy Statistics

Source	Consumption	Imports	TPES share	Electricity Generation share
Crude Oil	7.59 Mt	193%	25.7%	2.4%
Natural Gas	21.8 bcm	99%	66%	97.1%
Coal (all types)	0.15 Mt	87%	2%	0.1%
RES	-	-	5.5%	0.4%
Nuclear Energy	-	-	0%	0%
Note: 2010 data				

Source: *U.S. Energy Information Administration; International Energy Agency*; compiled and calculated by T. Vlcek

Belarus imports nearly twice as much crude oil as it consumes. The reason for this is the existence of Mozyr refinery owned by the company JSC "Mozyr Oil Refinery"¹. The refinery has 4.75 Mt/y design capacity.

¹ The ownership structure consists of 42.76% Government of Republic Belarus; 42.58% OAO NGK Slavneft; 12.25% non-state individuals and entities; 2.41% other stakeholders. 99.8% of OAO NGK Slavneft is owned by Russian companies OAO NK RussNeft and OAO Gazprom Neft (JSC "Mozyr Oil Refinery").

The top electricity generation source is by far natural gas and there is practically no diversified electricity generation mix and diversified natural gas supply. This leads to regular Russia-Belarus disputes over gas prices that once (in 2004) escalated to a complete shutdown of gas supplies to Belarus. The full dependence on Russian Federation in natural gas and therefore also electricity production, and also in crude oil, together with the fact that Belarus' domestic electricity production does not cover the demand and Belarus imports electricity, are the main reasons for the construction of the Ostrovets NPP.

In 2010, 34.9 TWh of electricity was generated and around 32.7 TWh annually is produced on average in Belarus. The country imports another 4.4 TWh annually on average to cover its electricity demand (International Energy Agency). The country's electricity sector is managed by state-owned GPO BelEnergo divided into six areas with six subsidiary companies (Minskenergo, Gomelenergo, Brestenergo, Grodnoenergo, Vitebskenergo, Mogilevenergo). The installed capacity in GPO BelEnergo is 8,506.2 MWe in 2014 (ГПО "БелЭнерго") and the total installed capacity in Belarus is 9,221.2 MWe in 2014 (Popov, 2014, p. 15).

Belarus is connected via electricity interconnectors with Russian Federation, Ukraine, Poland and Lithuania. There are three 330 kV lines to Russia and one 750 kV line to Russian Smolensk NPP with three RBMK-1000 reactors of 1,000 MWe each. There are two 330 kV interconnections to Ukraine (one from Chernobyl NPP) and five 330 kV interconnections with Lithuania (three from the Ignalina NPP). One 220 kV and two 110 kV interconnections heads to Poland (ГПО "БелЭнерго").

Tab. 4.1.2: Gas Power Plants (100 MWe+) in Belarus

Power Plant	Installed Capacity	Fuel	Year of Construction
Novopolotskaya CHP	505 MWe	Gas, HFO	1962
Lukomlskaya TPP	2,462.6 MWe	Gas	1969
Mogilevskaya-2 CHP	345 MWe	Gas, HFO	-
Minskaya-3 CHP CCGT	542 MWe	Gas	-
Minskaya-4 CHP	1,035 MWe	Gas, HFO	1977
Minskaya-5 CHP CCGT	720 MWe	Gas	-
Bobruiskaya-2 CHP	182.6 MWe	Gas, HFO	1976
Svetlogorskaya CHP	155 MWe	Gas, HFO	-
Gomelskaya-2 CHP	544 MWe	Gas	1986
Mozyrskaya TPP	195 MWe	Gas, HFO	1974
Grodnenskaya-2 CHP	302.45 MWe	Gas	1970
Berezovskaya CHP	958.12 MWe	Gas, HFO	1961-1967
Note: CHP = Combined Heat Power Plant; TPP = Thermal Power Plant; HFO = Heavy Fuel Oil; CCGT - Combined Cycle Gas Turbine			

Source: *Global Energy Observatory*; ГПО "Белэнерго"

4.1.2 New Units and Financing of the Nuclear Power Plant

Belarus had some experience of building a nuclear power plant because construction of a 2,000 MWe plant comprising two Russian design VVER-1000 reactors began in 1983, at a site 35 km from Minsk. Work stopped in 1988, two years after the Chernobyl accident, and eventually a thermal power plant was constructed on this site (Kovynev, 2014).

The reasons described above led Belarus to adopt a decision to construct a nuclear power plant in 2006. The site selection process was difficult as there were many potentially optimal places. But after consultations with experts from the IAEA, Russia, Ukraine and other countries, two sites were identified and eventually the site near the town of Ostrovets, in the Grodno region, 150 km from Minsk, was chosen and approved by IAEA missions in 2008 (Kovynev, 2014).

After expressions of interest were invited by the Republic of Belarus, four proposals have been received in 2008 from Atomstroyexport, Westinghouse-Toshiba, Areva and China Guangdong Nuclear Power Corporation. For different reasons, the last three were scrapped; e.g. Areva's EPR was noted too big for the first power plant and US offer would have been too complicated and slow as intergovernmental agreement was needed (WNA, 2014). Russia's Atomstroyexport therefore emerged as the most suitable supplier with the offer of two VVER-1200/V-491 units of combined capacity 2,400 MWe.

Russia's Eximbank offered USD 2 billion credit in 2007 in line to enable purchase of equipment from Russia's Power Machines OJSC Company, the largest power plant engineering company in Russia, as a major part of the overall cost (WNA, 2014). This played definitely an important part in the decision as Belarus has not been able to finance the whole project on its own. Eventually, Russia (most likely the Eximbank and the Vnesheconombank) provided USD 6 billion loan for the construction and this loan was in 2009 and in 2011 renegotiated to final USD 10 billion loan including investment into a new infrastructure to accommodate the remoteness of Ostrovets in northern Belarus (Schneider & Froggat, 2014, p.

26). The term of the loan is 25 years and it is intended to finance 90% of the contract between AtomStroyExport and the Belarus Directorate for Nuclear Power Plant Construction. The whole process and also the particular aspects of the loan and construction contract are very similar to the Bulgarian one, i.e. a NPP delivery on a turnkey basis. Russian companies will receive no share in the company RUP Belarusian NPP, which will remain fully in hands of Belarusian state.

On October 11, 2011, the JSC AtomStroyExport affiliated with Rosatom, and the Belarusian Directorate for Nuclear Power Plant Construction signed the contractual agreement for the construction of power units 1 and 2 of the nuclear power plant in Belarus ("Belarusian Nuclear", 2014). The JSC AtomStroyExport is the general contractor with Russian and Belarus subcontractors, and the state enterprise "Directorate for Nuclear Power Plant Construction" is the customer of preparatory, design and survey works on the construction of the nuclear power plant. This directorate exists under the Nuclear Power Engineering Department of the Ministry of Energy. In December 2013, the directorate was converted to state unitary enterprise RUP Belarusian NPP. The licensing body, the Nuclear and Radiation Safety Department (Gosatomnadzor) of the Ministry for Emergency Situations of the Republic of Belarus was created in 2007 and issued the license for building the nuclear reactor in December 2013.

The construction of the Ostrovets NPP in Belarus started in November 2013 (Unit 1) and May 2014 (Unit 2) and should finish in 2018 (Unit 1) and 2020 (Unit 2). The second nuclear power plant, i.e. Units 3 and 4 at the Ostrovets NPP site is also planned. The construction should start in 2025.

4.1.3 The Front End of the Nuclear Fuel Cycle

As there are no Uranium deposits, and no production, processing and/or fabrication capabilities in Belarus, no Front End information can be presented.

There is an intergovernmental agreement between Belarus and Russia that guarantees the supply of nuclear fuel for the lifetime of the plant. Under this agreement the spent fuel of Russian production will be returned to Russia for reprocessing and temporary storage.

4.1.4 The Service Part of the Nuclear Fuel Cycle

Belarus conducts a small civilian nuclear research. There was a 5 MWt IRT-M nuclear research reactor operating from 1962 to 1988, decommissioned nowadays. It was managed by the Institute for Nuclear Power Engineering of the Academy of Sciences². The institute was divided into three bodies in 1989 forming the Joint Institute for Power and Nuclear Research – Sosny of the National Academy of Sciences of Belarus. The institute now houses two critical assemblies (Yalina-T and Yalina-Booster) for civilian nuclear experiments. Both are not-operational due to lack of funding and the latter is being explored together with the US scientists for conversion to low-enriched fuel (Nuclear Threat Initiative).

However, as there are no nuclear power plants in Belarus, no Service Part information can be presented.

² Assisted by over 150 organizations and enterprises of the USSR, in 1985, the Institute created and started-up the world's first mobile nuclear power plant Pamir-630D, unfortunately the project was scrapped due to large amount of emergency shutdowns. There was also a project of pilot nuclear power station with a fast breeder reactor BRIG-300 (electric output of 300 MW) that was scrapped shortly before construction was about to begin (The Joint Institute for Power and Nuclear Research – Sosny; Nuclear Threat Initiative).

4.1.5 The Back End of the Nuclear Fuel Cycle

The irradiated material at Sosny and spent fuel was transported to the Russian Federation to be stored or reprocessed. Low-level waste is stored in the Spent Fuel Storage facility under the Institute of Atomic Energy in Minsk (State enterprise for nonreactor radioactive waste management) or in the underground storage facility near Sosny (Nuclear Threat Initiative).

The spent fuel from the Ostrovets NPP will be stored and actively cooled in storage pools next to the reactor for 5-10 years. Besides the small Sosny and Minsk storage facilities, there is currently no spent fuel repository in Belarus. An Intermediate storage for spent fuel in dry containers for 50 years is part of the Ostrovets NPP construction project.

As part of the contract, for the life of the plant, the used fuel will be repatriated to Russian Federation. It will be reprocessed there and the separated wastes returned to Belarus eventually. B. Popov suggests there might be an option to choose whether to dispose the separated wastes at home or abroad (WNA, 2014; Popov, 2014, p. 7). But it is more likely that high level waste final depository will eventually have to be constructed.

Tab. 4.1.3: Belarus Nuclear Sector Examination

Indicator	Description
Is there nuclear producing capacity present in the country?	No
Is there a project to expand the capacity? What is the status of the project?	Yes, the Ostrovets NPP (2x VVER-1200/V-491 units of combined capacity 2,400 MWe), the project is under construction, operation start expected in 2018 and 2020
How was the project procured?	Openly, with Russian bid, other bidders excluded on basis of too high installed capacity of the unit or the need of too complicated and slow intergovernmental agreement negotiation
Who is the contractor in charge of the project?	JSC AtomStroyExport (78.5362% Rosatom State Atomic Energy Corporation; 10.6989% OAO Gazprombank; 9.4346% AO VPO Zarubezhatomenergostroy; 1.3303 % OAO TVEL)
How is the financing secured?	Through USD 10 billion credit contract with Rosatom, the loan is for 25 years to finance 90% of the contract
Who is the operator of the facility?	State unitary enterprise RUP Belarusian NPP
Are there enough home-based experts to run the facility safely?	Yes, also training of the staff is part of the construction contract
Who is/will be in charge of decommissioning?	The contractor, the decommissioning will be funded from a special fund generated from the sales of electricity generated in Ostrovets NPP during its lifetime
Who provides nuclear fuel and under what conditions?	Russian OAO TVEL as part of the construction contract
What is the experience with the fuel being currently used? Is there any rationale or path-dependency behind the current contract?	No operational experience so far as the Ostrovets NPP is the first NPP in Belarus
Is there any part of nuclear fuel industry present in the country? If so, how it contributes to country's nuclear fuel cycle?	No
How is used fuel treated and who is in charge of this?	As part of the contract, the used fuel will be repatriated to Russian Federation for the life of the plant, reprocessed there and the separated wastes returned to Belarus eventually

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4.2 Country Case Study: Bulgaria

Tomáš Vlček¹

4.2.1 Introduction²

Bulgaria is a CEE country located in the south-eastern part of Europe and neighbouring with successor countries of former Yugoslavia, Greece, Romania and Turkey. This location gives the country an opportunity to play ever-greater role not only in energy sector in the future. Bulgaria was part of the so called Eastern Bloc and joined the European Union in 2007 along with Romania. As well as the other post-communist countries Bulgaria inherited specific structure of economy that has been influencing country's development not only in energy sector.

Bulgarian total primary energy supply (TPES) is by more than two thirds comprised of hydrocarbons. The greatest import dependency is in oil and gas sector. Almost whole oil consumption is imported while about 80% is of Russian origin and some limited amounts from Kazakh oil fields predominantly transported by CPC pipeline and by tankers from Novorossiysk. However, overall amount of imported oil is substantially bigger than the domestic consumption since Bulgaria is important manufacturer of refined oil products. All imported gas is delivered from Russian Federation through single pipeline running through Ukraine, Moldova and Romania (CSD, 2014, p.46-50, Nitzov et al., 2010). High dependency in oil and gas sectors and other unfavourable

¹ The chapter is based on a research that the author conducted in cooperation with Martin Jirušek.

² The chapter is based on the article previously published in the International Journal of Energy Economics and Policy journal in March 2015, where preliminary outcomes of the research were presented. (Vlček & Jirušek, 2015)

factors, like low gas storage capacity and limited reverse-flow capacity of gas pipelines on the borders with Romania and Greece, pose great threat for energy security of Bulgaria and makes it one of the most vulnerable country in the region. On the other hand, Bulgaria is important transit country with robust inland infrastructure serving to transit gas supplies to Turkey, Greece and Macedonia (Nitzov et al., 2010). The energy sector in Bulgaria further suffers from other chronic flaws that, despite serious threats, still remain rather unsolved. Apart from the insufficient gas reserve capacity, which has not been upgraded despite severe impact of the 2009 gas crisis, other structural threats are imminent.

Tab. 4.2.1: Key Energy Statistics

Source	Consumption	Imports	TPES share	Electricity Generation share
Oil	3.8 Mt	100%	23%	0.8%
Natural Gas	2.9 bcm	90%	13%	4.2%
Coal (all types)	12 Mt	12%	38%	48.5%
RES	-	-	8%	13.8%
Nuclear Energy	-	-	10%	32.7%

Source: IRENA, 2011; Energy Delta Institute, n.d.; European Commission; CSD, 2014, pp. 46-66; ; compiled and calculated by M. Jirusek

The most pressing issue is energy sector underinvestment in general, which is one of the main reasons for poor energy efficiency represented by huge energy losses in processes of transformation, transmission and distribution. Over 50% of energy is lost before it reaches end customers making Bulgaria the worst case of energy inefficiency in the region.

Characteristic feature of practically all post-communist countries – high energy intensity (i.e. high ratio of energy invested per unit of GDP) is also typical for Bulgaria adding up to the serious issues of the sector. Despite this severe inefficiency stemming out of gross underinvestment of infrastructure, the situation is still rather unaddressed. Rising costs of imported energy commodities and infrastructure maintenance are reflected in rising energy bills that pose a great financial burden for considerable share of Bulgarian population. The aforementioned factors have serious consequences – imminence of energy poverty. Over 1/3 of households are unable to keep adequate heating and are forced to switch-off heating due to high energy prices (CSD, 2014, pp. 33-34). Moreover, more than 1/2 of households use wood or coal for heating – a situation that is hardly to be seen anywhere else in the EU.

Electricity power generating capacity in Bulgaria is among the most diverse in EU and OECD countries. The high capacity also enables Bulgaria to be a substantial electricity exporter exporting about 20% of its power generation (“Bulgaria Exports”, 2014). With the total power generation capacity of 42.9 TWh and about 2.5 TWh of electricity imported, the country is able to export around 10.5 TWh of electricity (Euracoal, n.d.). The majority of power generating capacity is generated by coal and its variants that comprise about 50% of total power generating capacity. Since the majority of coal-based power generating capacity finds itself struggling with EU environmental rules due to its outdated technology and low quality of used lignite and the nuclear power development is unclear (below), the future of Bulgarian

power generation is endangered. There is also high concentration in terms of location and market concentration as majority of coal produced is supplied to three power plants located at the Maritsa site (Global Energy Observatory, 2014; Nitzov et al., 2010).

Tab. 4.2.2: Coal power plants in Bulgaria

Power plant	Installed capacity
Maritsa 3	120 Mwe
Bobov Dol	630MWe
Maritsa East 1	670 Mwe
Maritsa East 2	1450 Mwe
Maritsa East 3	840 Mwe
Varna Coal Power Plant	1260 Mwe

Source: *Global Energy Observatory*, 2014

The second most important source of electricity is nuclear power comprising over one third of the total power generating capacity. All nuclear-based power generation capacity of Bulgaria is concentrated at the Kozloduy NPP site, where total amount of six units is located (table 4.2.2). Units 1 and 2 were brought online in mid 1970s and employed VVER-440 units of Russian design, 405 MWe of power output each. Units 3 and 4 were brought online at the beginning of 1980s and although they employed upgraded version of the already used units, the power output was the same as in the case of units 1 and 2. Units 5 and 6 were built and started to operate at the break of 1980s and 1990s and unlike the first four units they employed more powerful VVER-1000 units able to produce up to nearly 1000

MWe each. During the EU pre-accession period Kozloduy 1-4 were shut down in 2002 and 2006 respectively, although the government was trying to prolong the operating period for units 3 and 4 as they were substantially upgraded and were said to be complying with the required safety standards. The units 1-4 are thus currently undergoing decommissioning (World Nuclear Association, 2014b). Due to electricity shortages in Balkan region caused by series of draughts and declining power generating capacity that have become obvious in the region in the second half of previous decade, Bulgaria considered bringing units 3 and 4 back online in case of energy crises. However, these units are now undergoing decommissioning.

4.2.2 New Units and Financing of the Nuclear Power Plant

There have been plans since the late 1970s and early 1980s to build two new units at the Kozloduy NPP site, but the economics of the project have consistently undermined the progress. Eventually, in 2010, it was assessed that new construction was possible at the Kozloduy site. Progress of the project was further slowed down by the decision to use finished parts of the Belene 1 unit (see below) for the Kozloduy 7 unit. A key feature of this project has been the fact that no state funding or guarantees will be provided for the construction phase, which made it necessary to find an investor to finance the plant. For the purpose of the project a new company – Kozloduy NPP New Build – was established. For the technological part, the government was at that time still considering two options – using the Russian equipment already purchased and delivered for the Belene 1 unit or building a brand new unit using Westinghouse AP1000

design. Eventually, in mid 2013, the latter option was selected³, although it was followed by the lawsuit with Rosatom (see below) and concerns regarding the transparency of the procedure (see above). Moreover, the financial part of the project still has not been satisfactorily settled. The whole enterprise was complicated in June 2014 by the withdrawal of Toshiba, the Westinghouse owner, which originally should have invested up to 30% of the project share. The 30% equity stake in the Kozloduy NPP New Build⁴ is about to be transferred to Westinghouse with the rest held by the Bulgarian Government. Although this deal was reached in August 2014, it is rather a formal confirmation of the previous selection of Westinghouse unit rather than final settlement as the details of the financing as well as the inner structure of the project (i.e. involved subcontractors) are yet to be secured, as the Westinghouse spokesman confirmed at the time the deal was signed. It is said that financing should be mainly secured by loans obtained by both sides of the contract (i.e. Westinghouse and Kozloduy NPP New Build – essentially Bulgarian government). However, the agreement is yet to be finally confirmed by the government after the October elections (“Bulgaria to sue Russia”, 2011; „Bulgaria picks Westinghouse“, 2012; “Commission wants EU capital”, 2010; Russia offers Bulgaria”, 2011; “Westinghouse moves forward”, 2014; Bivol, 2010; World Nuclear Association, 2014b).

Plans have also been made to build other units at the Belene site, which was also selected back in the 1970s. The plan to build nuclear production units at this site was the subject of

³ Westinghouse is set to provide the needed equipment, project design, engineering and prospectively also fuel supplies for the unit (contract on fuel supplies is not yet agreed) (World Nuclear Association, 2014b)

⁴ This means that Westinghouse will not remain the equity holder once the unit is built.

heated debate for many reasons and the project has been questioned, halted and resumed several times mostly because of its economic feasibility⁵ and unclear financing⁶, which, especially in the light of uneasy economic situation of the country after the collapse of the communist regime, made the project financially hazardous. The new units were later intended also to replace the Kozloduy 1-4 units that were shut down during the EU pre-accession period (see above). This project, which was originally set to utilize the Russian VVER-1000 design, has been offered a Russian loan several times to support the Atomstroyexport-led consortium. However, a succession of Bulgarian governments have refused this offer and a further Russian proposal to take an equity stake in the plant in return for financial and technical support, fearing a security of supply risk from being over-exposed to a Russian contractor especially when the original strategic partner, RWE, withdrew from the project (“Commission wants EU capital”, 2010; World Nuclear Association, 2014b; World Nuclear Association - Weekly Digest, 2012). Instead, the Bulgarian authorities decided to try and find a European partner, but without success (“Commission wants EU capital”, 2010; Bivol, 2010). Indeed, eventually financial concerns followed by a legal dispute between Atomstroyexport and Bulgaria's National Electric Company NEK and Atomstroyexport (which originally closed a deal on

⁵ The study conducted by the Bulgarian electric system operator suggests that the new capacity is needed (and thus economically feasible) only if agreements on substantial future electricity exports are secured (CSD, 2014, pp. 93-97).

⁶ The Belene NPP project is a fine example of how the upfront costs influence the price of the electricity generated by the plant. In this case the upfront cost of about EUR 10 billion have been one of the major arguments against the plant since the subsequent electricity price and further investments needed for the future exports (i.e. investments into infrastructure) would be hardly acceptable. Therefore the return-on-investment timeframe appears to be very unfavourable – 30-40 years – basically a great deal of typical nuclear plant's life cycle (CSD, 2014, p. 93-97).

Belene with the NEK) prompted the Bulgarian government to start considering a brand new solution to the problem (“Russia offers Bulgaria”, 2011). This involved installing the equipment originally designed for the Belene 1 unit at the site of Kozloduy 7 (“Bulgaria to sue Russia”, 2011; World Nuclear Association, 2014b), as it was becoming clear that the Belene NPP project was about to be terminated⁷. However, the procurement procedure for a new unit at the Kozloduy site eventually led to selection of the Westinghouse AP – 1000 designs („Bulgaria picks Westinghouse“; World Nuclear Association, 2014b), and this again prompted a lawsuit brought by Atomstroyexport claiming around EUR 1 billion in damages for the aborted Belene project. Although the ultimate decision selecting Westinghouse as the technology supplier for the Kozloduy 7 unit was accepted as geopolitically more favourable than the Russian offer, concerns questioning transparency of the procedure remained pointing to alleged corruption practices. Overall, though, the problems that both Bulgarian projects have faced highlight the importance of financing and to lesser extent a complicated perception of Russian involvement in nuclear projects in CEE countries. The fact that the technical features of each design were treated as rather second-tier priority⁸ indicates that it was the potential stake of Russian state-owned companies and the form of financing which has been of most concern.

⁷ This stems out of the development of the Kozloduy 7 project and the financial feasibility of building a completely new plant at Belene, and subsequent plans to build gas power plant on the site (“Bulgaria Quits”, 2012). Also, the referendum on future development of nuclear energy in Bulgaria did not shed a light on the future of the project as it was non-binding due to low voter turnout and vague wording (CSD, 2014, pp. 93-97). On the other hand, governments have been sending mixed signals and have not been able to formulate a coherent energy strategy. This inability further harms the government's position in aforementioned lawsuits that still remain to be settled.

⁸ The technology issue was addressed rather with connection to the already installed Russian equipment at

4.2.3 The Front End of the Nuclear Fuel Cycle

Uranium mining had been active since 1938. In 1992 and 1994, it was decided to shut down the mining and milling respectively, officially for ecologic and economic reasons. At its peak, the uranium mining industry produced approximately⁹ up to 645 tonnes of uranium ore per year, employed up to 13,000 employees and was very autonomous in terms of management. Altogether up to 48 uranium mines were active in Bulgaria and the country also ran 2 uranium enrichment facilities. Current remaining reserves in Bulgaria are estimated to be around 20,000 tonnes out of which suitable and recoverable is the amount totalling about 6000 tonnes at annual rate of 300 tonnes (International Atomic Energy Agency, 2013).

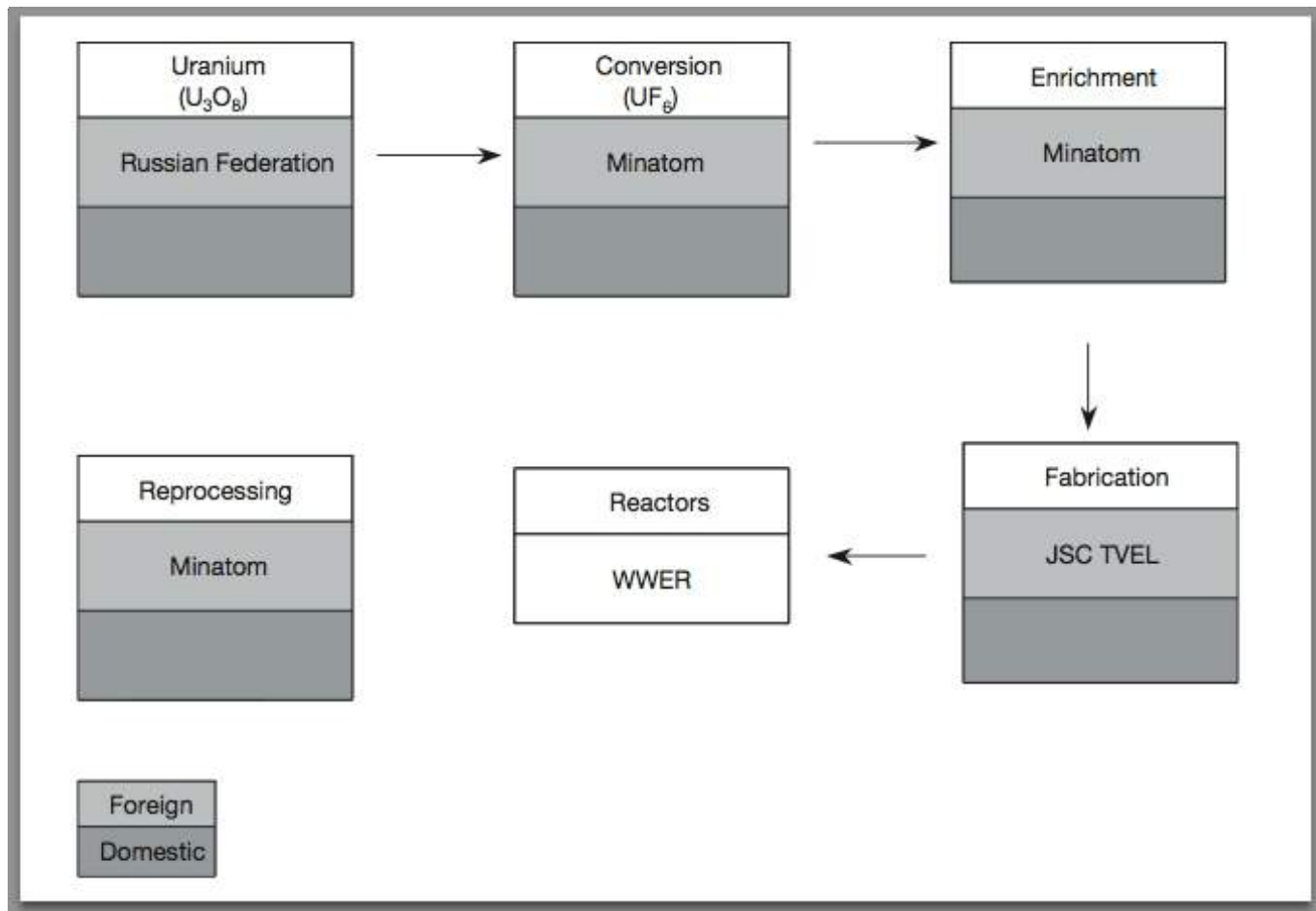
The uranium industry was focused on mining, milling and uranium concentrate production (up to the stage of yellow cake) and in that stage of development the production was being sent to the Soviet Union, since the country did not possess plants for more sophisticated treatment. Until 1992, Bulgaria paid for reprocessing of their ore for use in the Kozloduy NPP and the remainder was being left for USSR as a provision (Lazarova, 2006). In mid 2000s, it was rumoured that Canadian Cameco and Russian TVEL show interest in reviving uranium mining in Bulgaria. In 2006, Bulgarian – Russian intergovernmental commission expressed its opinion that Bulgaria should revive uranium mining. At that time, TVEL expressed the same opinion as the uranium production and cooperation with Russia in this regard would help reduce the price of Russian fuel shipped to the Bulgarian Kozloduy NPP (Wise Uranium

the Belene site and its possible utilization at the Kozloduy site.

⁹ Exact figures are unknown as they were confidential.

Project, 2014). This interest was probably linked to plans of building new production units in which Russia expressed their interest (“Bulgaria considers”, 2006).

Tab. 4.2.3: Bulgaria – nuclear fuel cycle profile



Source: IAEA, 2005

Nowadays, Bulgaria relies on fuel shipments from Russia and no part of the fuel producing cycle is present on Bulgarian soil. As Table 4.2.3 illustrates, all parts of the fuel cycle are secured by the Russian Federation and its state-owned companies (TVEL) or governmental bodies (Rosatom State Nuclear Energy Corporation). The current agreement on fuel supplies

was prolonged by 3 years¹⁰ in September this year (“АЭС Козлодуй опровергла“, 2014). Although the country is 100% dependent on Russian fuel shipments, it does not mean that the country is vulnerable or exposed to unbearable economic, safety or political pressures from the Russian side. As stated in the first part of this study, the uranium market is highly competitive and it is thus no problem to obtain supplies from various sources. In this regard, Bulgaria is no way near vital and unbridgeable dependency on Russian fuel shipments. In case of supply cuts, the stored supplies of nuclear fuel can well bridge the period of curtailed or even none supplies. Although there have been accusations that Russian side was sending recycled fuel instead of fresh one, these were not proven and denied by both Russian side and the plant's officials (“Bulgaria Kozloduy asks”, 2008).

4.2.4 The Service Part of the Nuclear Fuel Cycle

Nuclear industry is deeply rooted in Bulgaria since the development of nuclear facilities dates back to 1950s. The first research reactor started in 1961 and development of commercial use of nuclear energy started 5 years later, when the cooperation and future use of Russian nuclear technology was agreed. All nuclear units in Bulgaria are possessed by Bulgaria's National Electricity Company (NEK) a subsidiary of state-owned Bulgaria Energy Holdings. Two units in operation at the Kozloduy site NPP near the Danube River close to the northern border (Kozloduy 5&6) are currently the only nuclear units in operation. These reactors, Kozloduy 5 & 6, are the

¹⁰ The three-year term is given by the fact that the current operating permission for Kozloduy 5 unit ends in 2017.

VVER-1000 type, each with an output of 953 MW and they are the last two out of six units built during two decades since the early 1970s on the site (see above). In 2012, the procedure to extend their life-cycle has begun. The life-time extension will be ultimately granted by the Bulgarian Nuclear Regulation Agency based on the modernization and survey procedure that is being undertaken by the consortium of Russian Rosenergoatom and French EDF (“Bulgaria's NPP Kozloduy Moves”). These units are licensed to 2017 and 2019 respectively and since there are no concerns regarding their safety, it is planned to extend the licenses beyond 2030.

Tab. 4.2.4: Nuclear Units in Bulgaria

Reactor	In Operation from	Type	Power output	Status	End of life-cycle
Kozloduy 1	1974	VVER-440	405 MWe	Shutdown	-
Kozloduy 2	1975	VVER-440	405 MWe	Shutdown	-
Kozloduy 3	1980	VVER-440	405 MWe	Shutdown	-
Kozloduy 4	1982	VVER-440	405 MWe	Shutdown	-
Kozloduy 5	1987	VVER-1000	953 MWe	Operating	2017 ¹¹
Kozloduy 6	1991	VVER-1000	953 MWe	Operating	2019 ¹²

Source: *World Nuclear Association*, 2014b

¹¹ It will be most probably prolonged by 10 or 20 years.

¹² This construction was financed from the same source as is the project on decommissioning the closed 4 reactors – European Bank for Reconstruction and Development. The decommissioning and nuclear waste treatment is also partially paid from the governmental funds financed from energy taxes. The Kozloduy NPP also participates on this fund (World Nuclear Association, 2014b.).

4.2.5 The Back End of the Nuclear Fuel Cycle

The state-owned enterprise SE – RAW is responsible for dealing with nuclear waste. The way how the used fuel is treated in Bulgaria does not differ from how it is usually treated in other countries with nuclear production capacity. Initially, the used fuel is stored in cooling pools in reactors and in pool-type cooling facility in the area of the plant that was constructed in 2001 by German companies Nukem Technologies and GNS (World Nuclear Association, 2014b). A dry storage area for casks containing used fuel assemblies (i.e. fuel that already underwent initial cooling after being removed from the reactor) was opened near the Kozloduy site in 2011¹³.

An intention to build a disposal facility for low-level and intermediate-level waste to extend the capacity of storage at the Kozloduy NPP was announced in 2005. An area near the Kozloduy was selected for this project, which is currently in the stage of planning and designing. This facility is planned to accept nuclear waste worth of 60 years of nuclear plants' life-cycle and to be able to store it for about 300 years. The overall costs of the project are estimated to be around EUR 120 million. Used nuclear fuel is also sent back to Russia for reprocessing under terms of the agreement from 2002. The price per one tonne is set at USD 620,000 (World Nuclear Association, 2014b.).

¹³ This project will also be financed by the European Bank for Reconstruction and Development (World Nuclear Association, 2014b.).

Tab. 4.2.5: Bulgarian Nuclear Sector Examination

Indicator	Description
Is there nuclear producing capacity present in the country?	Yes, Kozloduy 5 & 6 operating at the Kozloduy NPP site (VVER-1000/V-320 design, 2 units of 953 MWe each).
Is there a project to expand the capacity? What is the status of the project?	Yes, cooperation agreement between Kozloduy NPP New Build and Westinghouse Electric Company LLC was signed in 2014. The financing is yet to be secured.
How was the project procured?	By lengthy and turbulent procurement procedure. Allegations of non-transparency and corruption emerged.
Who is the contractor in charge of the project?	Westinghouse Electric Company LLC
How is the financing secured?	Not clear yet. Should be secured by both parties (Westinghouse Electric Company LLC and Bulgarian Energy Holding state-owned company)
Who is the operator of the facility?	Bulgaria's National Electricity Company (NEK)
Are there enough home-based experts to run the facility safely?	Yes
Who is/will be in charge of decommissioning?	The State Enterprise Radioactive Wastes (SE-RAW)
Who provides nuclear fuel and under what conditions?	Russia's OAO TVEL through OAO Techsnabexport (Tenex)
What is the experience with the fuel being currently used? Is there any rationale or path-dependency behind the current contract?	No operational issues; path dependency rationale found in nuclear fuel supply from Russian companies
Is there any part of nuclear fuel industry present in the country? If so, how it contributes to country's nuclear fuel cycle?	No part of the fuel producing cycle is present on Bulgarian soil.
How is used fuel treated and who is in charge of this?	Standard procedure of waste management. Used fuel stored initially in pool-type facility and in dry casks storage. Used fuel is being sent for reprocessing to Russia under the agreement from 2002 for USD 620,000 per tonne.

4.2.6 Summary

Bulgarian energy sector has several issues to deal with in foreseeable future. First, it is the high vulnerability of the sector caused by almost 100% one-sided dependency on Russia in terms of oil and gas imports. This issue proved to be especially pressing in 2009 gas crisis, but unfortunately, little has been done to change it since then. Despite the country's relative importance as important regional transit country, the country remains to be potentially endangered if any supply cuts or disruptions occur. The overarching issue of the whole Bulgarian energy sector is a gross underinvestment. This applies to practically all parts of the sector regardless energy source.

Solid fuels and nuclear energy play important role in both, total primary energy supply of and in electricity generation of Bulgaria. The two nuclear units in Kozloduy along with three major coal fired power plants account for almost two thirds of total electricity generation capacity. As the coal fired power plants are getting old and will probably have serious issues in complying with environmental norms, the nuclear power generating capacity will play ever-greater role even though its future is still unclear due to unresolved financing of planned units. The price of the project and overall economical feasibility contribute to overall uncertainty.

In nuclear sector, it is again rather the financing that poses the greatest threat than any inner or outer political pressure. Despite the fact that the whole nuclear sector relies on Russian technologies and fuel supplies, we can hardly state that this may lead to jeopardizing country's energy security. In fuel supply, the current contract with Russian side can be replaced by an agreement with different supplier, although this may come at

higher price. Similarly, the nuclear waste treatment does not pose a threat since only a part of the nuclear waste is sent back to Russia, and additionally, Bulgaria has or plans to build capacities to store the used fuel. Since sober plans to extend nuclear producing capacity count with building only single unit at the Kozloduy NPP, the current repositories will be most probably able to handle this task for years to come even though the final deep geological repository has not been built yet.

Bulgaria may serve as a good example illustrating the risks in the nuclear plant life-cycle that were identified in the general part of this study. This case proves that the most sensitive part of the whole endeavor is financing and economic feasibility, as these were the principal reasons for several postponements in Kozloduy NPP extension and Belene NPP construction. Despite the fact that the contract for constructing new nuclear reactor was finally agreed, the financing is still unsolved. Apart from the financial part itself, corruption as a related issue undermines the development in the sector. Rumors related to the procurement procedure of both planned projects (Kozloduy NPP & Belene NPP) seriously harm the investment environment and aggravate the state of Bulgarian energy sector often seems to reach a dead end in terms of future development.

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4.3 Country Case Study: Czech Republic

Tomáš Vlček

4.3.1 Introduction

The Czech Republic is a country that emerged in modern history as an independent state (Czechoslovakia) after the WWI after 400 years of existence under the Habsburg Monarchy. The so called First Republic was occupied by Germany during the WWII and was integrated to the USSR as the Czechoslovak Socialistic Republic between 1948 and 1989. The communist regime collapsed during the Velvet Revolution in 1989 and democratic parliamentary Czechoslovak republic was formed. On January 1, 1993, the country was eventually peacefully dissolved into Czech and Slovak Republic. The country entered the EU in 2004 and is also a member of the UN, NATO, the OECD, the OSCE, the IAEA and IEA, the Council of Europe and many other international institutions. The country's modern political history contains one specific feature – relatively unstable governments due to periodical affairs and scandals of public officials. Therefore, also the citizens' trust in politics and politicians is low.

The Czech Republic is almost fully dependent on imports of hydrocarbons. The country imports approximately 98 % of its crude oil consumption, and approximately 2/3 of the demand is imported from the Russian Federation via the Druzhba pipeline. The rest is imported from other production countries including Azerbaijan, Algeria, Kazakhstan, Norway, Nigeria, Libya and others, as the country has diversified routes of crude oil imports via the IKL and TAL oil pipelines. There are two

processing companies in the Czech Republic - Česká rafinérská and Paramo. Each is divided into two more refining plants that make up the four refining plants in the Czech Republic (Litvinov, Kralupy nad Vltavou, Pardubice and Kolin; only the first two refine crude oil). The total primary distillation capacity is 9.7 Mt/y (OECD & IEA, 2014, p. 132). The majority owner of the refinery segment in the Czech Republic is the Polish company Polski Koncern Naftowy (PKN) Orlen SA. As the demand is higher than the refining capacity in the country, another approximately 15 % of the total petroleum consumption is imported directly in petroleum products.

Speaking about natural gas, the Czech Republic imports approximately 98 % of its consumption from two main sources based on long-term contracts with OOO Gazprom Export, the supplier of Russian gas, until 2035 and with a consortium of Norwegian producers¹ until 2017². The proportional share between these sources is approximately 2:1. Table 4.3.1 shows 111% imports of gas in 2011; this is due to the fact that some gas is imported to be stored in the country's vast underground natural gas storages. The gas industry has recently finished projects to expand the gas storage; the capacity at three of the country's eight underground storage sites has been raised to a total of 3.5 bcm. When completely full, the storage is able to supply peak demand for approximately 50 days (see OECD & IEA, 2014, p. 370-371). Natural gas is also transported via the Transgas and Gazelle pipelines through the Czech Republic to Germany.

¹ ExxonMobil Production Norway Inc., Statoil Hydro ASA, Norske ConocoPhillips AS, TOTAL E&P NORGE AS, ENI Norge AS

² The contracts with companies that own the parts of the German gas network used for gas transport to the Czech Republic are also necessary. These companies include ONTRAS - VNG Gastransport GmbH and Wintershall AG.

Tab. 4.3.1: Key Energy Statistics

Source	Consumption	Imports	TPES share	Electricity Generation share
Crude Oil	9.81 Mt	98%	17.1%*	0.1%
Natural Gas	8.41 bcm	111%	15.8%	1.3%
Coal (all types)	52.3 Mt	6%	42.7%	57.1%
RES	-	-	7.5%**	9.2%
Nuclear Energy	-	-	17.2%	32.3%
* Oil products imports add another 3.1% of TPES share				
** Biofuels and waste stand for 6.5% of TPES share and 3.2% of Electricity Generation share				
Note: 2011 data				

Source: *U.S. Energy Information Administration*; International Energy Agency; OECD & IEA, 2013; compiled and calculated by T. Vlcek

The Czech Republic produced 87.56 TWh of electricity in 2011, of which 17 TWh exported. The Czech Republic is an important exporter of electricity in Central Europe; the average value of electricity export equals 14.9 TWh (Energetický regulacní úrad, 2012, p. 11-12; Energetický regulacní úrad, 2014, p. 13). The company ČEZ, a.s. operates 15,193 MWe of installed capacity in the country (72% of the total installed capacity) and produced 69.21 TWh of electricity in 2011 (79% of the total Czech production), which makes it sovereign on the market. The company is owned by the Ministry of Finance of the Czech Republic (69.78%), ČEZ, a.s. (0.72%), other legal entities (22.20%) and other private entities (7.3%) in 2013 (ČEZ, a.s.).

As seen in Table 4.3.2, coal fired power plants are the crucial part of the electricity generation in the Czech Republic as they provide 10,819 MWe of installed capacity, which makes up 51.3

% of the energy mix. Thermal power plants (powered by brown coal, bituminous coal and biomass) in the Czech Republic provided 44,737 GWh of electricity in 2013, which is 51.4 % of the total gross electricity produced (Energetický regulační úrad, 2014, p. 4, 11).

Tab. 4.3.2: Installed Capacity in the Czech Electricity Grid on 31 December 2013

Type of Power Station	Installed Capacity (MWe)	Percentage (%)
Thermal Power Station	10,819	51.3
Gas Combined Cycle Power Station	518	2.5
Gas Fired Power Station	820	3.9
Hydroelectricity	1,083	5.1
Pumped-storage Hydroelectricity	1,147	5.4
Nuclear Power Station	4,290	20.4
Wind Power	270	1.3
Solar Power	2,132	10.1
Total	21,079	100

Source: *Energetický regulační úrad*, 2014, p. 11.

The following Table 4.3.3 shows all the 150+ MWe power plants in the Czech Republic including life expectancy as one of the most crucial aspects of the Czech coal industry. As seen in the chart, the life expectancy of the power plants is rather short and the end of electricity production from coal will have two peaks. The first peak is likely to occur around the year 2025, and the second around the year 2040.

Tab. 4.3.3: 150+ MWe Coal Fired Power Plants in the Czech Republic

Power Plant	Owner	Installed Capacity	Connected to the Grid	Fired on	Life Expectancy*
Dětmarovice	ČEZ, a. s.	800 MWe	1975 - 1976	Bituminous coal	2020-2030
Chvaletice	Severní energetická a.s.	800 MWe	1977 - 1978	Brown coal	2020-2029
Kladno	Alpiq Generation (CZ), s. r. o.	299.1 Mwe	1976, 1999	Bituminous coal, brown coal	2045-2050
Komořany	United Energy pravni nastupce, a. s.	239 Mwe	1959, 1978, 1986, 1994, 1997, 1998	Brown coal**	2025
Ledvice II	ČEZ, a. s.	220 MWe	1966-1968	Brown coal	2015
Ledvice III	ČEZ, a. s.	110 MWe	1998	Brown coal	2040-2055
Ledvice IV	ČEZ, a. s.	660 MWe	2014 - 2015	Brown coal	2055
Mělník (II)	ČEZ, a. s.	220 MWe	1971	Brown coal	2015-2020
Mělník (III)	ČEZ, a. s.	500 MWe	1981	Brown coal	2015-2020
Mělník (I)	Energotrans, a. s.	352 MWe	1961, 1994 - 1995	Brown coal	?
Opatovice	Elektrárny Opatovice, a. s.	378 MWe	1979, 1987, 1995 - 1997	Brown coal	2020-2030
Počerady	ČEZ, a. s.	1,000 MWe	1970 - 1977	Brown coal	2029+
Poříčí	ČEZ, a. s.	165 MWe	1957	Brown coal, bituminous coal**	?
Prunéřov II	ČEZ, a. s.	1,050 MWe	1981 - 1982	Brown coal	2015-2023 (2040***)
Prunéřov I	ČEZ, a. s.	440 MWe	1967 - 1968	Brown coal	2015-2023 (2040***)
Tisová I	ČEZ, a. s.	183.8 MWe	1959 - 1961	Brown coal	2020+
Tisová II	ČEZ, a. s.	112 MWe	1959 - 1961	Brown coal **	2020+

Třebovice	Dalkia Česká Republika, a. s.	174 MWe	1961, 1998	Bituminous coal, light fuel oil	2015-2020
Tušimice II	ČEZ, a. s.	800 MWe	1974 - 1975	Brown coal	2035
<p>* According to public open sources. ** The Komořany power plant is also partially fired on natural gas. One 55 MW block of the Poříčí power plant and one 57 MW block of the Tisová power plant employ biomass combustion. *** After completion of the modernization process that is due in 2015. Source: Energetický regulační úrad, 2010, p. 88, 92; Energetický regulační úrad, 2012, p. 24. Livelong expectancy and overall adjustments by T. Vlcek.</p>					

Source: *Energetický regulační úrad, 2010*, p. 88, 92; *Energetický regulační úrad, 2012*, p. 24. Livelong expectancy and overall adjustments by T. Vlcek.

Going further in detail, we need to distinguish between brown coal and bituminous coal, as these are two separate markets in the Czech Republic. At this moment, the bituminous coal sector is very negatively affected by the world market. The low prices of (especially quality bituminous) coal mean low profit from the mining. The bituminous coal mining is much more costly compared to brown coal mining. The bituminous coal in the Czech Republic is mined in deep underground shafts in Silesian region unlike the brown coal that is mined in large open pits in northern Bohemia. The fluctuations in price is thus more effective on bituminous coal production than on brown coal production.

The negative effects are rather limited also thanks to the character of use of the bituminous coal. Only approximately, a half of the mined coal is used for energy production. This coal is used in the only bituminous coal power plant (800 MWe Dětmarovice) and only a few bituminous coal cogeneration units (28 MWe Kladno I-B3 and 174 MWe Třebovice). The current domestic bituminous coal production covers the

demand of these facilities taking their life expectancy into account. The rest of the mined coal is high quality coal intended and used for metallurgical coke production. The mine with highest life expectancy is the ČSM mine that produces coal for energy production. Currently, it is relatively easier to find client for this product than for metallurgical coke. The economic slowdown of recent years led to lower demand for metallurgical coke by the steel industry.

Speaking about the brown coal sub-sector, the life expectancy of exploitable reserves covers the two above mentioned power plant life expectancy peaks, i.e. the current electricity production from coal until the end of the production. The market subjects of the brown coal industry in the Czech Republic behave rather in comparative mood. On a background of the end of the coal industry itself (according to the territorial ecological limits³) they make efforts to maximize their profits by coupling the coal production with the coal use. Mining companies buy coal fired electricity or heat power plants and the operators of such power plants are trying to buy their own mines or to secure long-term contracts. Both sides act to maximize their profits in the last years or decades of life of the coal sector.

The nuclear energy sector is analyzed further in the text and is the second most important source of electricity. There are two

³ Territorial Ecological Limits on Brown Coal Mining guided by the Government's Resolution No. 444/1991 on territorial ecological limits on brown coal mining in the North Bohemian Basin of October 30, 1991. This resolution specified the final lines of mining and landfill in the mines Merkur, Březno, Libouš, Šverma, Vršany, ČSA, Ležáky, Bílina and Chabařovice and in Růžodolská and Radovesická landfills as well as the limit values of air pollution in basins in the regions Chomutov, Most, Teplice, Ústí nad Labem and Louny. (Vlada Ceske republiky, 1991) The idea behind these limits was to provide the regions with some sort of government's guarantee that the city environment would not go worse and provide the inhabitants a stable ground for local investments, reconstructions, etc. The topic of territorial ecological limits on brown coal mining has been making its appearance on the political scene for years now.

nuclear power plants in the country, the Dukovany NPP with four Russian design 510 MWe VVER-440/V-213 units and the Temelín NPP with two Russian design VVER-1000/V-320 units (1x 1,078 MWe and 1x 1,056 MWe). Thanks to the modernization of the technical part of nuclear blocks, the power plants as of December 31, 2012, reached 4,404 MWe of installed electrical capacity and, therefore, made a 19.7% electricity generation share. The development of nuclear energy as the least bad of bad alternatives takes place on the background of the end of the coal industry itself (according to the territorial ecological limits), which is the key electricity producer in the Czech Republic. To cover the loss of the electricity generation capacities in coal, the country aims at developing the nuclear energy as a capable, stable and cumulative source of electricity.

4.3.2 New Units and Financing of the Nuclear Power Plant

The plan to expand the nuclear capacity exists since the 2004 State Energy Policy was presented. On August 3, 2009, ČEZ, a.s. released the announcement about opening a call to tender for two new nuclear blocks for the Temelín nuclear power plant. To some extent it was based on the investment plan for the construction of the Temelín power plant with 4 x 1,000 MWe of installed capacity, adopted in February 1979, replicating the construction site itself and some already existing auxiliary systems.

In the procurement procedure for the Temelín NPP project and construction (i.e. turnkey power plant) it took 3 years to prepare the documentation specifying the conditions of the

project and was created by group of several tens of experts. Ultimately this documentation comprised of more than 6,000 pages employing over 11,000 criteria to be met by the bidders in order to succeed in the procedure. In return each bidder provided the Czech side with documentation exceeding 10,000 pages each (Horacek & Topic, 2012; interview with a responsible Czech MFA official).

Three entities applied to the tender in July 2012. It was a Consortium of the companies ŠKODA JS, a. s., from the Czech Republic, Atomstrojexport, a. s., from the Russian Federation (a daughter company of the Russian company ZAO Atomstroyexport⁴) and OKB Gidropress, a. s.⁵ from the Russian Federation, offering the project MIR 1200 (Modernized International Reactor) with 1,198 MWe of capacity⁶. The French company Areva SA⁷ offered the EPR™ (European Pressurized Reactor) with 1,700 MWe of capacity and finally, the American Westinghouse Electric Company, LLC⁸, offering the project AP1000 with 1,200 MWe of

⁴ ЗАО АТОМСТРОЙЭКСПОРТ is the leading Russian organization building nuclear power plants abroad and accordingly engaged in their modernization. It is supervised by the Federal Agency for Nuclear Energy, Rosatom (Федеральное агентство по атомной энергии России, РосАтом) through Open Joint-Stock Company Nizhny Novgorod Engineering Company "Atomenergoproekt" (JSC NIAEP), and the ownership structure is 78.5362% Rosatom State Atomic Energy Corporation; 10.6989% OAO Gazprombank; 9.4346% AO VPO Zarubezhatomenergostroy; and 1.3303% OAO TVEL.

⁵ A daughter company of the Russian company OAO OKB Gidropress (OAO ОКБ "ГИДРОПРЕСС").

⁶ Based on talks with the Russian side, it is interesting that the tender should have included a seriously intended offer to build a manufacturing plant in the Czech Republic, i.e. a plant for assembling fuel cassettes out of single pallets. According to the Russian calculation, that sort of plant proves profitable for the state if there are at least eight reactors, which is the number the Temelín power plant will reach after completion. This is accordingly an opportunity for fuel fabrication for the Russian type of power plant in Slovakia and elsewhere. The paradox is that in this manner the most frequent comment on the Russian project, i.e. intensification of Czech energy dependence on Russia, to some extent ceases to be logical.

⁷ The ownership structure is as follows: 73.03 % Commissariat à l'énergie atomique (technological research institution financed by the French Government); 10.17 % French state; 4.82 % Korean car industry Kia Motors and the remaining 11.98 % other companies, employees and publicly traded stocks.

⁸ Belonging to the Japanese companies Toshiba Corporation (67 %) and Ishikawajima-Harima Heavy Industries Co. Ltd. (3 %), American mechanical companies The Shaw Group (20 %) and Kazakh state company Kazatomprom NAC (Казатомпром НАК 10 %).

capacity. All cases refer to the reactors of the III, III+ generation (Vlček & Černoch, 2013b, p. 144-146).

On October 5, 2012, ČEZ, a.s. announced the elimination of the French company Areva SA from the competition, because it did not meet the basic commercial and legal terms of the competition (“ČEZ vyřadil AREVU”, 2012). Areva submitted an appeal to the Czech Office for the Protection of Competition, which in February 2013, however, found the elimination substantiated.

Originally it was planned the overall administrative tender process will last for roughly 7 to 8 years (15 years together with the construction), which means that the connection of new blocks was estimated for around 2024. The procurement process deferred for about 18 months, to mid-2015, following completion of a new energy strategy by the new government. In parallel with the tender discussion about new State Energy Policy as well as governmental guarantees and stabilization mechanisms for construction of the NPP took place. These eventually led to the governmental expression in April 2014 it will not provide any price guarantees. CEO of ČEZ, a.s. shortly after announced the procurement procedure was cancelled in accordance with Public Procurement Act and explained: “while originally the project was fully economically feasible given the market price of electricity and other factors, today all investments into power plants, which revenues depend on sales of electricity in the free market, are threatened” (ČEZ, a.s.). The project is being reconsidered now and new tender and new bids are expected in 2015. Besides the three original bidders, Korea Electric Power Corporation (KEPCO) and China’s deputy prime minister expressed interest in the project (WNA, 2014).

Also a tender the construction of fifth unit in Dukovany is being considered.

Speaking about the financing, ČEZ, a.s. has said it would seek a strategic partner with which to share the risk of the project, following the choice of reactor technology. (WNA, 2014) And even though vendor financing offers were later offered by the bidders (up to 100% of the project costs from JSC Rusatom Overseas; 50% of the project costs as a loan from the Export-Import Bank of the United States), no agreements were closed and ČEZ, a.s. strictly followed its strategy.

In January 2015 the draft version of "National Action Plan for the development of nuclear energy in the Czech Republic" was presented envisaging construction of two new units by 2037 at the latest (one at Temelín NPP site, the other at Dukovany NPP site with respect to regional employment issues). The material was prepared by the Ministry of Industry and Trade; Ministry of Finance, ČEZ, a.s.; and State Office for Nuclear Safety. Speaking about financing two options were presented: either will be the new blocks financed fully by the company ČEZ, a.s.; or through a new parastatal project company where strategic financial partner will be invited. The partner could be either the technology supplier, or big energy consumer in the Czech Republic. The latter option is the most probable.

4.3.3 The Front End of the Nuclear Fuel Cycle

Uranium mining has a long history in the Czech Republic, and the Czech Rožná mine together with the Romanian Crucea-Botușana mines make the Czech Republic and Romania the only European countries still mining it. The Czech Republic

used to be among the most important world producers of uranium. A total historical production of almost 111 thousand tons of uranium in the form of sorted ores and chemical concentrate in 1946-2009 made it the 10th biggest producer in the world. The uranium has been mined in the country since 1843, and it was in Jáchymov where P. Currie and M. Curie-Skłodowska discovered first radioactive elements.

The production of uranium did not stop even during the Nazi occupation as the mining continued for German war purposes. After the WWII, an agreement between Czechoslovakia and the USSR was concluded and under this agreement the USSR invested in uranium exploration and production in Czechoslovakia and 96,660.6 tons of uranium metal and chemical concentrate was exported to the USSR in 1945-1991 (Tomek, 2000, p. 18; Poková, 1995, p. 504).

The extraction took place in many deposits near the cities of Jáchymov, Příbram, Horní Slavkov, Dolní Rožínka, Stráž pod Ralskem, Vítkov, Okrouhlá Radouň, Hamr na Jezeře, Chotěboř, Nové Město na Moravě and many others. All mines except one were closed in the second half of the 20th century. Currently the last mine Rožná in the city of Dolní Rožínka is still operating by the branch plant GEAM of the state enterprise DIAMO s.p. (under full control of the Ministry of Industry and Trade of the Czech Republic)⁹. The Rožná mine was supposed to be shut down in the mid-1990s, when uranium experienced a sales crisis as the previously important customer, Slovakian Slovenské elektrárne, a. s., refused to purchase Czech uranium and started purchasing enriched nuclear fuel directly.

⁹ The term DIAMO is an abbreviation for ammonium diuranate, in Czech “Diuranát amonný”.

Government Decrees from 1994, 1997, 2000, 2002 and 2005 gradually prolonged the mining period in Dolní Rožínka, while the government extended the mining and processing of uranium in the Rožná deposit for as long as mining remained economically effective by passing the Decree No. 565 from May 27, 2007, and the termination of mining is tied to the results of a profitability assessment, currently set for 2018 (Vlček & Černoch, 2013b, p. 132). The CEO of the DIAMO s.p. recently stated that the market situation is unfavourable and it is likely that the uranium mining will be shut down sooner than expected, by the year 2016 (Lukáč, 2014). This is also due to the fact that the resources are almost depleted and the extraction drops annually, from 420 and 383 tons of uranium in 2005 and 2006 to 191 and 170 tonnes in 2013 and 2014 (Ministerstvo životního prostředí / Česká geologická služba – Geofond, 2010, p. 185; Lukáč, 2014). Connected to the mining, there is a processing facility of the DIAMO s.p. state enterprise near the Rožná mine, where yellow cake is produced from the mined uranium ore.

Uranium prospecting activities take place in the Czech Republic and the total identified uranium resources estimation amount to 5,656 tons in the Brzkov, Horní Věžice and Polná deposits (Lazárek, 2012), all of the in the vicinity of the operating Rožná deposit. The Brzkov deposit, as the most promising one, was destroyed and buried in 1990s during the reduction program. The reintroduction of this site to mining would thus require a CZK 1 billion investment. Even though, the prime minister is interested in opening the mine not for the uranium it contains itself, but rather for social reasons. Around 900 employees work in GEAM in the Rožná mine and the

shutdown will cause a rise of unemployment in the region. The preparatory work in Brzkov would last 6-7 years and the subsequent mining period is estimated at 16 years. Therefore the employers could be transferred to the Brzkov mine in the vicinity of their current workplace, which allows for flexible management of employment and retirement of the miners.

At the beginning of 2000s, domestic mining covered approximately 93% of domestic demand. But later on, the domestic uranium production has not been able to cover the demand (e.g. the 230 mined tons in 2011 covers 27% of the uranium demand; Lazárek, 2012) and DIAMO, s.p. sold the domestic mined uranium on the market, and ČEZ, a.s., the operator of the NPPs, has been purchasing the final product since the end of 2009.

The long-term and permanent fuel supplier for the Dukovany nuclear power plant is the Russian company OAO TVEL. From 2002, when the plant was launched, until the end of 2009, fuel for the Temelín nuclear power plant was supplied by the American company Westinghouse Electric Company, LLC. Well known is the affair of the fuel rods deflections in the active zone of reactor at that time, because Western nuclear reactors have square-shaped fuel assemblies, while the Russian ones are hexagonal. Hexagonal assemblies for Temelín NPP were initially provided by Westinghouse Electric Company, LLC and caused fuel rods torsion, which resulted in forced operational interruption, limited production, and inability to produce electricity to its full capacity. Westinghouse's experience with VVER design fuel assemblies was short, as they started providing this product in 1997. That is why technological issues occurred. In 2010, a selection process for a

new supplier took place, which was won by the Russian TVEL by submitting a financially unbeatable offer. Until 2020, TVEL will therefore be the exclusive fuel supplier for both Czech nuclear power plants (Vlcek & Cernoch, 2013, p. 134-135). In 2014, the contract was renewed for the Dukovany NPP and prolonged to 2028 (OAO TVEL, 2014, p. 12).

In June 2014, the company UJP Invest, s. r. o. (a subsidiary of UJP Praha a.s.), which profiles in nuclear fuel fabrication, design and manufacture of packaging for the transport and storage of radioactivity, research into materials for the nuclear power sector and other industries, heavy metal processing etc., announced that it is interested in building a nuclear fuel fabrication facility in Bystřice nad Pernštejnem approximately 50 km from Brno. The municipal council has called a referendum in October 2014 where 80% of respondents were against this investment. The company thus searches for different industrial area in the Czech Republic and Slovakia (“V Bystřici by mohl”, 2014; Bytřičtí v referendu”, 2014).

4.3.4 The Service Part of the Nuclear Fuel Cycle

The agreement between Czechoslovakia and the USSR on the uranium exploration and production allowed for further cooperation, and in 1955, the Institute for Nuclear Research in the small town of Řež near Prague was established (Ústav jaderného výzkumu Řež a.s., current name ÚJV Řež, a. s.). The USSR supplied the Institute with research equipment including a cyclotron and a VVR-S research reactor. Nowadays it is a recognized institute specializing in applied research and engineering activities, safety analyses, documents for technical

changes in nuclear power plant projects, designing in the sectors of conventional and nuclear energy etc.¹⁰ (ÚJV Řež a.s.).

Currently there are 3 research reactors in the Czech Republic; the LR-0 (5 kWt, in 1983 reconstructed TR-0 reactor) and LVR-15 (10 MWt, in 1989 reconstructed VVR-S reactor) based at the Institute for Nuclear Research in Řež and the educational VR-1 Vrabec (1-5 kWt) based since 1990 at the Faculty of Nuclear Sciences and Physical Engineering of the Czech Technical University in Prague.

There are two nuclear power plants operating in the Czech Republic with a total of six pressurized water reactors cooled and moderated by light water. The Dukovany NPP is located in the Southern Moravia with four VVER-440/V-213 pressurized reactors (after the modernization, installed power capacity currently amounts to 4x 510 MWe), which had provided its first electricity in May 1985. The design was Soviet and the project base documents were prepared by the Soviet OOO LOTEK company, but the project was executed by Energoprojekt Praha a.s. and the general contractor was Průmyslové stavby Brno a.s. together with the technology contractor Škoda Praha a.s. (ČEZ, a.s.).

The Temelín NPP is located in the Southern Bohemia, a set of two VVER-1000/V-320 pressurized reactors (installed capacity equals to 2,134 MWe after turbine modernization), which was completed in December 2000. The initial power plant design was developed from the Soviet design by Energoprojekt Praha a.s. and construction of operating units was launched in 1987. After November 1989, under new

¹⁰ The ownership structure includes ČEZ, a.s. (52.46%), Slovenské elektrárne, a.s. (27.77%), ŠKODA JS a.s. (17.39%) and town Husinec (2.38%) (ÚJV Řež a.s.).

political and economic conditions, it was decided to reduce the number of production units to only two (ČEZ, a.s.). Both power plants are owned by ČEZ, a. s. Thanks to the modernization of the technical part of nuclear blocks, the power plants reached 4,404 MWe of installed electrical capacity on December 31, 2012, and therefore made a 19.7% electricity generation share.

Tab. 4.3.4: Nuclear Units in the Czech Republic

Reactor	Type	Power Output	Status	End of life-cycle
Dukovany 1	VVER-440/V-213	510 MWe	Operating	2015
Dukovany 2	VVER-440/V-213	510 MWe	Operating	2016
Dukovany 3	VVER-440/V-213	510 MWe	Operating	2016
Dukovany 4	VVER-440/V-213	510 MWe	Operating	2017
Temelín 1	VVER-1000/V-320	1,078 MWe	Operating	2020
Temelín 2	VVER-1000/V-320	1,056 MWe*	Operating	2022
ÚJV Řež LR-0	LR-0 (TR-0)	5 kWt	Operating	-
ÚJV Řež LVR-15	LVR-15 (VVR-S)	10 MWt	Operating	-
FJFI ČVUT Praha	VR-1 Vrabec	1-5 kWt	Operating	-
* Will be modernized to 1,078 MWe in 2015				

Source: Energetický regulační úřad, 2010b, p. 89; open sources; updated and modified by T. Vlcek.

Both of the power plants were constructed with Soviet assistance and employs Soviet design VVER reactors. The Dukovany NPP was put into service in 1985-1987 and the Temelín NPP in 2000 (Unit 1) and 2002 (Unit 2). According to the Czech Atomic law, the licensing process for life-extension can be started in the last year of the unit's life-cycle; therefore the Dukovany NPP will go through this process in the

following years. It is expected a 10-year life extension without any issues; the following life extension might be problematic as Dukovany NPP does not have the typical passive containment structure, but active pressure suppression containment, which is an outdated technology in reactor safety today. Temelín NPP operation is designed for 30 years but the operator's management expects longer operation depending on the condition of the reactor pressure vessel; the only part of technology that cannot be replaced.

4.3.5 The Back End of the Nuclear Fuel Cycle

The owner of spent nuclear fuel in the Czech Republic is ČEZ, a.s., the operator of the NPPs, and is responsible only for storage. The spent fuel is stored in interim dry storages in the areas of the Dukovany and Temelín NPPs. Due to the transience of private companies, the final radioactive waste repository is not under ČEZ, a.s., but the state's responsibility, specifically through the Radioactive Waste Repository Authority (RAWRA; in Czech SÚRAO, Správa úložišť radioaktivních odpadů). Once the spent fuel is declared waste, the ownership and also responsibility of spent fuel management will pass to RAWRA. RAWRA is subordinated to the Ministry of Trade and Industry of the Czech Republic and has been financed since 1997 from the so-called Nuclear Account, which was established at the Czech National Bank by the Ministry of Finance. All activities related to radioactive waste are financed from the Nuclear Account, which consists of payments by radioactive waste producers, revenues from investment in the financial market, RAWRA's own revenues, account interest,

grants, donations and other revenue (Správa úložišť radioaktivních odpadů).

RAWRA currently manages four surface radioactive waste repositories in the Czech Republic, namely the Richard near Litoměřice, Bratrství near Jáchymov, Dukovany and Hostim near Beroun. These repositories store institutional radioactive waste, emerging during the processes of medical, industrial, agricultural and research activities, therefore, waste containing natural radionuclides and low-activity radioactive waste from nuclear power plants (Vlček & Černoč, 2013b, p. 136-137).

RAWRA is responsible for the activities connected with the construction of the final underground geological repository. In 1990–2005, RAWRA originally selected 27 potential localities for building a deep geological repository of radioactive waste. It narrowed them down to 13, then to 11 and finally to the current 7: Březový potok near Pačejovo, Čertovka near Lubenec, Horka near Budišov, Hrádek near Rohožná, Čihadlo near Lodhéřov, Magdaléna near Božejovice and Kraví hora near Moravské Pavlovice. In recent years, the Authority has been checking the possibility of using military areas, while it was the Boletice military area that was positively valued in terms of its site, therefore, qualifying as an eighth possible appropriate location (Vlček & Černoč, 2013b, p. 137). Since 2010, these localities have been undergoing a basic land survey, consisting of three phases: the first research phase until 2015, the second exploratory phase in the period 2015–2025 and the third detailed exploratory phase in the period 2025–2050. The exploration of at least four localities is anticipated, as the company is expected not to receive an exploration permit for all localities. By 2018, two candidate localities should be chosen,

one of which will be then chosen as the winner. After obtaining enough data proving the locality's safety, the submission of the application for construction permit of a deep geological repository will follow, which should take place in the period 2050–2065 (Správa úložišť radioaktivních odpadů).

Since 1995, there has also been the high-level waste store (HLWS) at the Institute for Nuclear Research in Řež used for the storage of solid or solidified medium and high-level waste and for the storage of spent fuel from research reactors.

Tab. 4.3.5: Czech Nuclear Sector Examination

Indicator	Description
Is there nuclear producing capacity present in the country?	Yes, the Dukovany NPP with four 510 MWe VVER-440/V-213 units and the Temelín NPP with two VVER-1000/V-320 units (1x 1,078 MWe and 1x 1,056 MWe)
Is there a project to expand the capacity? What is the status of the project?	Yes, the public procurement process took place in 2009-2014 and was cancelled in April 2014 for no governmental price guarantees were secured; the project is being reconsidered now and a new tender and new bids are expected in 2015
How was the project procured?	Openly and professionally, the process was cancelled in April 2014 for no governmental price guarantees were secured
Who is the contractor in charge of the project?	ČEZ, a.s. (69.78 % Ministry of Finance of the Czech Republic; 0.72% ČEZ, a.s.; 22.2% other legal entities; 7.3% other private entities)
How is the financing secured?	From the ČEZ, a.s. capital, probably with strategic investor
Who is the operator of the facility?	ČEZ, a.s.
Are there enough home-based experts to run the facility safely?	Yes
Who is/will be in charge of decommissioning?	ČEZ, a.s. overseen by the State Office for Nuclear Safety

Who provides nuclear fuel and under what conditions?	OAO TVEL under the contract from 2010 (based on a selection process for a new supplier); it will supply nuclear fuel for both Czech nuclear power plants until 2020, the contract for Dukovany NPP was prolonged in 2014 until 2028
What is the experience with the fuel being currently used? Is there any rationale or path-dependency behind the current contract?	No issues, any potentially defective fuel assemblies are swiftly exchanged for new ones; there is a bad experience with fuel supplied by Westinghouse Electric Company, LLC in 2000s and this is likely to influence the future supplier selection
Is there any part of nuclear fuel industry present in the country? If so, how it contributes to country's nuclear fuel cycle?	Uranium mining, yellow cake production and radioactive waste management; it does however not contribute to the country's nuclear fuel cycle as domestic yellow cake production is low and therefore sold at the market, while the final product (nuclear fuel) is purchased directly on a long-term contract basis
How is used fuel treated and who is in charge of this?	Spent fuel is owned by ČEZ, a.s. and stored in interim dry storages in the areas of the Dukovany and Temelín NPPs; once declared waste, the Radioactive Waste Repository Authority will take over the responsibility of spent fuel management; the RAWRA is subordinated to the Ministry of Trade and Industry of the Czech Republic and is responsible for management of four surface radioactive waste repositories and the development and operation of the final underground geological repository

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4.4 Country Case Study: Estonia

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4.4.1 Introduction

Estonia is the northernmost Baltic republic that borders with Russian Federation and Latvia, and Sweden and Finland over the Baltic Sea. Estonia declared independence in 1918 to be immediately occupied by Germany and eventually fought for it against Red Army in 1918-1920. And even though Estonia declared neutrality before the WWII, the Molotov-Ribbentrop Pact assigned Estonia to USSR. Estonia was then occupied both by the USSR and the Nazi Germany and after the end of the war, Estonia was Sovietized and became the Estonian Soviet Socialist Republic until 1991 when independence was declared. Estonia joined the EU in May 2004 together with the Baltic and 7 other countries. Due to the history, the political and social mood is strongly anti-Russian, likewise in Latvia.

Speaking about the energy sector, Estonia is in much better position in terms of the energy security than the other two Baltic countries. The consumption of 100% Russian imported natural gas is very low (0.62 bcm in 2011) and also, together with Finland, Estonia agreed to build two LNG terminals connected via pipeline in Gulf of Finland to reduce dependency on Russia. The countries aim to have the gas pipeline in operation in 2019 (Molin, 2014). Coal use and imports are negligible and coal is used for some local minor heat generation.

Speaking about oil, Estonia's Eesti Energia AS has mined shale oil since 1928 and produces synthetic crude oil from shale oil deposits. By doing this, Estonia produces over 1 million

barrels (140,000 tonnes) of shale oil annually. This positively affects the dependency on imports of crude oil products as the reserves are about 1-2 billion tonnes of oil shale, i.e. 125-250 million tonnes of oil (Eesti energia AS). Estonia does not have a refinery; therefore some oil is exported to Lithuanian Mažeikiai oil refinery. Still, Estonia is a net importer of petroleum products (around 70 % of consumption). Likewise Latvia, Estonia imports directly oil products, not crude oil. Most importantly, oil shale is used as fuel in Narva Power Plants (2,380 MWe combined) for electricity and heat generation.

Tab. 4.4.1: Key Energy Statistics

Source	Consumption	ImportsTPES share	Electricity	Generation share
Crude Oil	1.32 Mt	0%	14.6%	0.3%
Natural Gas	0.62 bcm	100%	8%	1.9%
Coal (all types)	0.07 Mt	94.9%	64.2%	88.6%
RES	-	-	13.2%*	9.2%
Nuclear Energy	-	-	0%	0%
Note: 2011 data				
* Biofuels and waste stands for 12.7 % of TPES share				

Source: *U.S. Energy Information Administration; International Energy Agency*; compiled and calculated by T. Vlcek

In 2013, Estonian private chemical company Viru Keemia Grupp (VKG) chose a consortium made up of the Italian company KT - Kinetics Technology and the Spanish company OHL Industrial as the winner of a tender to build a diesel refinery in Estonia. But only a month later, the plan was

dropped as financing of the investment proved too expensive. A few months later, the idea was revitalized by STK Group, Estonian company owned by Russian investors and it has a plan to build refinery with 2 Mt/y capacity (“Estonia's VKG”, 2013; Karnau, 2013; “Russian investors”, 2013).

Estonia produces its electricity mainly from oil shale, wind and gas. The CHP Balti and CHP Eesti are big oil shale fired power plants with combined capacity of 2,380 MWe. They are fully supplied by domestic oil shale production. Estonia is also intensively developing wind power plants; currently there are 11 wind parks with the overall capacity of 186.6 MWe (the biggest being Paldiski, Aseri, Viru-Nigula and Pakri). Estonia also plans to build a huge offshore wind park Hiiumaa with the capacity of 700 MWe.

Tab. 4.4.2: Key Power Plants in Estonia

Power Plant	Installed Capacity	Fuel	Year of Construction
CHP Iru	207 MWe	Gas, solid waste	1976-1978, 2010-2013
CHP Balti*	765 MWe	Oil shale	1959-1965
CHP Eesti*	1,615 MWe	Oil shale	1963-1973
14 Wind Parks	143.8 MWe	Wind	-
* Together also known as Narva Power Plants			
Note: CHP = Combined Heat Power Plant			

Source: *Eesti Energia AS*

In 2011, 12,893 GWh of electricity was generated, but around 11,500 GWh annually is produced on average. The consumption in 2011 counted for 9,331 GWh and therefore Estonia also exports electricity to neighbouring countries. The average net export value is 2,000 GWh annually (International Energy Agency).

4.4.2 New Units and Financing of the Nuclear Power Plant

Estonia is very interested in the planned Lithuanian Visaginas NPP and is the 22% share holder in the future Visagino atominė elektrinė (VAE) Project Company through Eesti Energia AS. No domestic NPP project is planned or being developed. See Lithuania Case Study for detailed information.

4.4.3 The Front End of the Nuclear Fuel Cycle

In 1927-1928 Swedish-Norwegian Eestimaa Õlikonsortsium founded oil shale extraction plant in Sillamäe, Estonia. As part of the Soviet nuclear weapons program during Soviet era, it was decided to covertly mine uranium from the so called Dictyonema Shale in the Sillamäe mine and in 1946 the factory was renamed to Kombinat No 7. As this production soon proved to be uncompetitive (only 22.5 tonnes of elemental uranium produced between 1948 and 1952), the factory was then used only for enrichment of uranium mined elsewhere. A total of 4 million tonnes of uranium ore at grades of up to 1% from various East European countries were processed: 2.2 million tonnes from Czechoslovakia, 1.2 million tonnes from Hungary, as well as smaller amounts from Poland, Rumania,

Bulgaria, and the German Democratic Republic. Altogether, the uranium production from imported ores and concentrates amounted to 96,681 tons in 1950-1989 (Ehdwall 1993, cited according to Diehl, 1995; Maremäe, 2003, p. 34; *Nuclear Heritage Network*). The uranium processing was stopped in 1990 and the factory was renamed to Silmet. This company was eventually renamed again to Molycorp Silmet AS when U.S. mining group *Molycorp, Inc.* bought the company. Molycorp Silmet AS is today one of only two centers in Europe for the processing of rare earths (*Molycorp, Inc.*; *Nuclear Heritage Network*).

As there are currently no uranium deposits and no production, processing and/or fabrication capabilities in Latvia anymore, no Front End information can be presented.

4.4.4 The Service Part of the Nuclear Fuel Cycle

As there are no nuclear power plants in Estonia, no Service Part information can be presented.

4.4.5 The Back End of the Nuclear Fuel Cycle

There are three disposal sites for radioactive material in Estonia and both are connected with Estonian history. The Sillamäe Radioactive Tailings Depository owned by Molycorp Silmet AS had been receiving radioactive waste from 1948 to 1989 from the processing and enrichment factory at Sillamäe. In 2008, liquidation of the tailing ponds at Sillamäe was finished.

The Paldiski long-term storage facility was originally USSR's Nuclear Submarine Training Centre established in the early 1960s for training the USSR navy personnel for the

operation on nuclear submarines. Two PWR reactors used on the Echo and Delta classes submarines were constructed here in 1968 (70 MWt) and 1983 (90 MWt) for training purposes. Both reactors were shut down in 1989 and after difficult negotiations with Russia, the training centre itself was closed in 1994. All the facilities were decommissioned and dismantled by the end of 2007, sarcophagi were constructed at Paldiski and radioactive material was disposed in the Paldiski long-term storage facility (Lust & Muru, 2009, p. 2; Putnik, 2003, p. 39-46).

It is the state company Ltd A.L.A.R.A. that implements the activities in radioactive management, and decontamination and decommissioning, and that is in charge of the Paldiski and Tammiku storage facilities. The Tammiku radioactive waste storage facility for institutional radioactive waste was built in 1960 and it is the third disposal site in Estonia. The facility operation was finished in 1996 due to an incident with radioactive sources and the waste storage had to be decommissioned. The radioactive waste was transported to Paldiski until 2011, the facility had been cleaned in 2012-2013 and demolished in 2013 (Lust & Muru, 2009, p. 2; Tatrik, 2011; The Ministry of the Environment of Estonia, 2008, p. 13).

Tab. 4.4.3: Estonian Nuclear Sector Examination

Indicator	Description
Is there nuclear producing capacity present in the country?	No
Is there a project to expand the capacity? What is the status of the project?	No, Estonia is a partner of the Lithuanian Visaginas NPP project
How was the project procured?	-
Who is the contractor in charge of the project?	-
How is the financing secured?	-
Who is the operator of the facility?	-
Are there enough home-based experts to run the facility safely?	-
Who is/will be in charge of decommissioning?	-
Who provides nuclear fuel and under what conditions?	-
What is the experience with the fuel being currently used? Is there any rationale or path-dependency behind the current contract?	-
Is there any part of nuclear fuel industry present in the country? If so, how it contributes to country's nuclear fuel cycle?	Not anymore, Estonia used to produce uranium from Dictyonema shale until 1952 and enrich uranium mined elsewhere until 1989; the radioactive waste disposal sites serve for decommissioning and dismantlement of Sillamäe and Paldiski facilities
How is used fuel treated and who is in charge of this?	Radioactive material from the Sillamäe and Paldiski facilities is stored in the Sillamäe Radioactive Tailings Depository owned by Molycorp Silmet AS and in the Paldiski long-term storage facility owned by state company Ltd A.L.A.R.A.

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4.5 Country Case Study: Hungary

Tomáš Vlček

4.5.1 Introduction¹

Hungary is a relative newcomer to the EU, joined in May 2004, and as a result, its energy economy still bears many of the hallmarks of a centrally planned economy in the Eastern Bloc. This is among the reasons why many of the CEE countries deal with similar issues in their respective energy sectors. Hungarian revolution in 1989 changed the track of the country towards democracy and market economy. Obviously, this was and is a huge change that has been addressed ever since.

As seen in table 4.5.1, over 60 % of Hungarian TPES share consist of hydrocarbons and this share is historically rather stable. The import dependency in oil sector is basically entirely on Russian Federation and amounts approximately to 5.7-6.5 Mt annually. Analogical is the situation in natural gas sector, where over 60% of supply is imported from Russian Federation and up to 17% from other former Soviet Union countries.

When speaking about electricity generation, the key source is nuclear energy covering 42% of the country's production. Hungary accommodates four Soviet designed PWR reactor VVER 440/V 213 models at the Paks Nuclear Power Plant in central Hungary, which will be described in detail later in the text. The Paks NPP is in the portfolio of the MVM Paks

¹ The chapter is based on the article previously published in the International Journal of Energy Economics and Policy journal in March 2015, where preliminary outcomes of the research were presented. (Vlček & Jirušek, 2015)

Nuclear Power Plant Ltd. That is owned by MVM Group², which is a fully state owned company. It is the largest power company in Hungary responsible for production, distribution as well as sale of electricity. MVM Group consists of 61 companies³ operating not only in the electricity sector (all types of power and heat plants, distribution, accounting, etc.), but also in gas sector.

Tab. 4.5.1: Key Energy Statistics

Source	Consumption	Imports	TPES share	Electricity Generation share
Crude Oil	6.52 Mt	89%	25%	1.2%
Natural Gas	12.27 bcm	79%	38%	31%
Coal (all types)	11.1 Mt	19%	11%	17%
RES	-	-	7.9%	8.7%
Nuclear Energy	-	-	16%	42%
Note: 2010 data				

Source: *OECD & IEA*, 2011; compiled and calculated by T. Vlcek

Quite uncommon is a high share of natural gas used on electricity generation. The 38% share on TPES and 31% share on electricity generation was produced in 6 gas-fired power plants totaling at 2,748 MWe of installed capacity.

² Magyar Villamos Muevek Zartkoruen mukodo Reszvenytarsasag, Hungarian Electricity Private Limited Company.

³ On December 31, 2013, the MVM Group consisted of a total of 61 companies, including, with regard to ownership rights, one parent company, 41 subsidiaries, one joint management company, eight associated companies and ten other interests. (MVM Group, 2014, p. 5)

Tab. 4.5.2: Key Gas-fired Power Plants in Hungaria

Power Plant	Installed Capacity
Dunamenti	1,938 MWe
Csepel	389 Mwe
Kelenfold	196 Mwe
Debrecen	95 Mwe
Kispest	114 Mwe
Kobanya	15.6 MWe

Source: compiled by T. Vlcek from open sources.

Given the high reliance on Russian imports, it is not surprising that Hungarian energy policy is focused on diversifying the country's energy mix and reducing its dependence on gas and oil. One clear strategy to achieve this goal is via increased use of nuclear power because, as the IEA has pointed out in its Review of Hungarian Energy Policies “, any plans to significantly increase nuclear power capacity have a direct impact on the profitability outlook for gas fired power plants” (OECD & IEA, 2011, p. 66). This basically means that once a new nuclear power plant is constructed, cheap (in terms of production) electricity would be available, and this may cause a drop in demand of electricity from gas-fired power plants. Based on the merit order principle, the nuclear power plant would be able to cover the demand for electricity and also push the electricity produced in gas-fired power plants to the edge of competitiveness in Hungarian energy sector. This is also due to the fact that fuel costs are very high with gas-fired power plants and very low with nuclear power plants.

The third most important fuel for electricity production (17%) is coal. Hungary has domestic sources of sub-bituminous coal in the Markushegy underground mine and Visonta and Bukkabrany opencast mines (one of the largest coal reserves in Europe). The Markushegy mine is the last deep-cast coal mine in Hungary; it will be shut down in 2015 as part of the EU initiative to replace coal with cleaner energy (Hungary was approved to receive HUF 42.247 billion (€140 million) European Commission grant in January 2013 to shut down the uncompetitive coal mine operated by Vertes Power Plant by the end of 2014; “State aid: Commission”, 2014). The coal extracted in the opencast mines is not a subject to cross-border trade; it is used for power generation in coal-fired power plants (260 MWe Oroszlany; and 950 MWe Matra) in the vicinity of the mines (Euracoal, 2013). The Matra power plant consumes roughly 8.5 million tons of lignite annually and produces more than 15% of Hungary's electricity demand by itself. Its life was extended for 10 years in 2005 thanks to the refurbishment of boilers and other equipment, and further plans to expand its capacity by 440MW were also announced by the owner RWE, but this scheme was abandoned in 2010 on economic and environmental grounds, and it now appears that the plant will close at the end of its life-cycle in 2015. This will significantly reduce generating capacity in Hungary, raising the question of the need for new sources of power, as the country is already an electricity importer. There are currently no hard coal power stations in Hungary, as the last hard coal mine was closed in 2003. The Pecs hard coal-fired power station was reconstructed to combust biomass and natural gas recently; it had been supplied from abroad in the time between the loss of domestic black coal and the reconstruction.

National electricity generation in 2012 amounted to 31.9 TWh, with an installed capacity totaling to around 10 GWe, of which 8.3 GWe are constantly available. A net 8 TWh of electricity was imported (Euracoal, 2013).

4.5.2 New Units and Financing of the Nuclear Power Plant

Besides the one NPP Hungary already operates, plans for construction of new units have been present in Hungary since 1980s. The original idea was the construction of another VVER-440/V-213 type reactor unit, but those efforts were cancelled because the manufacture and standardizing of the VVER-1000 units were decided in the Soviet Union. Preparation of the VVER-1000 project (landscaping, ground replenishment and building of the on-site transportation infrastructure) was cancelled by the government during the social changes (officially in 1990). The sole exception was the only high school in the country founded by the Paks Nuclear Power Plant specifically for the training of the future specialists – the school works effectively even today (Paks Nuclear Power Plant Ltd.). Together with experience from the operation of the NPP, and the KFKI Atomic Energy Research Institute with Csilleberc, research reactor thus adds very much to Hungary developing domestic expertise.

The current construction plans are thus based on 1980s plans and project preparations for VVER design reactors. This also might be among the reasons the contract was granted to the Russian Rosatom company without any procurement, even though these preparations are not at all obliging from the

technical and also political point of view. The planned NPP should consist of two Russian design VVER-1200 models (also known as Modernized International Reactor 1200, MIR-1200) with 3,200 MWt/1,198 MWe of installed capacity each, an evolutionary model based on the previous VVER-1000 and VVER-440 models. In 2012, the company MVM Paks II Nuclear Power Plant Development Ltd owned by MVM Group was established to conduct preparatory work for the construction of new units. This company signed three implementation agreements with JSC NIAEP on December 12, 2014, a company forming part of the State Corporation Rosatom. The first document is the EPC contract (engineering, equipment supply, construction) for the two new power units, which stipulates the tasks for the next 12 years. The second one is the operation and maintenance contract for the future power units, and the third document is the fuel supply contract. The power units will remain under Hungary's ownership, while the total investment cost will be within a cost frame of 12.5 billion euros in all circumstances ("Contracts for constructing", 2014).

The example of Hungary's Paks NPP can thus serve as a negative example, as the decision to grant the project to the Russians was made by the prime minister and his closest collaborators without any consultations with other interested parties, industry experts, or the public at large (Field, 2014). In this situation, the state (i.e. the contracting party) leaves itself extremely vulnerable due to a lack of expertise on its side in a complex negotiation, with the lack of transparency only adding to the sense of an improper deal being concluded. In contrast, in the procurement procedure for the Czech Temelin NPP, just the documentation specifying the conditions of the project took

three years to prepare and was created by group of several tens of experts. Ultimately, this documentation comprised more than 6,000 pages establishing over 11,000 criteria that needed to be met by any successful bidders. In return, each bidder provided the Czech side with the documentation exceeding 10,000 pages each (Horacek & Topic, 2012; interview with a Czech official responsible for the process), while the procurement period itself took several years.

On the contrary, in Hungary the decision appears to have been made on rather less thorough basis. The project involving two Russian design VVER-1000 units has been planned since the 1980s, but the project was cancelled after the fall of the communist regime, due to both economic issues and a decrease in energy demand. A later initiative to build the new units in the mid-1990s also stalled, but the project has been revived due to the need to replace obsolete power generating plants and supplement them with 6000 MWe of new capacity by 2030 (WNA, 2014). Although the parliament agreed that it was necessary to expand the nuclear generating capacity, it has also been clear from the very beginning that the project could not be carried out without the financial support of an external project partner. As a result, when an EUR 10 billion loan to co-finance the project was offered by the Russian Federation,⁴ it soon became evident that the Russian VVER-1200 units were the preferred option and a deal was eventually cemented in January 2014⁵, when Hungary entered into an international agreement with the government of the Russian Federation on the

⁴ The Russian side was allegedly the only one prepared to offer financing to support the project. The loan equals 80% of the total costs of the project ("A Brief Summary, n.d.").

⁵ France's Areva and US electric company Westinghouse along with Japanese and South Korean power suppliers had previously expressed interest in bidding for a contract of the Hungarian plant's expansion.

cooperation in peaceful use of nuclear energy (Balogh, 2014). Under the terms of the deal, the Russian Federation will grant Hungary an interest-only loan at an annual rate of 3.9%, starting in 2014. Once the construction is completed in 2026 (the expected start date), the principal balance will be amortized for 21 years, with an interest rate of 4.5% for the first seven years, 4.8% for the next seven, and 4.95% for the final seven (“A Brief Summary”, 2014; “Kiderultek a rezletek”, 2014).

However, it is the conditions of the deal and the way they were negotiated that have raised concern about Hungarian dependency on Russia. Not only was Hungary granted a loan of EUR 10 billion to co-finance the project by the Russian Federation,⁶ but the deal was negotiated by the Hungarian prime minister and was granted to Rosatom without any official procurement procedure, causing a great outrage among the opposition parties in the parliament (Nolan, 2014). The specific terms of the loan have been called into question amid fears that Hungary could face significant losses in future.⁷ Many also fear that the deal will tie Hungary to the Russian Federation for many years to come, as part of an apparent foreign policy turn to the East conducted under the Prime Minister Viktor Orbán’s administration in recent years (Buckley & Eddy, 2014; “Atment a parlamenten”, 2014).

Additionally, Hungary may also be accused of breaching EU rules by omitting to carry out a proper procurement process

⁶ The Russian side was allegedly the only one prepared to offer financing to support the project. The loan equals 80% of the total costs of the project (“A Brief Summary, n.d.”).

⁷ Some sources claim that one of the catches within the agreement is the price of particular construction work that is to be defined by the contractor. Also, the payment conditions are allegedly very strict and may lead to severe financial losses for the Hungary, since the interest rates are quite high (around 4% at the beginning and rising progressively during the contract duration) and the penalties for overdue payments are also harsh (“A Brief Summary, n.d.”).

(“Russia, Hungary sign”, 2014), and the EU could also object to the state subsidies being granted to MVM Group, both of which could obviously lead to a long term political and legal dispute. Indeed, unofficial sources suggest that the European Commission has already started an initial investigation against the Paks NPP. Overall, though, the crux of the issue remains the financing of the deal, with the loan offered by Russia being a crucial element in the choice of reactor. Other issues have also undermined the credibility of the project, but essentially, the need to raise funds to pay for the construction has been at the heart of the decision-making process.

After the European Commission has checked the Russia-Hungary deals, the objection was basically against fuel supply part of the contract only. The EPC contract and the operation and maintenance contract was approved and signed by the European Commission, only the fuel supply contract was objected by Euratom Supply Agency (ESA). ESA objected to long-term supply contract from Russia as “rules in the European Union require all power plants to have more than one fuel supplier in the long term” (“Euratom approves Paks II”, 2015). After amending this particular contract, i.e. removing exclusivity of Russian fuel supplies (which of course does not mean Russian Federation will not supply fuel, only exclusive fuel contract was replaced by public procurement obligation for Hungary), the deal was accepted. Hungary is however still in talks with the European Commission concerning competition law and missing public procurement procedure. These talks have not been resolved so far.

4.5.3 The Front End of the Nuclear Fuel Cycle

Hungary does not currently have any capacity in the Front End of the Nuclear Fuel Cycle, although it is possible that uranium mining could be restarted at some point. Historically, Hungary had mined uranium from 1956 to 1997 in the Mecsek underground mine near the city of Pecs. The concentration of uranium in uranium ore was 0.1-0.15%; and 18,103 tons of uranium had been mined and sold during 1958-1997 (Csovári, 2008). Hungary consequently developed processing capabilities for ore milling and yellow cake production in the vicinity of the mine. The production and the processing were closed down in 1997 for economic reasons, i.e. due to the low price levels in the world market at that time. The remediation of the mine ended in 2008 with expenditures of EUR 83 million. Still, 19 million tons of uranium ore (of uranium concentration $\approx 0.12\%$) were left behind in the mine (Csovári, 2008).

In 2006, an Australian company WildHorse Energy joined with state-owned firm Mecsekerc to assess the feasibility of restarting uranium mining in four locations of the seven exploration licenses of WildHorse Energy (namely Mecsek, Bataszek, Dinnyeberki and Mariakemend). In 2012, the exploration drilling was completed, but the last three locations were completed without noteworthy success. However, a joint venture of WildHorse Energy, Mecsekerc, Mecsek-Oko and Hungarian Electricity Ltd. emerged around the Mecsek location as the inferred resources are of about 17,946 tons of uranium (tU). The high price of uranium is one of the reasons of driving the proposed re-start of operations (Malovics, 2014; OECD NEA & IAEA, 2014, p. 49, 244). Anyway, the exploration activities appear to be very limited and the possible

production is highly uncertain. Also, it is questionable whether the old processing facilities might be used. Moreover, restarting of mining operations would require investment into new processing facility, or an investment into reconstruction of the old one.

In present, given that Hungary does not currently produce uranium, there is a long term contract with Russian TVEL for nuclear fuel supply. The Paks power plant signed this contract in 1999 and the contract is valid as long as its reactors are operating, including the new service life extensions. The contract is worth EUR 83 million in 2013 (“Hungarian Nuclear Power”, 2014; “Paks moving to”, 2014). Starting in 2015, the power plant will be supplied with new generation fuel with higher enrichment (from 4.2% to 4.7% of ^{235}U) prolonging the fuel campaign of one assembly from 12 to 15 months (e.g. from three-year-cycle to five-year-cycle).

4.5.4 The Service Part of the Nuclear Fuel Cycle

Hungary has a long-term experience with nuclear energy; the first nuclear power plant was built at Csilleberc in Budapest in 1959. It is a research reactor reconstructed and upgraded in 1986-1993, based at KFKI Atomic Energy Research Institute in Budapest-Csilleberc. Similarly to many other CEE and world countries, the development of nuclear energy was connected to the world oil crisis in 1970s.

There is currently one nuclear power plant in Hungary, the Paks NPP in central Hungary, 5 kilometers from the city of Paks. The Paks NPP is operated by the state company MVM, and much of the country’s experience and expertise in the sector is located in Paks. As a result, Hungary is certainly competent

to run its own nuclear plants without an external assistance, including the provision of parts and maintenance. All repair and maintenance as well as the design and construction of different machinery and technology sets can be and usually is delivered by a range of companies around the world, especially from countries that operate nuclear power plants - many of them coming from the CEE region with a lot of experience with Russian technology.

Tab. 4.5.3: Nuclear Units in Hungary

Reactor	Type	Power Output	Status	End of life-cycle
Csilleberc*	VVR-S	10 MWt	Operating	-
Paks 1	VVER-440/V-213	500 MWe	Operating	2032
Paks 2	VVER-440/V-213	500 MWe	Operating	2014 (2034)**
Paks 3	VVER-440/V-213	500 MWe	Operating	2016 (2036)**
Paks 4	VVER-440/V-213	500 MWe	Operating	2017 (2037)**
Paks II 5	VVER-1200	1,198 MWe	Planned	-
Paks II 6	VVER-1200	1,198 MWe	Planned	-

* It is a research reactor built in 1959, reconstructed and upgraded in 1986-1993, based at KFKI Atomic Energy Research Institute in Budapest-Csilleberc.
 ** It is very likely that the lifetime of all units will be extended for 20 years, like with the Unit 1; see below.

Source: compiled by T. Vlcek from open sources.

The Paks NPP consists of 4 units of Soviet designed VVER 440, model V 213. It is an evolutionary model from the original V-230 model. Unlike the V-230 model that has no containment at all, the V-213 does have a specific type of containment, the so called pressure suppression containment. This equipment suppress pressure in the event of an accident in sealed areas of

nuclear power plant (i.e. primary circuit) to minimize the risk of leakage of radioactivity outside these areas.

The nuclear power plant was constructed between 1974 and 1987 and the original installed capacity was 4x 440 MWe⁸. The power plant underwent two series of modernizations and an upgrade in the 1990s and between 2002 and 2009⁹, and the installed capacity was thus raised to 4x 500 MWe. The power plant was connected to the grid during 1982-1987¹⁰ with 30 years lifetime expectancy. A feasibility study for the lifetime extension of the nuclear power plant units was carried out in 2000 stating that no technical or safety obstacles to extend the operational lifetime of the plant exist (“Report on the preparation”, n.d.). Since 2001, the company has successfully worked on all the required documentation for the lifetime extension program, including the most important Environmental Impact Assessment.

The Hungarian Atomic Energy Authority (HAEA) has approved the lifetime extension program (submitted in November 2008) for all four reactors, and in December 2012, it approved a 20-year license extension for unit 1 only (WNA, 2014), as the license for extended operation must be applied for each unit, one year before the original lifetime ends. It is very likely that all units will be extended and the life expectancy of the power plant will thus be 50 years, i.e. 2032-2037. The current government considers energy production as a way of

⁸ It is interesting to add that one of the four reactors was bought from Poland after the Polish Zarnowiec NPP project was abandoned in 1990 after strong public opposition, the Chernobyl disaster, and the public referendum in late 1980s.

⁹ The second modernization increasing the capacity by 8% was carried out by Russian Atomstroyexport. The EUR 19 million uprate program included modifications to reactor core control and primary circuit pressure control principles (“More Power for Paks”, 2007).

¹⁰ Unit 1 in 1982, unit 2 in 1984, unit 3 in 1986, and unit 4 in 1987.

emerging from the economic crisis, and one pillar of the strategy is to maintain the current share of nuclear generating capacity in the long term (OECD NEA & IAEA, 2014, p. 83). The lifetime extension of Paks NPP as well as the development of the Paks II NPP is in compliance with this strategy.

In 2003, Level 3 accident on the International Nuclear Event Scale (INES) took place. Paks NPP unit 2 had experienced problems with Russian fuel elements due to the presence of corrosion deposits. These deposits resulted in coolant flow problems which had resulted in an unscheduled refueling outage. Thus a cleaning system placed on the bottom of the spent fuel pool, next to the reactor, was hired from Framatome ANP (a joint company of French Areva and German Siemens). On April 10, the partially spent fuel rods undergoing cleaning in a tank of heavy water ruptured and spilled fuel pellets. It is suspected that inadequate cooling of the rods during the cleaning process combined with a sudden influx of cold water thermally shocked fuel rods causing them to split. Release of radioactive gases followed for several days and the unit was shut down until the end of 2006. In 2014, the 30 damaged fuel assemblies were sent to FSUE Mayak PA in Russia for reprocessing (World Nuclear Association, 2014c; "Serious incident", 2003; IAEA, 2009).

4.5.5 The Back End of the Nuclear Fuel Cycle

The used fuel in Paks NPP is cooled in the basins next to the reactor and then stored in interim storages. The pool storage capacity at Paks NPP was expanded almost twofold during 1984-1987, after the first units were commissioned. There are no plans for the reprocessing of the spent fuel. The first interim

storage is located approximately 5 km from the power plant, in the city of Paks in the Interim Storage of Irradiated Fuel (ISIF¹¹). This storage facility is used for about 3-5 years and the assemblies are transported to long term storage facility after 3-5 years.

The spent fuel is subsequently transferred to long-term storage facility near the village Puspokszilagy, which was constructed in 1960s and came into operation in 1976. It is operated by state owned Public Limited Company for Radioactive Waste Management (PURAM¹²). The problem with the site is that it was not primarily meant as a repository for radioactive waste from nuclear power plants, and therefore its capacity is insufficient. First capacity problems have already emerged in 2005, as 115 spent fuel assemblies are generated per unit annually.

As a result, it was deemed necessary to build a separate long-term storage facility, and in 1997, the location Bataapati located south of the nuclear power plant in Paks, was found to have suitable geological conditions. The spent fuel was stored in surface long-term storages in the complex and recently, on December 5, 2012, the first underground chamber of the final repository for low and intermediate-level radioactive waste was inaugurated, an important developmental step for the nuclear industry. The Bataapati municipality agreed to build the complex quite enthusiastically (with 90% of referendum respondents) and part of the residents also contribute to its functioning, i.e. is employed at the facility (Paks Nuclear Power

¹¹ Or KKAT, Kiegett Kazettak Atmeneti Taroloja in Hungarian.

¹² Or RHK, Radioaktiv Hulladekokat Kezelo Kozhasznu Nonprofit Kft in Hungarian. PURAM is also the responsible organization for decommissioning of nuclear installations in Hungary.

Plant Ltd.; Radioaktiv Hulladkokat Kezelo Kozhasznu Nonprofit Kft; Andras, 2012; Kovacs, 2010; OECD NEA & IAEA, 2014, p. 247).

It is calculated that the 2007 capacity was 7,200 fuel assemblies and the total number of spent fuel assemblies including the extended service of the power plant will be 17,900 (Hegyhati & Ormai, 2010). The company thus works on the expansion of the facility and the construction design allows for the extension of the storage facility. The work is financed from the Central Nuclear Financial Fund that was established as of the 1st of January 1998 by the Act on Atomic Energy and the executive orders thereof, with the purpose of financing the disposal of radioactive wastes, the interim storage, and final disposal of spent nuclear fuels and the decommissioning and dismantling of nuclear facilities.

Hungary does not have a final high-level wastes deep underground depository, but a claystone formation near the city of Buda in the southwest Mecsek Mountains is being investigated, and a preliminary safety analysis has been made for a deep geological repository there. It is expected to begin operation after 2060 (World Nuclear Association, 2014c).

Tab. 4.5.4: Hungarian Nuclear Sector Examination

Indicator	Description
Is there nuclear producing capacity present in the country?	Yes, Paks NPP (VVER-440/V-213 design, 4 Units of 500 MWe each)
Is there a project to expand the capacity? What is the status of the project?	Yes, planned, securing of finances in process
How was the project procured?	Without procurement process, bilateral agreement with Russia
Who is the contractor in charge of the project?	Rosatom State Nuclear Energy Corporation
How is the financing secured?	Hungary was granted a loan of EUR 10 billion to co-finance the project by the Russian Federation
Who is the operator of the facility?	MVM Paks Nuclear Power Plant Ltd. (owned by MVM Group, a fully state owned company) for Paks 1-4; MVM Paks II Nuclear Power Plant Development Ltd (owned by MVM Group) for Paks II 5 and 6
Are there enough home-based experts to run the facility safely?	Yes
Who is/will be in charge of decommissioning?	State owned Public Limited Company for Radioactive Waste Management (PURAM)
Who provides nuclear fuel and under what conditions?	Long term contract with Russian TVEL signed in 1999 and valid as long as its reactors are operating, including the new service life extensions
What is the experience with the fuel being currently used? Is there any rationale or path-dependency behind the current contract?	No operational issues; path dependency rationale found in nuclear fuel supply from Russian companies
Is there any part of nuclear fuel industry present in the country? If so, how it contributes to country's nuclear fuel cycle?	Uranium mining could be restarted at some point; currently, Hungary has capacities only in the Back End of the Nuclear Fuel Cycle
How is used fuel treated and who is in charge of this?	The used fuel is stored in domestic interim and in long-term storage facilities of the state owned Public Limited Company for Radioactive Waste Management (PURAM)

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4.6 Country Case Study: Latvia

Tomáš Vlček

4.6.1 Introduction

Latvia is a Baltic republic that borders with Estonia, Russian Federation, Belarus and Lithuania and also with Sweden and Finland over the Baltic Sea. Latvia gained sovereignty which was recognized by Russia in 1920 but lost it again in 1940 when it was unwillingly incorporated into the Soviet Union and shortly occupied by Nazi Germany in 1941-1944. Since that time, Latvia had been part of the USSR as the Latvian Soviet Socialist Republic until 1991. Latvia joined the EU in May 2004 together with Estonia and Lithuania and seven other countries. Due to the history, the political and social mood is strongly anti-Russian. Latvia was always a country with rather well-off economy and today the Latvian economy is basically unconnected with the Russian economy.

Speaking about the energy sector, Latvia is fully dependent on energy imports. It imports all of its natural gas, oil products and coal consumption almost exquisitely from Russia. Latvia does not import crude oil, but imports all of its oil needs in oil products directly. Biofuel production and electricity generation in hydro power plants and wind power are basically the only domestic sources of energy. As such, they are being well maintained and further developed.

Even though coal is not an issue in terms of energy security due to its negligible consumption, Latvia plays an important role in coal transportation; its JSC Baltic Coal Terminal in Ventspils with 6 Mt/y capacity is actively used for Russian coal

export in the EU. The port's capacity is currently being enhanced by another 4.5 Mt/y (JSC Baltic Coal Terminal).

Tab. 4.6.1: Key Energy Statistics

Source	Consumption	Imports	TPES share	Electricity Generation share
Crude Oil	1.58 Mt	0%	30.2%	0.03%
Natural Gas	1.53 bcm	100%	31.5%	45.1%
Coal (all types)	0.17 Mt	100%	2.3%	0.03%
RES	-	-	34.4%*	54.84%**
Nuclear Energy	-	-	0%	0%
Note: 2010 data				
* Biofuels and waste stands for 27.8 % of TPES share				
** Hydro stands for 53.1% of Electricity Generation share				

Source: *U.S. Energy Information Administration*; International Energy Agency; compiled and calculated by T. Vlcek

Latvia produces its electricity mainly from gas and water. The river Daugava, flowing through Russia, Belarus, and Latvia to the Baltic Sea, is therefore very important, as a cascade of hydroelectric power plants is constructed on its course. The biggest HPPs are Rīgas (402 MWe), Ķeguma 1 (72 MWe), Ķeguma 2 (192 MWe), and Pļaviņu (883.5 MWe). Natural gas is used as fuel in the combined heat power plants Riga 1 (144 MWe) and Riga 2 (832 MWe) and in some other very small CHPs in the country.

Tab. 4.6.2: Key Power Plants in Latvia

Power Plant	Installed Capacity	Fuel	Year of Construction
HPP Rīgas	402 MWe	Water	1966-1974
HPP Ķeguma 1	72 MWe	Water	1936-1940, renovated 1998-2001
HPP Ķeguma 2	192 MWe	Water	1976-1979
HPP Pļaviņu	883.5 MWe	Water	1961-1966
CHP Rīga 1	144 MWe	Gas	1954-1958 renovated 2003-2005
CHP Rīga 2	832 MWe	Gas	1975-1979 renovated 2006-2013
Note: CHP = Combined Heat Power Plant, HPP = Hydroelectric Power Plant			

Source: *Latvenergo AS*

More than 90% of electric energy generated in Latvia is generated by the Latvenergo AS. In 2010, 5,851 GWh was generated but around 5,100 GWh annually is produced on average (Latvenergo AS, 2014, p. 4). The consumption in 2010 reached 7,500 GWh and as the domestic production does not cover the demand, another approximately 1,600 GWh on average annually has to be imported from neighbouring states (International Energy Agency).

4.6.2 New Units and Financing of the Nuclear Power Plant

Latvia is very interested in the planned Lithuanian Visaginas NPP and is the 20% share holder in the future Visagino atominė elektrinė (VAE) Project Company through Latvenergo AS. No domestic NPP project is planned or being developed. See Lithuania Case Study for detailed information.

4.6.3 The Front End of the Nuclear Fuel Cycle

As there are no Uranium deposits, and no production, processing and/or fabrication capabilities in Latvia, no Front End information can be presented.

4.6.4 The Service Part of the Nuclear Fuel Cycle

There are no nuclear power plants in Latvia, but in the past there was a plan to construct a nuclear power plant. The project called Pāvilostas NPP originated in 1960s but was postponed after Lithuania agreed to build Ignalina NPP on its territory. The project was repeatedly suggested by the USSR Ministry of Energy and Electrification and VVER design reactors were planned first with 3,000 MWe, later with 4,000 MWe, and in the end, even with 6,000 MWe installed capacity. The project was definitely abandoned after the Chernobyl accident as well as due to the restructuring of the Soviet political and economic system in 1980s (*Nuclear Heritage Network*).

However, Latvia does have experience with nuclear energy as Latvian researchers participate in developing the ITER fusion reactor in Cadarache France, and also as one of the first research reactors in the USSR, the Salaspils 5 MWt research reactor, was constructed in 1959 at the Latvian Institute of Nuclear Physics. The reactor was shut down in 1998 and the option of dismantling of the reactor to “green-field” was chosen (Abramenkovs, 2011, p. 78). However, the plan was partly changed in 2006, when National multifunctional cyclotron center with Latvian Government's support has started to develop in Salaspils.

4.6.5 The Back End of the Nuclear Fuel Cycle

At the end of the 1950s and at the beginning of the 1960s, a radioactive waste repository was built in Latvia. This near-surface repository for both burial and storage of low and intermediate level radioactive waste is called Radons and is located in Baldone municipality in the vicinity of Riga. Local radioactive waste, especially from the Salaspils Research Reactor as well as waste from other Baltic states, is stored here and there are plans for considerable extension (approximately doubling the capacity) of the facility connected with the dismantling of Salaspils Research Reactor (*Nuclear Heritage Network*). The repository is operated by State Ltd "Latvian Environment, Geology and Meteorology Centre" under the Ministry of Environment of Latvia.

Tab. 4.6.3: Latvian Nuclear Sector Examination

Indicator	Description
Is there nuclear producing capacity present in the country?	No
Is there a project to expand the capacity? What is the status of the project?	No, Latvia is a partner of the Lithuanian Visaginas NPP project
How was the project procured?	-
Who is the contractor in charge of the project?	-
How is the financing secured?	-
Who is the operator of the facility?	-
Are there enough home-based experts to run the facility safely?	-
Who is/will be in charge of decommissioning?	-
Who provides nuclear fuel and under what conditions?	-
What is the experience with the fuel being currently used? Is there any rationale or path-dependency behind the current contract?	-
Is there any part of nuclear fuel industry present in the country? If so, how it contributes to country's nuclear fuel cycle?	No, except for the Radons low and intermediate level radioactive waste; this is however not intended for NPP's spent fuel and it would not contribute to country's nuclear fuel cycle
How is used fuel treated and who is in charge of this?	Radioactive material from the Salaspils Research Reactor decommissioning and dismantling is stored in the repository for low and intermediate level radioactive waste called Radons operated by State Ltd "Latvian Environment, Geology and Meteorology Centre" under the Ministry of Environment of Latvia

4.6.6 Sources

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4.7 Country Case Study: Lithuania

Tomáš Vlček

4.7.1 Introduction

Lithuania is a Baltic state that borders with Latvia, Belarus, Poland and Russia (Russian exclave of Kaliningrad). The history of Lithuania is grim, the country had been occupied, annexed or Sovietized during the 20th century, basically since its emergence in 1918 until the dissolution of the Soviet Union in 1991. The Lithuanian Soviet Socialistic Republic declared independence in March 1990 as the first Soviet republic and had to fight for it until 1993 when last Soviet troops left the country, which became the Republic of Lithuania. Lithuania joined the EU in May 2004 together with 9 other countries.

As a country with very limited domestic energy resources, Lithuania currently imports basically all natural resources including around 50% of its electricity needs (*International Energy Agency*). The Lithuanian energy system is linked with Latvia, Belarus and Russia via cross-border connections and new interconnectors to Sweden and Poland will begin operation in January 2016.

The top three electricity generation sources are gas, hydro and oil. On the country's total electricity production of 5.75 TWh in 2010, these accounted for 55.4%; 22.5% and 11.3% (see Table 4.7.1). The total installed capacity in Lithuania in 2011 was 4,021 MWe of which 3,681 was available (National Control Commission for Prices and Energy, 2012, p. 43).

Tab. 4.7.1: Key Energy Statistics

Source	Consumption	Imports	TPES share	Electricity Generation share
Crude Oil	2.84 Mt	333%	36.4%	11.3%
Natural Gas	3.11 bcm	100%	35.3%	55.4%
Coal (all types)	0.32 Mt	100%	2.9%	0%
RES	-	-	15.1%	33.3%*
Nuclear Energy	-	-	0%	0%
Note: 2010 data * Hydro stands for 22.5% of electricity production				

Source: *U.S. Energy Information Administration; International Energy Agency*; compiled and calculated by T. Vlcek

Lithuania imports nearly all of its oil consumption from Russia. As Russia has blocked imports to Lithuania via the Druzhba pipeline, all imports go through the Būtingė maritime oil terminal (European Commission, 2013, p. 168). Lithuania imports more than three times more oil than it consumes. The reason for this is the fact that Lithuania houses large Mažeikiai oil refinery and oil-processing plant with the capacity of 15 Mt/y of which 8 Mt/y is efficiently used given the existing technologies and current marketing conditions (*Orlen Lietuva*). Lithuania thus exports large volumes of crude oil products mainly through the Būtingė oil terminal.

Speaking about natural gas, the situation is not that different; Lithuania has no domestic production and is fully dependent on Russia and the country has active interconnections only with Latvia, Russia and Belarus (European Commission, 2013, p. 169). An interesting project to avoid the dependency on Russian gas supplies is the LNG Floating Storage

Regasification Unit (FSRU), a ship named Independence lent for 10 years from Norwegian company Høegh LNG with the option of purchase (“Independence LNG”, n.d.). Together with the LNG port Klaipėda, of which the operation start is scheduled for December 2014, this FSRU ship represents 100% diversification of Lithuanian imports as the capacity of the FSRU is nearly 4 bcm/y.

Tab. 4.7.2: Key Power Plants in Lithuania

Power Plant	Installed Capacity	Fuel	Year of Construction
TPP Lithuanian (Elektrėnai)	1,955 MWe	Gas, HFO	1960-1972
CHP Vilnius	388.8 MWe	Bio, Gas, HFO	1976-1983
CHP Kaunas	170 MWe	Gas, HFO	1971-1975
Mažeikiai	160 MWe	HFO	1979-1982
Panevėžys	35 MWe	Gas	2006-2008
HPP Kaunas	100.8 MWe	Water	1955-1960
PSHPP Kruonis	900 MWe	Water	1984-1998
Note: CHP = Combined Heat Power Plant, HPP = Hydroelectric Power Plant; TPP = Thermal Power Plant; HFO = Heavy Fuel Oil; PSHPP = Pumped Storage Hydroelectric Power Plant			

Source: Lietuvos Energijos Gamyba AB; “Installed generation”, 2014

Beyond the smaller gas- and oil-fired Combined Heat Power Plants in Vilnius, Kaunas, Mažeikiai and Panevėžys, Lithuania houses a big condensing thermal power plant 2 km from the city of Elektrėnai. This Lithuanian Power Plant's (LPP) installed capacity is 1,955 MWe of which 6 Units (1,355 MWe) combust natural gas and 2 Units (600 MWe) combust heavy fuel oil (HFO) (Lietuvos Energijos Gamyba AB).

There was 127 MWe installed capacity in Hydro in 2011 of which 116 was available. The biggest hydroelectric power plant in Lithuania is the 100.8 MWe Kaunas Algirdas Brazauskas' Hydroelectric Power Plant (KPP). There is also the 900 MWe Kruonis Pumped Storage Hydroelectric Plant (KPHP), an important part of the Lithuanian electricity system that helps balancing electricity supply and demand.

Until 2009, Lithuania generated electricity also from nuclear energy. The Ignalina NPP (Ignalinos atominė elektrinė) was shut down as part of Lithuania's accession agreement to the EU. Unit 1 was closed in 2004, and upon the shutdown of the Unit II in 2009 Lithuania lost the generation capacity meeting approximately 80% of total national electricity demand and 77% of domestic electricity production at the end of 2009, and the previous net exporter of electricity suddenly became net importer, importing electricity from the Russian Federation (National Control Commission for Prices and Energy, 2012, p. 9; Grigas, 2013, p. 71-72). Also, electricity prices increased dramatically after 2009.

4.7.2 New Units and Financing of the Nuclear Power Plant

Following the shutdown of Ignalina NPP and the sudden switch of Lithuania from being a net exporter to being a net importer of electricity, Lithuania has been developing a project to construct a new nuclear power plant at the same site as Ignalina NPP stands, but named Visaginas after a nearby city. The idea emerged in 2006 and since the beginning it was warmly welcomed by neighbouring countries, Latvia, Estonia

and Poland. In fact, these four countries initiated and prospected the construction of a new NPP with 3,200 MWe installed capacity in two units in Lithuania together since the beginning. The preparatory works were conducted by Lietuvos Energija UAB until 2008, when Visagino atominė elektrinė (VAE) Company was created and took over the preparatory works. The VAE is still owned by Lietuvos Energija UAB.

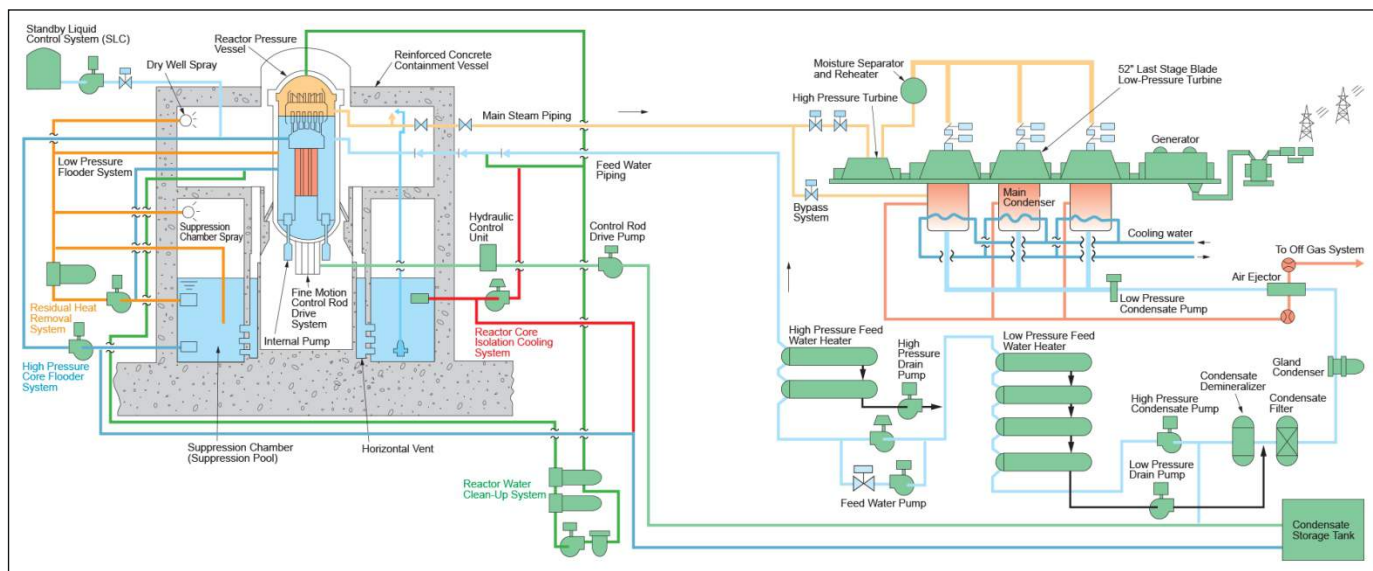
In 2009, the approved Environmental Impact Assessment imposed a limit of 3,200 MWt to be discharged into Lake Drūkšiai without the need to construct cooling towers (WNA, 2014a). This eventually led to reduction in the planned capacity to single unit of 1,350 MWe. In 2009, the business model and the financing plan for the new Visaginas NPP was prepared and presented. Considering the economic situation and the particularities of the development of NPP projects, a decision was made to attract a Strategic Investor with the experience in nuclear energy and the development of NPP construction projects as well as funds to invest in the Visaginas NPP (*Visagino atominė elektrinė*). The investor was supposed to get majority in the future VAE Project Company and the remaining stake should have been divided among Poland, Lithuania, Latvia, and Estonia. Unfortunately, with Lithuania wanting 34% of the project and Poland then wanting 30% of it, Latvia and Estonia were unhappy with the prospect of minor stakes and the discussion was not clearly resolved (WNA, 2014a).

In 2010, a tender for the selection of a Strategic Investor into Visaginas NPP was organized and also, the IAEA mission evaluated that the assessment of the new NPP's sites was conducted in accordance with its recommendations. There were

only two responses received, but unfortunately one undisclosed did not meet the official tender requirements and the other by Korea Electric Power Corporation (KEPCO) withdrew two weeks later (*Visagino atominė elektrinė*). Therefore later that year it was decided to continue with the selection of a Strategic Investor using direct negotiations.

In May 2011, two proposals from potential strategic investors were received, namely from Westinghouse Electric Company LLC and Hitachi-GE Nuclear Energy Ltd. Westinghouse offered AP1000 reactor technology with the capacity of 1,154 MWe and Hitachi-GE's offer was 1,350 MWe Advanced Boiling Water Reactor. Hitachi-GE was eventually selected to be the strategic investor. Moreover, as it is an EPC contract, the company will also engineer, procure and construct the Visaginas NPP. Through Hitachi-GE, the VAE was later joined by the project company Exelon Corporation, which has the most experience with BWR reactors in the USA.

Tab. 4.7.3: The Hitachi-GE ABW Reactor Scheme



Source: Hitachi-GE Nuclear Energy, Ltd.

Shortly after, Poland withdrew from the project because the VAE's conditions were reported “unacceptable” to PGE SA (state-owned company Polish Energy Group). Thus, the future VAE's Project Company equity shares were redistributed as follows: Hitachi-GE Nuclear Energy, Ltd. 20%, Latvia 20%, Estonia 22%, and Lithuania 38% (WNA, 2014a) through state companies Latvenergo AS, Eesti Energia AS, and Lietuvos Energija, UAB. The shares are described in detail in Table 4.7.4.

Tab. 4.7.4: Equity Shares of Shareholders in the Future Visagino atomine elektrine (VAE) Project Company

Shareholder	Ownership	Equity Share (%)	Visaginas NPP Installed Capacity Share (Mwe)
Hitachi-GE Nuclear Energy, Ltd.	Hitachi Ltd. 80.01%; General Electric Company 19.99%	20	-
Latvenergo AS	Latvian Government	20	330*
Eesti Energia AS	Estonian Government	22	363*
Lietuvos Energija, UAB	Lithuanian Government	38	657
* estimated			

Source: compiled by T. Vlcek from open sources and WNA, 2014a; Ministry of Energy of the Republic of Lithuania, 2013

A consultative referendum about the construction of the Visaginas NPP was held in Lithuania in October 2012 and 62.7% of voters were against the construction (Ministry of Energy of the Republic of Lithuania, 2013). These unfavourable outcomes led Prime Minister Algirdas Butkevičius to form a special work group to analyze the Visaginas NPP project. The

work group eventually stated that the development of the project is possible only if following additional conditions are fulfilled:

- sharing of project implementation expenses, responsibilities, and risks, by entering into legal agreements with regional partners on joint participation in Visaginas NPP project has to be ensured;
- together with Strategic Investor and Regional Partners to ensure maximum project financing at the lowest costs from international financial institutions and export credit agencies, thus securing economic competitiveness of electricity generated by Visaginas NPP;
- to ensure sustained and comprehensive public awareness of the project, considering the fact that the project can be implemented only if national agreement on rational, competitive, sustainable and perspective electricity supply is in place. The project must be developed by the use of the most modern and practically tested nuclear technology (Ministry of Energy of the Republic of Lithuania, 2013, p. 7).

The working group also proposed a balanced and diversified energy self-provision scenario, based on safe nuclear energy development together with renewables to be the best scenario option. Generally, the project was stalled since April 2013 as Lithuania started negotiating the economic conditions of the project with Hitachi-GE, Latvia and Estonia showed some reluctance, and prosecutions against VAE for non-tender purchases of services took place.

It was the Ukrainian Crisis in 2014 that added new energy into the process. A document setting out the nation's strategic goals and the commitment to the construction of the Visaginas NPP as soon as possible was signed by the representatives of all the parliament parties in the presence of Lithuanian president Dalia Grybauskaitė (WNN, 2014). In July, the Ministry of Energy of Lithuania and Hitachi-GE signed the Memorandum of Understanding, in which the establishment of an interim project company to enhance to project was agreed (“Memorandum of Understanding”, 2014). However, several unresolved issues are still to be clarified, including Lithuania's grid synchronization with the EU, project issues with other shareholders, and interconnectors' development.

As the Lithuanian government explicitly excluded the choice of a Russian design, there has been no direct Russian presence in the procurement of VAE. However, Russia is present in two other competing projects in the region, namely in Belarusian Ostrovets NPP (two VVER-1200/491 units of combined capacity of 2,400 MWe) and Russian Kaliningrad's Neman NPP¹ (two VVER-1200/491 units of combined capacity of 2,400 MWe) announced in 2008.

Lithuania and Ukraine has complained about the construction of the Ostrovets NPP in Belarus that should finish in 2018 (Unit 1) and 2020 (Unit 2) for numerous violations of the Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention). But the parties of the Convention at a meeting in Geneva in June 2014 eventually decided that the Belarus NPP under construction at Ostrovets

¹ Also referred to as Baltic Nuclear Power Plant or Kaliningrad Nuclear Power Plant.

is in non-compliance with the provisions of the Espoo Convention (Mitev, 2014). Even though the Lithuanian complaints seemed to be forced rather by political targets than environmental concerns, Belarus has been asked by the parties of the Espoo Convention to take these into consideration and also recommended to approach the International Atomic Energy Agency for an independent assessment of the nuclear power plant site. The Ostrovets NPP is discussed in detail in the Belarus Case Study.

Tab. 4.7.5: Nuclear Power Plant Projects in the Baltic Region



Source: „Baltic or Visaginas“, 2014

The greatest rival to the Visaginas NPP is the Russian project of construction of Neman NPP in the Russian exclave Kaliningrad. The idea came up several times in 1990s with lack of interest from Kaliningrad's authorities. After a new pro-Putin governor of Kaliningrad entered his office in 2005, the political environment and interest in Neman NPP changed. In 2008, JSC Inter RAO UES, where the Rosatom State Atomic Energy Corporation indirectly owns 13.42% stake², eventually presented a proposal to construct a NPP in Kaliningrad. Two units of VVER-1000 were originally intended to be constructed at Neman, but later enhanced to two VVER-1200/V-491 units. The design is the common project of OKB "Gidropress" and JSC "Atomenergoproekt" with the scientific supervision of Kurchatov Institute from Moscow (Jesien & Tolak, 2013, p. 5). It is important to stress that the Neman NPP has been promoted not as a source of electricity for Kaliningrad area, but since the beginning as a source of electricity to be exported to foreign countries, namely Germany, Poland and the Baltic countries. Even though the construction started in February 2010, a search for Strategic Investor was not finished and took place at the same time. The logic was to sell 49% of the Neman NPP to foreign investor, while the control share of 51% would remain in the hands of Russian Federation³. The original plan was to start commercial operations in 2017 (Unit 1) and 2018 (Unit 2). JSC InterRAO UES was responsible for soliciting investment and also for electricity sales but as there are two more NPP projects in the region and basically all of the regional

² See Moldova Case Study for information on equity shareholders.

³ Using money directly from Rosatom as well as from funding from the state budget and loans from Russian banks (see Menkiszak, 2013).

countries had some common history with Russia or Kaliningrad, no investors and no electricity sales were secured in the end, even though Germany and Poland supposedly participated in negotiations with JSC InterRAO UES. Eventually, in May 2013, Rosatom decided to revise its plans to build the Neman NPP and will consider building small- (40 MWe) and medium-sized (640 MWe) reactors instead (Menkiszak, 2013). There are probably several reasons for this decision: no cooperation or support from regional countries, the inability to attract foreign investors, the inability to close contracts for electricity sales, the imminent overcapacity in the region, and also the electricity systems issue. If these problems will not be resolved, Russia will not resume the construction of Neman NPP.

Speaking about the electricity systems issue, the electricity systems of Baltic States operate on the grid of Belarus, Russia, Estonia, Latvia and Lithuania (BRELL), which is a part of IPS/UPS system controlled by Moscow (Grigas, 2013, p. 79-80; Usanov & Kharin, 2014, p. 10). It would be therefore easy to supply electricity in the region after the construction of Neman NPP and this is the main reason why no Baltic country is interested in the Neman NPP project. It would also block the plans for development of electricity interconnectors and synchronizing the grid with the European ENTSO-E. The avoidance of physical dependence on BRELL electricity is among the key targets of Baltic countries nowadays. Besides the new EstLink⁴ and EstLink 2⁵ interconnectors, two new

⁴ From Harku, EST to Espoo, FIN; 330/400 kV; 350 MWe capacity, in operation from 12/2006.

⁵ From Püssi, EST over Nikuviken, FIN to Anttila, FIN; 330/400 kV; 650 MWe capacity, in operation from 3/2014.

electricity interconnectors are being constructed (see Table 4.7.6) to further develop the grid and the connections to ENTSO-E grid. The three Baltic States have already agreed to break up the BRELL and de-synchronize from the IPS/UPS system by 2020 (Menkiszak, 2013).

Tab. 4.7.6: Planned Electricity Interconnectors in the Baltic Region

Interconnector	Voltage	Capacity	In operation date
LitPol (Alytus, LT – Ełk, PL)	330/400 kV	1,000 MWe	12/2015
NordBalt (Klaipėda, LT – Nybro, SWE)	330/400 kV	700 MWe	12/2015
Source: compiled by T. Vlcek from open sources			

Source: compiled by T. Vlcek from open sources

Unfortunately, the de-synchronization would leave Kaliningrad without a connection to the rest of Russia and make it an energy island dependent on its own production of electricity. Moreover, the options of securing electricity supplies are being seriously considered by Russian government, including mentioned small- to medium-sized reactors, electricity link between Kaliningrad and Poland, or integration of Kaliningrad into the ENTSO-E together with the Baltic States. When we add the current very bad relations between the EU and Russia, Kaliningrad's future as an energy island looks like a predetermined outcome (Usanov & Kharin, 2014, p. 10-11; Jesien & Tolak, 2013, p. 4-5; Menkiszak, 2013).

4.7.3 The Front End of the Nuclear Fuel Cycle

As there are no Uranium deposits, and no production, processing and/or fabrication capabilities in Lithuania, no Front End information can be presented.

4.7.4 The Service Part of the Nuclear Fuel Cycle

As stated above, Lithuania operated two units of a RBMK reactor at Ignalina NPP until their shutdown in 2004 and 2009. The idea of construction of the Ignalina NPP emerged during the era of nuclear industry boom in 1970s. The power plant was built as a part of the Soviet Union's North-West Unified Power System rather than to meet Lithuania's needs (Cesna, 2004, p. 159). The first unit was commissioned in 1983, the second in 1987.

Tab. 4.7.7: Nuclear Units in Lithuania

Reactor	Type	Power Output	Status	End of life-cycle
Ignalina 1	RBMK-1500	1,300 MWe*	Decommissioning	2004
Ignalina 2	RBMK-1500	1,300 MWe*	Decommissioning	2009
Visaginas 1	ABWR	1,350 MWe	Planned	-

* Originally 1,500 MWe, but the reactors were de-rated to 1,300 MWe after the 1986 Chernobyl accident as they were of the same type. Construction of Ignalina 3 commenced in 1985 but was suspended after the accident, and the unit was later demolished.

Source: compiled by T. Vlcek from open sources.

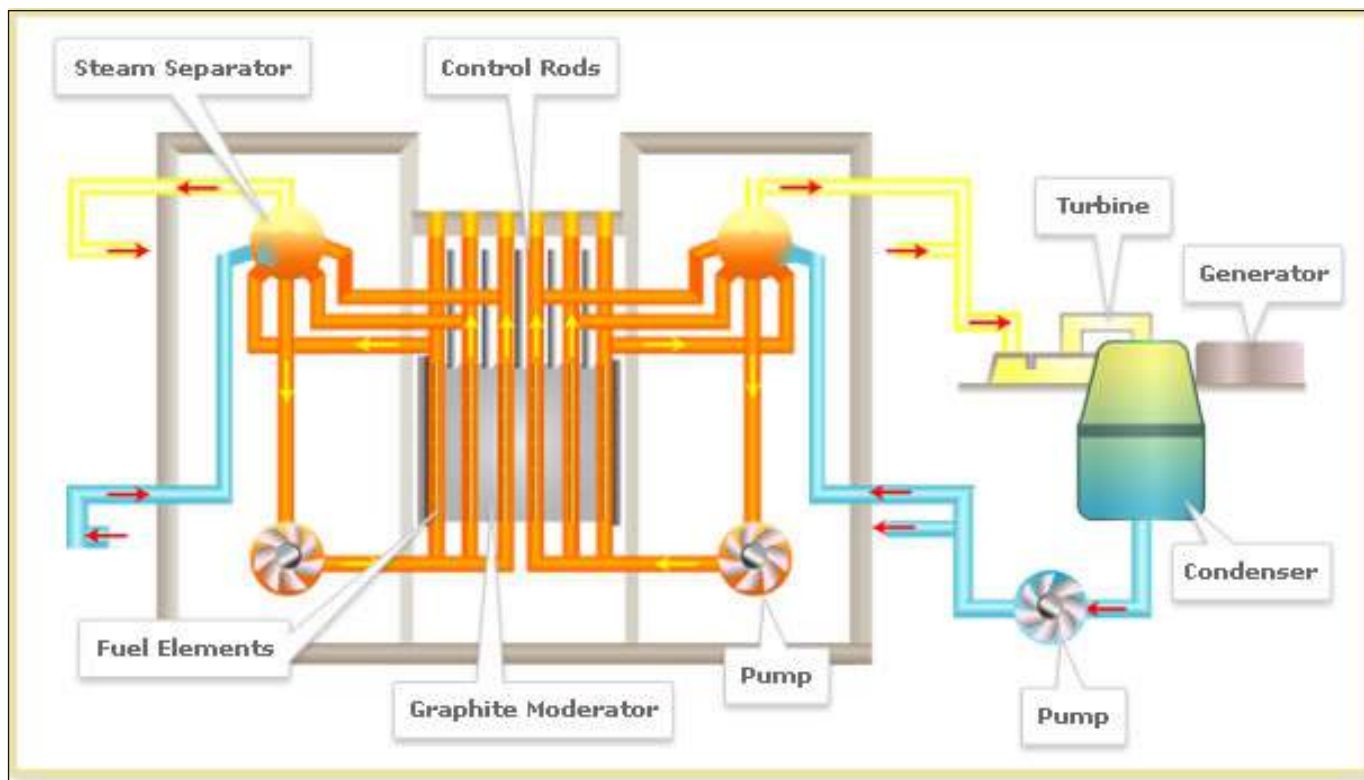
After Lithuania declared independence in 1990, the Ignalina NPP was still guarded by Soviet troops and KGB operatives, and remained under the jurisdiction of the Soviet Union until the August of 1991 (Cesna, 2004, p. 159). Today, the Ignalina NPP is regulated and supervised by Lithuanian State nuclear

power safety inspectorate (VATESI). Even though the plant's operators are ethnic Russians, most have agreed to stay on and become Lithuanian citizens (Pacific Northwest National Laboratory, n.d.). This does not mean that Lithuania does not have enough home-based experts to run the power plant. On the contrary, Lithuania established a complex system of education of nuclear energy engineers at Kaunas University of Technology and is able to secure its own operating personnel (Ziedelis, Gylys, Gediminskas & Brandisauskas, 2014).

The power plant was inherited from the former Soviet Union with a rather low level of safety culture and even though a lot has been done to enhance safety and security standards, this was the reason why Lithuania had to close the power plant's Unit 1 upon joining the EU in 2004 and the second Unit until 2009 as a safety precaution.

Lithuania was dependent solely on Russia in terms of the fuel supplies for Ignalina NPP. As the RBMK reactor design has been invented and developed in Russia and no other country in the world operates these reactors today, Russian company TVEL is the only supplier of nuclear fuel to RBMK nuclear reactors. According to A. Ozharovsky, M. Kaminskaya and C. Digges, the only player on this fuel market - Rosatom - also holds the prerogative to set its pricing policy. Additionally, for all kinds of planned repairs, upgrades, and procedures requiring the replacement of the facility's equipment and materials, Lithuania, again, have had to depend on Rosatom's enterprises. In return for the fuel supplies and services, Lithuania was expected to pay, partly, in power supplies, including the supplies to Russia's Kaliningrad Region (Ozharovsky, Kaminskaya & Digges, 2010).

Tab. 4.7.8: The RBMK Reactor Scheme



Source: *Hong Kong Nuclear Investment Co. Ltd.*

The RBMK is a light-water, graphite-moderated reactor designed by the Soviet Union and currently, all the 11 remaining RBMK operating reactors in the world are in Russia. The shutdown of the last one is planned for 2026.

It is a pressurized water-cooled reactor with individual fuel channels using only slightly-enriched uranium oxide as fuel and graphite as its moderator. The RBMK design allows fuel replenishment while the reactor is in operation. The reactor is very different from most of the other power reactor designs as it is derived from a design intended principally for plutonium production and was used in Russia for both plutonium and power production (WNA, 2010). The RBMK design contains no protective shell, i.e. containment structure which is one of the very basic passive safety measures of nuclear reactors.

Lithuania, forced to shut down the reactors, received assistance for this commitment from EU funds. Out of the total decommissioning costs of €2.8 billion, the EU has committed €1.37 billion up to the end of 2013 (“EU freezes Lithuanian”, 2012). The end stage of the decommissioning process is expected by 2038. The decommissioning process is coordinated by the Ministry of Energy of the Republic of Lithuania.

4.7.5 The Back End of the Nuclear Fuel Cycle

Originally spent nuclear fuel from Ignalina was to be managed by USSR. However, with the disintegration of the Soviet Union, Lithuania was obliged to find other solutions. Therefore, Lithuania now runs facilities for disposal of low, intermediate and high radioactive waste. The Ministry of Economy of Lithuania established state enterprise Radioactive Waste Management Agency (Radioaktyviųjų atliekų tvarkymo agentūra, RATA) in July 2001 to assume the responsibility for the safe management and final disposal of all radioactive waste.

The used fuel was cooled and stored in special storage pools constructed near the reactor premises. But as it is a temporary method, it was decided to construct dry storage at Drūkšiniai at the Ignalina NPP site, approximately 1 km from the reactors. The storage facility was commenced in 1999 and up to 80 casks will be stored here for 50 years. However, the existing dry storage facility has been totally filled and the left spent fuel is still stored in the Unit 2 reactor and storage pools of both units until the new interim storage facility (ISFSF) will be constructed. The new ISFSF will be commissioned at Drūkšiniai in early 2017. The total storage capacity will be about 17,000 fuel assemblies (190 casks). The construction was

financed from the Ignalina International Decommissioning Support Fund (IIDSF) administered by the European Bank for Reconstruction and Development (EBRD) and the constructor was German Consortium NUKEM Technologies GmbH and GNS Gesellschaft für Nuklear-Service mbH (Ignalinos atominė elektrinė). NUKEM Technologies GmbH has been owned by the Russian AtomStroyExport since 2009, and GNS is a joint venture of E.ON, RWE, EnBW and Vattenfall. The construction works are performed by the Lithuanian subcontractor Vetrūna UAB.

There is also the closed Maišiagala Radioactive Waste Storage Facility in Lithuania for radioactive waste generated in industry, medicine, scientific research etc. and Lithuania also plans its final underground repository. Location in the crystalline rocks in southern Lithuania is being developed with the assistance of Swedish experts. The project is in its very beginning.

Tab. 4.7.9: Lithuanian Nuclear Sector Examination

Indicator	Description
Is there nuclear producing capacity present in the country?	Not anymore, the Ignalina NPP (RBMK design, 2 Units of 1,300 MWe each) was shut down in 2009
Is there a project to expand the capacity? What is the status of the project?	Yes, the project is in pre-construction period (licensing, project company establishment, plant designing etc.), construction start is expected in 2015, financing is basically resolved
How was the project procured?	Openly, without Russian bid; Rosatom has been competing through Neman NPP in Kaliningrad and Ostrovets NPP in Belarus

Who is the contractor in charge of the project?	VAE Project Company (20% Hitachi-GE Nuclear Energy, Ltd.; 20% Latvia; 22% Estonia; and 38% Lithuania)
How is the financing secured?	The shareholders will finance the construction according to their shares together with Strategic Investor Hitachi-GE Nuclear Energy, Ltd. (80.01% Hitachi Ltd.; 19.99% General Electric Company)
Who is the operator of the facility?	VAE Project Company (20% Hitachi-GE Nuclear Energy, Ltd.; 20% Latvia; 22% Estonia; and 38% Lithuania)
Are there enough home-based experts to run the facility safely?	Yes
Who is/will be in charge of decommissioning?	Russian TVEL was supplying fuel to the Ignalina NPP as the only supplier in the world for the RBMK reactors; BWR fuel fabrication takes place in much the same way as PWR fuel, therefore many subjects can supply fuel for the Visaginas NPP
What is the experience with the fuel being currently used? Is there any rationale or path-dependency behind the current contract?	The Ignalina NPP is shutdown and the potential Visaginas NPP is of different type with different technical aspects of fuel demand, the path-dependency is thus impossible
Is there any part of nuclear fuel industry present in the country? If so, how it contributes to country's nuclear fuel cycle?	Lithuania has limited capacities only in the Back End of the Nuclear Fuel Cycle that has to be developed
How is used fuel treated and who is in charge of this?	The spent fuel is partly stored in storage pools next to the reactors, and partly in dry storage at the Ignalina NPP site; as the capacity is not enough, new interim storage facility is to be commissioned nearby the Ignalina NPP in early 2017; Radioactive Waste Management Agency established by The Ministry of Economy of Lithuania is in charge of this

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4.8 Country Case Study: Moldova

Tomáš Vlček

4.8.1 Introduction

Moldova (officially the Republic of Moldova) declared its independence in 1991 and it is currently the poorest country in Europe, even though Moldovan economy was able to transform from centrally planned economy quite satisfyingly. The economy is based on service sector and the GDP has slowly but steadily grown since 1999. Approximately 70-75% of the energy sector equipment is worn out. For example, over 2001-2008, gas pipeline losses were estimated at an average of 7% (Moldova Government, 2013, p. 8). As seen in Table 4.8.1, Moldova is nearly 100% dependent on energy sources imports (Moldova does not import crude oil, but imports nearly all consumed oil products; 0.8 Mt in 2010). The renewable energy potential is installed in hydro and this source is inevitably very affected by weather.

Tab. 4.8.1: Key Energy Statistics

Source	Consumption	Imports	TPES share	Electricity Generation share
Crude Oil	0.85 Mt	0%	22.5%	0.5%
Natural Gas	2.18 bcm	100%	67.9%	92.9%
Coal (all types)	0.19 Mt	97.4%	2.8%	0%
RES	-	-	3.1%	6.6%
Nuclear Energy	-	-	0%	0%
Note: 2010 data				

Source: *U.S. Energy Information Administration; International Energy Agency*; compiled and calculated by T. Vlček

Moldova is a small landlocked country and the energy sector is rather small too. The total installed capacity in the electricity system is only 3,016 MWe and the electricity sector is dominated by natural gas (see Table 4.8.2). Out of this nominal capacity, only about 346 MWe in cogeneration in Chisinau and Balti and in the hydro can be used, and only about a half of the capacity of the GRES is used (due to the difficult trading conditions) (Moldova Government, 2013, p. 6-7).

Tab. 4.8.2: Power Plants in Moldova

Power Plant	Installed Capacity	Fuel	Year of Construction
CHP-1 Chisinau	66 MWe	Gas, HFO	1951-1961
CHP-2 Chisinau	240 MWe	Gas, HFO	1976-1980
CHP-North Balti	28.5 MWe	Gas, HFO	1956-1970
4 CHP in Falesti and Drochia Sugar Factories*	97.5 MWe	Biogas from sugar beet pulp	1956-1981**
HPP Costesti	16 MWe	Water	1978**
HPP Dubasari	48 MWe	Water	1954-1966**
TPP Dnestrovsc (GRES)	2,520 MWe	Gas, coal, HFO	1964-1982
Note: CHP = Combined Heat Power Plant, HPP = Hydroelectric Power Plant; TPP = Thermal Power Plant; HFO = Heavy Fuel Oil * Factories owned by Südzucker Moldova SA ** Modernized during 2010-2013			

Source: *UNECE, 2009*, p. 3; T. Vlcek

The TPP Cuciurgan in Dnestrovsc is the biggest power plant in Moldova with the installed capacity of 2,520 MWe. The power plant is located on the left bank of the river Dniester in the Transnistrian Region, which after the war in 1992

declared itself the Pridnestrovian Moldavian Republic. The territory is unrecognized by any UN member state and by Moldova it is recognized as the Transnistria autonomous territorial unit with a special legal status. Therefore, electricity produced here and used in Moldova is deemed imported. Anyway, the fact that only about a half of the capacity of the GRES is used is caused by no connection with the EU's internal electricity market, which significantly affects the regional prices of electricity. The high prices of electricity generation at GRES and the volatile import tariffs for electricity from Ukraine are among the reasons for regular supplier switches between Transnistria and Ukraine. The Moldovan possible connection to ENTSO-E is very difficult due to historical connection and synchronization with Ukrainian system.

Moldova does not have any other option than to import electricity from Ukraine, Transnistria or potentially from Romania. There are seven double-330 kV international transmission lines between Moldova and Ukraine capable of transporting 1,400-1,500 MWe. As about 1,000 MWe are used by transits to Odessa, the net import capacity of Moldova is about 400-500 MWe (Zachmann & Oprunenco, 2010, p. 6). There is one 400 kV transmission line to Romania from Vulkănești in the south. This line is used for exports of electricity produced at GRES to Romania as electricity prices in Romania are much higher than in Ukraine or GRES. But it is exported only to a small border part of Romania due technical and historical reasons as the two countries are not synchronized. The local consumption in this area equals to only about 3-5% of Romanian consumption.

Due to the difference in frequency standards the systems do not work in parallel, i.e. import or export of power can take place based on island principal only (The Carbon Finance Unit of the Republic of Moldova, 2011, p. 11). There is a planned project of a converter station at the line to Romania to link the two asynchronous systems.

The Moldovan domestic production of electricity in 2010 reached 888.1 GWh while the consumption was 3,915.6 GWh (Moldova Government, 2013, p. 67). Moldova is therefore a net importer of electricity with the need of approximately 3,000 GWh annually. Since 2009, nearly 100% of electricity imports have come from Transnistria's Cuciurgan power plant (known as GRES in Moldova). Due to high prices of electricity produced in GRES and other reasons, in 2006-2008, Moldova imported electricity from Ukraine, and as explained above, Moldova imports electricity only either from Ukraine or Transnistria.

The situation with Transnistria's Cuciurgan power plant is very complicated. The power plant is supplied with natural gas through the company Tiraspoltransgas-Pridnestrovie (ООО Тираспольтрансгаз-Приднестровье) based in Transnistria. This is a daughter company of Moldavian JSC MoldovaGaz (АО Молдовагаз). Since 1993, Tiraspoltransgas does not pay for natural gas and this debt passes to MoldovaGaz as it is the mother company. The debt is currently calculated for USD 3 billion. A long discussion with Gazprom and Moldovan aiming to pass the debt back to Tiraspoltransgas has not ended with understanding, as Gazprom uses the Moldovan debt for Cuciurgan power plant's consumption as a political leverage. Gazprom is also a shareholder in both Tiraspoltransgas and

MoldovaGaz (51% in both companies supposedly). Moldovan foreign policy is thus strongly influenced by Gazprom.

Moldova purchases electricity in Transnistrian Cuciurgan TPP and also owes for this TPP's consumption of natural gas, which is, of course, strongly uneconomical for Moldova. Chisinau solves the situation by switching from Cuciurgan's electricity to electricity imported from Ukraine, where the power plants has been already paid off and the electricity price was lower due to overcapacity in the country. However, this situation has changed recently for two reasons. First, the Ukrainian crisis led to problems in domestic electricity production, and since 2014, Ukraine is no longer willing and able to export electricity to Moldova. And second, Ukrainian export policy changed in terms of pricing in 2011. Ukraine raised electricity price and also added new condition – the price of electricity shall be raised every month by 2.1 USD cents per 1 MWh. This eventually led Moldova to return to electricity imports from undesirable Transnistrian Cuciurgan TPP for economic reasons.

Until 1997, the state company Moldenergo had been in charge of the Moldovan electricity sector, then after liberalization and unbundling, Moldenergo transformed into 16 new entities. There are 3 electricity generation companies, 5 distribution companies and state-owned transmission and central dispatch “Moldtranselectro”. In 2000, the Spanish company “Union Fenosa” acquired 100% of the share capital in three out of five distribution companies (Zadnipru, 2011, p. 4). The ZAO Moldavskaya GRES Company operating the biggest power plant GRES is owned by the company JSC Inter RAO UES. The ownership structure is seen in Table 4.8.3.

Tab. 4.8.3: The Ownership Structure of JSC Inter RAO UES

Equity holder	Share
Rosneftegaz Group	27.63 %
FGC UES Group	18.57 %
Minorities	16.65 %
INTER RAO Capital	13.93 %
Norilsk Nickel Group	13.21 %
VEB	5.11 %
RusHydro Group	4.92 %
Note: through minorities Atomstroyexport JSC, Rosenergoatom Concern OJSC, Rosatom Securities Limited the Rosatom State Atomic Energy Corporation owns 13.42% stake in JSC Inter RAO UES as of 2012.	

Source: *JSC Inter RAO UES*; „*JSC Inter RAO UES*“, 2012

4.8.2 New Units and Financing of the Nuclear Plant

As Moldavian Soviet Socialist Republic Moldova had been one of the fifteen republics of the USSR until the dissolution of the Soviet Union, the planned Soviet design NPP at Piatra Neamț in Romania have had supposedly been a source of electricity not only for Romania but for Moldova as well. But the plan for the construction of VVER-440 or VVER-1000 design in Romania was cancelled in 1980s (see Romania case study for detailed information). Another plan to construct Soviet-design NPP in Rîbnița emerged in 1985 and building foundations were prepared. But this plan was dismissed after the Chernobyl accident and no plan for NPP in Moldova was considered ever after.

In 2003, there were information that Moldova is investigating possibilities of building a NPP and the president of Moldova V. Voronin and French ambassador to Moldova

E. Pamboukjian spoke out for prompt beginning of consultations on the issue (“Moldova builds”, 2003). The topic stayed only within the mentioned consultations and was not further developed. The whole topic seems to be just political expressions during mutual visits of the presidents of Moldova and France. The plan was eventually changed for 400 MWe natural gas power plant in Burlăceni, but this was also rejected due to lack of finances.

In December 2014, Romanian Minister for Energy Răzvan-Eugen Nicolescu said that Romania would welcome Moldova as a partner in the Cernavoda NPP expansion project (“Romania wants”, 2014), e.g. to become a shareholder in the EnergoNuclear SA. Moldova's partnership in the project would be a third competitive option for electricity imports besides Ukraine and Transnistria and the proposal seems beneficial even though additional investments to synchronize the two countries' electricity sectors would be necessary. However, it is impossible for Moldova to take part in the project financially, so Moldova's partnership is deemed rather symbolical.

4.8.3 The Front End of the Nuclear Fuel Cycle

As there are no Uranium deposits and no production, processing and/or fabrication capabilities in Moldova, no Front End information can be presented.

4.8.4 The Service Part of the Nuclear Fuel Cycle

As there are no nuclear power plants in Moldova, no Service Part information can be presented.

4.8.5 The Back End of the Nuclear Fuel Cycle

As there are no nuclear power plants and nuclear industry in Moldova, no Back End information can be presented.

Tab. 4.8.4: Moldovan Nuclear Sector Examination

Indicator	Description
Is there nuclear producing capacity present in the country?	No
Is there a project to expand the capacity? What is the status of the project?	No
How was the project procured?	-
Who is the contractor in charge of the project?	-
How is the financing secured?	-
Who is the operator of the facility?	-
Are there enough home-based experts to run the facility safely?	No
Who is/will be in charge of decommissioning?	-
Who provides nuclear fuel and under what conditions?	-
What is the experience with the fuel being currently used? Is there any rationale or path-dependency behind the current contract?	-
Is there any part of nuclear fuel industry present in the country? If so, how it contributes to country's nuclear fuel cycle?	No
How is used fuel treated and who is in charge of this?	-

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4.9 Country Case Study: Poland

Tomáš Vlček

4.9.1 Introduction

Poland played an important role in European history, as powerful kingdoms were spread on today's Polish soil since the time of Bolesław I Chrobry, the first Polish king, until the end of the Polish–Lithuanian union and Polish–Lithuanian Commonwealth. The historical importance and strategic position of Poland in Central Europe and the Baltic could also be deduced from the so called Partitions of Poland, when Europe's powers divided Polish territory among themselves in 1772, 1793, 1795, and 1939.

The Polish Republic emerged according to the Treaty of Versailles after the WWI. Unfortunately, Poland had to fight several border wars and the war with Soviet Union for its independence. Poland was occupied by Germany and the USSR during the WWII and eventually left under Soviet control after the war. Poland is very famous for the anti-communist socio-political opposition called Solidarity - an independent trade union created in 1980 that significantly contributed to the collapse of communism in Poland. The modern Republic of Poland was created on September 13, 1989, and since that time managed to enter the NATO, the EU, implement market economy principles in the country, and significantly restore its diplomatic power.

Although Poland is practically self-sufficient in terms of electricity production, it is dependent on imports of hydrocarbons. Poland imports nearly all of its oil demand from

a single source being the Russian Federation through the Druzhba pipeline (96% in 2012). There are six refineries in Poland, with a total primary distillation capacity of around 25.3 Mt/y (OECD & IEA, 2014, p. 363). These are the Refineries Lotos S.A. (in Gdańsk), Orlen S.A. (in Płock), Trzebinia S.A. (at Czyżówka near Trzebinia), Czechowice S.A. (in Czechowice-Dziedzice), Jasło, S.A. (in Jasło) and Jedlicze S.A. (in Jedlicze). Polski Koncern Naftowy (PKN) Orlen SA and Grupa Lotos S.A. are owners of these refineries and account for almost the entire Polish refining industry.

Speaking about natural gas, Poland imports approximately 2/3 of domestic demand and the rest is produced in the country (6.2 bcm in 2012). The share of Russian gas in Poland's total gas imports stood at 80% in 2012, while gas imports from Germany accounted for 15% in the same year (OECD & IEA, 2014, p. 370-371).

Both crude oil and natural gas are also transported via the Druzhba and Yamal pipelines through Poland to Germany.

Tab. 4.9.1: Key Energy Statistics

Source	Consumption	Imports	TPES share	Electricity Generation share
Crude Oil	27.74 Mt	85%	24.9%	1.5%
Natural Gas	17.19 bcm	69%	12.7%	3.6%
Coal (all types)	139.1 Mt	11%	54%	86.6%
RES	-	-	8.5%*	8.3%
Nuclear Energy	-	-	0%	0%
* Biofuels and waste stand for 8% of TPES and 4.7 % of electricity generation shares Note: 2011 data				

Source: U.S. Energy Information Administration; International Energy Agency; compiled and calculated by T. Vlcek

Poland is strongly dependent on coal in electricity production; in fact, it is the world's most coal-dependent country. There are some small capacities in other power plant types, such as natural gas in Gorzów CCGT (65.5 MWe) and Zielona Góra CCGT (198 MWe), water in Pumped Storage Hydroelectric Power Plant in Żarnowiec (680 MWe) and Żydowo (150 MWe), in some RES projects, especially wind farms, and as it is relatively easy to transform a coal-fired power plant to waste-fired one, 4.7% of electricity in 2011 was generated from waste.

But 86.6 % of electricity in 2011 was produced in coal-fired power plants, including hard coal as well as low-quality lignite. There are 65 hard coal and 5 lignite power plants in Poland (Kudelko, Suwala & Kaminski, n.d., p. 7). Table 4.9.2 presents the biggest coal-fired power plants in Poland. Bełchatów TPP (5,354 MWe) is the world's third largest coal-fired power plant after Taiwanese Taichung TPP (5,834 MWe) and Chinese Tuoketuo TPP (5,400 MWe, to be expanded by another 1,320 MWe).

This obviously causes trouble for the environment in Poland and for Polish CO₂ emissions reduction targets. There is already an impending penalty of over EUR 133 thousand for Poland failing to transpose its Renewable Energy Directive, which aimed at ensuring a 20% share of renewable energy in the EU by 2020 (Yeo, 2013), and as Poland is failing to achieve its part in the EU goal to reduce emissions by 20% by 2020, it is opposing the EU and the European Commission's plans to set more ambitious goals of 40% cut in CO₂ emissions by 2030 versus 1990 levels (Wasilewski, 2013). Due to Poland's coal-dependence, the country is a long-term stable critic of EU environmental goals.

Tab. 4.9.2: 1,000 MWe+ Power Plants in Poland

Power Plant	Installed Capacity	Fuel	Operator	Construction Year
Bełchatów TPP	5,354 MWe	Lignite	PGE GiEK S.A.	1981
Kozienice TPP	2,913 MWe	Hard Coal	ENEA S.A.	1972
Połaniec TPP	1,800 MWe	Hard Coal	Electrabel Połaniec SA (GDF Suez)	1973-1979
Rybnik TPP	1,775 MWe	Hard Coal	EDF Polska Oddział w Rybniku	1972
Turów CHP	1,694.8 MWe	Lignite	PGE GiEK S.A.	1962-1971
Pątnów I, II CHP	1,669 MWe	Lignite	Zespół Elektrowni Pątnów- Adamów-Konin SA*	1958-1974
Opole TPP	1,532 MWe**	Hard Coal	PGE GiEK S.A.	-
Jaworzno II, III CHP	1,485 MWe	Hard Coal	Tauron Polska Energia S.A.	1972-1979
Dolna Odra CHP	1,362 MWe	Hard Coal	PGE GiEK S.A.	1974
Łaziska CHP	1,155 MWe	Hard Coal	Tauron Polska Energia S.A.	1967-1972
* Ownership structure: 52.67% Zygmunt Solorz-Żak; 10.76% ING Open-end Pension Fund; 36.57% Others ** A 1800 MW expansion of the station began construction in 2014 Note: CHP = Combined Heat Power Plant, TPP = Thermal Power Plant				

Source: *Polska Grupa Energetyczna SA and other open sources*

Poland produced 163.5 TWh of electricity in 2011, of which 57 TWh was produced within the company PGE SA (Polska Grupa Energetyczna) (*International Energy Agency; Polska Grupa Energetyczna SA*). The company production portfolio thus constitutes 34.9 % of the country's electricity production with 12.86 GWe of installed capacity. The company is owned by State Treasury (58.39%) and other investors (41.61%) in 2014. Other important electricity generating companies include Tauron Polska Energia S.A., ENEA S.A., EDF Polska, GDF SUEZ Energia Polska S.A., ZE PAK SA, and others.

4.9.2 New Units and Financing of the Nuclear Power Plant

Poland's problematic dependence on domestic coal in electricity production is the key reason for nuclear energy development plans, and much has been done since 2005, when it was decided to introduce nuclear energy to Poland again. On November 10, 2009, the Council of Ministers adopted a resolution on the Polish Energy Policy until 2030. This resolution expects 10% of electricity generation share to be from nuclear energy (Ministerstwo Gospodarki, 2009a, p. 28) and in the appendix 2 it is planned to operate nuclear capacities of 1,600 MWe in 2020, 3,200 MWe in 2025, and eventually 4,800 MWe in 2030 (Ministerstwo Gospodarki, 2009b, p. 16). The Council of Ministers also issued a resolution on the actions taken for the development of nuclear power industry in 2009, where it was stated that it is necessary to prepare and implement a program for Polish nuclear power industry. Therefore the Government Plenipotentiary for Polish Nuclear Power was appointed and in January 2014 the Council of Ministers adopted the Polish Nuclear Power Program (PNPP; the first draft of the PNPP was presented in 2010), which envisions the construction of country's first nuclear power plant by 2024 (Unit 1) and 2029 (Unit 2). The capacity targets were reconsidered to be of minimum value 1,000 MWe for 2024; 3,000 MWe minimum value for 2030, and 6,000 MWe as a 2035 target (Ministerstwo Gospodarki, 2014, p. 19).

Since 2009 the Government has been searching for the optimal NPP site. The first appraisal of the site criteria by Energoprojekt Warszawa SA proposed 28 locations, of which eventually three were chosen by the investor: Żarnowiec (in the

city of Kartoszyno), Choczewo (5 km from Żarnowiec) and Gąski (between the towns of Kołobrzeg and Koszalin on the coast of the Baltic Sea). Preparations for location and environmental research were started in February 2013 for the sites of Choczewo and Żarnowiec. The outcome will enable to finally indicate the site for the first Polish NPP (Ministerstwo Gospodarki, 2014, p. 100-103). It is likely that the second power plant would stand on the second location coming out from this research.

The company PGE SA (Polska Grupa Energetyczna) – Poland's largest power group by generating capacity – is the investor in the nuclear project. In January 2010, a limited liability company PGE Energia Jądrowa 1 Sp. z o.o. in the portfolio of the PGE SA company was established as the project company responsible for preparing the investment process and the construction (the construction itself will be overseen by the National Atomic Energy Agency), as well as to be the future operator and licensee. Originally, the PGE SA aimed at 51% share in a consortium with foreign strategic partners, but after several changes throughout the years, the PGE SA holds 70% in the project company, while ENEA S.A., KGHM Polska Miedź and Tauron Polska Energia S.A. own 10% stake each. This was confirmed in a Shareholders' Agreement in September 2014 (*PGE Energia Jądrowa 1 Sp. z o.o.*). The project total expenditures are estimated to USD 10.3-11.3 billion (WNA, 2014) that these companies will split according to their shares in the project company.

Tab. 4.9.3: Shareholders of the PGE Energia Jądrowa 1 Sp. z o.o. project company

Shareholder	Share	Ownership Structure
PGE SA	70%	58.39% Ministry of State Treasury; 41.61% Other Investors (Free float)
ENEA S.A.	10%	51.50% Ministry of State Treasury; 48,50% Other Investors (Free float)
Tauron Polska Energia S.A.	10%	30.06% Ministry of State Treasury; 10.31% KGHM Polska Miedź S.A.; 5.06% ING Otwarty Fundusz Emerytalny; 54.49% Other Investors (Free float)
KGHM Polska Miedź S.A.	10%	31.79% Ministry of State Treasury; 68.21% Other Investors (Free float)

Source: compiled by T. Vlcek from open sources

The actual tender for the contractor has not been opened yet, but it is very likely that there will be no Russian contractor or subcontractor in the project due to Polish very strong traditional anti-Russian feeling. In February 2014, four bidders submitted tender offers to PGE EJ 1 Sp. z o.o. to provide technical assistance as owner's engineer for the program. These were AMEC Nuclear UK Limited, Exelon Generation Company, LLC, a Mott MacDonald Limited – Aktiebolaget Ångpanneföreningen AB consortium, and a URS Polska Sp. z o.o. – Tractebel Engineering GDF-Suez consortium. In July, the company announced its selection of AMEC Nuclear UK Limited. The owner's engineer will help select EPC (Engineering, procurement and construction) contractor, oversee project management, and supply chain contract management as well as regulatory aspects (WNA, 2014).

Several non-exclusive agreements were signed between PGE SA and Électricité de France S.A., GE Hitachi Nuclear Energy and Westinghouse Electric Company LLC to investigate using

their respective technologies in Poland. Korea Electric Power Corporation KEPCO is interested in Polish nuclear project as well, and estimates so far pointed towards the selection of Korean APR1400 or AREVA's EPR (Kulczynski, 2014).

PGE SA expects to make a final investment decision on the two plants by 2018. Final design and permits for the first are expected to be ready in 2018, allowing construction start in 2020. The first unit is now expected to be operational in 2024, the second one in 2029 (WNA, 2014). The financing model is not completed, but to avoid breaking the EU state-aid rules, the Ministry of State Treasury is not expected to involve directly.

4.9.3 The Front End of the Nuclear Fuel Cycle

Poland has historical experience with uranium mining and processing. First uranium ores were found in 1853, but until 1942, uranium was treated as waste with no commercial value as radium was the desired mineral (Chajduk & Polkowska-Motrenko, 2012, p. 4). Uranium was mined in Sudetenland for German WWII nuclear projects and eventually for Soviet projects. During 1948-1963, the Polish-Soviet enterprise "Kowarski Mines" named after Kowary site was responsible for the production of c.a. 704 tons of uranium that has all been sent to the USSR. The uranium mining facilities were secret and were codenamed R1. The extraction took place in many underground mines in Poland, such as Wolność, Podgórze, Miedzianka, Radoniów, Rubezal, Mniszków, Wiktoria, Wołowa Góra, Radoniów, Wojcieszce and others (Chajduk & Polkowska-Motrenko, 2012, p. 5-9; Rewerski, Mielnicki, Bartosiewicz, Polkowska-Motrenko & Skłodowska, 2013, p. 5-6).

All mines were closed in 1960s and 1970s and there are no operating mines nowadays. Although uranium had no commercial value in the past, there are large number of abandoned piles of waste rock that contain uranium. And even though the concentration is generally very low (under 0.01%), there are some interesting locations such as Kopaniec pile where the concentration reaches up to 0.24%. Therefore the possibility of uranium extraction from post-mining wastes is also analyzed (Rewerski, Mielnicki, Bartosiewicz, Polkowska-Motrenko & Sklodowska, 2013, p. 7) together with the possibility of mining domestic uranium resources after the plan to construct an NPP has been introduced.

Polish historic geological documentation (see Table 4.9.4) suggests that there are uranium deposits in Poland, but no modern prospects were executed, except for the Radoniów area that is being prospected since 2012 (OECD & IAEA, 2014, p. 348).

Tab. 4.9.4: Potential Conventional Uranium Resources in Poland

Region	Resources in place (t)	Uranium content (%)
"Rajsk" deposit	5,320.0	0.025
Okrzeszyn	937.6	0.05-0.11
Grzmiaca	792.0	0.05
Wambierzyce	217.5	0.0236

Source: *OECD & IAEA*, 2014, p. 348

The estimation of the total identified uranium resources amount to 7,267.1 tons, which is the reason why Poland is interested in the extraction. The potential uranium reserves

could positively affect the dependency on imported nuclear fuel. On the other hand, it is more likely that they would stay as potential uranium reserves, as it is very likely that the price of extraction and its use in the fuel would be more expensive than the purchase of commercial fuel. Also, there is strong local opposition in the potentially uranium-rich sites (*Powiedz Nie dla Kopalni Uranu w Sudetach*). For example, the prospecting process at Kopaniec (undertaken by Australian company European Resources Pty Ltd) was strongly opposed both by the Municipality of Stara Kamienica and the local inhabitants.

It is important to mention that Poland has also some short experience with uranium processing. It was the ore, not the metal that was transported to the USSR under the Polish-Soviet enterprise “Kowarski Mines”. And when the Polish mines became depleted and closed, the chemical processing of low-grade ore waste in Kowary began operation in 1969 and lasted until 1972, extracting some uranium even from the waste. One of the biggest environmental radioactive isotope contaminations in Poland, the Kowary tailing pond, was remediated with financial support of the European Commission in 2001.

In the end, as no Uranium is produced nowadays, and there are no processing and/or fabrication capabilities in Poland, no Front End information can be presented.

4.9.4 The Service Part of the Nuclear Fuel Cycle

In 1982, Poland started construction of a nuclear power plant called Żarnowiec (named after the Jezioro Żarnowieckie lake) in the city of Kartoszyno, not far from the Gdynia and Gdańsk ports. It was an NPP with four VVER-440 units and it was

planned as only a first step in Poland's nuclear power program, as the construction of the Warta NPP in the village of Klempicz was envisaged. The Żarnowiec project was carefully planned and a superb infrastructure developed in the area. The reactor vessels were manufactured in Škoda factory in Czechoslovakia, while the turbines and generators were made in Poland. Polish boiler factory Rafako built the Steam Generators (Kulczynski, 2010). After the Chernobyl accident, protests against the Żarnowiec NPP were strong in Poland and after the construction break, the government eventually decided to abandon the project. A referendum in 1990 in the Gdańsk Voivodeship with very clear outcome played also its part in the decision.

The components in the under-construction plant were sold and the country became very anti-nuclear, putting a temporary freeze on nuclear projects overall until at least 2000 (Raguzina & Kamiskaya, 2010). And truly, the nuclear project has been reconsidered in 2005, when it was decided by the Polish cabinet to introduce nuclear energy to Poland again.

There is a quite extensive nuclear research in Poland taking place at the National Center for Nuclear Research (Narodowe Centrum Badań Jądrowych, NCBJ) in Otwock-Świerk. The NCBJ emerged in 2011 by joining the former Institute of Atomic Energy POLATOM (Instytut Energii Atomowej POLATOM) with the former Andrzej Sołtan Institute for Nuclear Studies (Instytut Badań Jądrowych im. Andrzeja Sołtana). The NCBJ houses a Polish-design MARIA research reactor of 20-30 MWt operating since 1974. The NCBJ is currently the largest research Institute in Poland that is expanding quickly.

Between 1958 and 1995, the Andrzej Sołtan Institute for Nuclear Studies operated also the Russian design VVR-S research reactor named EWA (Eksperymentalny Wodny Atomowy Reaktor) with 2 MWt (later increased to 10 MWt) installed capacity. Also other nuclear research devices (MARYLA 0.1 MWt research reactor, AGATA and ANNA critical assemblies) have been already dismantled in the past.

And as there are no nuclear power plants in Poland, no Service Part information can be presented.

4.9.5 The Back End of the Nuclear Fuel Cycle

There are currently four spent fuel storages in Poland. Three of them (the interim spent fuel storage facilities 19 and 19A and technological pool of MARIA research reactor) are situated at Świerk. The fourth facility is the near-surface National Radioactive Waste Repository in Różan (Krajowe Składowisko Odpadów Promieniotwórczych, KSOP Różan) operating since 1961.

The National Radioactive Waste Repository is subject to the state enterprise Radioactive Waste Management Plant (przedsiębiorstwo państwowe Zakład Unieszkodliwiania Odpadów Promieniotwórczych, ZUOP) that also operates the 19 and 19A pool-type facilities in Świerk (the technological pool of MARIA reactor is of course operated by the NCBJ). The Plant (a state-owned company) is subordinated to the Polish Ministry of State Treasury, while National Atomic Energy Agency (Państwowa Agencja Atomistyki, PAA) under the Ministry of Environment is responsible for activities connected with the licensing and oversight of nuclear safety and radiological protection¹.

As the Rózan repository will be closed in 2020-2022, a new repository should be constructed and the Ministry of State Treasury is currently working on the National Plan of Radioactive Waste and Spent Nuclear Fuel Management (European Commission, 2012, p. 4). Therefore the new Low and Intermediate Radioactivity Waste Disposal is one of the most important goals of Polish Nuclear Power Program. The site selection process has not yet been closed but the construction should be completed before 2020.

A deep underground geological repository is also considered as the final repository of spent fuel from the future nuclear units. However, the necessity to construct such a repository will arise in about 30-40 years after commissioning the first nuclear power plant, i.e. in about 2050 at the earliest. By this time, spent nuclear fuel will be stored on-site the NPP (Ministerstwo Gospodarki, 2011, p. 32).

¹ There is also a Government Commissioner for Nuclear Energy under the Ministry of Economy for activities related to peaceful use of nuclear energy to satisfy social and economic needs of Poland (Ministry of Economy of Poland, 2011, p. 15).

Tab. 4.9.5: Polish Nuclear Sector Examination

Indicator	Description
Is there nuclear producing capacity present in the country?	No
Is there a project to expand the capacity? What is the status of the project?	Yes, 2 units of 3,000 MWe combined until 2029, another 3,000 MWe until 2035; site selection process is finishing and public procurement for the contractor is expected to be open soon
How was the project procured?	So far openly and professionally, the public procurement for the contractor did not yet take place; Russian technology is not considered at all, bids from following four subjects can be expected: Électricité de France S.A. together with AREVA S.A.; GE Hitachi Nuclear Energy; Westinghouse Electric Company LLC; Korea Electric Power Corporation KEPCO
Who is the contractor in charge of the project?	Unknown yet
How is the financing secured?	There are four investors in the project company to finance the construction, contractor's financial participation is possible and expected
Who is the operator of the facility?	PGE Energia Jądrowa 1 Sp. z o.o. (70% PGE SA; 10% ENEA S.A.; 10% Tauron Polska Energia S.A.; 10% KGHM Polska Miedź S.A.)
Are there enough home-based experts to run the facility safely?	Yes
Who is/will be in charge of decommissioning?	The responsibility for radioactive waste management issues rests with the Ministry of Economy and the Minister State Treasury (supervisor of the state-owned "Radioactive Waste Management Plant") overseen by the Polish National Atomic Energy Agency
Who provides nuclear fuel and under what conditions?	The issue of nuclear fuel supply will likely be addressed in the tender or after the NPP construction
What is the experience with the fuel being currently used? Is there any rationale or path-dependency behind the current contract?	As there is no NPP, there is no fuel experience

Is there any part of nuclear fuel industry present in the country? If so, how it contributes to country's nuclear fuel cycle?	No
How is used fuel treated and who is in charge of this?	Standard cooling in ponds followed by interim storage; Radioactive Waste Management Plant (state enterprise managed by the Polish Ministry of State Treasury) is in charge of storage

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4.10 Country Case Study: Romania

Tomáš Vlček

4.10.1 Introduction

Romania, together with Bulgaria, is one of the very latest countries to join the European Union. They have been member states since January 1, 2007, and only Croatia's joining in 2013 followed ever since. As one of the countries of the former Eastern Bloc, the Romanian economy is still burdened with residues of the centrally planned economy, even though all the former Eastern Bloc countries underwent the process of transition towards market economy in 1990s. The energy efficiency of transport has been dropping since 2000, and the trend is considered irreversible at present. On the other hand, in the period 2000-2010, the whole country's energy efficiency was twice as good as the EU's according to energy efficiency indicator (ODEX) (ICEMENERG & ANRE, 2012, p. 66). This has a lot to do with the fact that the Romanian energy sector is not as heavily reliant on hydrocarbon imports and on the use as other post-Soviet countries.

The top three electricity generation sources are hydro, coal and nuclear. On the country's total electricity production of 57.8 TWh in 2010, these accounted for 35.7%, 33.8%, and 19.4% (see Table 4.10.1). The total installed capacity in SEN (National Energy System) in 2011 was 21,717 MWe (Hidroelectrica, 2012, p. 14). With the installed capacity of 6,382 MWe in 2011 (Renewable Facts, 2011), hydropower is among the most important sources of electricity in Romania. This is due to a very favourable situation in Romanian

hydrogeology. All the 587 hydro production units are united under the company S.C. HIDROELECTRICA S.A., out of which 7 have more than 200 MWe of installed capacity and 5 are pumping stations (S.C. Hidroelectrica S.A.). The largest one is The Iron Gate I (Portile de Fier I) on the Danube River with 2,246 MWe installed capacity built as a joint venture with the former Yugoslavia. Nowadays, half of the power plant belongs to Serbians and half to Romanians.

Tab. 4.10.1: Key Energy Statistics

Source	Consumption	Imports	TPES share	Electricity Generation share
Crude Oil	10.81 Mt	56%	25%	0.9%
Natural Gas	13.76 bcm	23%	30%	10.2%
Coal (all types)	39 Mt	4.6%	22%	33.8%
RES	-	-	15%	35.7%*
Nuclear Energy	-	-	8%	19.4%

Note: 2011 data, Oil Consumption and Electricity Generation share data from 2010
 * Almost the whole figure stands for hydropower. Wind power as the second most developed RES in Romania has risen from 7 MWe in 2007, over 440 MWe in 2010, to 2,599 MWe in 2013. Other RES are negligible.

Source: *International Renewable Energy Agency, 2012; European Commission, 2012; U.S. Energy Information Administration; Lificiu, 2012; compiled and calculated by T. Vlcek*

Altogether 5,918 MWe of installed capacity in the Romanian electricity sector in 2011 accounts to coal-fired power plants. Hard coal reserves and resources are estimated at 2,446 Mt, of which 252.5 Mt are commercially exploitable within the currently leased perimeters, although as little as 11 Mt might be economically recoverable. Proven reserves of lignite total to 280 Mt, with further 9,640 Mt of resources. 95%

of lignite deposits are situated in the Oltenia mining basin and more than 80% of these can be mined in opencast mines. The main consumers of hard coal are the thermal power plants at Paroşeni (3 x 50 MWe) and Mintia (6 x 210 MWe). The main consumers of lignite are Turceni (2,640 MWe), Rovinari (1,720 MWe) and Mintia - Deva (1,260 MWe) and 300 MWe Craiova power plant (Euracoal, 2013). Coal sector is quite supported also by the inhabitants, as the monoeconomical mining areas are strongly connected with employment.

Romania has one nuclear power plant at Cernovoda with 1,413 MWe, which has two Canadian designed CANDU pressurized heavy water reactors that began operating in 1996 and 2007. Construction started in the 1980s, with the initial intention of five units. The first two units were partly funded by the Canadian Export Development Corporation with the second unit co-funded by Euratom (Schneider & Froggat et al., 2014, p. 134). Construction of the first unit started in 1980, and construction of units 2-5 in 1982. In 1991, work on the last four was suspended in order to focus on the unit 1, responsibility for which was handed to an AECL-Ansaldo (Canadian-Italian) consortium. The second 700 MWe unit had been built by an AECL-Ansaldo-SNN management team, and entered commercial operation in October 2007 (WNA, 2014). The SNN, Societatea Nationala Nuclearelectrica, Romanian state nuclear power corporation established in 1998 was assigned to operate the Cernavoda NPP. The shareholders are the Romanian Government (91%) and Romanian Property Fund (9%). The main shareholder of the Romanian Property Fund is the Ministry of Economy and Finance (66 %), the rest are private shareholders.

4.10.2 New Units and Financing of the Nuclear Power Plant

As the original plan was to build five Units at Cernavoda, but only two were constructed, the current plan aims at construction of Units 3 and 4 at Cernavoda site. There are currently no plans to complete Unit 5 at this time. There are building foundations from 1980s at the Cernavoda site for the construction of Units 3 and 4, as the decision to stop construction of Units 2-5 was made in 1991. As Romania have well-developed nuclear infrastructure, including heavy water plant, fuel fabrication plant, uranium production, and technically qualified and experienced staff (Rotaru, 2012) and operation experience, the plan to further develop nuclear capacities is expected, logical and predictable.

The procurement process for the construction of Cernavoda NPP Units 3 and 4 started in 2002 with the Unit 3 only. As the outcomes were unconvincing, SNN created a project joint venture EnergoNuclear SA with SNN to complete both 720 MWe units in a €2.5 billion project and then operate them. Twelve potential investors were selected from 15 initial bidders and eventually binding offers from six companies were accepted: ArcelorMittal of Romania, CEZ of the Czech Republic, Electrabel of Belgium, Enel of Italy, Iberdrola of Spain, and RWE Power of Germany (WNA, 2014).

In 2010-2013, all of these companies pulled out of the project for mainly commercial reasons and sold their stakes to SNN. SNN was thus a sole owner of the EnergoNuclear SA and it became clear that it could not raise this share of the funds¹, and new bidding was opened in 2011, unfortunately

¹ The total costs at that time were expected to be about €4 billion.

with no bids received². In May 2014, a vendor equity agreement with the China General Nuclear Power Group (CGN) to hold 51% in the EnergoNuclear SA (while SNN will hold the remaining minority of 49%) was closed (WNA, 2014). This agreement was eventually followed with a new public tender in August 2014, where the CGN was the only company to submit a non-binding bid with the September 9, 2014 being deadline for the contract to build the two new reactors. In October 2014, CGN has been designated as the "selected investor" for the development of units 3 and 4 at Romania's Cernavoda nuclear power plant. A letter of intent has been signed to complete the two units ("CGN to invest", 2014). Meanwhile, CNPEC has signed a "binding and exclusive" cooperation agreement with Candu Energy Inc for the construction of two more reactors at the Cernavoda NPP in Romania ("Cernavoda 3&4", 2014). The construction project of reactors 3 and 4 is supposed to be worth €6.45 billion ("China Nuclear Power", 2014). Also Moldova's partnership in the project is discussed (see Moldova case study for details).

However, the memorandum of cooperation with the Chinese also contained previously unknown points, such as the equipment and labour would come from China and Chinese demand for long-term governmental guarantees (contract for difference). The whole deal is therefore not certain yet, as Chinese presented new requirements that are being discussed at the moment. Romanian Government is of course reluctant to offer guarantees because there is in reality no need for electricity

² Some information suggest that the SNN, Societatea Nationala Nuclearelectrica, Romanian state nuclear power corporation was poorly managed so far and that they have problems with negotiating and receiving loans from private banks. This might also be among the reasons it were only the Chinese who eventually came with money.

from the Units 3 and 4. Also, some information suggest problems with water supply, especially in dry months. Nicolae Ceaușescu's original plan was to displace thousands of people and to create an artificial water reservoir for the Units 3 and 4. This plan is of course unrealistic today.

To sum up, the CGN is the investor in the Cernavoda NPP Unit 3 and 4 projects, the CGN subsidiary CNPEC (China Nuclear Power Engineering Co) is the constructor of the units, and the Industrial and Commercial Bank of China provided the finances to the investor. The design of the Units 3 and 4 will be the Canadian CANDU and as the CGN has no experience with CANDU design, the construction and the commission is to be overseen by the Canadian Candu Energy Inc, the owner of the CANDU technology and design. In 2014, Unit 3 is reported to be 53% complete and unit 4 to be 30% complete, and the construction should end in July 2019 (WNA, 2014).

Also, there is some evidence that a second nuclear power plant is planned to start construction in 2020 and the Romanian authorities are currently looking for the best suited nuclear technology. The French EPR has been considered so far and Piatra Neamț was understood to be the best location for a nuclear power station based on the EPR technology (“Romanians ponder”, 2008; “Old fashioned”, 2008). This idea of a second NPP is in the very beginning of the process and no further development has been registered. The reason might also be the fact that current Romania's generation capacities exceed consumption, and further development of these capacities would have negative impact on the competitiveness of some Romanian electricity production options. Another reason might also be the French willingness to sell Mistral-class military

ships to Russian Federation even after the Crimea crisis, which led to huge debates in Romania and froze the discussions about the second NPP with French technology.

4.10.3 The Front End of the Nuclear Fuel Cycle

The end of the delivery of uranium metal to the USSR in 1963 did not mean the end of the uranium extraction industry in Romania. On the contrary, in 1960s, the follower company of Sovrom Cuarțit, the Organizatia Expeditia Geologica worked on important geological surveys, where a lot of new uranium deposits were found, the Crucea-Botușana and the Tulgheș-Grințieș being the most important ones (Dumitrescu, 2010). During the socialist era, many deposits, both underground and open-cast, were mined (e.g. Avram Iancu, Dobrei, Natra, Ciudanovița, Băița). Băița, closed in 2009, was the biggest mine in Romania and was also the first to be opened in the 1950s by the Soviet Union. Nowadays, only Crucea-Botușana mines are still mined (together with the Rožná underground mine in the Czech Republic, these are the last two operating uranium mines in Europe). As Romania has yet not reported its production to OECD Nuclear Energy Agency, the Agency estimates the production is 80 tons of Uranium metal annually (OECD NEA & IAEA, 2014, p. 61). The Crucea-Botușana mines are mined over 40 years and they are almost depleted. The closure of the mines is planned to 2015. Therefore, the state-owned Compania Nationala a Uraniului S.A. Bucuresti (CNU) is planning to develop the small Tulgheș-Grințieș deposit in the East Carpathian mountains about 100 km south of Crucea-Botușana at a cost of EUR 91 million (WNA, 2014). The investment will most probably be covered from the state budget

and mainly by the CNU (Euratom Supply Agency, 2014, p. 12). It is an advanced project, as the feasibility study was already conducted. Authorities assess an annual exploitation of 124,000 tons over a 108 month long project (Stroe, 2013).

The extracted uranium has been since 1977 transported to Feldioara Processing Plant, where uranium dioxide has been produced ever since. The uranium dioxide produced is then transported to the Nuclear Fuel Plant (FCN) Pitești, where the CANDU fuel bundles are fabricated. The facility is recognized by the Atomic Energy of Canada Limited (AECL, nowadays known as Candu Energy Inc) as an authorized CANDU fuel manufacturer, the only supplier of this fuel in the World outside Canada (Dumitrescu, 2010).

The domestic uranium production covers the domestic uranium demand. Cernavoda 1 has been using 105 tons of natural UO₂ fuel per year; the domestic production of the fuel bundles fully covers the demand. In 2003, the production was doubled to 46 fuel bundles daily in preparation for unit 2 commissioning (WNA, 2014). We can thus clearly infer that Romania is self-sufficient in the uranium fuel production and supply.

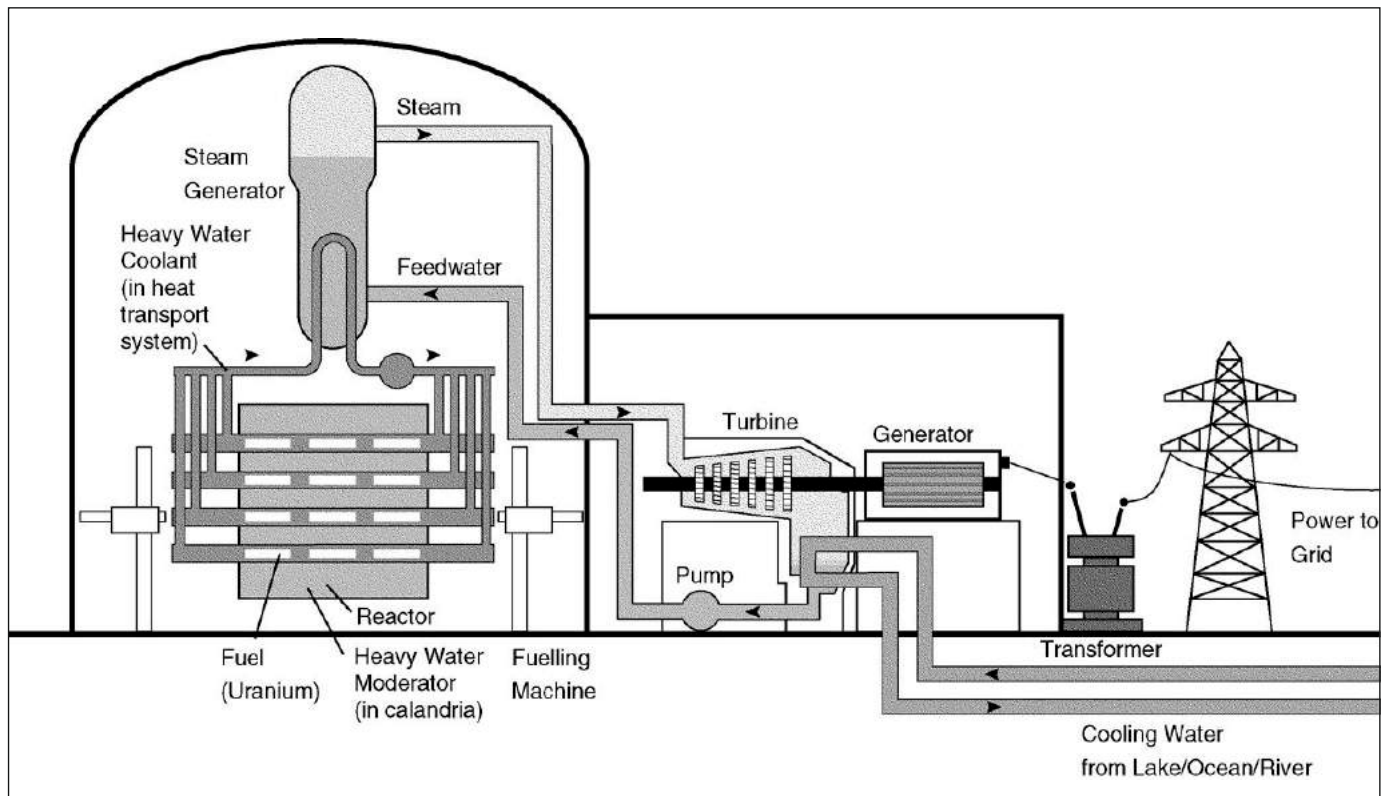
4.10.4 The Service Part of the Nuclear Fuel Cycle

Even though the Russian VVER-440 design was also considered in the past, eventually, the CANDU design was selected. The decision was not done because of the actual need of the nuclear power plant, but rather due to the efforts to politically move away from the USSR during Nicolae Ceaușescu's rule. Also, Ceaușescu's denouncement of the Soviet invasion to Czechoslovakia in 1968 led to the end of Soviet-

Romanian cooperation in the nuclear sector. He thus started to play the “Western” card to secure Western technology for Romania. The CANDU design has many structural similarities with PWR design, with the most visible difference that the power plant operation consists of only two circles, as the first and second one is jointed (see Table 4.10.2). Unlike with PWR, the CANDU design uses heavy water as regulator. Heavy water absorbs less neutrons, thus is able both to moderate nuclear reaction and secure criticality, and non-enriched fuel can be used. The Danube River is used as a reservoir for cooling water in the cooling circle. The reactor design originated in Canada, but was sold to and is used also in India, South Korea, Romania, Pakistan, Argentina, and China. Heavy water is produced within Romania, in ROMAG-PROD Heavy Water Plant in the city Drobeta Turnu Severin.

The Romanian nuclear sector is relatively new, but very well organized. All the nuclear related institutions and bodies work under the Ministry of Economy and Finance, with the exception of independent control body (CNCAN, National Commission for Nuclear Activities Control), which is subordinated to the prime minister. The Cernavoda NPP and FCN Nuclear Fuel Factory are parts of the SNN Company, and the SNN together with Waste Management Agency (ANDRAD), Nuclear Agency (NA) and Romanian Authority for Nuclear Activities (RAAN) are subordinated to the Ministry of Economy and Finance. RAAN controls and coordinates the work of the ROMAG-PROD Heavy Water Plant, SITON Center of Design and Engineering for Nuclear Projects and INR Institute for Nuclear Research (Romanian Authority for Nuclear Activities, n.d.).

Tab. 4.10.2: The CANDU Reactor Scheme



Source: *Nuclear Engineering*

Romania has also quite a history of nuclear energy development originally based on the cooperation with the USSR. The cooperation started with creation of the joint venture Sovrom Cuarțit Company to extract uranium. Even though the lifetime of the company was only 4 years (1951-1956), the USSR had received 17,228 tons of uranium metal until Romania bought out the Soviet stake in the company in 1961 (Cioroianu, 2005, p. 70). After the dismantlement of the Sovrom Cuarțit, the cooperation flourished and USSR assisted with the construction of the VVR-S research reactor in Măgurele, U120 cyclotron and other equipment (Gheorghe, 2012, p. 10-11). In late 1960s, Romania started to court various Western governments and firms active in the nuclear industry.

The reason was the poor quality of Soviet equipment and the fact the USSR was reluctant to share its technology with Romania as the USSR was delaying the delivery of nuclear technology to all Eastern European allies at that time fearing of nuclear proliferation (Gheorghe, 2012, p. 13).

Tab. 4.10.3: Nuclear Units in Romania

Reactor	Type	Power Output	Status	End of life-cycle
Măgurele*	VVR-S	2 MWt	Decommissioning	2002
Măgurele**	Sub Critical Assembly	-	Shut down	2006
Măgurele**	RP-0	0 MWt	Decommissioned	-
Pitești***	TRIGA II	14 MWt	Operating	2025
Cernavoda 1	CANDU 6	706.5 MWe	Operating	2026
Cernavoda 2	CANDU 6	706.5 MWe	Operating	2037
Cernavoda 3	CANDU 6	720 MWe	Planned	-
Cernavoda 4	CANDU 6	720 MWe	Planned	-
Second NPP	-	2,400 MWe	Proposed	-

* It is a research reactor built in 1957 based at Horia Hulubei National Institute of Physics and Nuclear Engineering (IFIN HH). The reactor was shut down in July 1997.
 ** The sub critical assembly "HELEN" is owned by the Faculty of Physics, University of Bucharest. The Zero Power Reactor RP-0 belongs to the Polytechnic University of Bucharest.
 *** It is an American research reactor manufactured by General Atomics built in 1980 and based at Institute for Nuclear Power Research in Pitești.

Source: compiled by T. Vlcek from open sources.

Eventually, even though an agreement on construction of VVER-440 design NPP at Olt River was never cancelled, Nicolae Ceaușescu decided to deal with the unwillingness to share the technology simply with finding partnership in the West. And shortly after the energy crisis connected with the

closure of the Suez Canal in 1967, Romania established that the CANDU reactor was the most efficient option³ (Gheorghe, 2012, p. 15, 29).

Also, in 1982 a contract was signed with the Soviet Union to build a VVER-1000 nuclear power plant, which would have three 1,000 MWe reactors. The preparatory work even began in March 1986 for construction of a nuclear plant at Piatra Neamț, to be equipped largely by the Soviet Union (Federal Research Division of the Library of Congress, n.d.). Piatra Neamț is a city approximately 100 km from the current Moldovan border. But these plans appeared unattainable and the plan was scrapped.

4.10.5 The Back End of the Nuclear Fuel Cycle

The used fuel from the Cernavoda NPP is cooled in Spent Fuel Storage Bay (SFB) next to the reactor with the capacity for ten years of operation for one unit (Radu, n.d., p. 115) and then stored in interim storage units⁴. The Interim Dry Spent Fuel Storage Facility (DICA) at Cernavoda NPP location is a modular construction⁵ with the first module operational from 2003, second from 2006, third from 2008, fourth from 2011 etc., with the final profile of 27 modules. Altogether, this storage capacity is enough for 50-80 years of storage for 2 CANDU Units (Rotaru, 2012, p. 24). At the end of 2002, after 6 years of plant operation, the inventory was of 30,344 spent

³ During the following negotiation period, the USA equipped Romania with different nuclear technology, including TRIGA II research reactor

⁴ There are other repositories in Romania for low and intermediate level waste, such as the location Băița-Bihor at the former uranium mine Băița operational since 1985.

⁵ A concrete monolith module of the MACSTOR type, a system designed by Atomic Energy of Canada Limited (see Andrei, Glodeanu, Talmazan & Radu, n.d.).

fuel bundles, which means an annual production of 5,000 spent fuel bundles per Unit (Andrei, Glodeanu, Talmazan & Radu, n.d., p. 283). Obviously, another Dry Spent Fuel Storage Facility will be constructed for the Units 3 and 4.

The Spent Fuel Final Disposal Facility (SFDF), e.g. the deep underground depository, is planned to be developed later as the capacity of the interim storage is adequate. The plan is to open the facility in 2050 and fill it with spent fuel until 2075, when it should be closed (Radu, n.d., p. 115). There are 15 locations that were taken into consideration for future geological analysis.

Romania has got experience also with decommissioning of nuclear facilities with decommissioning of Măgurele VVR-S reactor, Sub Critical Assembly and RP-0 reactor, and with decommissioning of depleted uranium mines. The National Agency for Radioactive Waste (ANDRAD) together with the Ministry of Economy and Finance are responsible for the Decommissioning process of nuclear facilities, and these agencies have responsibly prepared very detailed plans and scenarios for the future including financing.

Tab. 4.10.4: Romanian Nuclear Sector Examination

Indicator	Description
Is there nuclear producing capacity present in the country?	Yes, Cernavoda NPP (CANDU design, 2 Units of 706.5 MWe each)
Is there a project to expand the capacity? What is the status of the project?	Yes, financing resolved, negotiations reaching their end
How was the project procured?	Openly, without Russian bid
Who is the contractor in charge of the project?	China General Nuclear Power Group
How is the financing secured?	The contractor received a loan from the Industrial and Commercial Bank of China

Who is the operator of the facility?	Societatea Nationala Nuclearelectrica (91% Romanian Government, 9% Romanian Property Fund, of which 66% Ministry of Economy and Finance, and 34% private shareholders) for Cernavoda 1 and 2; EnergoNuclear SA (51% China General Nuclear Power Group; 49% Societatea Nationala Nuclearelectrica) for Cernavoda 3 and 4
Are there enough home-based experts to run the facility safely?	Yes
Who is/will be in charge of decommissioning?	National Agency for Radioactive Waste together with the Ministry of Economy and Finance
Who provides nuclear fuel and under what conditions?	Romanian Nuclear Fuel Plant Pitești, licensed and authorized CANDU fuel manufacturer by Candu Energy Inc
What is the experience with the fuel being currently used? Is there any rationale or path-dependency behind the current contract?	No operational issues; path dependency inherent as Nuclear Fuel Plant Pitești or Canadian Candu Energy Inc are the only CANDU fuel type producers worldwide
Is there any part of nuclear fuel industry present in the country? If so, how it contributes to country's nuclear fuel cycle?	Romania houses working capacities for the whole nuclear fuel cycle and is therefore fully self-sufficient
How is used fuel treated and who is in charge of this?	The used fuel is stored in the Interim Dry Spent Fuel Storage Facility (DICA) at Cernavoda NPP, the DICA is owned and operated by Societatea Nationala Nuclearelectrica

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4.11 Country Case Study: Slovak Republic

Tomáš Vlček

4.11.1 Introduction

Slovakia is a country that shares common history with the Czech Republic until 1993, when Czechoslovakia was peacefully dissolved into Czech and Slovak Republic. Even though separated, the two Republics are still very close partners. The country entered the EU in 2004 and its economy and citizens' will allowed for the adoption of Euro in 2009.

Slovakia is fully dependent on imports of crude oil from the Russian Federation via the Druzhba pipeline. As seen in Table 4.11.1, the imports of crude oil reached 146% in 2011. This happened due to the fact that Slovakia houses the Slovnaft, a.s. refinery in Bratislava with 5.5 Mt/y design capacity. The ownership structure of the Slovnaft refinery is 98.4% Hungarian MOL Rt and 1.6% other legal and physical entities (Slovnaft, a.s.). The transport sector accounts for half of all oil used in Slovakia (OECD & IEA, 2014, p. 392). The petroleum products are partly supplied to neighbouring states, especially the Czech Republic and Hungary.

Slovakia is also almost fully dependent on natural gas imports from Russian Federation via the Yamal pipeline. Less than 3% of demand is covered by domestic production. Table 4.11.1 shows over 100% imports of gas in 2011; this is due to the fact that some gas is imported to be stored in the country's underground natural gas storages in the Láb complex. The capacity of this facility in Western Slovakia is 3.02 bcm (OECD & IEA, 2014, p. 401).

Both crude oil and natural gas are also transported via the Druzhba and Eustream pipelines through Slovakia to the Czech Republic.

Tab. 4.11.1: Key Energy Statistics

Source	Consumption	Imports	TPES share	Electricity Generation share
Crude Oil	4.09 Mt	146%	35.9%	2.0%
Natural Gas	5.64 bcm	105%	26.7%	11.0%
Coal (all types)	7.47 Mt	68%	21.4%	14.1%
RES	-	-	7.7%*	19.1%*
Nuclear Energy	-	-	23.5%	53.8%
* Biofuels and waste stand for 5.5% of TPES share and 2.9% of Electricity Generation share; hydro stands for 14.5% of Electricity Generation share Note: 2011 data				

Source: *U.S. Energy Information Administration; International Energy Agency*; compiled and calculated by T. Vlcek

Slovakia produced 28.66 TWh of electricity in 2011 and produces 28 TWh annually on average. The import/export values are more or less coping with one another; the average import is 10.1 TWh and export is 9.3 TWh (International Energy Agency). The sovereign company in terms of its market share is Slovenské elektrárne, a.s. operating 68% (5,739 MWe) of the total installed capacity in the country (8,431 MWe) and produced 21.93 TWh in 2011, making it 77% of the total electricity production (Slovenské elektrárne, a.s.). The company is owned by Italian Enel Produzione S. p. A. (66%) and the Ministry of Economy through the National Property Fund of the Slovak Republic (34%). Due to mother company's debt, the

Italian Enel Produzione S. p. A. decided in summer 2014 to sell its share in Slovenské elektrárne, a.s. (Holeš, 2014b)

The following Table 4.11.2 shows the key power plants in the Slovak Republic besides the nuclear power plants. As seen in Table 4.11.1, nuclear energy produces more than half of the country's electricity consumption and is therefore the most important source of electricity. There are currently four operating units in Jaslovské Bohunice NPP and Mochovce NPP with two more being under construction at Mochovce site. The current total installed capacity in nuclear reaches 1,950 MWe. The nuclear energy sector is analyzed further in the text.

Tab. 4.11.2: Key Power Plants in the Slovak Republic

Power Plant	Owner	Installed Capacity	Connected to the Grid	Fired on
Gabčíkovo HPP	Vodohospodársky podnik, š.p.	746.54 MWe	1992-1996	Water
Čierny Váh PSHPP	Slovenské elektrárne, a.s.	734.4 MWe	1982	Water
Vojany 1 TPP	Slovenské elektrárne, a.s.	440 MWe	1965-1967	Hard coal
Vojany 2 TPP	Slovenské elektrárne, a.s.	440 MWe	1973-1974	Gas
Nováky B TPP	Slovenské elektrárne, a.s.	440 MWe	1964, 1976	Brown coal

Note: HPP = Hydroelectric Power Plant; PSHPP = Pumped Storage Hydroelectric Power Plant; TPP = Thermal Power Plant

Source: compilation by T. Vlcek.

Besides nuclear power plants, the remaining electricity generation capacity is well diversified. There are basically only five more centralized power plants with bigger cumulative

capacity. Slovakia has been developing its hydroelectric potential, so two of them are Gabčíkovo Hydroelectric Power Plant (746.54 MWe) and Čierny Váh Pumped Storage Hydroelectric Power Plant (734.4 MWe). The Gabčíkovo HPP was originally part of the international Slovak-Hungarian project of Gabčíkovo–Nagymaros Waterworks. Hungaria withdrew from the project in 1977 due to negative environmental effects leaving Slovakia alone to choose whether to abandon the project or to finish it. After several years of negotiation and reconsidering, Slovakia adjusted the project and completed the Gabčíkovo Dam without the Hungarian Nagymaros part in 1992–1996. The Slovak-Hungarian international dispute at the International Court has still not been resolved. The Gabčíkovo HPP is owned by the state enterprise Vodohospodársky podnik, š.p. but operated by Slovenské elektrárne, a.s. In December 2014, it was announced that the Slovak Government terminated the contract between Vodohospodársky podnik, š.p. and Slovenské elektrárne, a.s. for violations of the contract (“Slovenské elektrárne”, 2014). Legal struggle is now expected.

The Čierny Váh PSHPP is the biggest hydroelectric plant in Slovakia and is also a very important part of the electricity supply system. It assists the TSO greatly as it is used as a primary regulation of the power balance. Vojany TPP and Nováky TPP are the country's fossil fuel power plants being fired on hard coal, brown coal, natural gas and heat fuel oil. Together their installed capacity is 1,398 MWe. Besides all these power plants, there are many decentralized small units around Slovakia, for example, several tens of small hydroelectric power plants followed by some photovoltaics, wind power plants and biofuels.

4.11.2 New Units and Financing of the Nuclear Power Plant

Originally, the Mochovce NPP was supposed to be equipped with four VVER-440/V-213 units, but due to the lack of finances, the construction of the units 3 and 4 was stopped in 1992. In 2006, Italian Enel Produzione S. p. A. acquired 66% stake in Slovenské elektrárne, a.s. and came with an investment plan to enhance nuclear capacities. The plan was eventually incorporated in the 2006 Energy Policy and 2008 Energy Security Strategy. These documents envisaged completion of Mochovce NPP 3&4 (+880 MWe); uprate of Jaslovské Bohunice V2 NPP and Mochovce NPP 1&2 (+180 MWe) and eventually uprate of newly constructed Mochovce NPP 3&4 (+60 MWe). In 2024, the operation of a new NPP of 1,200 MWe is also proposed (Ministerstvo hospodárstva SR, 2008, p. 106).

The Mochovce NPP 3&4 were partially built and the project was thus a real completion. In 2007, Slovenské elektrárne, a.s. concluded a revolving credit line for seven years in the amount of EUR 800 million and the major shareholder announced its intend to invest over EUR 3 billion in Slovakia, of which approx. EUR 1.7 billion will be used for the completion of units 3&4 of the Mochovce NPP (Slovenské elektrárne, a.s., 2008, p. 19). The total cost was in November 2014 finally authorized at EUR 4.63 billion, the whole sum is covered exclusively with the company's own financial resources (“Akciónári schválili”, 2014).

In July 2008, the European Commission approved the completion of the units and in June 2009, contracts were signed with the original suppliers of the unfinished parts. The contracts were signed with Škoda JS a.s., ZAO AtomStroyExport and Slovak suppliers Výskumný Ústav

Jadrovej Energetiky, a.s. (VÚJE), Enseco a.s. and Inžinierske Stavby a.s. for more than EUR 370 million to supply the remaining nuclear island equipment (beyond that delivered 20 years earlier), with part of the instrumentation and control (I&C) systems being from Siemens AG. Contracts for engineering, construction and project management of the conventional island were signed with ENEL Ingegneria & Innovazione S.p.A., involving the use of Doosan Škoda Power s.r.o. steam turbines (WNA, 2014). The completion of the project was originally due in 2012 and 2013, but has been postponed several times, currently to November 2016 and 2017. The main reason was the implementation of new safety measures after the Fukushima Daiichi accident (“Úrad jadrového”, 2014).

In 2008, plans for a new NPP were announced and it was decided that it will be a new reactor at Jaslovské Bohunice NPP site. A project company Jadrová energetická spoločnosť Slovenska, a. s. (JESS) was established in 2009, with 51% share for Jadrová a vyradovacia spoločnosť (JAVYS), fully owned by the Slovak Ministry of Economy (Ministerstva hospodárstva SR), and 49% share for ČEZ Bohunice a.s. fully owned by the Czech company ČEZ, a.s. (Jadrová energetická spoločnosť Slovenska, a. s.) At that time, the Czech 2008 tender for the Temelín NPP contained an option for up to three more reactors; one of them was intended for Slovakian Jaslovské Bohunice NPP.

In 2010, potential vendors were invited to send information about their projects. At the end of the year, six information packages were received: Westinghouse Electric Company LLC

¹ Joint venture of AREVA SA and Mitsubishi Heavy Industries, Ltd.

(AP1000 PWR of 1,117 MWe), ATMEA S.A.S.¹ (ATMEA 1 PWR of 1,100 MWe), Mitsubishi Heavy Industries, Ltd. (Mitsubishi Advanced PWR of 1,700 MWe), Consortium MIR.1200² (MIR 1200 of 1,200 MWe), Korea Hydro & Nuclear Power³ (Advanced Pressurised Reactor-1400 of 1,400 MWe) and AREVA SA (PWR EPR 1600 of 1,600 MWe).

The material received was used for the feasibility study prepared in 2012 by Ústav jaderného výzkumu Řež, a.s., which stated that the location is suitable for up to 2,400 MWe of new installed capacity and a turnkey option is the most preferable. It was also said that all the offered technologies are suitable for the location. In September 2013, the work proceeded with the start of EIA process that should end in the second half of 2015 (Jadrová energetická spoločnosť Slovenska, a. s.).

Originally, the project was meant to be financed by the stakeholders of the project company, e.g. the Jadrová a vyradovacia spoločnosť (JAVYS) and the Czech company ČEZ, a.s. In August 2010, the newly-elected centre-right government said it was keen for the Bohunice project to proceed, but would not offer any financial support for it (WNA, 2014). The Czech company eventually started to aim at withdrawal from the project, since they focused on the Czech Temelín NPP tender, and also because of its unsuccessful Balkan investments. In January 2013, Jadrová a vyradovacia spoločnosť (JAVYS); ČEZ, a.s.; ČEZ Bohunice a.s.; and Jadrová energetická spoločnosť Slovenska, a. s. (JESS) signed a memorandum of understanding with Rosatom, as this company showed, in 2012, an interest to

² Consortium of the companies ŠKODA JS, a. s., from the Czech Republic, Atomstrojexport, a. s., from the Russian Federation (a daughter company of the Russian company ZAO Atomstroyexport) and OKB Hidropress, a. s. from the Russian Federation.

³ Subsidiary of Korea Electric Power Corporation KEPCO.

be both technology provider and an investor in this unit (ČEZ Bohunice a.s., 2014, p. 10). The ČEZ, a.s. offered its 51% stake to Rosatom; the planned sell was supported by the Slovak government. However, Rosatom possibly sought a BOO (build-own-operate) arrangement, and also a guaranteed long-term electricity price of EUR 60-70 /MWh, which the Minister of Economy Tomáš Malatinský was unwilling to provide (Mitev, 2013), and therefore the transaction was scrapped.

Slovaks eventually stopped the negotiations with Russians at the end of 2013, as Rosatom insisted on a guaranteed electricity price, and even though promised, no other proposal was provided. Shortly after, at the beginning of 2014, Rosatom stopped insisting on guaranteed prices and it is now prepared to consider any form of support from the Slovak side, which will ensure that a project is economically viable way for investors as well as for creditors (Holeš, 2014a). Also, the new Minister of Economy of Slovakia Pavol Pavlis, who entered the office in July 2014, is inclined to offer electricity price guarantees.

The new Jaslovské Bohunice II NPP should be operational after 2025. However, the negotiations and investor seeking is complicated, and financing of the new NPP is not secured. Other non-Russian subjects are interested as well (for example French and Slovak presidents discussed potential cooperation in nuclear energy in October 2013), but they were not disclosed and no official offer was received (Dargaj, 2014).

4.11.3 The Front End of the Nuclear Fuel Cycle

The Slovak Republic shares common history with the Czech Republic as until 1993 the countries were coupled in Czechoslovakia. Therefore the uranium mining history is also

common. Because the uranium deposits were richer in the Czech lands, uranium has never been really mined in Slovakia, except as a byproduct in molybdenum and copper mining or during some geological research (Rizman, 2009, p. 5). Uranium was therefore to some extent extracted in the Novoveská Huta deposit near the city Spišská Nová Ves, where 6,340 tons of uranium in 0.099 grade uranium ore is now deposited (Bartalský, Kuestermeyer & Novotný, 2012, p. 12). Other deposits include Kurišková – Jahodná, Kluknava, Kálnica – Selec.

However, there is a plan for opening a new deposit Kurišková near the city of Košice in east Slovakia. A Preliminary Feasibility Study conducted by American Tetra Tech, Inc. gave evidence of 15,831 tons of economically exploitable uranium deposited in Kurišková (Ludovika Energy s.r.o.). Currently, detailed geological and technical research by the company Ludovika Energy s.r.o. takes place and this will be eventually followed by a feasibility study, EIA, and potential licensing procedure. The amount of resources will be enough for 50 years of Slovak needs, as Slovak demand is 300 tons of uranium annually (Bartalský, Kuestermeyer & Novotný, 2012, p. 24), which is an important incentive for further work on this deposit. The European Uranium Resources Ltd., 50% owner of both projects in Novoveská Huta and Kurišková (the other 50% owns Forte Energy NL), decided in April 2014 to sell their shares to Australia's Forte Energy NL for USD 8.5 million plus a 1% production royalty (Bacal, 2014).

The reason might be the fact that the outlined development is not certain, as strong opposition emerged not only in local authorities and NGOs, but also in the Slovak Parliament, where two members of the parliament (SDKÚ-DS party) submitted

in April 2014 a proposal for country-wide ban for uranium mining with local referendum approved exceptions. They later withdrew their proposal because the Minister of Environment Peter Žiga with the mayor of Košice Richard Raši succeeded with their initiative to impose a general uranium mining ban in the whole territory of the Slovak republic by a law. The government agreed on this amendment of the law in May 2014, and since June 2014, there has been a compulsory prerequisite for uranium mining – a positive compulsory referendum in affected municipalities (“Uranium mining amendment”, 2014). Without this referendum it is forbidden by law to mine uranium in Slovakia. As people in the affected municipalities in east Slovakia are generally against uranium extraction, it will be very difficult to successfully complete the two abovementioned uranium projects.

As Slovakia does not have capacities in the Front End of the Nuclear Fuel Cycle, it purchases the final product (uranium fuel) directly from the producer. Slovakia signed a contract with Russian TVEL in 2008, and according to this contract, TVEL is the provider of fuel until 2015 with an option to prolong the contract. The Government has however discussed the possibilities of reducing dependency on Russian nuclear fuel, and in November 2014, information about signing a contract for uranium fuel supply with a non-Russian company emerged without any further details. (“Vymenit’ ruské”, 2014; Ehl, 2014) Later the contract was publicly specified as a contract for the supply of enriched uranium only and this product will still be processed into nuclear fuel elements by TVEL. The supplies began in 2015. (Carney, 2014; Vilikovská, 2014) Unofficial information suggests that the new supplier of enriched uranium is AREVA SA.

4.11.4 The Service Part of the Nuclear Fuel Cycle

There are two nuclear power plants operating in the Slovak Republic with a total of four pressurized water reactors cooled and moderated by light water. The Jaslovské Bohunice NPP is located in western Slovakia near the Czech and Austrian borders. The V1 Units were shutdown because of Austrian political pressure during the EU-accession period⁴, therefore only the V2 Units are currently in operation. Jaslovské Bohunice NPP is equipped with two VVER-440/V-230 pressurized water reactors (2x 505 MWe), which had provided their first electricity in 1984-1985. The second nuclear power plant Mochovce in southern Slovakia is equipped with two VVER-440/V-213 pressurized water reactors (2x 470 MWe) and has been operating since 1998 and 2000. The new units at Mochovce site should be operational in 2016 and 2017. Both of the power plants were constructed with Soviet assistance and employ Soviet design VVER reactors.

The Slovak Republic (or Czechoslovakia) has also experience with its own reactor design. Between 1958 and 1972, the Czechoslovak KS-150 design Jaslovské Bohunice A1 NPP had been constructed by domestic companies with Soviet support. Since 1972, the A1 NPP had generated electricity until its shutdown in 1977 due to a nuclear accident (INES 4). Human error was behind the 1977 accident, with reactor meltdown that eventually led to NPP shutdown. This also means that the Czech and Slovak experts have quite an experience with decommissioning and nuclear accident mitigation.

⁴ With EUR 437 million compensation from the EU for the first seven years after the shutdown.

Tab. 4.11.3: Nuclear Units in the Slovak Republic

Source	Consumption	Imports	TPES share	Electricity Generation share
Crude Oil	4.09 Mt	146%	35.9%	2.0%
Natural Gas	5.64 bcm	105%	26.7%	11.0%
Coal (all types)	7.47 Mt	68%	21.4%	14.1%
RES	-	-	7.7%*	19.1%*
Nuclear Energy	-	-	23.5%	53.8%

* Biofuels and waste stand for 5.5% of TPES share and 2.9% of Electricity Generation share; hydro stands for 14.5% of Electricity Generation share
Note: 2011 data

Source: open sources, compiled by T. Vlcek.

Speaking about the life-cycle of the nuclear units, they were all designed and licensed for 30-year operation. As the two units of Jaslovské Bohunice V2 reached its planned life-cycle, the operator requested in 2013-2014 at the Úrad jadrového dozoru SR (Nuclear Regulation Office of the Slovak Republic) an extension of the life of the two units for another thirty years and a positive decision is expected. In fact, the operator counts that all the nuclear units will be operating for 60 years.

The VVER-440/V-230 model at Jaslovské Bohunice V1 was not equipped with containment structure and this was one of the safety deficiencies and the main reasons Slovakia had to shut down the V1 NPP in accordance with the Accession Treaty to the European Union. The Unit 1 was therefore shutdown in December 2006 and the Unit 2 in December 2008. During the natural gas crisis January 2009 caused by Russia-Ukraine gas disputes, the Slovak Government announced that the EU it will restart the NPP to mitigate the

effects of the crisis (Filo, 2009). However, as the cut-off of Russian gas supplies was mitigated by reverse flow from the Czech Republic, the Jaslovské Bohunice V1 NPP was not restarted.

4.11.5 The Back End of the Nuclear Fuel Cycle

After at least 3 years of cooling, the spent fuel in a pool they are transported to the wet-type Interim Spent Fuel Storage (MSVP, Medzisklad vyhoretého paliva) at the Jaslovské Bohunice site. Spent fuel from both of the country's nuclear power plants is stored there. Even though the current capacity is 14,112 fuel assemblies, this will be enough only until 2021 (with respect to the new Units 3 and 4 at Mochovce). Plans for expansion are therefore being considered, as well as plans for construction of another Interim Spent Fuel Storage in Mochovce to avoid unnecessary transportation of spent fuel. The ISFS construction in Mochovce should commence in 2016.

The whole Back End of the Nuclear Fuel Cycle is managed by the company Jadrová a vyradovacia spoločnosť (JAVYS), fully owned by the Slovak Ministry of Economy (Ministerstva hospodárstva SR). This company thus also operates the Jaslovské Bohunice MSVP. It is also responsible for the safe storage of non-fuel radioactive wastes; therefore, it operates the storages at Jaslovské Bohunice and Mochovce sites, and since its construction in 2001, also the Republic Radioactive Waste Storage (RÚ RAO, Republikové úložisko rádioaktívnych odpadov) for industrial low- and medium-level waste (Jadrová a vyradovacia spoločnosť).

Tab. 4.11.4: Slovak Nuclear Sector Examination

Indicator	Description
Is there nuclear producing capacity present in the country?	Yes, Jaslovské Bohunice V2 NPP with two VVER-440/V-230 reactors (2x 505 MWe) and Mochovce NPP with two VVER-440/V-213 (2x 470 MWe)
Is there a project to expand the capacity? What is the status of the project?	Yes, the EIA procedure will be finished in second half of H2 2015, investor and technology provider is sought
How was the project procured?	The public procurement process has not yet been opened, direct negotiations with technology suppliers and investors in one are preferred
Who is the contractor in charge of the project?	Jadrová energetická spoločnosť Slovenska, a. s. (51% Jadrová a vyradovacia spoločnosť, fully owned by the Slovak Ministry of Economy; 49% ČEZ Bohunice a.s. fully owned by the Czech company ČEZ, a.s.)
How is the financing secured?	Originally from contractors, currently strategic investor is sought
Who is the operator of the facility?	Unclear, either Jadrová energetická spoločnosť Slovenska, a. s. or Slovenské elektrárne, a.s.
Are there enough home-based experts to run the facility safely?	Yes
Who is/will be in charge of decommissioning?	The operator together with Jadrová a vyradovacia spoločnosť (fully owned by the Slovak Ministry of Economy) overseen by Úrad jadrového dozoru SR (Nuclear Regulation Office of the Slovak Republic)
Who provides nuclear fuel and under what conditions?	OAO TVEL under the contract from 2008; since 2015 undisclosed non-Russian company has started supplying the fuel, unofficial information suggests the new supplier is AREVA SA
What is the experience with the fuel being currently used? Is there any rationale or path-dependency behind the current contract?	No issues, as OAO TVEL is the traditional manufacturer and supplier of VVER-reactor fuel, path-dependency was expected, however, breached by the new undisclosed fuel supplier

Is there any part of nuclear fuel industry present in the country? If so, how it contributes to country's nuclear fuel cycle?	None except for spent fuel storage
How is used fuel treated and who is in charge of this?	The whole Back End of the Nuclear Fuel Cycle is managed by Jadrová a vyraďovacia spoločnosť (JAVYS), fully owned by the Slovak Ministry of Economy; standard procedure with Interim Spent Fuel Storage at the Jaslovské Bohunice site; plans for expansion as well as for construction of another one in Mochovce; deep final underground depository planned

4.11.6 Sources

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4.12 Country Case Study: Ukraine

Tomáš Vlček

4.12.1 Introduction

Ukraine declared its independence for the first time in the turbulent times after the February Revolution in the Russian Empire in 1917. The following Ukrainian war for independence ended with partition of Ukraine among Poland, USSR and Ukrainian SSR. The Ukrainian SSR withstood all the political changes in the world and lasted until the breakup of the USSR in 1991. In December 1991, three officials; Ukrainian president Leonid Kravchuk; Chairman of the Supreme Council of the Republic of Belarus Stanislav Shushkevich, and President of the Russian Federation Boris Yeltsin, signed the Belavezha Accords, dissolving the Soviet Union and establishing the Commonwealth of Independent States instead.

The political struggle between presidential candidates Viktor Yanukovich (pro-Russian) and Viktor Yushchenko (pro-Western) eventually led to massive protest (Orange Revolution) and abdication of the elected president Viktor Yanukovich. However, at the end of Yushchenko's presidential mandate, one of his closed allies, Yulia Tymoshenko, turned against Yushchenko and ran for president. Even though she did not succeed, the country was politically harmed and Viktor Yanukovich became the president. This eventually led to a political switch from heading towards the EU to closer ties with Russia. This was again followed by a public protest and the power struggle continued. Two more presidents changed in the office (Oleksandr Turchynov and the current one Petro Poroshenko) and the country went to another crisis in 2014,

when Crimea was annexed through Russian military intervention. The crisis burst out into civil war and the fighting continues in Eastern Ukraine until today. The country is still neither unified, nor stable.

Tab. 4.12.1: Key Energy Statistics

Source	Consumption	Imports	TPES share	Electricity Generation share
Crude Oil	14.2 Mt*	55%*	7.2%	0.3%
Natural Gas	64.6 bcm	69%	37%	9.5%
Coal (all types)	64.1 Mt	20%	32.8%	38.2%
RES	-	-	2.1%	5.7%**
Nuclear Energy	-	-	18.7%	46.3%
* 2010 data ** Hydro stands for 5.6% of Electricity Generation Share Note: 2011 data				

Source: *U.S. Energy Information Administration; International Energy Agency*; compiled and calculated by T. Vlcek

Speaking about fuel imports, the country is dependent on crude oil and natural gas imports. Speaking in percentage, the dependence is relatively lower than in many other CEE countries (55% and 69% respectively); however, speaking in absolute numbers, the consumption is high (14.2 Mt of crude oil and 64.6 bcm of natural gas in 2011), thus the import dependency is high as well. Crude oil is imported via the Druzhba and Prydniprovski oil-trunk pipelines from the Russian Federation to Ukrainian refineries (see Table 4.12.2). However, due to the current political and economical situation, only one of the seven refineries in Ukraine is operational – the Kremenchuk refinery.

Tab. 4.12.2: Ukrainian refineries

Refinery	Owner	Capacity
Odessa	VTB Bank OAO	2,8 / 3,9
Lysychansk	TNK-BP	7,2 / 16,0
Kherson	Continuum Group	? / 7,1
Kremenchuk	Privat Group (57 %), Naftogaz of Ukraine (43 %)	8,0 / 18,6
Drohobych	Privat Group (75 %), Naftogaz of Ukraine (25 %)	2,0 / 3,3
Nadvirna	Privat Group (74 %), Naftogaz of Ukraine (26 %)	2,2 / 4,0
Shebelinka	UkrGazVydobuvannia	1,0 / 1,2
Note: capacity in Mt/y; first figure is technical (maximal available) capacity, the second is installed capacity		

Source: LUKOIL oil company; OECD & IEA, 2012, p. 142; „Oil Processing Industry of Ukraine“, n.d.; compiled by T. Vlček

31% of domestic consumption of natural gas is covered from the domestic sources. The main natural gas fields are Dashava in the West and Krestiche and Shebelinka in the East. There is also major potential in underexplored Ukrainian sectors of the Azov and Black Seas as well as in the onshore areas of the Crimean Peninsula. Very promising are also unconventional natural gas sources that could exceed 11.5 Tcm (Ministry of Energy and Coal Industry of Ukraine, 2012, p. 18-21). Driven by the idea of diversification of natural gas supplies, the Naftogaz of Ukraine¹ (НАК Нафтогаз України) signed a USD 3.65 billion contract with China Development Bank Corporation for investment programs into coal gasification

¹ Owned fully by Ministry of Energy and Coal Industry of Ukraine.

facilities in Luhansk, Donetsk and Odessa (Alic, 2013). The facilities are to be constructed by China National Chemical Engineering Corporation (CNCEC). Even though there are only several exclusively natural gas-fired power plants in Ukraine (700 MWe CHP-5 and 500 MWe CHP-6 in Kiev and 540 MWe CHP-5 in Kharkiv), as primary use of natural gas is for heating and cooking, the country will save 1.64 Bcm annually (Revina, 2012, p. 8).

The following Table 4.12.3 shows the key power plants in Ukraine besides the nuclear power plants. As seen in Table 4.12.1, nuclear energy constitutes 46.3% of the country's electricity generation share and is therefore the most important source of electricity. There are currently fifteen operating units in four nuclear power plants, all operated by DP NNEGC National Nuclear Energy Generating Company Energoatom (Державне підприємство Національна атомна енергогенеруюча компанія Енергоатом) fully owned by the Ministry of Energy and Coal Industry of Ukraine. The current total installed capacity in nuclear reaches 13,835 MWe. The nuclear energy sector is analyzed further in the text.

Besides nuclear power plants, the second most important source for electricity generation is coal with 38.2% on electricity generation share. 31,800 million tons of proven coal reserves at the end of 2012 ranks the country as No. 7 in the world (Euracoal, 2013) and as No. 2 in Europe (DTEK, 2014, p. 23). The most important is the Donetsk Basin in the East, followed by Lviv and Dnipro Basins. As of December 2012, more than 350 legal entities operated in the coal, lignite and peat production, processing and agglomeration sectors in Ukraine, of which approximately 250 produced and processed hard coal

(Euracoal, 2013). The coal sector is an important part of Ukrainian energy sector, the government plans to further support development of its coal production capacities as well as the portfolio of coal-fired power plants by both modernization and new construction. The largest coal miner as well as the largest private energy company in Ukraine is DTEK, which produces nearly half of the total country's coal production.

Tab. 4.12.3: 1000+ MWe Power Plants in Ukraine

Power Plant	Installed Capacity	Fuel	Operator	Construction Year
Krivorozhskaya TPP	2,820 MWe	Coal, Gas	OJSC Dniproenergo	1965-1973
Pridneprovskaya TPP	1,765 MWe	Coal, HFO	OJSC Dniproenergo	1959-1966
Kurakhovskaya TPP	1,487 MWe	Coal, Gas	Vostokenergo LLC	1972-1975
Zuyevskaya TPP	1,245 MWe	Coal	Vostokenergo LLC	1982-1988
Uglegorskaya TPP	3,600 MWe	Coal, Gas	OJSC Centrenergo	1972-1977
Starobeshivska TPP	1,775 MWe	Coal, Gas	OJSC Donbasenergo	1961-1967
Burshtynska TPP*	2,300 MWe	Coal, Gas	OJSC Zapadenergo	1965-1969
Zmiyevskaya TPP	2,200 MWe	Coal, Gas	OJSC Centrenergo	1960-1969
Trypilska TPP	1,800 MWe	Coal, Gas	OJSC Centrenergo	1969-1972
Luganskaya TPP	1,150 MWe	Coal, Gas	Vostokenergo LLC	1963-1969
Ladyzhinska TPP	1,800 MWe	Coal, Gas	OJSC Zapadenergo	1970-1971
Zaporiska TPP	3,600 MWe	Coal, Gas	OJSC Dniproenergo	1972-1977
Danipro HPP	1,504 MWe	Water	VA UkrHydroEnergy	1947-1980

* The Burshtynska TPP is vital for ensuring electricity exports to Hungary, Slovakia and Romania as it operates within the Burshtyn Energy Island integrated in ENTSO-E. The export capacity is 650 Mwe.

Note: TPP = Thermal Power Plant; HFO = Heavy Fuel Oil; HPP = Hydroelectric Power Plant; OJSC = Open Joint-Stock Company

Source: *Global Energy Observatory*

Ukraine produced 194.9 TWh of electricity in 2011 and produces 189 TWh annually on average. The country is a net exporter, the average electricity exports value is 6.6 TWh (International Energy Agency). Electricity is exported mainly to Hungary and Belarus, to some extent also to Moldova and Poland. Negligible amounts go to Romania and Slovakia. The electricity sector is divided into seven main companies covering the whole country; these are OJSC Kyivenergo, OJSC Dniproenergo, Vostokenergo LLC, OJSC Centrenergo, OJSC Donbasenergo, OJSC Zapadenergo, and VA UkrHydroEnergy. The country is dominated in terms of its market share by DTEK, Ukrainian leader in coal and energy markets. The company owns 72.4% in OJSC Kyivenergo, 73.3% in OJSC Dniproenergo, 100% in Vostokenergo LLC and 72.19% in OJSC Zapadenergo. The second most important subject is the Energy Company of Ukraine (НАК Енергетична компанія України) as it owns shares in these companies as well (78.29% in OJSC Centrenergo, 25% in OJSC Donbasenergo and 100% in VA UkrHydroEnergy).

4.12.2 New Units and Financing of the Nuclear Power Plant

Following the recent decision for life extension of Rivne 1 and 2 and South Ukraine 1 and 2, the key Ukrainian topic in nuclear sector today is the life extension of operating units. In the following years, units Rivne 3, Khmelnytsky 1, South Ukraine 2 and 3, and Zaporizhzhya 1-5, will come to their 30-year design life and the operator is fully focused on the life extension process. Lifetime extension of Ukrainian NPPs is envisaged by February 2014 state

Energy Strategy of Ukraine for the period up to 2030, and is considered as high priority activity by DP NNEGC Energoatom.

Currently, there are Khmelnytsky units 3 and 4 under construction. The construction of units 1 and 2 started in 1981 and 1983, but the works were stopped as part of Ukrainian Moratorium on new nuclear plant construction in 1990. Units 1 and 2 were finished in 2004 shortly after the moratorium was lifted. Units 3 and 4, of which the construction started in 1985-1986, were however left unfinished – unit 3 was completed from 75% and unit 4 from 28%, according to DP NNEGC Energoatom (Sklyar, 2013, p. 17). The Information and Analytical Survey (IAS) of the Feasibility Study (FS) however described the degree of completion as 35-40% for unit 1 and 5-10% for unit 2 (Backer, Wallner, Hirsch, Indradiningrat & Andrushevych, 2013, p. 6).

In 2005-2006, government decided to focus on finishing these two units, as well as to focus generally on nuclear power plants enhancement as part of reaction measures for problems with natural gas supply from Russia. The 2006 nuclear power strategy involved building and commissioning 11 new reactors with the total capacity of 16.5 GWe (and 9 replacement units totaling 10.5 GWe) to more than double the nuclear capacity by 2030 (WNA, 2014). This strategy was strongly corrected several times to current emphasis on life-extensions and around 2-5 GWe of new nuclear units by 2030.

Five potential suppliers were invited to participate in the tender in 2008, Russian OAO OKB Hidropress (OAO OKB “Гидропресс”); Czech ŠKODA JS, a. s.; American Westinghouse Electric Company, LLC; Korea Electric Power Corporation KEPCO; and French Areva SA. Only OAO OKB

Gidropress and Korea Electric Power Corporation KEPCO however submitted their bids, and in October 2008, it was stated that the OAO OKB Gidropress' reactor facility VVER-1000 V-392 was chosen as the reactor facility for new power units (Backer, Wallner, Hirsch, Indradiningrat & Andrusevych, 2013, p. 35-37). In February 2011, Russian ZAO AtomStroyExport and Ukrainian SE AtomProektInzhiniring (ВП АТОМПРОЕКТІНЖІНІРИНГ, subdivision of DP NNEGC Energoatom) signed an agreement in Kiev to complete the reactors, and the following year, the Ukrainian Parliament adopted legislation to create a framework to finance the project, which included 80% of the funds coming from Russia (Schneider & Froggat, 2014, p. 138; "Contract agreement", 2011). The logic of the agreement is that Russia will provide loan for 80-85% of the total costs estimated at EUR 3.7 billion. The rest will be provided by Ukraine. However, Ukraine and Russia haven't yet agreed on the government guarantees for this loan, nor on the interest rate. One of the main conditions for the loan was a government guarantee that the Ukrainian side has not granted to the necessary extent. As a result, Sberbank offered Energoatom a credit for priority effort to implement the project on commercial terms, to which the Ukrainian side did not agree ("Russia to credit", 2012; "Further construction", 2011). There has been generally no progress in the matter since 2012, and the current Russia-Ukraine relations do not imply that the issue will be resolved soon.

This idea was confirmed in August 2014, when DP NNEGC Energoatom stated that Ukraine will not cooperate with Russia in building new power units at Khmelnytsky NPP. Yuri Nedashkovskiy, president of DP NNEGC Energoatom

stated that Russian participation is not even considered from now on and that there are other financing options, such as long-term electricity export contracts to Europe. According to him, a “completely new attitude” towards nuclear power is adopted and he supports the idea of building new reactors using technology of Western design (“Україна вирішила”, 2014; “Ukraine to sign”, 2014). This was demented by Russian side stating that the two parties are still negotiating over the Ukraine’s Khmelnytsky Nuclear Power Plant (Sweet, 2014).

Unfortunately, the most recent development in this issue is strongly affected by disinformation and propaganda of both sides in the conflict. The Ukrainian turn away from Russia can be observed since September 2014, when Ukraine and Westinghouse Electric Company, LLC started negotiating the possibility of privatization of nuclear power plants in Ukraine. The operator of the power plants DP NNEGC Energoatom could be privatized, which would allow for foreign investment and nuclear energy development. This most up to date plan was developed by Ukraine Prime Minister Arseniy P. Yatsenyuk and Pavlo M. Sheremeta, Ukrainian economist and former Minister of Economical Development and Trade (“Westinghouse хочет”, 2014).

4.12.3 The Front End of the Nuclear Fuel Cycle

Ukraine has got several decades of experience with uranium mining. It started in 1944 with the first deposits discovery. Subsequently, the Pervomayskoye and Zheltorechenskoye uranium deposits were mined out in 1967 and 1989 respectively. In the mid-1960s, the explorations revealed deposits in the Kirovgrad region that have been mined until today. Currently,

three mines are in operation (Ingulsky with Michurinskiy and Centralny deposits, Smolinskiy with Vatutinskiy deposit and Novokonstantinovskiy mine with the deposit of the same name) with uranium concentration ranging between 0.1% and 0.17%. The recoverable resources are 160,816 tons of uranium. Also, there are plans to begin operation of the Safonovskiy deposit in the Safonovskiy mine in 2015 with 2,248 tons of uranium in 0.02% grade uranium; and the Severinskiy-Podgaytsevskiy deposit in the Severinskiy mine in 2020 where 48,120 tons of uranium in 0.1% grade uranium ore is now deposited (OECD & IAEA, 2014, p. 426-427).

The Vostochniy mining-processing combinat VostGOK (Східний ГЗК, Державне підприємство "Східний гірничо-збагачувальний комбінат"), fully owned by the Ministry of Energy and Coal Industry of Ukraine, is the only body operating in the uranium production and processing. The annual average uranium production of 940 tons of uranium concentrate has recently started to be exceeded by 1,000 tons annually.

The first Ukraine uranium processing plant, the Pridneprovskiy Chemical Plant (PCP) in the town of Dneprodzerzhinsk, is connected with the first deposits discoveries. It was constructed in 1948 and uranium ore from the Pervomayskoye and Zheltorechenskoye uranium deposits was processed there. After mining out the mines, the PCP stopped uranium processing in 1991. The company developed zirconium production technologies and have processed zirconium from a mine near the city of Volnogorsk, the only zirconium mine in the former Soviet Union. Zirconium is used for fuel rods production and the mine with the processing plant has the capacity to meet

all of Ukraine's zirconium requirements. In 1959, a second uranium processing plant (VostGOK) was constructed in the city of Zheltiye Vody. The plant capacity is 1.5 Mt/y of uranium ore (OECD & IAEA, 2014, p. 428) and it is the largest facility in the former Soviet Union's military industrial complex.

Uranium fuel has always been provided by the Russian OAO TVEL. However, as the country's uranium production is quite significant, domestic uranium concentrate is sent to the Russian Federation for enrichment and fuel fabrication. Domestic uranium production currently covers 30% of domestic requirements, but the expansion in uranium production due to new mines openings is expected to meet the uranium requirements for the Ukrainian nuclear fleet by 2014-2015 (OECD & IAEA, 2014, p. 430).

Ukraine has planned to construct the facilities for domestic uranium fuel production since early 1990s (Levine, 1995, p. 896). Obviously, the fact that Ukraine houses extensive uranium and zirconium production played its part in these plans. There is, however, no enrichment plant in Ukraine, which is why Ukraine joined in October 2010 the new JSC International Uranium Enrichment Centre at Russian Angarsk in Siberia. The company is now owned by Rosatom State Atomic Energy Corporation (70%), JSC NAK Kazatomprom (10%), JSC Armenian NPP (10%) and Ukrainian State Concern "Nuclear Fuel"² (10%) (JSC International Uranium Enrichment Centre). The Ukrainian State Concern "Nuclear Fuel" aims at preparation of domestic nuclear fuel elements production and fuel assembly fabrication.

² Государственный концерн "Ядерное топливо" under the Ministry of Energy and Coal Industry of Ukraine.

Ukraine's State Concern Nuclear Fuel apparently sells natural uranium to IUEC, which enriches it at Russian plants. Then IUEC sells the enriched uranium to the OAO TVEL, which fabricates fuel assemblies and supplies them to NNEGC Energoatom. The remaining nuclear fuel required for Ukraine's nuclear power plants is purchased directly from OAO TVEL. The contracted volume is reported to be 60,000 SWU/yr, proportional to the Ukrainian shareholding, which covers approximately 3% of Ukraine requirements (WNA, 2014; Safirova, 2014, p. 47.5). However, as the capacity of Ukrainian share of IUEC is very low, NNEGC Energoatom signed a long-term contract with OAO TVEL for all 15 reactors. The contract was signed in June 2010 for 20 years, as Rosatom had offered a substantial discount to Ukraine if it signs up with TVEL for 20 years. Ukraine is OAO TVEL's biggest foreign client, totaling to 55% of its exports (WNA, 2014). Ukraine has historically been sending its used fuel to Russia for storage or reprocessing and has no long-term storage facility for high-level waste (Schneider & Froggat, 2014, p. 138).

Westinghouse Electric Company LLC supplies VVER design fuel assemblies to Ukraine as well. Although the price of the contract was not published, the logic is obvious. The Ukrainian political decision was clearly to diversify the supply of nuclear fuel even at higher costs. The contract was signed in 2008 and Westinghouse supplied a total of 630 fuel assemblies for the South Ukraine NPP ("More Westinghouse", 2014). And although there were similar problems (manufacturing defects in the fuel led to a lengthy unscheduled outage at two units) with the diversified fuel as in the Czech Republic's case, after the

Russian annexation of Crimea, the contract with Westinghouse was extended until 2020 (“Ukraine signs”, 2014; “Westinghouse significantly”, 2014; WNA, 2014). So far, no figures or details on the quantities of fuel or the number of reactors involved were presented.

The mentioned Ukrainian State Concern "Nuclear Fuel" is active in building nuclear fuel fabrication plant in Ukraine. It was in 2010 when tender for joint venture to build a plant to manufacture VVER-1000 fuel assemblies was announced. OAO TVEL and Westinghouse Electric Company LLC bid to build this plant, and in September 2010, OAO TVEL was selected by the decision of the Cabinet of Ministers of Ukraine. It is likely that the OAO TVEL has won because it offered to transfer all the nuclear fuel manufacturing technologies from nuclear fuel elements filling and fuel assembly to the production of medicine and powder to the joint venture. The joint venture (Private Joint-Stock Company Nuclear Fuel Production Plant) thus comprises of OAO TVEL (50% -1) and State Concern "Nuclear Fuel" (50% +1) and the construction has been underway near the village of Smolino since 2012. In 2015, it is planned to put the assembly into operation, and by 2020, the plant will commence its own production of fuel pellets. Once operational, it will produce around 400 fuel assemblies annually. However, delays might occur, as the construction was delayed already in 2014 due to shareholders' disagreements and financial issues.

4.12.4 The Service Part of the Nuclear Fuel Cycle

There are four nuclear power plants operating in Ukraine with a total of fifteen pressurized water reactors cooled and moderated by light water. The Rivne NPP with two VVER-440/V-213 units (415 and 420 MWe) and two VVER-1000/V-320 units (2x 1,000 MWe); and the Khmelnytsky NPP with two VVER-1000/V-320 units (2x 1,000 MWe) are located in Western Ukraine. The other two plants are located in Southern Ukraine. These are the South Ukraine NPP with three VVER-1000 units of V-302, V-338 and V-332 types (3x 1,000 MWe); and the Zaporizhzhya NPP with six VVER-1000/V-320 units (6x 1,000 MWe). The Zaporizhzhya NPP is the biggest nuclear power plant in Europe. All of the units were constructed with Soviet assistance and employ Soviet design VVER reactors.

All units are operated by DP NNEGC National Nuclear Energy Generating Company Energoatom (Державне підприємство Національна атомна енергогенеруюча компанія Енергоатом) fully owned by the Ministry of Energy and Coal Industry of Ukraine.

There are also two research reactors in Ukraine. The 10 MWt VVR-M reactor is located at Kiev Institute for Nuclear Research of the National Academy of Sciences of Ukraine. The reactor is scheduled for shutdown in 2015 followed by decommission. The very small IR-100 research reactor at the Naval Engineering School in the Sevastopol National University of Nuclear Energy and Industry in Crimea has been recently seized by the Russian Federation. Also, in 2012, the construction of Experimental Neutron Source at the Kharkov Institute of Physics and Technology began with US technological assistance.

Tab. 4.12.4: Nuclear Units in Ukraine

Reactor	Type	Power Output	Status	End of life-cycle
Chernobyl 1	RBMK-1000	800 MWe	Permanent shutdown	2000
Chernobyl 2	RBMK-1000	1,000 MWe	Permanent shutdown	1991
Chernobyl 3	RBMK-1000	1,000 MWe	Permanent shutdown	2000
Chernobyl 4	RBMK-1000	1,000 MWe	Permanent shutdown	1986
Rivne 1	VVER-440/V-213	415 MWe	Operating	2030
Rivne 2	VVER-440/V-213	420 MWe	Operating	2031
Rivne 3	VVER-1000/V-320	1,000 MWe	Operating	2016
Rivne 4	VVER-1000/V-320	1,000 MWe	Operating	2034
Khmelnitsky 1	VVER-1000/V-320	1,000 MWe	Operating	2017
Khmelnitsky 2	VVER-1000/V-320	1,000 MWe	Operating	2034
Khmelnitsky 3	VVER-1000/V-392B	1,000 MWe	In construction	-
Khmelnitsky 4	VVER-1000/V-392B	1,000 MWe	In construction	-
South Ukraine 1	VVER-1000/V-302	1,000 MWe	Operating	2023
South Ukraine 2	VVER-1000/V-338	1,000 MWe	Operating	2015
South Ukraine 3	VVER-1000/V-320	1,000 MWe	Operating	2019
Zaporizhzhya 1	VVER-1000/V-320	1,000 MWe	Operating	2015
Zaporizhzhya 2	VVER-1000/V-320	1,000 MWe	Operating	2016
Zaporizhzhya 3	VVER-1000/V-320	1,000 MWe	Operating	2016
Zaporizhzhya 4	VVER-1000/V-320	1,000 MWe	Operating	2017
Zaporizhzhya 5	VVER-1000/V-320	1,000 MWe	Operating	2019
Zaporizhzhya 6	VVER-1000/V-320	1,000 MWe	Operating	2025
Kiev	VVR-M	10 MWt	In termination	2015
Sevastopol	IR-100	200 kWt	Suspended	?

Source: Mykolaichuk, 2011; DP NNEGC Energoatom; State Nuclear Regulatory Inspectorate of Ukraine, 2013, p. 39; International Nuclear Safety Centers of Ukraine; open sources; compiled by T. Vlcek.

Speaking about the life-cycle of the nuclear units, they were all designed and licensed for 30 years operation. As many of the units achieved the 30 years of operation or are about to achieve, the life extension is one of the key targets of the nuclear units' operator. Lifetime extension of Ukrainian NPPs is envisaged by state Energy Strategy of Ukraine for the period up to 2030, and is considered a high priority activity by DP NNEGC Energoatom. The Rivne 1 and 2 have been extended by 20 years by State Nuclear Regulatory Inspectorate of Ukraine (Державна інспекція ядерного регулювання України) in 2010, and the South Ukraine 1 has been extended by 10 years in 2013. Actions for life extension of South Ukraine 2 and Zaporizhzhya 1 and 2 have been implemented since 2012. The Zaporizhzhya 1 was disabled for 96 days at the end of 2014 and Zaporizhzhya 2 and 5 will be disabled from February 2015 for 110 and 107 days respectively (“Ukraine will disable”, 2014; “The power unit?”, 2014). These outages are in line with the implementation of the planned activities associated with the prolongation of the life of these units. The requirement of a new license for these units might be problematic due to the lack of investment and potential EU pressure on closing the power plant.

4.12.5 The Back End of the Nuclear Fuel Cycle

The country's spent fuel management is specific, as the spent fuel is partly stored on site and partly removed to Russian Federation for storage. Speaking about the Zaporizhzhya NPP, after cooling down the spent fuel in a pool, the spent fuel is stored in an interim dry storage facility on site (new facility for treatment solid radioactive waste will be commissioned in

2015). There is also a wet interim storage facility at Chernobyl NPP site (together with the whole Industrial Complex for Solid RW Management) for storage of high-level wastes from Chernobyl NPP and other sources. However, the spent fuel from all other Ukrainian NPPs is removed to the Russian Federation, according to the contract with OAO TVEL, at a cost to Ukraine of over USD 100 million per year. From 2011, high-level wastes from reprocessing Ukrainian fuel are to be returned from Russia to Ukraine to be stored in Ukrainian Central Spent Fuel Storage Facility (CSFSF) (WNA, 2014). However, this has been most likely postponed as the CSFSF is not commissioned yet. These high-level wastes are stored in the interim storage facility (ISF-1) at Chernobyl NPP, where another one (ISF-2) is currently under construction.

It was the Strategy for Radioactive Waste Management in Ukraine adopted in 2009 that envisaged the construction of CSFSF. The Construction of the centralized storage facility of the State Specialized Enterprise “Centralized RW Management Enterprise” (Державне спеціалізоване підприємство Центральне підприємство з поводження з радіоактивними відходами) was originally planned to take place in March 2011, but commenced in August 2014, and is being built with the financial support of the Department of Energy and Climate Changes of the United Kingdom and the European Commission. The final design capacity of the facility will allow storage of 16,530 used fuel assemblies, including 12,010 VVER-1000 assemblies and 4,520 VVER-440 assemblies (IAEA Contact Expert Group, 2012; WNA, 2014). The company is subordinated to Ukrainian State Corporation RADON (ДК УкрДО “РадоH”) that collects, transports,

conditions, and stores temporarily radioactive waste from all non-nuclear cycle enterprises, which produce radioactive waste in the course of their activities. USC RADON consists of Scientific and technical center and 6 facilities for storage and management, processing, decontamination etc. in Lviv, Kyiv, Kharkiv, Odessa, Donetsk and Dnipropetrovsk.

The state managing body for USC RADON is the State Agency of Ukraine on Exclusion zone management (Державне агентство України з управління зоною відчуження). This company is in charge of management of RW processing including long-term storage and disposal in Chernobyl Exclusion Zone and is also in charge of the implementation of the state policy for RW management.

Deep geological repository is planned in Ukraine without specific data as the new Central Spent Fuel Storage Facility is planned for at least 50 years of operation.

Tab. 4.12.5: Ukrainian Nuclear Sector Examination

Indicator	Description
Is there nuclear producing capacity present in the country?	Yes, 4 nuclear power plants with a total of 15 reactors; Rivne NPP (2x 505 MWe VVER-440/V-213 and 2x 1,000 MWe VVER-1000/V-320 units), Khmel'nitsky NPP (2x 1,000 MWe VVER-1000/V-320 units), South Ukraine NPP (3x 1,000 MWe VVER-1000 of V-302, V-338 and V-332 types), Zaporizhzhya NPP (6x 1,000 MWe VVER-1000/V-320 units)
Is there a project to expand the capacity? What is the status of the project?	Khmel'nitsky 3 and 4, tender was won by OAO OKB Hidropress, however, due to Crimea crisis, the project was cancelled and other Western options are investigated, especially with Westinghouse Electric Company, LLC

How was the project procured?	Publicly, openly, five potential suppliers were invited (Russian OAO OKB Hidropress; Czech ŠKODA JS, a. s.; American Westinghouse Electric Company, LLC; Korea Electric Power Corporation KEPCO; and French Areva SA); OAO OKB Hidropress and Korea Electric Power Corporation KEPCO eventually submitted their bids and in October 2008, OAO OKB won the tender
Who is the contractor in charge of the project?	DP NNEGC Energoatom fully owned by the Ministry of Energy and Coal Industry of Ukraine
How is the financing secured?	Russian loan for 85% of total costs, however, due to Crimea crisis, the project was cancelled and other Western options are investigated, especially with Westinghouse Electric Company, LLC
Who is the operator of the facility?	DP NNEGC Energoatom fully owned by Ministry of Energy and Coal Industry of Ukraine
Are there enough home-based experts to run the facility safely?	Yes
Who is/will be in charge of decommissioning?	The operator together with State Agency of Ukraine on Exclusion zone management
Who provides nuclear fuel and under what conditions?	Ukraine's State Concern Nuclear Fuel sells natural uranium to IUEC in Russia for enrichment, OAO TVEL fabricates fuel assemblies and supplies them to DP NNEGC Energoatom; as the Ukrainian share of IUEC capacity is very low, NNEGC Energoatom signed a long-term contract until 2030 with OAO TVEL for all 15 reactors with a substantial discount; Ukraine's diversification efforts led to Westinghouse Electric Company LLC supplying VVER design fuel assemblies for the South Ukraine NPP, the contract with Westinghouse was extended until 2020 after the Russian annexation of Crimea

<p>What is the experience with the fuel being currently used? Is there any rationale or path-dependency behind the current contract?</p>	<p>Some Westinghouse's fuel manufacturing defects led to a lengthy unscheduled outage at two units of the South Ukraine NPP</p>
<p>Is there any part of nuclear fuel industry present in the country? If so, how it contributes to country's nuclear fuel cycle?</p>	<p>Uranium production currently covers 30% of demand, opening of Safonovskiy and Severinskiy-Podgaytsevskiy deposits should cover the whole demand; VostGOK uranium processing plant in Zheltiye Vody has 1.5 Mt/y of uranium ore processing capacity; Pridneprovskiy Chemical Plant produces zirconium (used for fuel rods) has the capacity to meet all of Ukraine's zirconium requirements; the State Concern "Nuclear Fuel" (50% +1) together with OAO TVEL (50% -1) is constructing nuclear fuel fabrication and fuel assemblies plant at Smolino, it should be in operation by 2020 with production of around 400 fuel assemblies annually, delays are likely to occur</p>
<p>How is used fuel treated and who is in charge of this?</p>	<p>Used fuel from Zaporizhzhya NPP is stored in interim dry storage facility on site; spent fuel from all other Ukrainian NPPs is removed to Russian Federation according to the contract with OAO TVEL at a cost to Ukraine of over USD 100 million per year and the high-level wastes from reprocessing Ukrainian fuel was to be returned from Russia to Ukraine to be stored in Ukrainian Central Spent Fuel Storage Facility (CSFSF); CSFSF construction commenced in August 2014; ISF-1 and ISF-2 (under construction) interim storage facility at Chernobyl NPP are used for storage as well; different companies are in charge, but all fully owned by the State</p>

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4.13 Activities of Rosatom in Asia

Hedvika Kodoušková

4.13.1 Introduction

As far as civil nuclear power development is concerned, we identified several diverse groups of players in the Asian market: a) mature countries with their nuclear technology and services export programs (e.g. Japan, South Korea, newly followed by China); b) countries which operate nuclear power plants, but had otherwise limited participation in nuclear sector due to being outside of the Nuclear Non-proliferation Treaty (India until 2008, Pakistan); c) newcomers to the sector, who decided to address their rapidly growing energy demand by developing their nuclear power-generating capacity (e.g. Vietnam, Bangladesh, etc.). Therefore, within the study, we examined Rosatom's activities in the selected case studies representing each of the above mentioned groups. The countries under scrutiny were China, India, and Vietnam.

4.13.2 China

Short history of nuclear power development

In China, nuclear energy is comprehended as an important mean to fulfill several simultaneous goals: a) continuing with economic development, which started in 1970's by opening exclusive economic zones at the South-eastern coast of China and which is nowadays the main driver of growing energy consumption; b) increasing self-sufficiency, so slowing down China's growing dependence on fossil fuels imports; c) electrification - providing electricity and modern energy

services to majority of inhabitants, so decreasing number of people living below poverty line; d) dealing with rising environmental degradation from heavy use of coal-fired plants – a pressing issue, which has already led to many local demonstration, something Chinese communist government is very much concerned with; e) finally, increasing national prestige and the role of China in the international relations by introducing its own civilian nuclear power program and exporting home-made technologies to the third countries (Kodoušková, Kuchyňková, Leshchenko, 2014, pp. 31-38).

Pressing character of the above mentioned issues and the determination of China to continue with its nuclear power program is apparent from the following comparison: in 2007, there were only 9 reactors with capacity of 8 GWe in Chinese territory (1,1% of installed electricity generation capacity) with production of 62 TWh (less than 2% of electricity production in China). This was significantly below ten major world nuclear power producers (Sang, 2011, p. 59). In 2015, however, China had 26 nuclear power reactors in operation with the capacity of more than 23 GWe, 23 under construction with additional capacity of more than 25 GWe and many others (45) to start construction or planned possibly adding more than 52 GWe in future (WNA, 2015). This signifies an unprecedented rise. Moreover, China expressed many times its commitment to increase its future nuclear power capacity to reach at least 58 GWe by 2020, and around 150 GWe by 2030 (WNA, 2015). As such, it has most rapidly expanding nuclear power program worldwide.

Even after Fukushima, Chinese nuclear power strategies were not significantly altered. Following the accident on March

11, 2011, it was announced that China would suspend approval for new nuclear power stations and conduct comprehensive safety checks of all nuclear projects including those under construction. In October 2012, the Chinese Prime Minister approved the nuclear roadmap for the next decade. He outlined a modified approach to nuclear power construction. The Prime Minister said that nuclear power development would continue at a steady pace, with strong emphasis put on safety and quality (so that that new reactors will have to be built with “third generation” reactor design technology and adhere to the highest safety standards in the world). Plans for inland plants were put on hold until 2015 taking into account the public opposition (FT, 2012; see also Nakano, 2013). To sum up, national policy has moved from ‘moderate development’ of nuclear power to ‘positive development’ in 2004 (see below), and in 2011-12 to ‘steady development with safety’ (WNA, 2015).

In building nuclear power plants, China combined the effort to develop its own domestic reactor designs by simultaneously encouraging international cooperation and technologies transfer (Buijs, 2012; Sang, 2011). The result is a large number of various reactors types on the Chinese territory and a growing effort of the national government to implement some kind of unification. After Fukushima, the third generation of PWRs is preferred in new power plants together with merger of latest most developed domestic design technologies.

As late as in 1985, China National Nuclear Power Corporation (CNNC) built its first CNP reactor (start-up in 1991) based on cooperation with Framatome (now Areva), later upgraded in its design and capacity. In the past, CNNC has also imported reactors technology from Canada (CANDU 6). It

also operates two Russian VVER-1000 reactors at Tainwan (see below) (Peachey, 2014). CNP reactors have evolved into ACP series. In 2011, CNNC announced that it independently developed ACP1000, a third generation 1000MWe class PWR, claiming full intellectual property rights. This reactor type is planned for export to Pakistan (CNNC, undated; Peachey, 2014). Another Chinese national company - China General Nuclear Corporation (CGN - renamed from China Guangdong Nuclear Power Group in 2013) started construction of its first reactor in 1987 with technology imported from Framatome (M310). Later CPR-1000 (generation II+) was developed as an upgraded version of French technology with nearly complete domestic supply chain established. However, intellectual property rights are held by Areva which constrains overseas sales since agreement from Areva would be needed in each case. As such, CPR-1000 reactors were intended mainly for the domestic market and widely and quickly deployed (Goncharuk, 2011). Most recently, advanced CPR - ACPR1000+ reactor design - has been developed with full Chinese intellectual property rights (WNA, 2015). However, after Fukushima accident, rationalization of CNNC's and CGN's 1000 MWe class designs was ordered. ACP1000 morphed into the ACC1000 or Hualong I as a merger of CNNC and CGN latest nuclear reactor designs (WNA, 2015). Plans for the CPR-1000 have been scaled back since AP1000 reactors, winning the national tender from 2004 (see below), were given priority. ACPR1000+ was envisaged for export starting from 2014, but was abandoned with the rationalization to Hualong 1, as stated by the World Nuclear Association (WNA, 2015). ACC1000 could serve as a

supplement of both domestic and exporting uses, although it seems that AP1000 will be supported as the preferred generation III model to mass-produce, and CAP1400 (its upgraded model with stated 100% Chinese intellectual property rights) as the favoured generation III model for export (Peachey, 2014).

The 2004 nuclear tender

Based on the above mentioned assessment of nuclear power development in China, the country's strong commitment to gradually develop its own third generation reactors design for domestic as well as export markets is apparent. As it has been already mentioned, to reach this immense task cooperation with international players was actively searched for. Important part of this process was a nuclear tender for the third generation of reactor design announced in September 2004. Technological transfer was one of the central factors in the bidding process.

The State Council approved the plans for two units at Sanmen in Zhejiang province and two or more others at Yangjiang in Guangdong province (the site was later changed to Haiyang in the more northerly Shandong province).¹ Reactors were subject to an open bidding process from overseas. Major global players including Russia took part: Westinghouse (with AP1000 reactor), Areva (EPR) and Atomstroyexport (VVER-1000 model V392). Bids for both two-unit plants were received

¹ The change of site made way for two EPR units that Areva was in negotiations to build at Yangjiang. Later in 2007, the plans for the EPRs under consideration for Yangjiang were transferred to another Guangdong site – Taishan. This deal was not expected to involve the technology transfer which is central to the Westinghouse contracts (see below), since the EPR has multiple redundant safety systems rather than passive safety systems and is seen to be more complex and expensive, hence of less long-term interest to China (WNA, 2015).

in Beijing on behalf of the two customers: CGN for Yangjiang (later Haiyang), and CNNC for Sanmen. The State Nuclear Power Technology Corporation (SNPTC, undated) founded in 2007 under the administration of the Central Government was in charge of technology selection for new plants. Bids were assessed on a level of technology, the degree to which it was proven, price, local content, and technology transfer. Areva and Westinghouse were short-listed (WNA, 2015).

In December 2006, Westinghouse AP1000 reactor design was confirmed for the four units.² It was reported that China had chosen Westinghouse to gain the access to latest U.S. technology, which it had not yet had, and issues of self-reliance and localization of technology (Bloomberg, 2006; Reuters, 2006). Westinghouse was reported to have a better record in transferring technology to others and was able to make a better offer than Areva on technology transfer. It was prepared to use hundreds of Chinese engineers to do a detailed design for the first Chinese AP1000 units. Diplomatic concerns played an important part in the decision as well, as Chinese government was under pressure to improve the trade balance with the U.S. (Xu, 2010, p. 153).

SNPTC, as the transferee of the advanced third generation nuclear power technology, is the main body to perform related engineering design and project management of first AP1000 projects (SNPTC, undated). As part of the agreement with Westinghouse, the Chinese supply chain takes an increasingly large share of reactor construction. The next eight units (so-

² Sanmen site works commenced in February 2008. Full construction on Sanmen 1 – the world's first AP1000 unit – officially began in April 2009. The reactor is expected to begin operation at the end of 2015 with the second less than one year later. First concrete at Haiyang 1 was laid in September 2009. The Haiyang units are expected to commence operation in 2016 (WNA, 2015).

called CAP1000s) will involve higher local content, although they will still contain some critical components from Westinghouse (Peachey, 2014). By December 2013, Xinhua reported that 80 % of the components of the AP1000 had already been localized in China (Barrett, 2014). The long-term goal of China is to firstly digest, absorb, and fully grasp the technology, and re-innovate it to CAP1400 (China's advanced passive nuclear power technology with installed capacity of 1400 MWe) or even to CAP1700 with China's proprietary intellectual property rights. The aim is not just to satisfy domestic demand, but also to implement “going global” strategy for nuclear power technology and win global nuclear power order like the U.S., France, and other countries (SNPTC, undated).³

It seems that the factor of technology transfer can be comprehended as crucial as far as Russian role in Chinese nuclear power program is concerned. As Goncharuk (2011) put it, Russian specialist must take into account the possibility of future competition with China on the global nuclear market. So, Russia makes efforts at securing some of its top nuclear achievements even if some profitable contracts could be lost. On the other hand, more flexible position can be observed as far as the U.S. attitude is concerned. Westinghouse sees the Chinese rise of nuclear power as a possibility for trading new reactor technologies, obtaining valuable operational experience for AP1000 technology that had never been built before, and

³ The nuclear independence strategy should proceed in three stages: The first stage would require complete reliance on the outside assistance, while in the second one China would begin to develop engineering plans, equipment manufacturing, and construction in conjunction with Westinghouse. This process would culminate in the complete digestion and absorption of AP1000 technology and the completion of independent innovative designs. As such, China would possess complete independent IP rights to trademark large-scale advanced pressurized water reactor technology (Barrett, 2014).

securing its presence on the Chinese market through technological and scientific support (Goncharuk, 2011; Xu, 2010, p. 151). The question remains, how and to what extent does Russia participate on the nuclear power development in China?

Tianwan nuclear power project (Russian VVER-1000/V-428(M))

Russia has taken part in Tianwan nuclear power project development. Russia's Atomstroyexport is the general contractor for the Tianwan 1&2 (phase 1) power plants using the V-428 version of VVER-1000 reactor (AES-91). The project, which is now in operation, was built in the years 1999-2007 (CNEC, 2011).⁴ According to Xu (2010, pp. 56-59), mainly political and diplomatic reasons were pursued, when Sino-Russian nuclear deal concerning Tianwan was being negotiated. China became isolated after June 1989, when Western countries imposed sanctions, and negotiations on several potential NPP projects were stalled. Building strong partnership with the Soviet Union was important for the Chinese government. On the other hand, as economy started to collapse in most former Soviet republics and in Russia itself at the end of the 1980s, the potential to build NPP in China would have created an opportunity for Russia to keep one of its industries alive (Xu, 2010, p. 58). An intergovernmental agreement was signed in December 1992. The project's cost was originally estimated at \$2,5 billion, but finally reached \$3,2 billion (\$1,4 billion on Russian side) (Sozoniuk, 2014; WNA,

⁴ Completion was delayed due to corrosion in the steam generators.

2015). The owner and operator of the plant is Jiangsu Nuclear Power Corporation (JNPC).⁵

Tainwan 3&4 (phase 2) contract, comprising two Russian-designed VVER-1000/V-428(M) (AES-91), was signed in 2010. The plant has been under construction from December 2012, respectively September 2013 (there was some delay due to discussion on pricing for the Russian components and then safety checks of all Chinese nuclear projects including those under construction after Fukushima). Commercial operation is planned to begin in 2018/19. According to Sozoniuk (2014), the project cost is estimated at \$6 billion (\$1,8 billion on Russian side). Though another source states that \$3,8 billion are expected as the overall project cost (WNA, 2015). Atomstroyexport is not acting as the principal contractor in this case, though it insists on retaining intellectual property rights (Sozoniuk 2014; WNA, 2015).

The two phases of Tianwan nuclear power project are typical of rising share of construction works done by Chinese side from 50% (phase 1) to 70% (phase 2). In the former case, the Russian company was responsible for providing technology for the nuclear power plant, design of the nuclear island and conventional island, as well as supplying, installing, and calibrating the whole equipment, personnel training, and commissioning the plant. The Chinese side was responsible for the project construction and management, some auxiliary equipment procurement, providing auxiliary services and performing most of the installation work on the nuclear power plant. Russia's Energoatom has been responsible for reactor's

⁵ JNPC is a joint venture between China National Nuclear Corporation (50%), China Power Investment Corporation (30%) and Jiangsu Guoxin Group (20%) (CNEC, 2011).

maintenance from 2009 (Sozoniuk, 2014). The project to build Tianwan 3&4 had a similar format, with JNPC taking responsibility for the design and supply of non-nuclear components and equipment. However, this time, based on the previous experience, the Chinese side was able to increase its share of construction works up to 70%, including procurement of major part of the equipment excluding the nuclear island, construction management, building related infrastructure on the site, etc. Russian side is responsible solely for the technology, nuclear island design, supply of the reactor and related equipment, and commissioning of the nuclear power plant (Sozoniuk, 2014). Also in this case, Chinese determination to maximally increase domestic manufacturing of plant and equipment can be observed.

Russian involvement in nuclear fuel cycle in China

It also seems that Chinese interest in Russian involvement in its nuclear power development stems from the contract to the uranium enrichment technology, which was attached to the package agreement on Tianwan 1&2. Looking to sign a new contract on Tianwan 3&4, Russia played a similar hand, according to Goncharuk (2011). As for the uranium enrichment technologies, China is deeply interested in gas centrifugal enrichment and Russia is the world's leader in this technology.

China has stated many times that it intends to become self-sufficient not just in the nuclear power plant capacity but also in the production of fuel for those plants (it is for closed fuel cycle).⁶ However, the country still relies on foreign suppliers for

⁶ Domestic uranium mining currently supplies less than a quarter of China's nuclear fuel needs. Exploration and plans for new mines have increased significantly since 2000, and state-owned enterprises

all stages of the fuel cycle, from uranium mining through enrichment, fabrication and reprocessing. As China rapidly increases the number of new reactors, it has initiated a number of domestic projects, often in cooperation with foreign suppliers, to meet its nuclear fuel needs (WNA, 2015, April).

China's two major enrichment plants were built under agreements with Russia in the 1990s, and under a 2008 agreement (valued at over \$1 billion), Russia is helping to build additional capacity and also to supply low-enriched uranium for Chinese nuclear power stations for the period 2010-2020.

There is a Russian centrifuge enrichment plant at Hanzhun (Shaanxi province). In May 2008, JSC Techsnabexport (Tenex) concluded contracts with China Nuclear Energy Industry Corporation (CNEIC - a CNNC subsidiary responsible for technology imports) regarding technical assistance in the construction of phase four of the plant (Tenex, undated).⁷ Up to 2001, China had been a major customer for Russian 6th generation centrifuges, and more of these were supplied in 2009-10 for Hanzhun under the phase four (WNA, 2015, April; World Nuclear News [WNN], 2013, February). Another enrichment plant in Lanzhou (Gansu province) started operation in 1964 for military use and operated commercially from 1980 to 1997 using Soviet-era diffusion technology. A Russian centrifuge plant started operating there in 2001 as

are also acquiring uranium resources internationally. China aims to produce one third of its uranium domestically, obtain one third through a foreign equity in mines and joint ventures overseas, and to purchase one third on the open market (WNA, 2015, April).

⁷ Three phases of the gaseous centrifuge enrichment plant have already been built in China under the framework of a 1992 Russian-Chinese intergovernmental agreement ("On Cooperation in the Construction on the Territory of the PRC of a Gaseous Centrifuge Plant for the Enrichment of Uranium for Nuclear Power") and a protocol to the 1992 agreement signed in 1996. In March 1997, the first phase was brought into operation in Hanzhun. Phase two became operational at the same site in 1998. Phase three covered another capacity increase in Lanzhou. The Lanzhou plant started operation in 2001 (Bukharin, 2004).

the phase three of the Sino-Russian 1990s agreements. It was designed to replace the diffusion capacity (Bukharin, 2004; WNA, 2015; WNN, 2013, February).⁸

Regarding fuel fabrication, CNNC is responsible for it in China. CNNC's main PWR fuel fabrication plant, set up in 1982, is located in Yibin (Sichuan province). In 2009, VVER fuel fabrication for Tianwan nuclear power plants began at Yibin, using technology transferred from TVEL. Initial loads and three reloads of fuel of UTVS design for Tianwan 1&2 came from Novosibirsk Chemical Concentrate Plant in Russia under the contract signed in 1997. Third reload was completed in March 2010. To enable the manufacture of UTVS fuel for the fourth reloads of the units, TVEL signed a contract in 2009 with CNEIC. It subsequently supplied CNNC with billets for use in producing fuel assemblies. Four VVER-1000 fuel assemblies produced at Yibin, together with a related component, passed the inspections by Russian experts in April 2010, and were loaded into the Tianwan units during their fourth refueling (WNN, 2010, August).

In November 2010, TVEL signed a set of contractual documents with JNPC and CNEIC (worth a total of \$500 million). The first part of the package is a deal to supply TVS-2M fuel for Tianwan 1 made at Novosibirsk plant in the amount for six refueling. The contract also provided for transfer of production technology of TVS-2M with a view to fabricate it in Yibin factory beginning with the 7th refueling of the Tianwan 2. The final component of the package comprises contracts for the supply of Russian zirconium components for the manufacture of

⁸ China is also developing its own centrifuge technology at Lanzhou, and the first domestically-produced centrifuge was commissioned there in February 2013 (WNA, 2015, April).

UTVS nuclear fuel for the sixth reloads at Tianwan 1&2 and for TVS-M2 fuel for the seventh reload at Tianwan 2. According to TVEL, the contract will provide China with a more modern and cost-effective TVS-2M VVER reactor fuel. Moving to TVS-2M will allow the first two Tianwan units to operate on a longer term 18-month cycle (Nuclear Engineering [NE], 2010; TVEL, 2013, November). TVEL certified the Yibin plant to manufacture the new TVS-2M for Tianwan 2 in April 2014, so fuel for the Tianwan 2 is now fabricated in China under the Russian technology and using Russian accessories (TVEL, 2013, November; WNA, 2015, April).

The fuel for Tianwan 3&4 is being supplied by Russia's TVEL until 2025, along with help to equip the Yibin plant to produce from then on, under a latest \$1 billion contract signed with JNPC and CNEIC in October 2013 (NE, 2013). The contract covers scheduled deliveries of TVS-2M fuel for Tianwan 3&4. It includes first cores for both units and six complete refueling sets for Tianwan 3. TVEL is also to supply accessories for the fabrication of fuel for all four units at Tianwan to the Yibin plant (WNN, 2013, October).

Most of Chinese civil back-end facilities are in Gansu province. An initial commercial reprocessing plant is planned to operate there around 2017, with the larger one based on indigenous advanced technology from 2020. However, an industrial agreement signed with Areva in 2010 (final step towards a commercial contract according to Areva) employing proven French technology could displace it (WNA, 2015, April). Russia is not involved in the back-end of the nuclear fuel cycle in China.

Possible Sino-Russian nuclear cooperation in future

Russian Floating Nuclear Power Plants

In May 2014, the China Atomic Energy Authority (CAEA) and China Institute of Atomic Energy (CIAE) signed an agreement with Rosatom to cooperate in construction of floating nuclear cogeneration plants (FNCP) for China offshore islands. These would be built in China but based on Russian technology, and possibly using Russian KLT-40s reactors. Russia's TVEL anticipates providing fuel for them. In July 2014, Rusatom Overseas signed a further agreement, this time with CNNC New Energy, for the joint development of FNCPs – both barge-mounted and self-propelled – from 2019 (WNA, 2015). Russia is a global leader in developing FNCP. It is currently building a prototype twin-reactor nuclear power plant called “Akademik Lomonosov”. Floating reactor can power e.g. ports, industrial infrastructure and oil and gas platforms. Chinese delegation travelled to the Floating NPP Training Centre and the Baltic Shipyard, where the FNCP is being built in July 2014 (Global Construction Review [GCR], 2014). Russia's first FNPC will be operational by 2016 or 2017 (WNN, 2014, October).

Sanming (Russian BN-800 fast neutron reactor)

China started R&D of its fast neutron reactors in 1964. A sodium-cooled fast neutron reactor – the Chinese Experimental Fast Reactor (CEFR) – at the CIAE near Beijing started up in July 2010. It was built by Russia's OKBM Afrikantov in collaboration with OKB Hidropress, NIKIET and Kurchatov Institute. It was a grid connected at 40% power (8 MWe net) in July 2011. Since then, various commissioning tests of the

reactor, the turbines, and the sodium pumping system have been carried out. In December, 2014 CEFR successfully operated at full capacity (WNN, 2014, December).

The CDFR-1000, a 1000 MWe Chinese prototype fast reactor based on the CEFR, is envisaged with construction start in 2017 and commissioning in 2023 as the next step in CIAE's program. This is CIAE's 'project one' Chinese Demonstration Fast Reactor (CDFR).

However, in October 2009, an agreement was signed by CIAE and China Nuclear Energy Industry Corporation (CNEIC) with Russia's Atomstroyexport to start pre-project and design works for a commercial nuclear power plant with two BN-800 reactors at Sanming city (Fujian province). These reactors are referred to by CIAE as 'project two' Chinese Demonstration Fast Reactors (CDFRs), with construction originally intended to start in 2013 and commissioning in 2018-19.

A site survey and a preliminary feasibility study had been undertaken in 2007-08. Proposals were submitted in 2009 to build a demonstration fast reactor in Sanming in cooperation with Russia. In April 2010, CNNC established Sanming Nuclear Power Co Ltd as a joint venture company with the Fujian Investment & Development Corp and the local government, and initiated a full feasibility study (WNN, 2010, April). Construction was due to start in 2013, once an intergovernmental agreement was in place, expected in 2012, but still pending in 2014. The local content was targeted at 70%, and the first unit was to be in operation in 2018, with the second following about a year later. The plant was expected to be similar to the OKBM Afrikantov BN-800 design built in

Russia at Beloyarsk 4. However, negotiations on price have delayed the project. Moreover, it appears that policy regarding fast reactors remains uncertain, and the first commercial demonstration units are now not expected to be on line before 2025 (WNA, 2015).

Conclusion

The long-term goal of China is to develop a sophisticated nuclear energy program being able to satisfy growing energy demand at home as well as to become an exporter of its own domestic reactor designs to third countries. To meet this goal, China combined the effort to develop its own domestic reactor designs by simultaneously encouraging international cooperation and technologies transfer. Transfer of technologies was actually one of the major factors in 2004 nuclear tender for the third generation of reactor design, which was eventually won by Westinghouse with its AP1000 design. Given the development of Chinese nuclear sector, China will most likely be competing with Russian suppliers in future as it apparently aims on the same markets.⁹ We can assume that for that reason, Rosatom is not willing to share its latest technologies with its Chinese counterparts, which could affect the outcome of 2004 nuclear tender (though very few pieces information are publicly available). Anyway, Rosatom's activities in China are limited to a single project, even though one of the largest - Tianwan nuclear power plant, and even in this case, China has successfully raised the share of construction works done by its

⁹ Intergovernmental nuclear agreement was signed with Vietnam (Le, 2012). China also explored options of nuclear cooperation with India (Reuters, 2014, September).

own companies from 50% (Tianwan 1&2) to 70% (Tianwan 3&4). Chinese desire to involve Russians into its nuclear power development most likely stems from the contract on the uranium enrichment technology, which was attached to the package agreement on Tianwan. China's two major enrichment plants were built under agreements with Russia in the 1990s, and under a 2008 agreement, Russia has been providing technical assistance to build additional capacity and also supplying low-enriched uranium to Chinese nuclear power stations. Additionally, in 2010, China bought Russian fuel production technology. Chinese Yibin fabrication plant will thus be able to supply Tianwan 2 with Russian TVS-2M fuel enabling the plant to operate on longer 18-months cycle.

4.13.3 India

Short history of nuclear power development

India had started its nuclear power program long before other Asian countries. In general, Indian motives included the desire to increase national security against external threats as well as energy security issues. Currently, civilian nuclear power is intended to help India in dealing with several mutually related challenges: economic rise, poverty alleviation, and to lesser extent sustainability and environmental issues. Similarly to China, India has seen an unprecedented rise in its energy consumption. Nowadays, it has to rely on fossil fuels imports and the dependency on foreign supplies is expected to increase in future (Kodousková, Kuchyňková, Leshchenko, 2014, pp. 85-98). Moreover, India is the country with the largest population worldwide without access to electricity and modern sources of

energy for cooking and heating, which indicates further increase in overall consumption if India is successful in its “energy poverty” alleviation programs (IEA, 2012, p. 532).

Despite the fact, that nuclear power constitutes a minor part in total energy consumption in India (1%) (EIA, 2014), it could serve as a suitable source to diminish energy insecurity in the country (growing electricity consumption, insufficient fossil fuel production, large black-outs) as well as deal with environmental concerns (rising CO₂ emissions due to high reliance on coal). Nowadays, India has 18 small, 2 mid-sized and 1 large nuclear power reactors in operation with overall capacity of 5302 MWe (3,4% of generated electricity in the country). Five large reactors are under construction (possibly adding another 4300 MWe gross), and more are planned (21300 MWe) or proposed. 25% nuclear contribution to electricity production) is the ambition for 2050, when 1094 GWe of base-load capacity is expected to be required (WNA, 2015, May).

Similarly to China, India's nuclear energy policy was not significantly altered after Fukushima. Indian government responded quickly with a message that it is “business as usual” for nuclear power (Vivoda, 2013). Following the accident, the situation in India was evaluated and recommendations were made for safety improvements in both its BWRs and each PHWR type (supplementary provisions to cope with major disasters) (WNA, 2015, May). However, based on the above mentioned energy security concerns as well as the 2008 U.S.-India nuclear treaty (see below), India's overall goals regarding its nuclear power program remained unchanged.

The long-term aim of India is to gain self-sufficiency in nuclear research, using maximally its domestic resources (mainly

thorium) and industrial capacities (for more info see e.g. Lee, 2011, pp. 70-72). The three-phased heavy-water thorium fuel cycle development has been followed to overcome insufficient domestic uranium resources and reduce the country's dependence on its foreign imports.¹⁰ As part of stage two of the cycle, fast breeder reactor (FBR) of 40 MWe capacity was constructed in Kalpakkam in 1985 by Bharatiya Nabhikiya Vidyut Nigam Ltd (BHAVINI).¹¹ In early 2000s, construction of a bigger 500 MWe prototype started there with operation expected in 2011 (Lee, 2011, p. 85). However, the termination of the reactor's construction saw major delays. According to the Department of Atomic Energy of the India's government (DAE, 2014), the project achieved an overall physical progress of 97,5% at the end of March 2014. The reactor is expected to be put into operation in 2015. India has a vision of becoming a world leader in nuclear technology due to its expertise in fast reactors and thorium fuel cycle (WNA, 2015, May).

The determination of India to increase its self-sufficiency in nuclear power program is understandable if we take into account the long-term exclusion of the country from the international nuclear commerce. International assistance from the U.S., Great Britain, France and Canada helped India to construct its first experimental nuclear reactors as late as in the

¹⁰ The first stage of the cycle employs the PHWRs fuelled by natural uranium and light water reactors, which produce plutonium incidentally to their prime purpose of electricity generation. The second stage uses fast neutron reactors burning the plutonium with the blanket around the core having uranium as well as thorium, so that further plutonium (ideally high-fissile Pu) is produced as well as U-233. Then in the stage three, advanced heavy water reactors (AHWRs) will burn thorium-plutonium fuels in such a manner that breeds U-233, which can eventually be used as a self-sustaining fissile driver for a fleet of breeding AHWRs (WNA, 2015, May).

¹¹ BHAVINI is a wholly owned enterprise of Government of India under the administrative control of the Department of Atomic Energy (DAE) with the objective of constructing and commissioning the first 500 MWe Fast Breeder Reactor (FBR) at Kalpakkam in Tamilnadu and to pursue construction, commissioning, operation and maintenance of subsequent Fast Breeder Reactors.

1950s. The pressurized heavy-water reactor (PHWR) design was adopted in 1964 (Rajasthan 1), which used Canada's reactor as a reference unit. Subsequent indigenous PHWR development has been based on this. However, India remained outside the Nuclear Non-proliferation Treaty in 1970, and after nuclear weapons testing in 1974 (and again in 1998) it was excluded from international trade (Zaleski & Cruciani, 2009). As a result, India's nuclear power program has proceeded largely without fuel or technological assistance from other countries.

Gradually, India's nuclear energy self-sufficiency extended from uranium exploration and mining through fuel fabrication, heavy water production, reactor design and construction, to reprocessing and waste management (WNA, 2015, May). However, because of insufficient domestic uranium resources, its conventional nuclear power reactors had some of the world's lowest capacity factors in the mid-1990s, reflecting the technical difficulties of the country's isolation. They rose impressively from 60% in 1995 to 85% in 2001-02. However, due to chronic shortage of fuel, average load factor for India's power reactors dropped below 60% over 2006-2010, reaching only 40% in 2008 (WNA, 2015, May).¹²

The 2008 U.S.-India nuclear deal

A possible breakthrough was signified by the United States-India Peaceful Atomic Energy Cooperation Act ratified by both sides in September and in October 2008 respectively (Carl, 2009, p. 229; see as well Ntoubandi, 2008, pp. 273-287). The

¹² In December 2014, the 40% of nuclear capacity under safeguards (based on the 2008 U.S.-India nuclear treaty – see below) was operating on imported uranium at rated capacity. The remainder, which relies on indigenous uranium, was operating below capacity, though the supply situation was said to be improving (WNA, 2015, May).

agreement ended more than three decades of U.S. sanctions against India and constitutes a legal basis for future cooperation. India pledged to put most of its nuclear power reactors under IAEA safeguards and close down the CIRUS research reactor at the end of 2010.¹³ This would allow India to participate in international commerce in nuclear fuel and equipment. Based on the deal, India is allowed to reprocess U.S.-origin and other foreign sourced nuclear fuel at a new national plant under IAEA safeguards. This would be used for fuel arising from reactors designated as unambiguously civilian and under regular IAEA inspections. India's safeguards agreement with the IAEA was signed early in 2009. An Additional Protocol to the safeguards agreement was agreed by the IAEA Board in March and signed in May 2009 by India. The Additional Protocol came into force in July 2014, giving the IAEA enhanced access to most of India's civil power facilities (20 facilities listed) (WNA, 2015, May). Following the Nuclear Suppliers' Group (NSG)¹⁴ agreement which was achieved in September 2008, the scope for supply of both reactors and fuel from foreign suppliers opened up (WNA, 2015, May). Civil nuclear cooperation agreements have been signed with many countries afterwards. Russia signed the long-term pact for expanding nuclear cooperation with India during Russian President Dmitry Medvedev's visit in the country in December, 2008 (WNN, 2008, December). It was announced that this deal would “ensure transfer of technology and uninterrupted uranium fuel supplies to India's nuclear reactors” (Tsan, 2012, p. 158).

¹³ CIRUS reactor produced some of India's initial plutonium stockpile.

¹⁴ NSG is a group of nuclear supplier countries that seeks to contribute to the non-proliferation of nuclear weapons through the implementation of two sets of Guidelines for nuclear exports and nuclear-related exports.

The issue of “liability law”

Despite overall enthusiasm about rising cooperation between India and foreign partners after 2008, another problem emerged. India passed the Civil Liability for Nuclear Damage (CLND) Act in 2010, which many governments and companies around the world found inconsistent with existing international norms.¹⁵ Suppliers, foreign as well as domestic, have been worried that the liability law would leave them overexposed in the event of an accident,¹⁶ so were not willing to supply India with any nuclear facilities, systems or related equipment, except for fuel supplies agreements (WNN, 2015). Despite the protests, the Indian government refused to alter the law, however, possible ways were explored to overcome the liability impasse, e.g. by creating a nuclear insurance pool that would cover the vendors accident liability to a certain level and mitigate the extraordinary clauses of the law (Einhorn & Sidhu, 2015). Moreover, the Civil Liability for Nuclear Damage Rules (CLND Rules) came into force in November 2011. As a consequence, the liability of the suppliers, irrespective of the total damage, was limited to the maximum liability of the operator (\$250 million) under the Section 6(2) of the CLND Act (although this section does provide for enhancement of the maximum liability). Plus, not just the liability but also the time

¹⁵ It deals particularly with the Convention for Supplementary Compensation for Nuclear Damage (CSC) that channels liability to nuclear plant operators, and which was signed but not ratified by India as of February 2015 (GI, 2015).

¹⁶ In most countries, liability for a nuclear accident is channeled exclusively to the operator who takes responsibility for the safe construction and operation of their power plant, but Indian legislation written in 2010 could see part of this channeled to the supplier under certain circumstances (WNN, 2015, May). It deals mainly with the section on Right of Recourse (Section 17 of the Act) and in particular Sec. 17(b) according to which: “The operator of the nuclear installation, after paying the compensation for nuclear damage in accordance with section 6, shall have a right of recourse where-the nuclear incident has resulted in a consequence of an act of supplier or his employee, which includes supply of equipment or material

period has been reduced substantially, which made it a little bit easier to enable both the supplier and the operator to enter into commercial contracts (Balachandran, 2014). Still, major suppliers viewed this subsequent arrangements not satisfactory enough, including some of the Indian companies such as Larsen & Toubro (see below) (WNA, 2015, May). As such, the 2010 CLND Act stalled nuclear cooperation agreements and led to rounds of negotiations with major suppliers.

Kudankulam nuclear power project (Russian VVER-1000/V-412)

Despite the above mentioned obstacles, Russia succeeded in practical implementation of nuclear power cooperation deals with India. Russia's Atomstroyexport is supplying the country's first large nuclear power plant at Kudankulam (Tamil Nadu state). It is the India's first cooperative nuclear power plant project with Russia and also its first deployment of PWR technology in the country.

In comparison with another, rather recent nuclear cooperation deals between India and foreign players, the Kudankulam project stems from long history of Russian-Indian nuclear cooperation. The first substantive bilateral nuclear cooperation agreement between India and the USSR was signed only after 1974 nuclear weapons testing, following which Canada formally ended nuclear cooperation with India in 1976, after an unsuccessful attempt to persuade it to accept the full-scope safeguards on its nuclear program. After the Canadian

with patent or latent defects or sub-standard services" (cited from Balachandran, 2014, see as well GI, 2015). The law is framed and was debated in the context of strong national awareness of the Bhopal disaster in 1984, probably the world's worst industrial accident (WNA, 2015, May).

withdrawal, India was desperately looking for international supplies of heavy water. The USSR agreed to supply heavy water for the Rajasthan power station through a bilateral agreement signed in September 1976 (Patil & Balachandran, 2012). It was the only country willing to provide assistance to India's civilian program after withdrawal of many following 1974 and formation of NSG. The Indian-Russian inter-governmental agreement was signed regarding Peaceful Uses of Atomic Energy in January 1979 (Patil & Balachandran, 2012). Around the year 1987, to meet increasing demand for energy, DAE decided to build large capacity (1000 MWe) reactors in the country. It preferred PWRs in view of their large worldwide operation experience. VVER type or Russian reactors were chosen to be located at Kudankulam (AERB, undated). The two countries signed a nuclear cooperation deal in November 1988. There was no further development for nearly a decade, however, because of the break-up of the Soviet Union. The deal was updated only in June 1998 by signing a supplementary to previous inter-governmental agreement (Tsan, 2012, pp. 157-158). Meanwhile, the NSG modified the guidelines for transfer of nuclear-related dual-use equipment, material and technology in 1992¹⁷, and opposed Indian-Russian 1988 deal, its 1998 supplement and the implementation of the plan to construct two reactors in India. Russia opposed that it pertained to an agreement before 1992, when new NSG guidelines entered into force. Thus, despite the vehement opposition from other NSG

¹⁷ The new NSG guidelines required that nuclear supplier states require, as a necessary condition for the transfer of relevant nuclear supplies to non-nuclear weapon states (NNWS), the acceptance of IAEA safeguards on all their current and future nuclear activities (i.e., full-scope safeguards, or comprehensive safeguards). However, the major bone of contention between India and the NSG was the former's unwillingness to accept full-scope safeguards (FSS) on its civilian nuclear program (Patil & Balachandran, 2012).

members, Russia proceeded with implementation of Indian-Russian nuclear deal. This was of immense political importance for India (Patil & Balachandran, 2012). The Indian-Russian deal was extended with other agreements, including the 2002 agreement for the construction of two nuclear reactors at Kudankulam (Tsan, 2012, pp. 157-158).

Kudankulam 1&2 nuclear power plant project (KNPP) comprises two VVER-1000/V-412 reactors (AES-92). The 412 version is specially designed for India as a slightly modified version of VVER-1000/V-320. The units have been constructed by the Nuclear Power Corporation of India Ltd (NPCIL) and also commissioned and operated by NPCIL under IAEA safeguards.¹⁸ Russia is providing technologies and equipment, is responsible for training for operation and maintenance, and is also supplying all the enriched fuel through the life of the plant. The original agreement in 1988 specified the return of used fuel to Russia, but a 1998 supplemental agreement allowed India to retain it and reprocess it (WNA, 2015, May). This has recently become an important aspect of other negotiations between India and major reactor suppliers, as India aims to reprocess used fuel to recover plutonium for its indigenous three-stage program using a new purpose-built Integrated Nuclear Recycle Plant under IAEA safeguards (WNA, 2015, May).

The construction of first Kudankulam unit began in 2002. When the project was first agreed, the original commercial operation date for unit one was expected to be December 2007, second unit following one year later. However, the Indian-

¹⁸ NPCIL is a Public Sector Enterprise under the administrative control of the Department of Atomic Energy (DAE), Government of India. It is responsible for design, construction, commissioning and operation of nuclear power reactors (NPCIL, undated).

Russian cooperation made slower progress than expected. Moreover, there was a strong public opposition against the KNPP, which rose once again after Fukushima. In 2011/2, completion and fuel loading was delayed by public protests and local demonstrations. Kudankulam 1 reached first criticality in July 2013 and was connected to the grid in October 2013. It had reached full capacity in the middle of 2014, however, in October 2014, the unit was temporarily shut down due to in-depth inspection and diagnosis of its turbine generator system and repairs. The first unit re-entered commercial operation at the end of 2014 (NPCIL, 2014; NE, 2015, 2011). Kudankulam 2 went through the last phase of testing in March 2015 (Rosatom, 2015, March). The unit was being prepared for commissioning in the time of writing this study. The Kudankulam 1&2 was built under a Russian-financed \$3 billion contract. A long-term credit facility covers about half the cost of the plant (WNA, 2015, May).

We can assume that previous agreements have opened the door to greater Russian involvement in India's nuclear energy field. Recently four or more additional Russian nuclear reactors to be built in India have been being discussed and planned. As mentioned above, in December 2008, during Medvedev's visit to India, a major deal on civil nuclear cooperation was signed. Commercial contracts were prepared based on the deal, the first in the form of uranium supply agreement between Russia's TVEL and NPCIL (worth \$780 million) signed in February 2009. Based on the deal, TVEL would supply natural uranium pellets for India's PHWRs over ten years and low-enriched fuel pellets for its BWRs at Tarapur (NE, 2009). TVEL was the first company to have signed such a contract since the lifting of the

NSG's restrictions on India in September 2008, though Russia is not involved in Indian uranium fuel cycle as in the case of China¹⁹ (WNA, 2015, May; WNN, 2008, 2009, March).

As part of Indian-Russian nuclear cooperation, a deal to build additional four or more reactors at Kudankulam and other selected site has been discussed many times since 2007/8. A roadmap agreement was signed in March 2010 covering the new nuclear units' construction and a MofU followed in December 2010 to expand Indian-Russian scientific and technical cooperation in the peaceful uses of atomic energy (DAE, 2010; President of Russia [PR], 2014; WNN, 2010, December). In December 2014, the document "Strategic Vision for Strengthening Cooperation in Peaceful Uses of Atomic Energy" was signed after Putin's visit in Delhi (PR, 2014). As far as future development is concerned, the document envisages: a) construction of additional Russian-designed nuclear power units (not less than 12) in India in the next two decades in accordance with the Agreement of 2008 (including identification of a second site next to Kudankulam), b) cooperation in research and development of innovative nuclear power plants, c) localization of manufacturing of equipment and fuel assemblies in India (Government of India [GI], 2014).²⁰ However, despite the development in mutual negotiations, equipment supply and service contracts for further reactors at Kudankulam (3&4) have been delayed. This is most likely because of the "liability law" issue.

¹⁹ Though, a Russian fuel fabrication plant was under consideration to be built in India to bring down cost considerably (Deccan Herald [DH], 2010).

²⁰ The two sides will enhance the scope of orders for materials, equipment and services from Indian suppliers and cooperate in nuclear power plants technical maintenance and repair, modernization and retraining of personnel. From a long-term perspective, the sides also envision their cooperation in decommissioning of nuclear power plants.

As far as the CLND act is concerned, India chose not to apply it to Kudankulam 1&2. It was argued that the units were constructed under the original 1988 agreement - long before the 2010 CLND Act was passed. The bilateral agreement on KNPP's units 1 and 2 puts the onus of any liability on the operator and there is no provision in it for recourse to suppliers (Russia & India Report [RI], 2014). One possible explanation for such an exemption can be once again found in the history of the Indian-Russian nuclear cooperation. In 1998, at the time when the NPCIL and Rosatom finalized the Russian VVER design and engineering supervision arrangements for the construction of Kudankulam 1&2, India did not have any nuclear liability law in force. Based on this, Russia insisted on exemption from liability for Russian suppliers and the supplementary agreement finalized in 1998 gave such an assurance (Patil & Balachandran, 2012). As Russia was the only state able and willing to engage in nuclear commerce with India (not just to build nuclear power plants but also to provide fuel for India's nuclear reactors)²¹, the latter had no other options than to agree to Russian terms or otherwise place itself outside of international nuclear commerce (Patil & Balachandran, 2012). When the inter-governmental agreement to build additional units at Kudankulam was signed in 2008 (GI, 2012), the liability legislation was still not in force. It was decided in this case that the earlier practice would be followed to exempt the Russian suppliers from the liability (Patil & Balachandran, 2012).²²

²¹ Two Indian Tarapur BWRs built by GE on a turnkey contract before the advent of the Nuclear Non-Proliferation Treaty had been using imported enriched uranium from France and China in 1980-90s and from Russia since 2001. However, late in 2004, Russia deferred to the NSG and declined to supply further uranium for them. They underwent six months refurbishment over 2005-06, and in March 2006, Russia agreed to resume fuel supply (WNA, 2015, May).

²² According to Section 13.1 of the Agreement: "the Indian side and its authorized organization at any

However, later reports indicated that India would like Russia to accept the application of the CLND act in the case of Kudankulam 3&4, which was most likely one of the reasons why no contract had been signed between Rosatom and NPCIL until 2014.²³ Then in April 2014, NPCIL signed an agreement with Rosatom for units 3&4 (worth of \$5.47 billion)²⁴, having apparently resolved the liability question. According to WNA (2015, April), the Indian government reached some sort of agreement with Russia to provide liability insurance through the government-owned General Insurance Corporation of India (GIC), though the actual arrangements for a nuclear liability insurance product had yet to be worked out. In December 2014, agreements, which would set the groundwork for starting Kudankulam 3&4 were signed, including a contract for the implementation of units 3 and 4 of the plant with Atomstroyexport supplying the major equipment (The Hindu, 2014). Construction of Kudankulam 3 is now scheduled to start in May 2016, Kudankulam 4 possibly following in 2017 (WNA, 2015, April).

time and at all stages of the construction and operation of the NPP power units to be constructed under the present Agreement shall be the operator of power units of the NPP at Kudankulam Site and be fully responsible for any damage both within and outside the territory of the Republic of India caused to any person and property as a result of a nuclear incident occurring at NPP..." (cited from Balachandran, 2014).

²³ The "liability question" as well as the Fukushima accident and the rise of local opposition movements obviously delayed other cooperation agreements between Russian and Indian companies. E.g. in 2010, a MofU with Walchandnagar Industries Ltd (WIL) was signed by Atomenergomes (AEM). However, there has been no major development so far. After Putin's visit to India in December 2014, it was declared that WIL would like to revive a four-year-old plan to set up a joint venture with AEM to make a variety of products for nuclear plants in the country (The Hindu, 2014a). In 2009, ASE signed a MofU with the Indian engineering and construction company Larsen & Toubro for co-operation relating to Russian design VVER 1000 reactors (WNN, 2009, April). Similarly, no news has appeared about further development.

²⁴ The estimated price of the project oscillated around \$5 billion. The Indian government said in 2012 that it is expected to take up the credit offers to the value of \$3.06 billion, about 53% of the \$5.78 billion estimated total project cost. This would be in line with the finance for the first two units (WNN, 2012). A protocol for financing the Kudankulam 3&4 was signed between Government of India and the Russian

Conclusion

Although India has developed its own nuclear power program, in this case no Rosatom's future competitor has been rising there. India has focused on the three-phased heavy-water thorium fuel cycle instead of conventional PWR reactor designs to overcome insufficient domestic uranium resources. Strong Rosatom's position in the country stems from historical development. Russia was the only country willing to provide assistance to India's civilian nuclear program after the withdrawal of Canada and other players after 1974 nuclear weapons testing and formation of Nuclear Suppliers Group (NSG). That said, after the 2008, U.S. - India nuclear deal was signed (followed by agreements between India, IAEA and NSG respectively) opening the opportunity for technology and fuel supplies from foreign suppliers, Russia found itself in substantially better position compared to other global players.

Previous agreements have opened the door to greater Russian involvement in India's nuclear energy sector. Kudankulam 1&2 nuclear power plant project construction began as soon as in 2002. Recently, construction of four or more additional Russian nuclear reactors has been discussed and planned either in Kudankulam or in other sites. TVEL was also the first company to sign uranium supply agreement with India since lifting of the NSG's restrictions. The previous cooperation provided Russia also some kind of leverage vis-à-vis India itself. India agreed not to apply the problematic 2010 “liability law” to

federation in July 2012. As per the protocol, Russia would extend export credit amounting up to \$3,4 billion for financing 85% of the value of works, supplies and services provided by the Russian organizations. The estimated cost of the project was Rs 32,000 crore (GI, 2012). According to Russia & India (2014), Russians have agreed to build the third and fourth units of KNPP under the framework of Indian nuclear liability law, though at a higher price. The price tag for each new Kudankulam unit would be around \$2.5 billion.

Kudankulam 1&2 project and the two parties apparently reached some sort of agreement about the liability issue also in the case of Kudankulam 3&4. The Russian position in India is further reinforced by its willingness to allow India to retain and reprocess used fuel for its indigenous three-stage fuel cycle.

4.13.4 Vietnam

Nuclear power development plans

Vietnam is a unique case of Rosatom's activities in Asia. The country has no nuclear power production capacity or nuclear-related facility; however, it has declared its serious intentions to integrate nuclear power energy into its energy mix in future and develop its own nuclear program.

The continuously high economic growth in Vietnam over the past decade has resulted in substantial electricity demand of the whole country. Vietnam has decided to choose nuclear power as an important component of its primary energy consumption (Le, 2012). Two preliminary nuclear power studies were undertaken as soon as in early 1980s, followed by another reported in 1995 (WNA, 2015a, May). Since 1996, the government of Vietnam has financed many studies on sustainable energy development in the country, which took into consideration the role of nuclear power in the national energy mix. In 2006, the “Strategy for Peaceful Utilization of Atomic Energy up to the year 2020” was approved, which determined major objectives and road-map for atomic energy development in Vietnam. In December 2007, the “National Strategy for Energy Development up to 2025 with vision to 2050” was accepted, followed by the general “Atomic Energy Law”, which passed National Assembly in June 2008 (Le, 2012). In July

2010, the document called “Planning orientation on nuclear power development in Vietnam up to 2030” was approved. The overall objectives stated in the document covered following goals: “To incrementally build and develop a nuclear power industry in Vietnam; assuring safe management and effective operation of nuclear power plants; step by step raising the participation of domestic industries in the execution of projects to build nuclear power plants and striving to assume the tasks of designing, manufacturing, building, installing, operating and maintaining nuclear power plants” (Vietnam Law & Legal Forum [VLLF], 2010). Finally, in July 2011, the government issued the “Master plan on electricity development period 2011-2020 with vision to 2030”, which evaluates current status of national electricity system and its future development (Le, 2012).

According to the 2010 plan, the nuclear technology selection should at first focus on units of capacity of about 1000 MWe. After 2025, units of larger capacity should be considered (Hung, 2014; Le, 2012). The main focus is now on the initial, at least 1000 MWe, units located at Ninh Thuan (units 1&2 at Phuoc Dinh site and units 1&2 at Vinh Hai site). In May 2010, the overall “Ninh Thuan nuclear power project” was approved. The plan envisaged a three-phase program to introduce nuclear energy in the country (WNN, 2010, June): a) in the initial phase (between 2010-2015), Vietnam will approve investment and locations, select contractors and train managers and technicians to start NPP construction works; b) in the second phase (between 2015-2020) construction will be finalized and the first 1000 MWe reactor put into operation at Phuoc Dinh at the end of the period; c) during the third phase (between

2020-2030), Vietnam wants to continue in construction of more power reactors (WNN, 2010). The pre-feasibility study for construction of the first nuclear power plant was carried out in the years 2002-2009. The project on feasibility study for Ninh Thuan 1 started in 2011 (Le, 2012), delivered by Russia in 2014 (see below). The first four units of Ninh Thuan are assigned to Electricity of Vietnam (EVN)²⁵ as the sole investor and project owner and operator. The estimated \$10-11 billion for these was to be financed with up to 25% EVN equity and the balance was borrowed from countries supplying the technology (Hung, 2014). As far as Vietnam's fuel policy is concerned, it is expected that fuel will be imported up to 2030 (Hung, 2014). Vietnam intends to rely on international markets for nuclear fuel supplies and not to pursue domestic enrichment capabilities (WNA, 2015a, May). Vietnam's aims to integrate the contract on nuclear fuel supply in the contract on nuclear power plant building; determine and diversify long-term nuclear fuel suppliers (Le, 2012).

In addition to building imported reactors, Vietnam aims to master nuclear power plant design technology during the final phase of the program. The country wants to partner with foreign companies to design its nuclear power plants, with Vietnamese companies participating in nuclear power projects to account for 30-40% of the total construction value (Hung, 2014). As intensive international cooperation in investment and technology transfer is considered to be a part of Vietnam's nuclear development policy, Vietnam has signed nuclear cooperation and assistance agreements with many countries

²⁵ EVN is a company under the Department of Energy within the Ministry of Industry & Trade (MOIT) responsible for building and operating Vietnam's nuclear power plants.

(Hung, 2014). Russia, France, the USA, Canada, Japan, South Korea, and even China - all expressed strong interest in supplying the first two twin-unit Ninh Thuan plants (WNA, 2015a, May). The following section outlines the strategy of Russia vis-à-vis this non-nuclear country.

Ninh Thuan 1 (units 1&2) nuclear power project (Russian VVER-1200/V-491)

Vietnamese-Russian cooperation in the field of peaceful use of nuclear energy has started in 2002, when intergovernmental agreement on cooperation was signed. In 2010, the government of Vietnam took the decision on the construction of Ninh Thuan 1 under the Russian design and with the assistance of Russian experts. Mutual agreement on cooperation was signed in October, 2010.²⁶ According to the agreement, JSC Atomstroyexport is the general contractor of NPP construction (Atomstroyexport, undated). Construction of the Ninh Thuan 1 plant was scheduled to start in 2014 as the first Russian nuclear power plant in the Southeast Asian country with expected commissioning in 2020 (but see below). In November 2011, Vietnamese-Russian agreement on credit loan on the construction was approved (Wolf, 2014).

What was most likely decisive for Vietnam to choose Russia as a general contractor of its first nuclear power plant was the fact that Russia agreed to construct it as a turnkey project. The agreement included: design, development, and supply of the equipment and materials, construction and adjustment of the

²⁶ Ninh Thuan 2 plant at Vinh Hai site is to be developed under a partnership with Japan, and consideration of possible technology options is ongoing. The intergovernmental agreement took effect in January 2012. Japan has committed to provide financing and insurance of up to 85% of the total cost and to train staff for Ninh Thuan 2 (WNN, 2014).

equipment, nuclear power plant commissioning, as well as training of the nuclear power plant operating staff (Wolf, 2014), which has big importance for a country without a previous nuclear power development experience. Rosatom also committed itself to supply all fuel and repatriation of used fuel for the life of the plant. The fuel is to be reprocessed in Russia and the separated wastes returned to the client country eventually (WNA, 2015a, May). Rosatom has confirmed as well that Russia's Ministry of finance is prepared to finance at least 85% of the first plant. An agreement for up to \$9 billion finance was signed in November 2011 with the Russian government's state export credit bureau and a second agreement for \$500 million loan covered the establishment of the Centre for Nuclear Energy Science & Technology (CNEST – see below) jointly by Rosatom and Vietnam's Ministry of Science and Technology (MOST). Moreover, Russia was ready to provide training for Vietnamese students to become managers and technical experts. For international ventures, Rosatom has arranged both university and in-company training for nationals. In 2014, more than three hundred Vietnamese undergraduate and graduate students studied in Russia to prepare for the project.²⁷ Construction training and probation of the Vietnamese engineers and workers were arranged in Russia as well. In 2014, more than one hundred Vietnamese welders, installation and concrete workers were engaged on the construction and installation at the units 3&4 of Rostov nuclear power plant (Drozdov, 2014). Negotiations are underway to

²⁷ Russia offered one specialist degree taught in Russian language “Nuclear power plants: design, operation and engineering” as well as one master degree taught in English language “Nuclear power installations operation” (Drozdov, 2014).

jointly establish the CNEST with small 15 MWe research reactor intended for training programs. Rosatom is working with MOST to establish the CNEST under Vietnam Atomic Energy Institute, based in Hanoi but having facilities in both south and north. Access to training centre will be offered to other Southeast Asian countries as well (WNN, 2014, November). A Nuclear Energy Information Centre has been established for the public at the Hanoi Polytechnic University in 2012. This is the first foreign centre opened by Rosatom. Another was established in Turkey the same year, followed by a center in Dhaka (Bahgladesh) in 2013 (Rosatom, undated). As far as promotion on nuclear power in Vietnam is concerned, a MofU on “Cooperation in Information Support of Joint Projects in the Area of Nuclear Power Industry for the period of 2015-2020” was signed by MOST and ROSATOM in February 2015. The plan is to work more actively on public awareness of modern nuclear technology and increase the public acceptance of nuclear power in Vietnam, as well as to cooperate in organizing related international conferences, exhibitions and workshops (Rosatom, 2015, February).

The Vietnamese Ninh Thuan 1 nuclear power plant construction can be understood as a “demonstration project” aimed to attract other potential customers in the Southeastern Asian region. As ASE itself put it: "The Ninh Thuan 1 plant will become the first nuclear power station not only in Vietnam but also in South-East Asia. Successful implementation of the project will significantly increase the competitive advantages and export opportunities for Russia's nuclear industry in this region" (cited from WNN, 2010). The regional goals of the company were specified at the Nuclear Industry Supplier

Forum ATOMEX Asia organized by Rosatom in Vietnam in November 2014. At an opening plenary session, special focus was put on Russian strategic partnership with Vietnam (Rosatom, 2014). Rosatom presented itself as a provider of a complex solution that includes nuclear infrastructure, nuclear and emergency response, physical protection, regulatory framework, nuclear education and personnel training (Rosatom, 2014). Nuclear industry was introduced as important part of local modernization. Possible areas of cooperation were offered to newcomers as well, such as localization of the equipment manufacturing in the client country and involvement of local experienced staff, suppliers of materials, equipment and services in the course of NPP construction. Development of the package of services in the region during the period of both construction and operation of the NPP was undermined as well (Wolf, 2014).

Coming back to Ninh Thuan 1 project, in November 2011, Russian independent company JSC “E4 Group” signed a contract with EVN to develop documentation for approval of the site and the feasibility study for the Ninh Thuan 1 construction project. In October 2014, the elaborated feasibility study was submitted to EVN including the most contemporary Russian reactor design (AES-2006) proposal, detailed plan for implementation of the project, and cost estimation of the plant construction (Wolf, 2014). According to Oxana Wolf (2014), this allows authorized Russian and Vietnamese organizations to start negotiations about the contract for NPP design. However, it seems that there will be some delays based on up-to-now little experience of the country with nuclear power program development. The initial schedule for Ninh Thuan 1 envisaged construction start in 2014 and commissioning of the first unit in

2020, but in January 2014, the Vietnamese government said that nuclear power program would be delayed for up to four years (2017 or 2018) to ensure “safety and efficiency”, after IAEA representative visited the country, declared support, but urged Vietnam not to be in hurry (Reuters, 2014, January). The “Master plan on developing nuclear power infrastructure” was approved in December 2014 by Vietnamese prime minister in line with the IAEA's instructions. Accordingly, policies, legal documents, and technical standards and regulations will be improved (PM, 2014). It is expected now that the construction of Ninh Thuan 1 will not start before 2019 (WNA, 2015a, May).

Conclusion

Vietnam has no nuclear power production capacity or nuclear-related facility; however, it has declared its serious intentions to integrate nuclear power energy into its energy mix in future and develop its own nuclear program. With regard to similar cases, Rosatom has developed export strategies aimed to address the specific situation of nuclear sector newcomers by providing complex “nuclear solutions” including individually-tailored solutions for building nuclear power plants. It is therefore probable that this approach was decisive for Vietnam to choose Russia as a general contractor of its first nuclear power plant - Ninh Thuan 1 (units 1&2). In this case, Russia agreed to construct the plant as a turnkey project. The Vietnamese Ninh Thuan 1 nuclear power plant construction can be understood as a “demonstration project” aimed to attract other potential customers in the Southeastern Asian region. The Nuclear Industry Supplier Forum ATOMEX Asia was organized by Rosatom in Vietnam in November 2014. Here, Rosatom

presented itself as a provider of complex solutions and a reliable supplier for newly opening Asian markets.

4.13.5 Summary

The diversity in Asian market led Rosatom to differentiate its export strategies vis-à-vis the position and aspirations of respective customer in the nuclear energy business. Given the development of Chinese nuclear sector, China will most likely be competing with Russian suppliers in future. We can assume that for that reason, Rosatom is not willing to share its latest technologies with its Chinese counterparts, which could affect the outcome of 2004 nuclear tender (though very few pieces of information are publicly available). Although India has developed its own nuclear power program, in this case no Rosatom's future competitor has been rising there. India has focused on the three-phased heavy-water thorium fuel cycle instead of conventional PWR reactors designs to overcome insufficient domestic uranium resources. Rosatom's strong position in the country stems from historical development, as Russia was the only country willing to provide assistance to India's civilian nuclear program after the withdrawal of other players after 1974. When an opportunity for technology and fuel supplies from foreign suppliers appeared in 2008, Russia found itself in substantially better position compared to other global players. Rosatom's latest strategies focus on newcomers in nuclear energy business mainly from the South-East Asian region. Rosatom aims to build a reputation of a reliable supplier there by providing complex “nuclear solutions”. As such, the company focuses not just on short-term gains but tries to develop long-term strategies to benefit from business opportunities that the region offers.

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4.14 Summary of findings

4.14.1 The Sector of Nuclear Energy in Central and Eastern Europe¹

Tomáš Vlček

As stated above, the aim of the research was to provide an in-depth analysis of Russian operations in the nuclear sector of Central and Eastern Europe. The research sought to unearth whether Rosatom subscribes to specific patterns of conduct with regard to business environment and if so, what are the determining factors of such behaviour. To meet the goals of the study, the following hypothesis was formulated: „Russian state-owned energy companies in the natural gas and nuclear sectors act in order to maximize their influence and market share in CEE markets and strengthen Russian geopolitical leverage and positioning in this region.“ This section is aimed to address the nuclear sector, i.e. conduct of Rosatom and its subsidiaries in the region of Central and Eastern Europe. The general findings addressing the hypothesis are described below with specific subsections dedicated to findings characterizing the conduct of Rosatom and its subsidiaries in cases under scrutiny. A secondary goal was to identify the behavioural determinants of Russian SOEs and how they differ according to various environments.

In the nuclear sector, Rosatom is positioned as the dominant provider of nuclear technology and fuel supplies to the region, in large part stemming from the Soviet legacy in CEE countries.

¹ The chapter is partially based on the article previously published in the International Journal of Energy Economics and Policy journal in October 2015, where preliminary outcomes of the research were presented. (Vlček & Jirušek, 2015)

Compounding this challenge, nuclear energy is one of the major sources of power generation in CEE. Given the long-time, near monopoly of Russian nuclear technology/design in the region and plans to expand further the nuclear capacity of select CEE countries, the sector requires careful monitoring from both a technical and security-minded perspective. The behaviour of this Russian energy giant in Asia was also examined, due to the region's rise to be the new centre of gravity in the global energy environment and, as such, can offer valuable comparisons to the conduct of these companies in CEE.

The nuclear energy sector has a number of structural differences when compared to crude oil, natural gas or coal; most typically it is not dependent on certain infrastructure and the uninterrupted flow of energy supplies. These supplies are also of different nature than those in the gas sector. These wide differences, including safety and other technical concerns, alter the behaviour of commercial actors in this space and make it somewhat more difficult to detect strategically motivated behaviour. Accordingly, the research team developed a specific approach to assess the potential risks associated with three different stages of the nuclear plant life-cycle: (1) the initial stage when the plant is being planned and financing is being secured; (2) the three sub-stages of the nuclear fuel cycle; and the (3) the final stage which is the decommissioning of the facility. The research team examined these three stages individually in order to identify potential risks of strategically motivated conduct of Russian companies. In the case of nuclear fuel, its origin, supply sources, usage and waste management were taken into account. The main findings of this exercise are below.

Finding 1: All Roads Lead to Rosatom

Although the research was aimed at the operations of Rosatom State Atomic Energy Corporation (Федеральное агентство по атомной энергии России, РосАтом), the evidence shows Rosatom operating directly in only three countries (Bulgaria, Hungary and Slovakia). Rosatom is the contractor of a new nuclear power plant (NPP) only in Hungary. However, Rosatom's network of subsidiaries is extensive and the bulk of the Russian Federation's nuclear portfolio is executed through these subsidiaries which include, ЗАО AtomStroyExport, ОАО ОКБ Hidropress, ОАО TVEL and others. The Table 14.4.1 below helps illuminate the network of companies that ultimately reports to Rosatom.

All the companies JSC NIAEP, JSC Atomenergoprom, ОАО TVEL, OJSC Atomenergomash are fully controlled by Rosatom, and therefore we can use the expression "Rosatom" even when speaking about these companies. In 1992-2008, Rosatom existed as the MinAtom - Ministry for Atomic Energy of the Russian Federation (МинАтом, Министерство по атомной энергии Российской Федерации). According to the law adopted by the Russian parliament and signed by Vladimir Putin in 2007, the MinAtom was transformed to one of six current Russian state corporations. The company was renamed to Rosatom State Atomic Energy Corporation and is subordinated to the Government of Russian Federation.

Tab. 4.14.1: Ownership Structure of Russian Nuclear Energy Companies

Company	Shareholders	Share (%)
Rosatom State Atomic Energy Corporation	Government of Russian Federation	100
ZAO AtomStroyExport	Rosatom State Atomic Energy Corporation AO VPO Zarubezhatomenergostroy OAO TVEL OAO Gazprombank	78.5362 9.4346 1.3303 10.6989
OAO OKB Hidropress Experimental Design Bureau	OJSC Atomenergomash	100
OAO TVEL	OJSC Atomic Energy Power Corporation Atomenergoprom	100
JSC NIAEP	OJSC Atomic Energy Power Corporation Atomenergoprom	100
JSC Atomic Energy Power Corporation Atomenergoprom	Rosatom State Atomic Energy Corporation	100
JSC Inter RAO UES	Rosneftegaz Group FGC UES Group Minorities* INTER RAO Capital Norilsk Nickel Group VEB RusHydro Group	27.63 18.57 16.65* 13.93 13.21 5.11 4.92
OJSC Atomenergomash	OJSC Atomic Energy Power Corporation Atomenergoprom CJSC AEM Leasing INTERNEXCO GMBH OFEJSC Techsnabexport LLC Energomashkompleks	80.6296 2.3673 9.0896 2.8481 0.0453
* Minority shareholdings include ZAO AtomStroyExport, OJSC Rosenergoatom Concern, Rosatom Securities Limited. All these companies are part of the Rosatom which owns a 13.42% stake in JSC Inter RAO UES through these minorities.		

Source: compiled from open sources by T. Vlček

Finding 2: Path Dependency is an Important Factor

Evidence of relatively strong path dependency was found in the nuclear sectors of the CEE countries. Of the twelve countries analyzed, six house a nuclear power plant on their soil and all plan to expand current capacity or construct new NPPs. The six countries referenced are Bulgaria, the Czech Republic, Hungary, Romania, Slovakia and Ukraine. Bulgaria proved to be an anomaly in that it has two VVER-1000 units in operation and yet awarded Westinghouse Electric Company LLC the contract for the construction of Kozloduy 7, despite previous experience with only Russian technology. All of the other countries referenced have followed the path dependency related to previously implemented nuclear technology.

Historical experience in the construction, commissioning and operation of reactors as well as downstream industries, education and training systems factor heavily in tender decisions. These ties to selected technology and infrastructure are a strong prerequisite for future decisions in public tenders. The existence of a nuclear power plant of one kind in the country is a strong factor for decisions about constructions of a new NPP of the same kind. The Russian Federation therefore has a better business starting position in CEE nuclear sectors due to historical and structural reasons. While it is generally the case that Rosatom is strongly advantaged in these tender scenarios, historical experience can also have the opposite effect.

The operating phase is also dependent on a sufficient number of well-trained staff able to operate the facility. The uninterrupted development of a country's nuclear sector can greatly assist in maintaining this vital know-how. From this perspective, securing operation of nuclear units within a country is often key to

Rosatom's future business development for the contractor as well as the customer country's preferences. Russian companies generally have the advantage of long lasting cooperation with countries in the region and know-how related to the nuclear units in the region built according to Russian design.

In the decommissioning phase, no threats directly related to Russian involvement were identified. The decommissioning process is regulated by strict rules of treatment of the potentially hazardous materials. Although the amount of waste produced by nuclear plants is usually not an issue in terms of quantity, the question of its ultimate storage remains, as generally little has been done in terms of building final depository underground storages. It is thus rather a question of competence and capacity of particular state authorities to act in order to deal with this issue.

Finding 3: Russian Nuclear SOEs Adapt to the Specific Needs and Conditions of the Operating Country

The enormous cost of every NPP construction project makes such business extremely attractive for contractors given the limited number of such projects worldwide. The financial burden of such projects, however, often requires contractors to offer large-scale, low-cost financing packages in order to win tenders or be selected on a sole-source basis (i.e. with no tender process – a standard Russian sales goal). Smaller countries such as Slovakia, the Czech Republic and Hungary (not to mention the Baltic States) cannot hope to shoulder these multi-billion-dollar price-tags on their own. Quite understandably, in such situations contractors try to decrease the risk of financial loss or at least to secure their position in terms of future revenues by employing various financing schemes. In certain cases, they are also obliged

to secure financing of the project appropriate to their share in the joint-venture as, for instance, in the case of Bulgaria.

Rosatom is a very flexible and adaptive entity when it comes to addressing the exact needs and conditions of the prospective sovereign client. Sales techniques and options that are widely accepted – and are also used by Russia – include: vendor investments (favored in the Czech Republic); strategic investment in the project itself (e.g. sharing the financial burden in exchange for a stake in the project and future (as took place for the Czech Temelín NPP and Romanian Cernavoda NPP); providing financial loans through national and/or private banks (as in the cases of the Bulgarian Kozloduy NPP, Ukrainian Khmelnytsky NPP and Hungarian Pakš NPP); and the turnkey option (exercised for the Belarusian Ostrovets NPP and the Slovakian Jaslovské Bohunice NPP). Indeed, Rosatom was the first contractor to arrange payment for the entire construction phase of an NPP project.

Quite recently a new type of contract has been introduced to the nuclear industry, namely the "Build-Own-Operate" (BOO) model or "Build-Own-Operate-Transfer" (BOOT). Rosatom markets this type of contract to "newcomers" that require an elaborate support structure. This sales model was applied in the case of Turkey's Akkuyu NPP, which will be that country's first nuclear power generating facility. In the BOO model, the contractor builds the plant and also operates it, while serving as the principal owner. Although it defies logic at some level, in effect, to turn over a strategically-sensitive national asset like a nuclear power complex to another country – particularly one like Russia – some states are content, via the BOO model, to exchange favorable financing for merely hosting the facility on its soil².

Among the several potential dangers of this scheme include the sovereign client becoming a "hostage" of the contractor who will be operating the facility. The popular view, however, is that the contractor would never abuse its position, as it could estrange potential future clients. This is especially true given the fact that Russians claim the BOO scheme is the best way to attract newcomers to the nuclear club. (Sokolov, 2013)

The BOO contracts is certainly a proof of Russian strive to penetrate new markets with more open public procurement procedures and to root into these regions to exploit these countries' potential path dependency in the future. A little desperation might be seen in this strategy, as Rosatom takes the risk of not being paid for their constructions and services. The principal loan is usually to be paid including interest in fixed time (usually 10-20 years), however, when the construction of the NPP faces delays, it becomes difficult for operating countries to pay the loan within the original time. This is likely the reason why other nuclear companies worldwide do not plan to react to Russian BOO contracts with their versions of similar contracts.

As mentioned, Rosatom operates through many different subsidiaries, in part to blur its identity, as illustrated in Finding 1. Although some of these subsidiaries were, no doubt, formed as a consequence of commercial circumstances, others were established to assist with Rosatom's reputational challenges.

² Under the "Build-Own-Operate-Transfer" variant the facility is transferred to the state after certain, previously agreed, period of time.

Finding 4: The Sector is Strongly Driven by Economics

Generally, the nuclear sector offers limited opportunities to exert influence because of the specific nature of the sector itself which shapes the behavior of respective actors and provides a framework for operational interaction. In fact, it is primarily the economics of a nuclear power project, driven by extraordinarily high costs of construction and the longevity of the projects (e.g, as many as 30 years or more), that provides Russia, in particular, with substantial advantage in the bidding process. Few, if any, countries and/or companies are able to build and finance an entire nuclear power plant. This makes the initial stage, where financing and identifying a strategic partner takes place, crucial and simultaneously the most sensitive in terms of the potential influence that can be exerted by an external actor.

Given the limited amount of contracts in the nuclear sector and the revenue implications of each one, any attempt to use a nuclear contract as leverage on a particular country would cause substantial damage to any contractor's reputation. This fact diminishes the possibility of a nuclear contractor exerting political pressure over a sovereign client, as contractors with damaged reputations would find themselves in a difficult situation regarding future business prospects worldwide. Rosatom probably calculates that it cannot afford to be found guilty of abusing a particular project to advance its political/strategic goals, as it would essentially harm not only its long term future but also its immediate market capitalization.

Naturally, no one could guarantee that no political pressure may take place during the bidding and procurement processes. The rather scarce contracts are usually worth several billions and it is thus natural that contractors give each potential

contract high priority and are often backfired by their home governments by various means (rhetorically, formally by officials during state visits, by foundations and partnership programs, state guarantees, etc.).

The scale of NPPs often requires Head of State attention and bargaining for some of the reasons mentioned above. Financing is the key issue of every project to ensure that initial costs are repaid during a reasonable period of time (i.e. before the life-cycle of the plant comes to an end). This very much depends on the electricity price in the client country, which has been an issue for some time in Europe due to relatively low and unpredictable prices that have undermined the commercial viability of certain nuclear projects. Obviously, this is an overarching concern, not exclusively related to the operations of Russian SOEs. On the other hand, Russian SOEs operating in the sector often come with a model that gives them a sizeable advantage over Western competitors in the sector as described in the following section.

Finding 5: Rosatom Comes with Attractive Financing

There are five countries in which public procurements have taken place or are underway where Rosatom is a player. These are Belarus, Bulgaria, the Czech Republic, Slovakia and Ukraine. Russia has selected financing as its “tip of the spear” in these competitive circumstances, some of which are referenced below. In the case of Belarus, Russia’s Vnesheconombank, provided the Belarusian commercial bank Belvnesheconombank a subsidized USD 6 billion loan for the construction of the Ostovets NPP site in a remote area in the north of the country (Schneider & Froggat, 2014, p. 26). This loan was renegotiated

in 2009 and 2011 to end up at USD 10 billion, including investment in new infrastructure. The loan has a term of 25 years and will finance 90% of the total contract cost between AtomStroyExport and the Belarus Directorate for Nuclear Power Plant Construction.

The Bulgarian Belene project, which was originally set to utilize the Russian VVER-1000 design, has been offered a large-scale Russian loan several times to support the AtomStroyExport-led consortium. These offers have, thus far, been rejected for primarily political and security-related reasons. The project was eventually scrapped and attention shifted to a new unit at the Kozloduy site where Westinghouse Electric Company LLC was selected to be the contractor.

In the Czech Republic, two vendor financial offers were made towards the end of the public procurement process for Temelin's 3 and 4 units. Rosatom offered 100% coverage of project costs (through its JSC Rusatom Overseas subsidiary). Westinghouse, in turn, arranged a U.S. Exim Bank credit covering 50% of project costs. This one example speaks volumes about the respective levels of financial competitiveness of the two sides. In the end, no agreements were concluded and ČEZ, a.s. cancelled the whole procurement procedure in April 2014. A major reason for the cancellation was the Czech government's announcement that it will not provide any electricity price guarantees for construction of the NPP. A less public reason could be that Rosatom was set to win the tender, but it was judged too controversial for the Czech government to award Moscow the tender in the midst of the Ukraine crisis.

In the case of Slovakia's Jaslovské Bohunice project, Rosatom expressed the willingness to purchase a 51% stake in the project

company Jadrová energetická spoločnosť Slovenska, a. s., thus making it both the technology provider and strategic investor. Rosatom sought a guaranteed long-term electricity price of EUR 60-70 /MWh and possibly a BOO (build-own-operate) arrangement. As the Slovak Minister of Economy, Tomáš Malatinský, was unwilling to meet these conditions, the offer was rejected. The Slovaks eventually ended negotiations with the Russians at the end of 2013, as Rosatom continued to insist on guaranteed electricity prices. Shortly thereafter, at the beginning of 2014, Rosatom changed course abruptly and stopped insisting on a price guarantee. Indeed, it is now prepared to consider any form of support from the Slovak side, which will ensure that the project is economically viable for investors as well as for creditors (Holeš, 2014a). Moreover, the new Minister of Economy of Slovakia, Pavol Pavlis, who entered office in July 2014, is inclined to offer such electricity price guarantees.

Concerning Ukraine, in February 2011 Russia's ZAO AtomStroyExport and Ukrainian SE AtomProektInzhiniring (a subdivision of DP NNEGC Energoatom) signed an agreement to complete reactor units 3 and 4 at the Khmelnytsky site. The following year, the Ukrainian Parliament adopted legislation to create a framework to finance the project, which included a plan to attract 80% of the necessary funds from Russia (Schneider & Froggat, 2014, p. 138; "Contract agreement", 2011). The terms of the agreement were that Russia would provide a loan for 80%-85% of total project cost (estimated at EUR 3.7 billion) and the remainder would be financed by Ukraine. To date, Ukraine and Russia have not agreed on a government guarantee for this loan or on the interest rate. One of the principal

conditions for the loan was a Ukrainian government guarantee that has not been granted to the necessary extent. As a result, Sberbank offered Energoatom a credit to implement the project on commercial terms, to which the Ukrainian side has not agreed (“Russia to credit”, 2012; “Further construction”, 2011). There has been generally no progress in the case since 2012, and current Russia-Ukraine relations do not bode well for the deal being concluded.

Hungary is a rather special case. Rosatom was victorious in providing an expansion of the Pakš NPP complex with no public tender whatsoever. It was rather a classic “backroom” deal concluded by the two Heads of State in a highly secret framework. In fact, the Hungarian Parliament was pressured by the Hungarian Prime Minister to pass legislation making it a crime to reveal the terms and conditions for a 30-year period. A EUR 10 billion loan was offered by the Russian Federation to co-finance the project³ and the deal was eventually cemented in January 2014, when Hungary entered into an international agreement with the government of the Russian Federation on the cooperation in peaceful use of nuclear energy (Balogh, 2014). The deal will reportedly involve the Russian Federation granting Hungary an interest-only loan at an annual rate of 3.9%, starting in 2014. Once construction is completed in 2026 (the expected operational date), the principal balance will be amortized over 21 years, with an interest rate of 4.5% for the first seven years, 4.8% for the next seven, and 4.95% for the final seven. (“A Brief Summary”, 2014; “Kiderultek a részletek”, 2014).

³ The Russian side was allegedly the only one prepared to offer financing to support the project. The loan equals to 80% of the total costs of the project (“A Brief Summary, n.d.”).

Romania also stands aside as the public procurement process was without Russian bid due to the nature of the project. The project is actually a completion of Cernavoda units 3 and 4 on building foundations from 1980s. Analogical is the situation in Lithuania and Poland, where the public procurement process have been without Russian bid, too. Russian bids are not allowed in the public procurement process in these countries, which is related to the business environment.

Finding 6: Business Environment Sets the Operational Framework

Historical ties and traditional policies play an important role in the operational framework of Russian state-controlled companies. The research indicates three categories of “nuclear energy” states in the region. First is the Western-leaning countries of Bulgaria, the Czech Republic, Romania and Slovakia. These countries are enmeshed in EU structures, policies and procedures, making it more difficult for Russia to cut “sweetheart” deals of the type on display in Hungary. The interconnection with EU legislation also reduces the space for shadowy undertakings. EU procurement procedures and related documentation is formulated quite precisely, according to respective regulations and laws, especially those related to promoting fair competition. These positive features of EU integration and involvement in other Western political structures however, is accompanied by a tedious and complicated bureaucracy.

The second category is non-nuclear states that seek to enter the nuclear club, but have more negative relationships with the Russian Federation. These countries include Poland and the

Baltic states. For example, the Lithuanian government explicitly excluded a Russian design in its tender for the Visaginas NPP. Rosatom, through its subsidiary JSC Inter RAO UES, sought to oppose the project by offering its own alternative in Kaliningrad's Neman NPP announced in 2008. This effort however, was unsuccessful. The actual tender in Poland has not yet been opened, but it is also likely that there will be no Russian contractor or subcontractor allowed to bid on the project due to Polish very strong traditional anti-Russian feeling stemming from historical Russian-Polish relations.

The third category consists of CEE nuclear countries that remain close to the Russian Federation for political, historical and economic reasons. These countries include Belarus and Hungary. Not so long ago, Ukraine would have appeared in this category, but, obviously, not now. These countries favor Russian energy enterprises, and Rosatom in particular. In addition, the business and political environments are more accommodating for Russian companies.

As referenced earlier, special attention is warranted in the case of Hungary. It now fits in this third category, despite its EU membership, for ignoring proper procurement procedures and including state subsidies being granted to MVM Group. The EU has not sought to unwind the Rosatom contract for the Pakš NPP, despite every necessary justification to do so, and instead concentrated on reducing Rosatom's monopoly on nuclear fuel supplies from twenty years to ten years. The decision to grant the project to the Russians was made by the Prime Minister and his closest collaborators without any official procurement procedure or even consultations with other interested parties, industry experts or the public at large.

In sum, Rosatom is most often forced to operate within specific local, political, economic and regulatory frameworks, which means the business and political environment has a great deal to do with determining tender winners and losers and the operations of these facilities. In this regard, the importance of multilateral regimes, especially the EU, is as clear as it is necessary to discipline Rosatom's behaviour, which is often more strategic, under Kremlin oversight, than it is commercial.

Finding 7: Delays Are Natural Part of the Process

When examining the nuclear industry, one of the key issues is actually the construction itself. To build a nuclear power plant is a complex undertaking that typically takes some five to seven years. Currently in countries such as South Korea and China, construction timetables range from four to six years and in European countries between six and eight years (Nuclear Energy Agency, 2012). Delays and additional work are natural components of the process. For example, the in-service dates of the pilot project of the Westinghouse's AP1000 design at the American Vogtle NPP in Georgia (in the United States) has been recently moved from April 2016 to December 2017 (unit I) and December 2018 (unit II) with additional work costing some \$650 million. Rosatom's VVER-1200 design at the Russian Novovoronezh II site has been postponed from the original in-operation date (2012 for unit I and 2013 for unit II) to 2014 for unit I and 2016 for unit II ("2014 startup", 2012). Moreover, this project is likely to be postponed again. AREVA's pilot European Pressurized Reactor (EPR) design at Finland's Olkiluoto-3 site has also been postponed several times. The original date of in-service (2009) has been recently changed

once again to the end of 2018. Olkiluoto-3's construction costs were first estimated at 3.2 billion euro. Later in 2012, the CEO of AREVA estimated the overall cost would end up closer to 8.5 billion euro (Rosendahl & De Clercq, 2014).

These are only a few examples of the challenges of NPP construction that have reportedly afflicted some 50 of the 67 reactors under construction in 2014. The delays have stretched from several months to several years. All of the 17 remaining units are currently in their initial stage of construction, making it difficult to assess whether they are on schedule or not (Schneider & Froggat, 2014, p. 34). Either the construction process or the public procurement process, were behind schedule in each of the CEE countries analyzed.

Although the reasons for these persistent delays and cost-overruns are often not made public, they are generally caused by rising material costs, delayed subcontractors' work, accidents, increasing safety requirements and public opposition. It seems clear that these set-backs are a natural part of the process of building highly complex nuclear units. There was no evidence of any delays motivated by political considerations, but this is not to exclude the possibility.

Such irresponsible actions would mean substantial damage to the contractor's reputation, given the complexity and strategic nature of a nuclear power plant for the client. As there are a limited number of such high cost contracts, the suppliers have to proceed very carefully not to compromise their position for future projects. In this sense, any effort to use delaying tactics concerning a nuclear contract for geopolitical purposes would be perilous for the contractor's reputation in the markets, as was pointed out earlier. That said, Russia's efforts to derail

Lithuania's NPP involved trying to delay the procurement process by introducing its own alternative in Kaliningrad to confuse the process. Should, for example, Rosatom politically manipulate the time of the construction process of its projects, it will likely never get another job overseas. Quite naturally, every contractor aims to highest possible capitalization within each contract, but this is neither exclusively related to a specific companies nor to the Russian ones. Although it is rumored that there were some unusual delays caused by not merely technical difficulties in some cases⁴, neither the contractor – and Rosatom is without any doubt no exception – can simply afford to be convicted for misusing the particular project for political goals of the homeland government. Such reputation would make any future projects impossible to reach for such contractor.

Recommended tactic for any contracting party is thus to ensure that the procurement procedure and all the related documentation is formulated very precisely, leaving no room for further “behind-the-scenes” negotiations. Naturally, no one could guarantee that no political pressure may take place during the bidding and procurement processes. The rather scarce contracts are usually worth several billions and it is thus natural

⁴ Examples of these alleged non-standard delays are for instance the construction of Iranian Bushehr NPP and situation of the Czech Temelin NPP in early 1990s.

The Iranian Bushehr NPP built by Russian companies was a subject to major delays that prolonged the original construction time to more than three times its original length. It is rumored that Russians used this opportunity for consolidation and capitalization of their nuclear industry after it was seriously harmed by the collapse of the Soviet Union. Although this may be partially true the major reason for those delays was the vast complexity of this project that was originally built by Germans, then abandoned and damaged during the war between Iran and Iraq (Khlopkov & Lutkova, 2010).

The Czech example relates to the situation when Russian engineers were forced to leave the project of Temelin NPP due to political changes following the fall of communist regimes in CEE countries. The hand-over of the project documentation was in this case slower than it should have been. But again, this was rather caused by the financial situation and the fact that Russian companies were losing their ground in the formerly closely tied economies.

But even if the delays were financially motivated it was no way near political motives which, as stated above, would make a serious and lasting damage to the contractor's reputation.

that contractors give each potential contract high priority and are often backfired by their home governments with by various means (rhetorically, formally by officials during state visits, by foundations and partnership programs, state guarantees, etc.).

Finding 8: Dependency of Operators of VVER Reactors on OAO TVEL Fuel

Not surprisingly, for the VVER reactor design, the dominant supplier is the Russian company OAO TVEL. This company supplies nuclear fuel for each of the analyzed countries, except for Romania and partially Slovakia and Ukraine. The VVER type fuel assemblies are hexagonal, while the Western reactor fuel employs square-shaped fuel assemblies. Although the VVER type fuel can be produced by Western companies, Russian experience and facilities are difficult to beat in terms of price of the product. Even though Westinghouse⁵ and other companies⁶ are capable of supplying the client country with VVER design fuel assemblies, they cannot do so at competitive prices⁷. For example, Westinghouse says it could resume VVER fuel rod production with an investment of \$20 million, if

⁵ The Czech experience: The long-time fuel supplier for the Temelín NPP was the Russian company TVEL. Since 2002, when the plant was launched, to the end of 2009, fuel for the Temelín NPP was supplied by the American company Westinghouse Electric Company, LLC. It is well-known that the fuel rods were defective in the active zone of reactor at that time. This was caused by the different shape of the fuel assemblies which Westinghouse produced. Hexagonal assemblies for Temelín were initially provided by Westinghouse Electric Company LLC, but the fuel rods suffered from torsion, which resulted in forced operational interruption, limited production and inability to produce electricity at full capacity. These issues occurred mainly due to Westinghouse's short experience with VVER design fuel assemblies, as they began providing this product only in 1997. In 2010, a selection process for a new supplier took place and was awarded to the Russian TVEL, which submitted a financial offer that was substantially below other offers. TVEL will now be supplying nuclear fuel to the Czech Republic until 2020, and is now the exclusive fuel supplier for both Czech nuclear power plants.

⁶ For example, since 2010 part of the nuclear fuel supplies for Chinese VVER design reactors has been produced by Chinese China National Nuclear Corporation.

⁷ Westinghouse, for example, now supplies VVER design fuel assemblies to Ukraine. Although the price of the contract was not published, the logic is clear. The Ukrainians made a political decision aimed at diversifying the supply of nuclear fuel even at a higher cost. Although some problems similar to those

allowed back into the market. Such a plan, however, would take at least two years. (Lenoit, 2014) The economies of scale play into the hands of Russian TVEL.

The logic chain is as follows: Westinghouse will reenter the market only if customers can be found; these will be found only if the product is offered at a competitive price; the product will be offered at a competitive price only if the existence of customers allows investment into production capabilities; the investment in production capabilities will be allowed only if customers can be found. Accordingly, the situation resembles a kind of a vicious circle that can be breached but is unlikely to be anytime soon. It is also worth noting that TVEL manufactures nuclear fuel assemblies for Western type reactors as well.

This feature of the nuclear sector is currently being addressed at the EU level, as the European Commission offered a research grant of EUR 2 million for safety analyses, tests and further study into the licensing of other than TVEL-produced nuclear fuel (“Kdo nahradí ruské”, 2014). Such an allocation supports the diversification of nuclear fuel supplies and also serves as indirect support of TVEL competitors in the EU market, especially Westinghouse. It is also clear evidence of the fact that political will can change a seemingly unchangeable pattern, at least from a commercial perspective.

In sum, the nuclear fuel cycle does not represent an unworkable, one-sided dependency on Russian supply. This is, in part, because of the global abundance of uranium and a highly competitive uranium market, enabling countries to switch between suppliers more easily. On the other hand,

faced by the Czech Republic have surfaced, after the Russian annexation of Crimea the contract with Westinghouse was extended until 2020, validating the politicization of the decision.

Rosatom's fuel subsidiary has some sizeable advantages over other suppliers stemming from long-term, technology-specific relations with CEE countries, experience and technological compatibility based on the prevalence of nuclear units built according to Russian design. This results in better pricing – also occasionally lowered for political purposes – and generally smoother operation of those fuel assemblies provided. Switching to another provider is possible, but may be accompanied by higher prices and operational difficulties in the early stages.

Finding 9: Spent Fuel Treatment Procedure Poses Only Standard Risks

There are two types of nuclear fuel cycles that differ in the last phase. When the fuel is not reprocessed and is disposed after use, it is called the “open” or “once-through” nuclear fuel cycle. If the fuel is reprocessed, the nuclear fuel cycle is referred to as “closed”. Fuel reprocessing is nowadays technically and financially demanding, which only a few countries in the world are willing or able to afford⁸. In the next 50 years, this may become common practice. Currently, nuclear fuel is reprocessed only by countries with a broad portfolio of nuclear power plants (such as France, Russia, UK, Japan and certain others). The fuel is reprocessed only by countries with a broad portfolio of nuclear power plants (such as France, Russia, UK and some others), where it makes economic sense. The global recycling capacity is presently some 5,370 tons annually, which is only around 8.7% of global uranium demand. Far more usual is the open nuclear fuel cycle option.

⁸ In 2011, it was only China, France, the Great Britain, India, Japan, Pakistan, Russia and the USA.

After removal from the reactor, three phases of fuel disposal follow. In the first phase, fuel cassettes are actively cooled in a pool next to a reactor. After at least five years they are moved into dry containers and then passively cooled in interim storage facilities. The interim storage units are built with the capacity to last for several decades, at least for a period exceeding the lifespan of the power plant itself. The second phase includes safe transport to the final waste disposal site. The third phase, disposal, is understood to be the final operation, which is why the depository for the spent fuel needs to offer impenetrable protection. None of these phases generally pose a risk related to Russian SOEs.

Constructing a deep geological repository is a very complicated process which requires confident data regarding its locality. In terms of its radioactivity, spent fuel becomes safe at least for 300 years after its removal from a reactor, which is accordingly the period for which a repository has to function without difficulty. In that relation, we can mention an interesting aspect of a nuclear sector, namely that spent fuel also alone protects itself against abuse, because its removal from the protection containers would, during this period, mean a deadly dose of radiation (Vlcek & Cernoch, 2013, p. 137). The possible abuse could be actually a dirty bomb production only (in the “closed” cycle) or also nuclear bomb (in the “open” cycle). Unlike with the reprocessing, storage is always managed by the home country, unless the return of the used fuel to the possession of the producer is not a part of the contract⁹. The risks within the

⁹ Currently, this is for example a part of the contract between the Russian Federation and Hungary (Digges, 2014). But the so-called Commercial Nuclear Fuel Leasing might become an interesting future's option, as it might very positively relate with nonproliferation efforts and spent fuel management.

storage are very low given to strict security measures by respective national nuclear safety authority, the Non-Proliferation Treaty and the International Atomic Energy Agency regulations.

A deep geological repository is meant to be a final repository of spent nuclear fuel. It is questionable whether it should be technologically implemented, so as to make it impossible for already deposited waste to ever be picked up again, or to enable deposited waste to be extracted and processed in the far future. Even though experts are rather inclined to the second alternative, because spent nuclear fuel represents a very valuable material which can be used as fresh fuel after being processed or even as fresh fuel without previous processing¹⁰, economic reality suggests the first alternative¹¹. The most expensive feature of a repository is its operation, which makes it economically unreasonable to keep a repository open for decades. This means it is better to store spent fuel on a long-term basis in interim storages and only when so decided, to deposit high-activity radioactive waste rather at once, and to do it definitely (opening and using it again would be impossible). A deep geological repository is constructed under the assumption it will work for the next hundred years (Vlcek & Cernoch, 2013, p. 137).

The countries analyzed, can be divided into two basic categories. Those countries in the first category (i.e. Belarus, Bulgaria and Ukraine) send their spent fuel to the Russian

¹⁰ Some of the current fourth generation reactor projects plan to use as a fuel previously spent fuel.

¹¹ The assumption that using reprocessed fuel is not economically viable under the current conditions (i.e. world abundance of uranium and highly competitive global market) has been also confirmed by, for instance, the updated interdisciplinary MIT study on nuclear energy from 2009 (Deutch et al., 2009) and very little has changed since then.

Federation for reprocessing. It is not actual reprocessing per se, as the same reprocessed fuel is not returned to the country. Rather, as a part of their contracts, the fuel is “leased” and repatriated after use. Only the separated wastes are returned to the country for storage. The states in the second category (i.e. the Czech Republic, Hungary, Lithuania, Romania, Slovakia and partly Ukraine) purchase fuel from Rosatom and spent fuel management is completely done by them. This option is much more common.

So, as part of the Belarusian-Russian contract, for the life of the plant the used fuel will be repatriated to Russian Federation. It will be reprocessed there and the separated wastes returned to Belarus eventually. The same logic is applied in Bulgaria where used fuel is being sent for reprocessing to Russia under the agreement from 2002 for USD 620,000 per ton. Spent fuel from all Ukrainian NPPs, except for Zaporizhzhya NPP, is removed to the Russian Federation according to the contract with OAO TVEL at a cost to Ukraine of over USD 100 million per year, and the high-level wastes from reprocessing Ukrainian fuel was to be returned from Russia to Ukraine to be stored in Ukrainian Central Spent Fuel Storage Facility (CSFSF). The CSFSF facility construction has commenced in August 2014.

The states in the second category (Czech Republic, Hungary, Lithuania, Romania, Slovak Republic and partly Ukraine) actually purchase the fuel and the spent fuel management is completely theirs. This option is much usual. In the Czech Republic, spent fuel is owned by the operator of the nuclear power plants and stored in interim dry storages in the areas of the Dukovany and Temelín NPPs. The used fuel in Hungary is stored in domestic interim and long-term storage facilities of

the state owned Public Limited Company for Radioactive Waste Management (PURAM). In Lithuania, the spent fuel is partly stored in storage pools next to the reactors, and partly in dry storage at the Ignalina NPP site. The used fuel in Romania is stored in the Interim Dry Spent Fuel Storage Facility (DICA) at Cernavoda NPP. The whole Back End of the Nuclear Fuel Cycle in Slovakia is managed by Jadrová a vyradovacia spoločnosť (JAVYS), and there is a standard procedure with Interim Spent Fuel Storage at the Jaslovské Bohunice site with plans for expansion as well as for construction of another one in Mochovce. Used fuel from Ukrainian Zaporizhzhya NPP is stored in interim dry storage facility on site. The facility is always under control of the respective state.

The spent fuel (or back-end) treatment procedure is nothing extraordinary. It is a fairly common procedure and no threats or abuses appear to be related to Russian involvement, as the nuclear fuel cycle is regulated by strict rules due the potentially hazardous materials involved. Although the amount of waste produced by nuclear plants is usually not an issue in terms of quantity, the challenge of its ultimate storage remains. Little has been done in terms of building final underground storage facilities.

4.14.2 Rosatom's Activities in the Asian Market

Hedvika Kodousková

As far as civil nuclear power development is concerned, the research identified several different groups of players in the Asian market: 1) mature countries with their own nuclear technology and services export programs (i.e., Japan, South Korea, and increasingly China); 2) countries which operate nuclear power plants, but have had otherwise limited participation in the nuclear sector due to being non-signatories to the Nuclear Non-proliferation Treaty (i.e., India until 2008, Pakistan); and 3) newcomers to the sector, who decided to address their rapidly growing energy demand by developing their own nuclear power-generating capacity (e.g. Vietnam and Bangladesh). Within the study, we examined Rosatom's activities in the selected case studies representing each of the above-mentioned groups. The countries under scrutiny were China, India and Vietnam. Major findings derived from this research are below.

Finding 1: Russian SOEs Adjust Their Export Strategies Based on the Customer's Specific Position

The diversity in the Asian market led Rosatom to differentiate its export strategies vis-à-vis the position and aspirations of respective customers in the nuclear energy business. A clear example of this finding is the case of China. Beijing's long-term goal is to develop a sophisticated nuclear energy program that is capable of satisfying growing domestic energy demand as well as to become an exporter of its own domestic reactor designs to third countries. To meet this goal, China has implemented a

policy of international cooperation with global players and has been encouraging the transfer of technologies. Technology transfers were one of the major factors in the 2004 nuclear tender for a third generation of reactor design, which was eventually won by Westinghouse with its AP1000 design.

Given the development of the Chinese nuclear sector, China will most likely be competing with Russian suppliers in the future, as it apparently has taken aim at the same markets¹². Accordingly, it can be assumed that for that reason, Rosatom is not willing to share its prized technologies with its Chinese counterparts. Anyway, Rosatom's activities in China are limited to a single project, even though one of the country's largest, the Tianwan nuclear power plant project. Even in this case, China has successfully raised its share of the construction work from 50% (Tianwan 1&2) to 70% (Tianwan 3&4). China's desire to involve the Russians in its nuclear power development most likely stems from its contract on uranium enrichment technology, which was attached to the package agreement on Tianwan 1&2.

China's two major enrichment plants were built under agreements with Russia in the 1990s and a 2008 agreement. Russia has been providing technical assistance to build an additional capacity and also to supply low-enriched uranium to Chinese nuclear power stations. Additionally, in 2010, China bought Russian fuel production technology. China's Yibin fabrication plant will thus be in a position to supply Tianwan 2 with Russian TVS-2M fuel, enabling the plant to operate on longer 18-month cycles.

Although India has developed its own nuclear power program as well, Rosatom is making substantial headway in the Indian market. India has focused on the three-phased, heavy-water thorium fuel cycle instead of conventional PWR reactor designs to offset insufficient domestic uranium resources. Rosatom's strong position in the country stems from the historical ties. For example, Russia was the only country willing to provide assistance to India's civilian nuclear program after the withdrawal of Canada and other vendors following the country's 1974 nuclear weapon test and the formation of Nuclear Suppliers Group (NSG). After the 2008 U.S.-India nuclear deal was signed (followed by agreements between India and the IAEA and NSG, respectively), the door was open for technology and fuel supplies from foreign suppliers, but, by then, Russia found itself in a privileged position in India.

The Kudankulam 1&2 NPP project construction began in 2002. Previous agreements had secured greater Russian involvement in India's nuclear energy sector. Recently, construction of four or more additional Russian nuclear reactors has been discussed and planned either in Kudankulam or at another site. TVEL was also the first company to sign a uranium supply agreement with India since the lifting of NSG restrictions. In a development favourable to Rosatom, India agreed not to apply the problematic 2010 "liability law" to Kudankulam 1&2 project and the two parties apparently reached an accord of some kind concerning the liability issue also in the case of Kudankulam 3&4. The Russian position in India is further reinforced by its willingness to allow India to retain and reprocess used fuel for its indigenous three-stage fuel cycle.

Vietnam has no nuclear power production capacity or nuclear-related facilities. It has, however, declared its serious intention to integrate nuclear power energy into its energy mix for the future and develop its own nuclear program. In similar cases in the past, Rosatom has developed export strategies addressing the specific situations of nuclear sector newcomers by providing complex “nuclear solutions”, including tailored ones, for building nuclear power plants. Therefore, it is probable that this almost fatherly approach of Moscow was quite decisive in Vietnam choosing Rosatom as the general contractor for its first nuclear power plant - Ninh Thuan 1 (units 1&2). In this case, Russia agreed to construct the plant as a turnkey project (see below). An elaborate Russian arms sale placed in the window of Vietnam’s decision may also be seen as a potentially important factor influencing the decision of the Vietnamese government.

Finding 2: Rosatom Arrives with Subsidized Financing

Similar to the findings derived from an examination of CEE countries, the Russian side has arrived in Asia ready to offer inexpensive, long-term financing (though payment details are usually not publicly disclosed). A good example is the Indian Kudankulam 1&2 NPP project, which was built under a Russian-financed contract. A long-term credit covered about a half of the cost of the plant. Consistent with this arrangement, the Indian government made clear in 2012 that it expected the same credit terms and coverage for Kudankulam units 3&4. In Vietnam, Rosatom has confirmed that Russia's Ministry of Finance is prepared to underwrite at least 85% of the first plant, which is a cornerstone of Vietnam’s development plans.

Finding 3: Rosatom Offers Complex Solutions for Newcomers

As mentioned, Rosatom is flexible in addressing the various needs and conditions of a client country. Coming back to Vietnam's case, the Ninh Thuan 1 agreement included: design, development, supply of the equipment and materials, construction work, construction and adjustment of the equipment, nuclear power plant commissioning, as well as training of the nuclear power plant operating staff. Rosatom was ready to provide educational resources as well as in-company training for Vietnamese students, engage Vietnamese workers in the construction and installation of nuclear power plants in Russia, and establish a Nuclear Science and Technology Centre with a small research reactor in Hanoi intended for training. The Rosatom subsidiary, JSC “E4 Group”, completed the documentation needed for approval of the nuclear power plant site and also provided the feasibility study. Rosatom also committed itself to supply fresh fuel and to take responsibility for the repatriation of used fuel during the entire life-cycle of the plant. In short, this Russian sales strategy matches well the complex requirements of countries with no previous experience in the nuclear sector.

Finding 4: Rosatom Reveals Its Long-Term Business Strategy in the Region

The Vietnamese Ninh Thuan 1 NPP construction can be understood as a “demonstration project” aimed at attracting other potential customers in Southeast Asia. The Nuclear Industry Supplier Forum, ATOMEX Asia, was organized by Rosatom in Vietnam in November 2014. At this event,

Rosatom presented itself as a provider of complex solutions that include nuclear infrastructure, nuclear and emergency response, physical protection, a regulatory framework, nuclear education and staff training. The nuclear industry was introduced as an important factor in local modernization efforts, with many areas of cooperation opened to host countries' companies. It is apparent that Rosatom aims to build a reputation as a reliable and comprehensive supplier in newly opening Asian markets. Accordingly, Rosatom has a strong incentive to avoid the perception of a country seeking to leverage its foreign and security policy goals through its nuclear energy relationships, at least in Asia.

Tab. 4.14.2 Summary of findings: The Sector of Nuclear Energy

Country	Is there a NPP in the country?	Is it of Russian design?	Is there a plan to expand the capacity or build a new one?	Does a Russian company take part in the procurement?	Is the expansion or a new NPP under construction?	Is the expansion or NPP of Russian design?	Is a Russian company the contractor?	Who supplies fuel?
Belarus	No	-	Yes	Yes ZAO AtomStroyExport	Yes	Yes	Yes ZAO AtomStroyExport	OAO TVEL
Bulgaria	Yes	Yes	Yes	Yes Rosatom	No	No	No Westinghouse Electric Company LLC	OAO TVEL
Czech Republic	Yes	Yes, both of them	Yes	Yes - ZAO AtomStroyExport and OAO OKB Gidropress in a consortium with SKODA JS, a.s.	No	Unknown, tender cancelled	-	OAO TVEL
Estonia	No	-	No	-	-	-	-	-
Hungary	Yes	Yes	Yes	Yes Rosatom (No procurement process)	No	Yes	Yes Rosatom	OAO TVEL
Latvia	No	-	No	-	-	-	-	-
Lithuania	Not anymore, Ignalina NPP was shut down in 2009	Yes	Yes	No (not allowed)	No	No	No - VAE Project Company (20% Hitachi-GE Nuclear Energy, Ltd.; 20% Latvia; 22% Estonia; and 38% Lithuania)	OAO TVEL was the supplier for Ignalina NPP
Moldova	No	-	No	-	-	-	-	-
Poland	No	-	Yes	No (not likely to be allowed)	No	No	No Contractor yet unknown	-
Romania	Yes	No	Yes	No - (because the project is a completion of a different technology reactor)	No	No	No - China General Nuclear Power Group	Domestic production in SN Nuclearelectrica's Pitești Nuclear Fuel Plant

Slovakia	Yes	Yes, both of them	Yes, two	Yes - ZAO AtomStroyExport is one of the companies finishing Mochovce NPP; Rosatom in the new Jaslovské Bohunice NPP unit (Procurement process not yet opened, direct negotiations preferred)	Yes Mochovce No Jaslovské Bohunice	Yes Mochovce Yet unknown Jaslovské Bohunice	No - ZAO AtomStroyExport is one of sub-contractors for Mochovce No - Jadrová energetická spoločnosť Slovenska, a. s. (51% Jadrová a vyradovacia spoločnosť, fully owned by the Slovak Ministry of Economy; 49% ČEZ Bohunice a.s. fully owned by the Czech company ČEZ, a.s.)	OAO TVEL, from 2015 undisclosed non-Russian company (likely AREVA SA) supplies part of Slovakia's needs of enriched uranium that is still processed into nuclear fuel by TVEL
Ukraine	Yes	Yes, all four of them	Yes	Yes OAO OKB Gidropress won the tender	No	Unknown, the project was cancelled due to Crimea crisis and other Western options are investigated, especially those of Westinghouse Electric Company, LLC	DP NNEG Energo-atom fully owned by Ministry of Energy and Coal Industry of Ukraine	OAO TVEL, partly (30%) using domestic uranium and IUEC enrichment facility; South Ukraine NPP's fuel is supplied by Westinghouse Electric Company LLC; from ca. 2020, domestic production of uranium and zirconium together with operation of VostGOK uranium processing plant in Zheleziye Vody and the construction of nuclear fuel fabrication and fuel assemblies plant at Smolino (owned by 50% +1 State Concern "Nuclear Fuel" and 50% -1 OAO TVEL)

Asian market								
China	Yes (26 reactors in operation)	Yes, one (Tianwan 1&2)	Yes	Yes ZAO AtomStroyEx port took part in 2004 nuclear tender, however did not win	Yes (23 reactors under construc- tion)	Yes, one (Tianwan 3&4)	Yes for Tianwan 1&2 Not for Tianwan 3&4 (but ZAO AtomStroyEx port insists on retaining intellectual property rights)	OAOTVEL (though a contract was signed for transfer of produc-tion tech-nology of TVS-2M to China in 2010)
India	Yes (18 small, 2 mid-sized and 1 large reactor in operation)	Yes (Kudanku- lam 1)	Yes	Yes Agreement signed with Rosatom for add-itional units in Kudankulam	Yes (5 reactors under construc- tion)	Yes, one (Kudanku- lam 2 - reached criticality in June 2015)	Yes ZAO AtomStroyEx port	OAOTVEL
Vietnam	No	-	Yes	Yes Agreement signed with ZAO AtomStroyEx port for Ninh Thuan 1 nuclear power project	No	Yes, one (though Ninh Thuan 1 construc-tion will not start before 2019)	Yes ZAO AtomStroyEx port	Rosatom committed itself to supply fuel and for repatria-tion of used fuel for the life of the plant

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Natural Gas Sector in Central and Eastern Europe

5.1 Natural Gas Market Of the European Union and Its Impact on the Position of Gazprom in Europe

Filip Černoch

5.1.1 Introduction

Natural gas markets in the EU are characterised by the high level of import dependency resulting from the combination of decreasing indigenous production¹ and stable or increasing demand. Despite significant share of LNG, the EU imports most of its consumption from Norway, Russia and Algeria.² The producers in this countries are often state controlled and function in close cooperation with the government (Talus, 2014). Given the accusations of Gazprom misusing gas supplies as a political tool, the EU faces a challenge how to cope with this company as a significant energy supplier.

In this text we focus on how ongoing restructuralisation of the EU's internal gas market affects the manoeuvring position of Gazprom. We work with the assumption that the shift from traditional, fragmented, and national market dominated by (semi)monopoly incumbents with strong ties to external suppliers towards unified, liberalised and hub trading based European market limits the ability of Gazprom to politicize its gas supplies.

The structure of our argument is as follows: 1) Gazprom's position in some EU member states' (MS) markets has been

¹ The EU indigenous production has decreased from the level of 200 Mtoe in the late 1990s to the level of below 150 Mtoe in 2012 (European Commission, 2014, pp 41).

² In 2012, imports from Russia accounted for 32% of total imports to the EU, followed by Norway (31%) and Algeria (14%) (European Commission, 2014, pp 44).

dominant, endowing the company with a significant market power; 2) the traditional market model, based on the long-term take or pay contracts (LTC) and limited competition, cement(ed) this state, providing Gazprom with tools to exert economical and political power (provided that there would be incentives to do that); 3) new market model introduces increased competition and liquidity³ within the EU while unifying previously fragmented national markets into a Pan-European one; 4) this new model challenges the position of Gazprom denying it its sources of market power; and 5) the role of bilateral relations between suppliers and purchasers has diminished in favour of the pro-liberalisation regulatory framework of the market, controlled managed by the EU's regulatory bodies. That marks the significant shift of control over the situation from Gazprom to the European Commission.

5.1.2 Position of Gazprom on the EU markets

Analyzing the presence of Gazprom's gas on the markets of EU countries (see Table 5.1.1) we notice that for 10 MS Russia is a single country of origin for more than 75% of their supply. For 16 MS it is a pivotal supplier, whose gas is required to cover demand after the capacity of other suppliers is used.

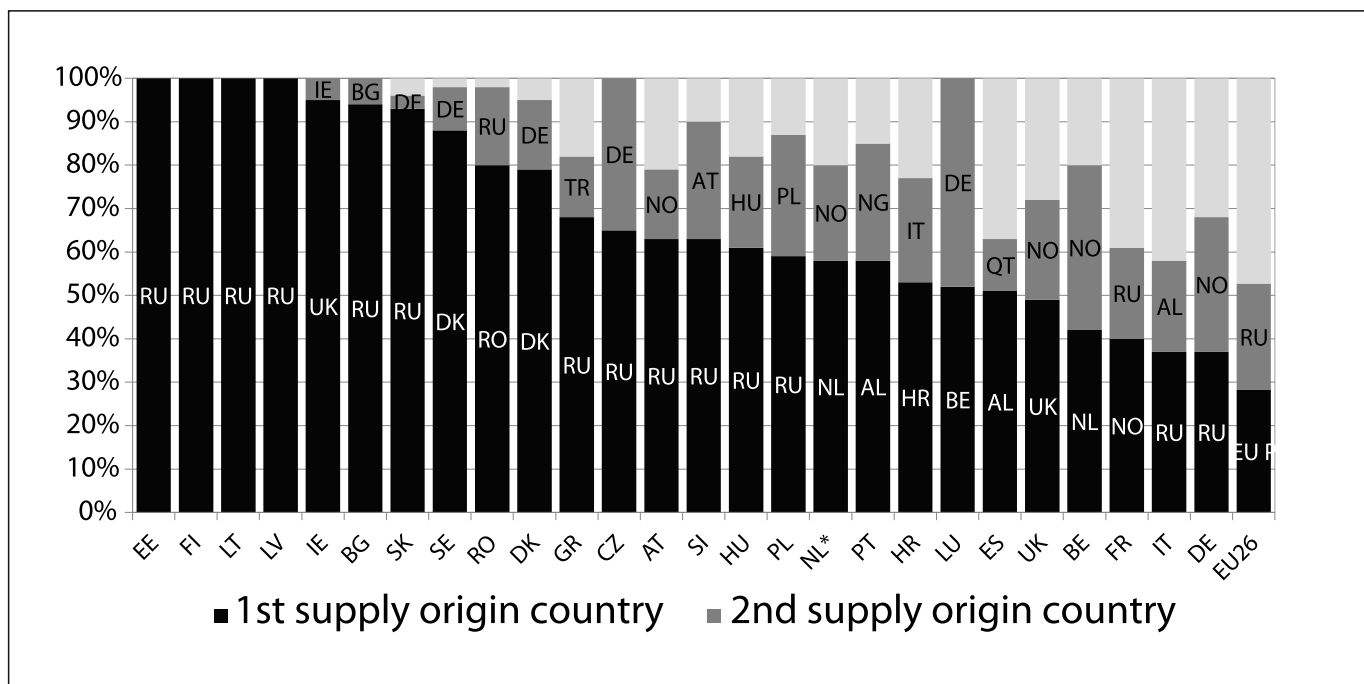
Based on this data we could categorize Gazprom as a dominant company with significant market power on these markets. That creates an opportunity for potential abuse of this dominance, whether motivated economically or politically. This

³ Level of trading activity. High liquidity means that given commodity could be bought or sold without significant impacts on price.

abuse could have a form of company excluding rivals (foreclosing⁴) or directly harming consumers (their exploitation, for example by rising the prices) (Federico, 2015).

The gas sector has been especially sensitive to the exploitation of market power. Firstly, due to the limited demand elasticity (difficulty of customers/consumers to reduce demand after the price increase) and supply elasticity (other producers than the dominant supplier are not able to replace supply after the price increase or supply interruption). And secondly, due to the market design and structure that allow for market concentration.

Tab. 5.1.1: Estimated Diversity of Gas Supply in EU-26 per MSs and by Origin of



Supply Country - 2013 (%)

Source: ACER 2014

⁴ Situation when (dominant) company limits or disadvantages the entrance of competing companies to the market.

5.1.3 Traditional model of gas market

In this chapter we work with the assumption that traditional model of gas market described further 1) strengthens the position of fundamental suppliers of gas to Europe, providing them with tools to exert market and political (if there is an intention) power and 2) prevents any significant changes of status quo, cementing the position of these companies (mainly through foreclosure effects of LTC).

As from the beginning of the gas market in Europe in 1960s, the trade was organised on the basis of long-term take or pay contracts. Since they provide security both for producers (security of demand) and purchasers (security of supply), they were accepted by these actors as a cornerstone of the market structure. Kononplyanik summarizes the main elements of the LTC:

- 1) LTCs provide secure and lasting demand for production and thereby facilitate the investment for the field development;
- 2) both domestic and export gas prices pegged to fuel oil replacement value;
- 3) regular price review, both within the given contract pricing formula and review of the formula itself;
- 4) minimum pay obligation (take or pay obligation), which guarantee that the producer will receive minimum guaranteed revenues from gas sales;
- 5) net-back to the delivery point (from end user, e.g. gas replacement value for the end user, less transport costs from the delivery point to this end user);
- 6) destination clauses are required because gas may be further reexported to different export markets with differing contract prices at the given delivery point (Konoplyanik, cited in Taulus, 2014).

The stability and predictability of the system was further strengthened by limiting the number of actors on the market (mainly national monopolies protected by the governments) and the limited cross-border gas competition due to the fragmentation of national markets. With enormously expensive pipelines being the default way to transport natural gas, the producers and importers were predestined for the long-term partnership.

The whole structure was built around the political (and societal) preference of stability and predictability of the system over the competition. And as such, it was adopted by the all important actors: importing companies, supplying companies, governments.

How this model determined Gazprom's position via its customers?

The fragmentation of national markets and politically motivated favouring of stability over competition allowed for highly concentrated markets with limited numbers of suppliers and purchasers (mainly state owned incumbents with monopoly or semimonopoly positions). Having dominant companies with large market shares resulted in lowered ability (readiness) of other firms to flexible fill in if the dominant firm decides to restrict the output or raise the price at the given markets. In other words, it preserved the situation when Gazprom was both indispensable and irreplaceable.

⁵ Primarily heavy fuel oil, light fuel oil, crude oil or a combination of these. The original reasoning for this arrangement comes from the fact that natural gas was offered as a substitution for other energy sources. Oil indexation made it competitive.

LTC indexed to the costs of alternative non-gas fuels⁵ and destination clauses enabled Gazprom to charge different markets with different prices. That enables company to extract not only economical but also political gains linking the prices and condition of contracts with economical and political concessions.

5.1.4 Liberalised model of the EU gas market

In 1980s, the situation started to change. The Single European Act launched an effort of the European Commission (EC) to introduce competition and liberalisation to the gas and electricity markets of the member states of European Community, with a vision of building unified Internal Energy Market (IEM). Since then, the new regulatory framework has been introduced, challenging the monopoly power of national incumbents and underlying the role of market and contracts (Taulus, 2014).

In 2009, the EC accelerated the process of building the IEM issuing the Third Liberalisation Package⁶. In an effort to strengthen competition on the gas market, the existing rules were amended and tightened up, such as obligation of operator of networks to allow third parties to access this infrastructure (TPA principle), differentiation between competitive and non-competitive parts of gas industry (unbundling provision), removing barriers preventing alternative suppliers from importing or producing energy, or free choice of consumers to choose their supplier.

⁶ IEM builds on three liberalisation packages with directives setting the rules for gas markets and power markets. This fundamental set-up is supplemented with other regulations, guidelines, network codes and other tools that define the shape of the market. These rules are enforced by the European Commission and other bodies of the EU and also by national authorities.

For the IEM, the role of independent regulatory authorities is crucial. The state is no longer an active participant on the energy market (for example by protecting national energy incumbent), its role is limited to overseeing the market using regulatory authorities to ensure fair rules for all market actors. To strengthen the position of national regulatory authorities, Agency for the Cooperation of Energy Regulators (ACER) was created at the EU level.

Moreover, since 2009 the European gas market has been undergoing significant changes in terms of market design and regulations with the most visible trend of implementing Gas Target Model (GTM), alternating the long-term bilateral contracts with hub trading.⁷ Based on the third liberalisation package, the framework guidelines and network codes are being prepared to complete the IEM.

EU regulatory authorities started to accent short term dealing on hubs as an unimportant contribution to competition and LTCs got under increasing pressure due to their foreclosure potential. This trend met other structural changes on the global and European gas market; rising share of LNG and pressure on prices due to the shale gas revolution in U.S. and limited EU consumption due to the economic crisis.

These changes put a strain on the position of traditional suppliers and purchasers, including Gazprom.

⁷ Measures to implement GTM include „the setting of criteria on the appropriate size of market zones, the offering of cross-border bundled capacity from and to virtual trading points supported by trading platforms, the organisation of capacity auctions, harmonised transmission entry/exit tariff structures, market-balancing mechanisms and maybe the merging of market zones“ (ACER/CEER, 2014).

Colision of Gazprom's strategy and the new regulatory framework of IEM

In this chapter we show how the implementation of IEM affects the position of Gazprom. We divided this issue into two subcategories. 1) the clash between the rules and regulations of IEM on one side and Gazprom's trade model on the other side is analyzed. We observe that regulatory framework of IEM limits the tools of Gazprom's trade strategy (LTC, destination clauses, oil-indexation) based on legal arguments; 2) the analysis of the changing structure of EU gas market is provided, showing how the market forces changes the position of Gazprom.

Gazprom's tools to exercise power

The following cornerstones of Gazprom's trade strategy in Europe have been questioned by the European Commission and national regulatory authorities (NRA) based on the new regulatory model described above.

Long term contracts

Due to the its anti-competitive foreclosure effects, the European Commission percieves the long term contracts with a suspition and they are often an aim of the EU's antitrust policy. Hauteclorque and Glachant summarize their ambiguous effect on the competitive structure, investments and consumer welfare as follows.

LTCs hedge price and quantity risks, facilitating investments. They decrease transaction costs for contracting parties, serving as a substitute for vertical integration. In the short term they tend to limit double marginalization. In the long term they

facilitate entry and contribute to market building if spot prices are volatile and unpredictable, provided they are sufficiently long and covering high volumes of gas.

On the side of negative effects, the foreclosure potential is declared. If a significant share of demand is reserved in the long term, a lack of retail outlets may lead to output foreclosure. Tied consumers are not able to benefit from potential more profitable offers by new entrants in the future. That could create a barrier to entry for new market players. That applies especially when the production level is very concentrated (de Hauteclouque & Glachant, 2009).

Concluding that long-term (downstream) contracts could reduce the ability of the customers to choose their future suppliers and acknowledging that this could compromise the competition on the market, the European Commission started to challenge this issue. Based on the cases of Gas Natural, Distrigaz, E.ON Ruhrgas, Repson, Synergen and others, the European Commission built the general guidelines of how this contracts should be judged. LTCs are not forbidden per se, but volumes locked-in under the contract, its duration, cumulative effect and efficiencies suggested by the contracting parties are evaluated (Talus, 2011).

Destination clauses and territorial sales

They prohibit the buyer from re-selling the gas into other countries or areas than those for which it was intended, enabling Gazprom to charge different clients different prices at the same delivery point.

Territorial restrictions and measures to partition the market are anticompetitive according to the past decisions of the

European Commission. In 2004, the Commission issued a decision on contract concluded by GDF with ENI and ENEL confirming that territorial restriction clauses restrict competition. According to the contract, ENI and ENEL were forbidden from selling the gas the GDF transported for them in France. In 2009, the Commission fined EDF and E.ON for partitioning their respective markets in term of gas transported via MEGAL pipelines (European Commission, 2015).

Also, the Commission's intervention to the Gazprom-ENI, Gazprom-OMV, Gazprom-E.ON or Gazprom-PGNiG agreements confirmed that this provision is no longer acceptable on the EU market (Talus, 2011).

Linkage of gas prices on competing sources of energy

Oil-indexation was standard way of pricing the natural gas since the beginning of the European gas industry. Norway, the Netherlands, Algeria, Libya, they all linked their prices to the oil products. Even if the reasons for oil-indexation are not valid any longer (oil products are no more substitutes for natural gas in Europe), Gazprom defends this pricing mechanism as a crucial mean of its business in Europe.

EC questioned oil-indexation together with other provisions of LTCs in the crucial antitrust proceeding against Gazprom that started in September 2011 with on-site inspections in eight EU countries.⁸

⁸ Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia.

The case is based on the accusation of Gazprom of abusing its dominant market position in the group of Central and Eastern European countries and consists of following charges:

- i) Gazprom might be hindering cross-border gas sales, including a number of territorial restrictions⁹ in its supply agreements with wholesale traders. As a result, affected countries have no access to potentially more competitive gas supplies from other markets. Also free flow of gas is prevented with the impact on gas prices;
- ii) Gazprom may apply unfair pricing policy, pegging the price of gas to a number of oil products. The EC claims that it does not consider oil-indexation illegal per se, the allegation is based on a comparison of different prices in different MSs with different benchmarks. The Commission's preliminary conclusion is that Gazprom has charged unfair prices (up to 40% higher than elsewhere) in Bulgaria, Estonia, Latvia, Lithuania and Poland;
- iii) Gazprom possibly used its market dominance in Bulgaria and Poland by making gas supplies dependent on obtaining certain infrastructure-related commitments from wholesalers (European Commission, 2015).

On April 22, 2015 the European Commission sent a Statement of Objections to Gazprom, which is another formal step in EC's investigations. The preliminary view of the EC is that Gazprom is breaching EU antitrust rules based on above listed reasons. Gazprom now has 12 weeks to reply and present its arguments. The fine Gazprom faces could reach up to 10% of its global turnover.

⁹ Export ban clauses, destination clauses and others.

The control over transit infrastructure

As the last example of the clash between EU regulatory framework and Gazprom's trade strategy we refer to the South Stream case. This pipeline, intended to deliver Russian gas through the Black Sea to Austria and Italy, was cancelled recently, with Gazprom citing Bulgaria's failure to provide a construction permit as a reason (Beckman, 2014).

However, the explanation is more complex. Based on the principles of IEM, the new gas infrastructure (network, LNG terminals) is subject to Third party access (TPA principle), that obliges the operators of the pipeline to enable access of all eligible customers without discrimination, based on published tariffs. Also the separation between production, transit and distribution (unbundling) are required by energy acquis communautaire (Stoyanov, 2013). During protracted negotiations, the European Commission demonstrated no will to withdraw from these rules and provide South Stream with exemption from TPA, irrespective of concessions of possible transit countries (esp. Serbia, Hungary, Bulgaria). EC's tenacity combined with the rising estimated costs and low prices of gas in the EU undermined Gazprom's determination to proceed with this pipeline. Absence of Bulgaria's permit came as a relief for the company providing it with reason to drop the project.

5.1.5 The structure of the market

The analysis of the changing structure of EU gas market is provided now, showing how the market forces altered the position of Gazprom.

Hub pricing

Changes in the EU gas market(s) have been driven in the last decade by following reasons: 1) the implementation of new regulatory framework of IEM, which boosted the transparent and short term hub trading¹⁰ and also provided final customers in EU countries with the right to change its supplier, freeing them from the dependency on national incumbent; 2) increasing price of oil-indexed long term contract gas prices; 3) surplus of gas due to the economic stagnation of the EU and increased domestic production in the U.S.

Especially midstream utilities in EU countries were damaged by these changes, since they were legally bound¹¹ to buy huge volumes of expensive LTC oil indexed gas competing at the same time with considerably cheaper spot gas from hubs. The significant economic losses made companies like E.ON, Wingas, Eni, RWE and others to open the round of renegotiations of these contracts with their suppliers (Stern, 2014). After Dutch and Norwegian producers started with concessions also Gazprom and Sonatrach were forced to yield. For Gazprom it meant agreeing to reduce the take or pay's minimum to 70% of

¹⁰ Liquidity on gas hubs in the EU has grown over the last years with the UK NBP and Dutch TTF being the leaders. The same applies on the total volumes of spot gas traded on hubs with the example of 14% increase between September 2013 and September 2014 (European Commission, 2014, pp 21). The importance of hubs has been increasing, even though the long term contracts of pipeline gas are still estimated to cover 17-30% of EU market demand (European Commission, 2014, pp 62).

¹¹ Based on take or pay provisions that require the buyer to take certain annual minimum volume of gas or to pay it whether or not it is taken.

annual contract quantity (from previous average of 85%), when volumes taken in excess would be sold at hub-based prices for three years beginning in October 2009¹² (Stern, 2014). Also some price concession was agreed, such as that of Polish PGNiG that in 2012 received 10 % retroactive discount on LTC contract until 2022 (Stratfor, 2013).

In some cases the negotiation had no effect, resulting in arbitration. This is the case of RWE that had pursued arbitration dispute with Gazprom from 2010 to 2013 receiving retroactive payment of USD 1,5 billion (Novikov, 2014).

As a result, since 2012 Gazprom has began to use a different type of price mechanisms delivering gas to EU. Oil indexation preserved, but the base price was lowered (by 7-10%) to adjust to hub prices. Moreover, if price paid by the buyer exceeded the hub price by more than a defined percentage (reported as 5-15%) at the end of the given price period (one or two years), the buyer would receive a rebate reflecting the difference. In 2012, this rebates reached around USD 3,8 billion and as a result of this mechanism the gap between Gazprom's prices and prices at NPB hub narrowed from 30% in 2010 to less than 5% in 2013 (Stern, 2014, pp 64).

We could therefore conclude that market forces (significantly supported by the new EU regulatory framework) forced Gazprom to adjust its pricing mechanism to that of hubs¹³ – narrowing the gap between LTC and hub prices, limiting the

¹² The great majority of information about LTC gas contracts is confidential, therefore the details are not published for analysis

¹³ On the other hand, it would be unreasonable to consider LTCs outlived since the data on the duration of these contracts indicate that a lot of them preserve up to the next decades. There are almost 300 contracts in the EU with duration above one year: 31 % of those contracts has duration between 1-10 years, 33 % duration between 10-20 years, 36 % duration of more than 20 years (mainly Russia's supplies). Regarding expiry dates, 47 % of those contracts will expire within 10 years, 45 % within 10-20 years and 8 % above 20 years (European Commission, 2014, pp 52).

minimal amount under take or pay contracts, and increasing the share of supplies directly linked to hub trading.

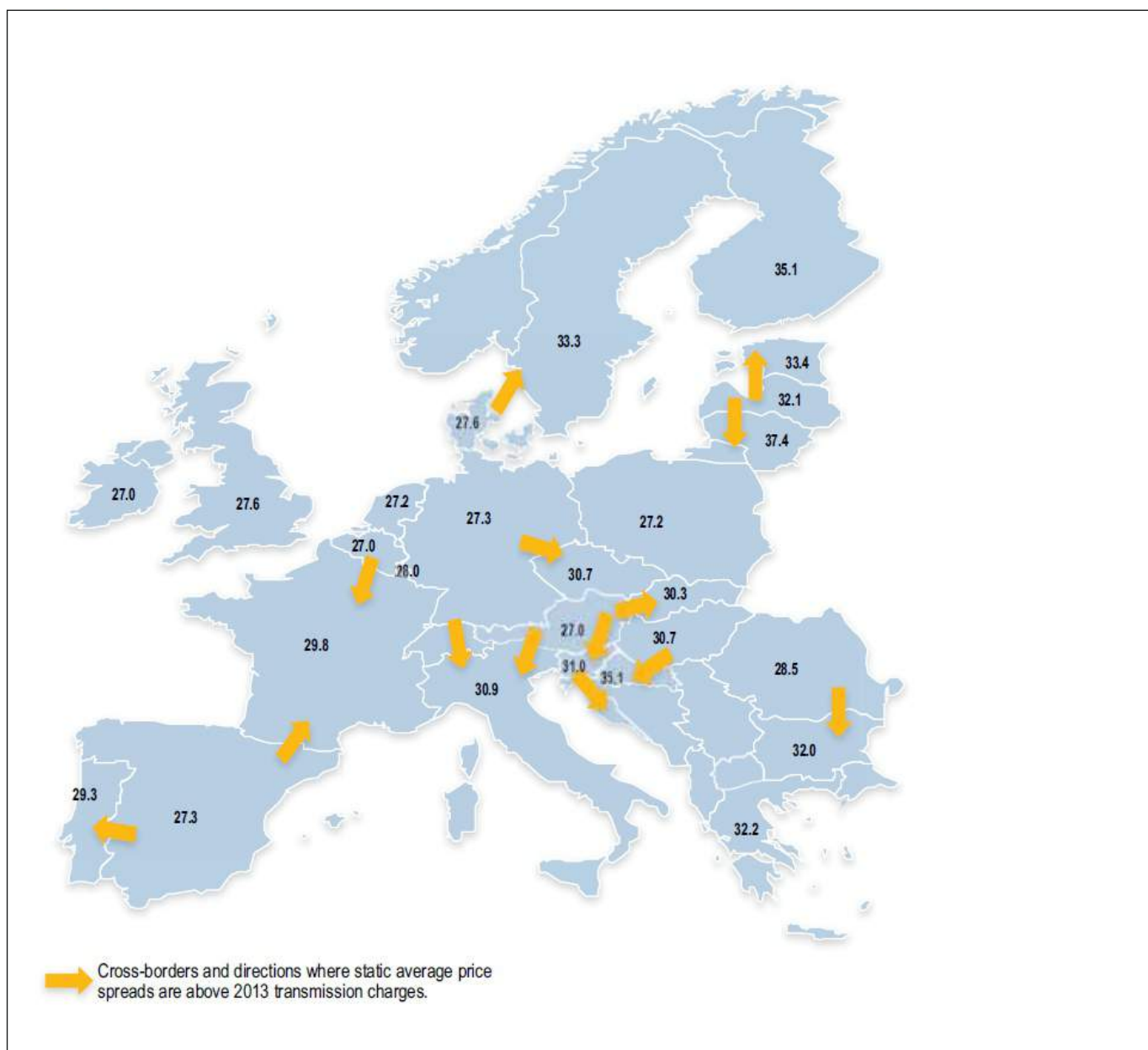
Price convergence

We also observe continuing alignment and the convergence of hub prices and the prices of LTC indexed to other commodities. It is another mechanism that subordinate Gazprom to market forces, preventing the company from conditioning the different prices for different countries by (economical or political) concessions.

Price convergence between various wholesale markets indicates the level of market integration. Fully integrated markets reduce price differentials attracting the supplies from the areas with lower prices to the areas of higher prices. Analyzing the data for the period from January 2009 until the end of September 2014, the European Commission concludes „the increasing convergence in the day-ahead price on major European gas hubs...this price convergence is a result of market integration whereby improved transport capacity access has allowed price signals from larger and more liquid hubs in Northwest Europe to pass through to hubs in Central and Southern Europe“ (European Commission, 2014, pp 21-22).

The price convergence could nevertheless be observed mainly on more mature Western European markets while significant price variations persist over the EU as a whole. Especially on the immature Central and Eastern European markets we notice the price divergence above the transmission tariffs. Despite the growing hub trading in some of these countries (Czech Republic, Hungary, Poland, Slovakia), shippers rely also on adjacent markets in Germany and Austria (ACER/CEER, 2014, pp 172).

Tab. 5.1.2: EU-26 Average Annual Cross-Border Gas Wholesale Price Spreads - 2013 (EUR/MWh)



Source: ACER 2014

In other words, these countries are still subjects of individual pricing of Gazprom with the final price based to the great extent on the degree of bargaining power of purchasers on the given market.¹⁴ „There is some evidence that Central-East and

¹⁴ „Using the data of ICIS Heren or Platts Acer states that the price reduction of more than 15% was given

South-European member states tend to sustain a premium over more liquid, less concentrated and better interconnected Western countries. Oil-indexed and semi oil-indexed long-term contract prices also remain more common in Central-East and Southern Europe, and in 2013 the price of these contracts continued to be higher than hub spot prices, even though the gap has narrowed compared to previous years“ (ACER/CEER, 2014, pp 173). This roots from the lower economic development of these countries, their late accession to the EU, lack of gas interconnectors enabling the trading, delay in building the institutions of gas markets and other reasons.

(Under)developed markets and Gazprom

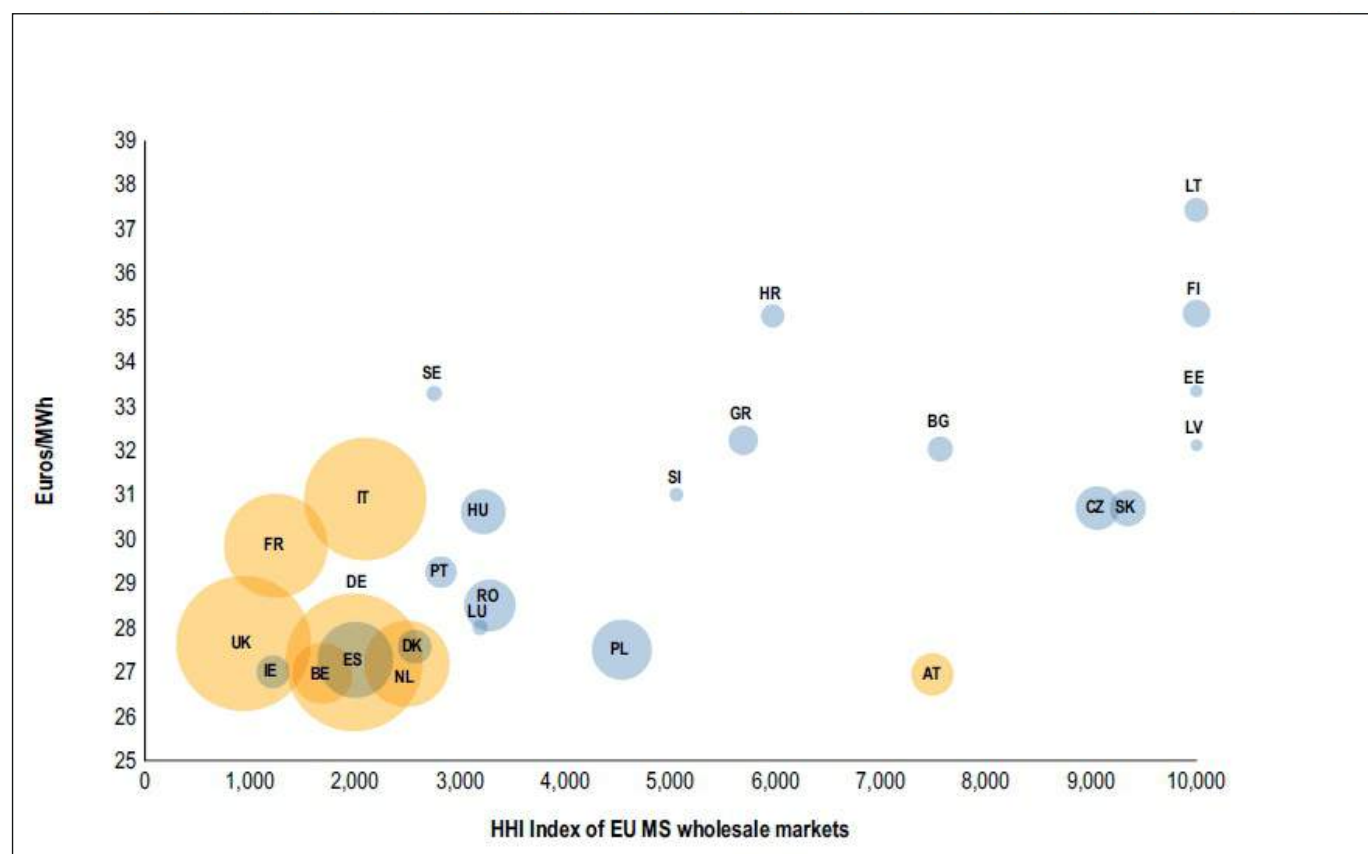
To support the above mentioned arguments about the relationship between the level of development of individual market and Gazprom's position on this market we employ the data of ACER (see Table 5.1.3). It problematizes the prevailing argument about Gazprom punishing/rewarding countries on the ground of Kremlin's order.

What we observe is the correlation between the size of the market (size of the circle), its concentration and prices of gas. Large, liquid a competitive markets enjoy the lower prices more than small markets with limited competition and dominant position of a single supplier – Gazprom.¹⁵

to Poland and Bulgaria. "Gazprom seems to have a strategy of treating markets separately and thus establishing some price discrimination between member states, arguably influenced by political considerations" (ACER/CEER, 2014, pp 173).

¹⁵ The figure is distorted by the regulation of retail prices, that is still present on some markets (e.g. Poland).

Tab. 5.1.3: Gas Wholesale Prices in EU MSs Compared with Market Concentration and Gas Demand - 2013 (EUR/MWh)



Source: *Acer* 2014

It doesn't mean that on liquid and competitive markets the supplies cannot be politicized, but any such efforts are to a great extent shielded by the market.

5.1.6 Effect of IEM on the political power of market players – a discussion

We described how the legislative and regulatory actions of EU institutions altered the structure of markets, restricting the capability of Gazprom to abuse its market power. But how these changes modified the political power of this company?

Building on the work of Fernandez and Palazuelos, we understand the shift from the traditional to liberalised market model as a shift from relational power¹⁶ of market players to structural power of the market itself. Relational power is defined as an ability to impose one's will on others with a direct link of authority between the one who holds that power and others who do not. Structural power is defined as the ability to shape or determine the functioning of certain structures in one's own interest, even when there is no direct link of authority between oneself and the others (Fernandez & Palazuelos, 2014).

The historical model of the market was built upon the bilateral relations of limited number of players, bounded together by LTC. The general structure of this market was a result of the consensus of actors on fundamental rules, while individual agreements were adjusted according to the bargaining position of parties involved. Players interacted shaping the structure of the market. Relational power defined the relations between market actors while structural power was diffused and unassigned.

Liberalised model of IEM changed this imbalance. Relational power still plays the role, with companies bargaining about the deals. But the structure of the market, that defines the boundaries for their negotiations, is no longer a result of their consensus only. The power to define and modify the structure of the market was given to a great extent to the EU regulatory bodies (the European Commission and national regulatory authorities). The consequences of this shift are especially severe for the companies outside of the EU, since

¹⁶ Now we are shifting from economics (market power) and regulation (dominance) to the area of international relations and political sciences (relational vs. structural power).

their position in the process of building of the EU's rules and policies is limited. To change the structure of the market they have to endure miserable (and often vain) way of protracted negotiation with all actors relevant to the EU negotiation process. The example of South Stream serves as a compelling example.

5.1.7 Conclusion

The implications of new market model for Gazprom's position in consuming countries are as follows:

- 1) the principles of the IEM restrict Gazprom's trade strategy. LTCs and their provisions are challenged based on their foreclosure effect and role which they play in abusing of market power;
- 2) from the perspective of Gazprom the situation is more favourable in the CEE countries. IEM legislative and regulatory framework is introduced here only gradually, gas network is insufficient, hubs are missing and liquidity improves very slowly. Although this dichotomy between the west and the east of the EU's gas market is growing weaker, the full convergence could take years;
- 3) the position of the EU towards Gazprom strenghtenes. The structure of the IEM limits the ability of Gazprom to use its relational power in bilateral relations with purchasers. At the same time the structural power (ability to change the structure of the market and its rules) of Gazprom is limited, since IEM is created, implemented and protected by the large bureaucratic body consisting of the European Commission, the European Court of Justice, committee,

regulatory authorities and a lot of other actors. Gazprom's position has been gradually evolving from the co-author of the market structure to its subject.

The number and frequency of supply disruptions in which Gazprom is involved are expected to decrease. Politicizing of deliveries is no longer a useful tool on the market where shortages of gas could be flexibly satisfied from other sources and where, due to the price convergence, any suspensions of supplies harms all the consumers equally.

Reflection of the indicators

Based on our analysis we can comment on the relevant indicators defined in the beginning of this paper.

Tab. 5.1.4: Reflection of Energy Policy Indicators of Strategic Approach

The foreign supplier rewarding certain behaviour and linking energy prices to the client state's foreign policy orientation	Limited by the regulatory framework and structure of the market.
Abusing infrastructure (e.g. pipelines) and offering different pricing to exert pressure on the client state	Limited by the regulatory framework and structure of the market.
Efforts to gain a dominant market position in the client country	Limited by the regulatory framework and structure of the market.
Efforts to eliminate competitive suppliers	Limited by the regulatory framework and structure of the market.
Acting against liberalization	Limited by the regulatory framework and structure of the market.
Preference for long-term bilateral agreements and „take-or-pay“contracts	Limited by the regulatory framework and structure of the market.
Diminishing the importance and influence of multilateral regimes like that of the EU	The EU (and IEM) itself is a multilateral regime. Gazprom is therefore a subject of this regime and is made to accept its rules.
Attempts to control the entire supply chain (regardless of commercial rationale)	Legally forbidden by the unbundling provisions of EU's energy <i>acquis communautaire</i>

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Why Gazprom Is In Trouble In One

Chart *Forbes* <http://www.forbes.com/sites/markadomanis/2013/02/19/why-gazprom-is-in-trouble-in-one-chart/>

5.2 Country Case Study: Belarus

Anna Leshchenko

5.2.1 Introduction

From the political, economic and security relations point of view, Belarus is often considered to be the closest ally among Russia's neighbours (Garbe, Hett & Lindner, 2011, p. 188). In the times of USSR's existence, Belarus was Byelorussian SSR a federal republic, within which significant production capacities of Soviet industry existed, especially the heavy industry and consumer production. However, at the same, this republic was dependent on raw material supplies and on export of manufactured goods, as the production significantly exceeded the internal demand. Absolutely crucial for Belarusian economy is the import of crude oil, which is exported after being processed in domestic refineries. Political and economic ties of both countries were so tight after the dissolution of the Soviet Union, that the union of Russia and Belarus in a single state was expected for a long time. Finally, the proposal of unification was restricted to a project of Customs Union, which had been in last years supplemented by extending cooperation to other sectors, and finally on January 1, 2015, the Eurasian Economic Union was established, members of which include also Kazakhstan.¹

Regardless the political-economic integration of Russia and Belarus, political relations of the both counties are not entirely smooth, and these political disagreements are often reflected

¹ Among the members of Eurasian Union belong also a number of other states of the former Soviet Bloc, actively participating on all projects and only three members implement the necessary legislature.

also in the energy materials trade. Certain, sometimes even comical, “refreshment” in the political negotiations is brought by a unique personality of Belarusian President Alexander Lukashenko (Krechetnikov, 2013; Melnichuk, 2014).

Generally it can be said that Russia and Belarus are still “fraternal countries” with a strong compliance in interests in political sphere and especially on the level of security. Nevertheless, economic issues, and especially issues of export of Russian crude oil to Belarus, and export of other oil products from Belarusian refineries, have been in the recent years a bone of contention between these two neighbours.

5.2.2 The role of gas in Belarusian energy sector

In the Belarusian energy mix, natural gas plays unreasonably important role; unreasonably, because this raw material is 100% imported, moreover, from a single monopoly supplier – Gazprom. From the perspective of energy security of the state, the Belarusian energy mix is balanced quite badly: the amount of imported oil and gas in TPES is more than 90%, while domestic resources (primarily, peat, wood and wood waste) provide about 8% of TPES only.

Because Belarus was used to use inexpensive gas for electricity production for years, which also contributed to the economic growth despite preserving the strong characteristics of the central economy in Belarus, the proportion of gas in electricity sector is 97%. Gas is also the key fuel for Belarusian heating plants: the proportion of gas in the heating industry is 87 % (EIA, 2010). Annually, the state consumes around 20 billion m³ of natural gas, and the entire volume is imported from Russia.

Ever since the dissolution of the Soviet Union, Gazprom has been the key supplier of gas for Belarus. It imported from 60 to 70% of Belarus needs back then, with the rest being provided by the independent Russian traders. Gazprom has become the only gas supplier to Belarus since 2005. In comparison to other Russian investors in Belarusian territory, Gazprom is also the biggest property owner.²

Of course, a great role in Russian-Belarusian relations plays the transport of gas through the Belarusian territory to the West. Until Nord Stream was put in the operation in 2012, almost one fourth of the entire Russian gas export into Europe was transported through the Belarusian territory (Garbe, Hett & Lindner, 2011, p. 192).

State-owned company Beltransgaz originally owned and managed pipelines Northern Lights, which were built in the Soviet era, and which served as a transit of gas to Europe as well as for distribution in the Belarusian territory itself. The overall operational capacity of the infrastructure is 46-48 bcm, an integrated part of the system is also a gas reservoir with a lower capacity of 0,66 bcm. 100% control of Beltransgaz was so important for Kremlin that it was willing to negotiate with Minsk, which affected especially the gas prices for Belarus (see below).

² Except the Jamal pipeline, nowadays Gazprom also owns the former company Beltransgaz, now Gazprom Transgaz Belarus, with the whole infrastructure. In the gas sector, in the state's hand remains only a smaller company Beltopgaz, which is dedicated to the production of peat (Astapenia, 2014). Despite that, Gazprom also owns stakes in „Belstroytransgaz“, „Siburbelservis“, „Beltehnogaz“, „Belrusneftegaz“ through its daughter companies. In the oil sector, Gazprom's capital was invested into „Gazpromnéft – Belneftěprodukt“ company. In Belarus, Gazprom owns a network of petrol stations and oil repositories, and also it has a stake in refinery in Mozyr. In the ownership of the Russian gas monopoly is also a majority stake in a company producing gas and electric cookers - „Brestgazoapparat“. The majority of Belgazprombanka is also owned by Gazprom and Gazprombanka (Ministerstvo Ekonomicheskogo Razvitiya Rossiskoioy Federacii).

The Soviet infrastructure was in 1990s supplemented with (Placeholder2)l Yamal pipeline (referred to also as Yamal or Yamal-Europe), which, in contrast to Northern Lights system, was constructed solely for Gazprom's transit needs. The Russian monopoly built as well as financed the Yamal pipeline. That is why the whole Belarusian section belongs to Gazprom from the very beginning (however, Russia paid a rental of land, through which the pipelines are laid) (Yafimava, 2011, p. 218-220).

5.2.3 Reflection of the indicators

The foreign supplier rewarding certain behaviour and linking energy prices to the client state's foreign policy orientation.

After the dissolution of the USSR, Belarus was, similarly as Ukraine, confronted with the increase in prices of energy material, thus with the condition, which largely replaced the barter system established between the USSR republics during the Cold War (Closson, 2009, p. 93). In the case of Belarus, thanks to the maintenance of excellent political-economic relations, the reality was the purchase of energy material at very low prices, as compared to the oil and gas prices on the world market long after the dissolution of the USSR. A changed occurred after 2000, and the beginning of Russian-Belarusian disagreements in the field of oil and has dates back to 2002.

In the autumn of 2005, although Gazprom announced an introduction of market prices for gas imports, in December 2005, it confirmed that the price for Belarus will remain the same as in 2005, because of the ongoing negotiations on the formation of a common Russian-Belarusian confederation. Also the presidential elections in Belarus were approaching and

the Russian side clearly did not want to cause a stir in the political situation. A kind of asymmetric was appearing, when Russian continued with gas supplies to Belarus at significantly lower prices than in the case of Ukraine or Baltic states. Already during 2006, Gazprom began to announce the introduction of higher prices corresponding to European ratios for 2007 in Belarus, which Lukashenko refused,³ unless the simultaneous increase in prices on the Russian internal gas market occurs. Gazprom argued with the requirement to gain 50% share in the Beltransgaz company in exchange for cheaper gas for Belarus, and on the contrary, Belarus demanded the access to the Russian up-stream (Nygren, 2010, p. 77–78).

Another significant disagreement, which influenced not only the Russian-Belarusian relation on the energy level but also touched the issue of reliability of supplies from Russian energy sources through Belarus to Europe, occurred in January 2007. The official reason for this Russian-Belarusian energy quarrel was exactly the disagreement in the gas prices and subsequently the prices of crude oil for Belarus. At the beginning, the Belarusian side refused to accept the Russian requirements, especially signing the contract unifying the payments for Belarusian consumption of Russian gas with European market prices, and allowing Gazprom to partly gain control over Beltransgaz company. This time, the disagreement did not lead to disruption of gas supplies, however, the ongoing dispute over crude oil complicated the situation (Romanova, 2008, p. 89).

The gas dispute was finally solved by the concession of Belarus and signing a contract related to a gradual increase in

³ Gazprom demanded the price 105 USD for mcm of gas, however, Belarusian side was willing to pay maximum of 75 USD (Garbe, Hett, & Lindner, 2011, p. 196).

gas prices for Belarus, an increase in transit fees for transport of Russian gas (from 75 cents to USD 1,45 for each tcm of gas per 100 km), and especially a relatively advantageous purchase of 50% stake in Beltransgaz by Gazprom (za 2,5 mld. USD). In the first phase of gas disputes with Belarus in 2007, Gazprom therefore achieved its interests, although it had to make a compromise. The real price, which Belarus paid for gas, was still lower than, for example, in the case of Baltic countries. Moreover, Russian has to accept the increase of transit fees and the advantageous loans, which had to help Belarus to deal with the new situation after the energy crisis in 2007, and later, the already emerging consequences of the world financial crisis (Closson, 2009, p. 93; Yafimava & Stern, 2007).⁴

Although the gas dispute was temporarily resolved, the crude oil trade stood in the centre of the Russian-Belarusian dispute from 2007. As its consequences, the crude oil supplies through the Belarusian branch of Druzhba pipeline were interrupted, and the disruption affected also a several EU member states (Baev, 2008, p. 148; Westphal, 2008, p. 114; Youngs, 2009, p. 85–86).

As it has been already proven, for Gazprom it was important to gain 100% control over Beltransgaz in terms of providing the transport security of its gas to Europe, as well as to minimize the Belarusian political-economic extortion potential. Therefore, after another series of complicated negotiations in 2011 between Moscow and Minsk, an agreement was achieved that the remaining 50% of Beltransgaz, owned by the state by that time,

⁴ Gas price for Belarus increased to 67 % of the price, at which Gazprom sells gas to Western Europe; a new contract provided gas supplies to Belarus for 100 USD/1 mcm, until 2011 these prices had to be increased to the Western European level. On the other hand, Russia had provided Belarus with a stabilization loan amounted to 1,5 billion USD, which should have allow Belarus to restore debt payments to Gazprom company (Baev, 2008, p. 148; Engelbrekt & Vassilev, 2010, p. 193).

will be sold in exchange for the low price on Russian gas (amounting 165,5 USD/tis.m³) for 2012. Russia paid 2,5 billion USD for a stake in the company, and subsequently renamed the company to Gazprom Transgaz Belarus. The interesting thing is that the utility of Yamal pipeline increased from 80 % to nearly 100% almost immediately after Gazprom became the 100% owner of Beltransgaz. In 2014, more than 45 billion m³ was exported through the Yamal pipeline (Maiorov, 2014).

Beginning in 2013, the price of Russian gas for Belarus has been calculated according to the gas price in Yamalo-Nenets region of Russian (in which the material for Belarusian market is mined), plus the expenses for transportation to the Russian-Belarusian border and the expenses for refuelling Russian gas tanks. This change was related to the rules of Customs Unions coming into force⁵.

Abusing infrastructure (e.g. pipelines) and offering different pricing to exert pressure on the client state

Already at the end of 2002, both sides met for the first time due to the Russian request for higher prices of gas supply, beyond the original contract for 2002, according to which Belarus de facto imported gas for prices comparable to those on the Russian domestic market. However, the contract contained a condition to create a joint venture, what would mean a purchase of 50% stake

⁵ Customs Union, which was established in the middle of 2011, moved all customs procedures to the external borders of the Union, only migration control was left on the internal borders. The project of a single economic space between Russia, Belarus and Kazakhstan started in January 1, 2012, and it should be finished in 2016.

A crucial difference in the Eurasian Economic Union after the establishment of the single economic space will be the regulation of customs duties on energy material. In the Customs Union are the customs duties for the export of energy material in the competence of each of the states, and they are a subject of bilateral negotiations. This should be changed in the Eurasian Economic Union. Gradual integration of energy markets of the three states and unification of activities in the oil, gas and electricity sector and in the sector of oil products was anchored in the special articles (Vesti: Biznes, 2015; Evrazes).

in Belarussian company Beltransgaz, which was the operator of Belarussian gas pipeline network and operated also the Belarussian part of Gazprom's Yamal pipeline. Belarussian side had objections at first, claiming this process to be an economic pressure, but finally it agreed with the conditions.

Of course, the dispute regarding the gas supplies continued in 2013. This time it was related to transit gas supplied through Belarussian transit routes from Russia further to Europe (Yamal pipeline), as well as to the privatisation of Belarussian petrochemical plants.⁶ There was also the mentioned sale of a stake in Beltransgaz company in the game. In the summer of 2003, Lukashenko announced that he refuses to sell the stake in strategic company Beltransgaz to Russian Gazprom “practically for free”, and that he requires the payment of market price set by Russian experts. Moreover, in September 2003, the Belarussian authorities decided to freeze the assets of Russian oil companies in Belarus (Nygren, 2010, p. 76–77). The dispute thus affected the field of gas and oil, which is characteristic for Russian-Belarussian energy disagreements.

In September 2003, Gazprom announced that from January 2014 it will terminate the gas supplies to Belarus at a discounted price and requires its double increase. In the same month the Russian-Belarussian summit took place, during which Lukashenko and Putin agreed on implementation of

⁶ Russian elites have made efforts to privatise the particular Belarus companies for a long time, especially modern, efficient and gainful refineries Mozyr (42,5 % is already under control of Gazpromneft and Rosneft) and Naftan (interest expressed by Rosneft and Lukoil), as well as Gomeltransneft, Druzhba (interest expressed by Transneft) Grodno Azot, Gomel Chemical Plant, Belshina, etc. Kremlin decided to help its operators to get the ownership of operating Belarussian plants by the means of financial leverages. Minsk has faced an issue of ensuring the budgetary stability for a long time, and in terms of financial support in the Eurasian Economic Union, Belarus was promised to get a financial support from Anti-Crisis Fund, but only under the condition of privatisation of local companies for 4,5 billion USD (Manenok, 2013).

market prices in the field of gas supplies, and on the establishment of a joint venture operating the gas network. Based on this, in October, Belarus announced that it agrees with the sale of the minority stake in Beltransgaz company to Gazprom, however, it requires that the Russian side would determine a quote for consumption of cheaper gas on the basis of the contract on gas purchase for 2002 and on the basis of prices from 2002, in exchange. In the dispute, Belarussian side argued with the possibility of increase of the transit fees of Russian gas through the Belarussian territory, and also pointed out that Russia is using military bases on the Belarussian territory free of charge (Garbe, Hett & Lindner, 2011, p. 195). At the beginning of 2004, Gazprom responded with interruption of gas supplies to Belarus (Baev, 2008, p. 147). In February, also the Yamal transit pipeline was closed for 18 hours, because according to the Russian side, Belarus illegally consumed this gas for its own needs (Romanova, 2008, p. 89; Wyciszkiewicz, 2009, p. 18–19). Russia complained that there was no agreement on the establishment of a joint venture concluded between both sides, which would take control over Beltransgaz, and thus over the Belarussian gas pipeline network, and the management of Gazprom repeatedly stated that it is not willing to continue to “subsidize” the Belarussian economy. The supplies were interrupted also by some smaller Russian gas companies, which supplied Belarus until the expiration of the existing contracts. Finally, in the middle of winter, when the temperature fell below -20°C , Lukashenko accepted the Russian conditions and identified the Russian actions as an act of terrorism (Baev, 2008, p. 147).

The contract on the gas prices for 2005 signed in December 2004, including the contract on the loan allowing for the restoring of supplies, which allowed Belarus to avoid a possible recurrence of the crisis. Of course, Belarussian side repeatedly complained about the high prices, despite the fact that 47 USD for 1 000 m³ of gas was, compared to the prices from 2004, only slightly higher. In return, Belarus unilaterally increased the fees for transit of Russian gas. The results of the first gas dispute between Russia and Belarus were thus not very satisfying for Gazprom (Garbe, Hett & Lindner, 2011, p. 195).

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5.3 Country Case Study: Bulgaria

Martin Jirušek

5.3.1 Introduction

Bulgaria is a country located in the South-eastern Europe that experienced similar transition period as its neighbor Romania and joined the EU in 2007. Contrary to the expectations of similarities between Romania and Bulgaria, their situation in terms of energy security differs quite substantially. One of the reasons is rooted in history. Despite its close proximity, Bulgaria did not develop into a position of largely independent country in terms of energy supply. Although its dependence is not the highest¹, the energy security risks are highlighted by the fact that the only energy source that can be found in Bulgaria in considerable amount is lignite. The country is actually one of the most dependent in terms of energy supplies within the EU. The country's economy can also be characterized by high energy intensity which further aggravates its position of major energy importer. The high energy intensity is given by the inner structure of the economy, which is heavily reliant on industrial sector. Moreover, the energy sector itself consumes considerable amounts of energy and is one of the most important sectors in terms of the share in the economy output (Center for the Study of Democracy, 2010). On the other hand, the sector itself is in a need of substantial investments since the infrastructure is getting old and undermines the energy security situation of the country.

¹ The value of the dependence index depends on whether nuclear energy is counted as indigenous or not. As Bulgaria imports 100% of its nuclear fuel from Russia, the overall energy import dependency is around 70%.

The transmission network used to get gas supplies to Bulgarian customers is 1700 km long and its technical capacity is 7,4 bcm/year, more than twice the current utilization (see below) (Bulgartransgaz, 2014). Bulgaria is an important transit country transporting (Russian) gas coming from Romania to Turkey, Greece and Macedonia via transit network, which is 945 km long in total (Enerdata, 2015). The gas transit is an important part of Bulgarian energy sector along with the transport of oil and electricity (see the respective chapter dealing with the nuclear sector). The total capacity of Bulgarian transmission system is 18,7 bcm/year (Enerdata, 2015).

The current gas contract was signed in November 2012 and stipulates to supply Bulgaria with 2,9 bcm/year until 2022 (Gazprom Export, 2012). This contract has an inner structure of 6+4 which means that the contract will run under the current conditions only for 6 years if Bulgaria manages to increase its domestic gas production. More importantly, as Gazprom tried to improve its reputation after the 2009 crisis, Bulgaria used this opportunity and acquired a price discount of 20% for 10 years (Marson J. P., 2013). The transit contract was signed in 2006 for delivering 17,8 bcm/year through Bulgaria to 2030 (Enerdata, 2015). Bulgaria has domestic gas production of about 0,3 bcm/year with domestic sources at Dometsi and Black Sea shelf developed by Canadian Direct Petroleum and UK's Melrose Resources respectively (Ministry of Foreign Affairs of Denmark, 2013; TransAtlantic Petroleum, n.d.; Natural Gas Europe, 2012; Bulgartransgaz, 2014)². Despite the

² Activities to start drilling in the Black sea shelf have been lately spurred recently with projected start of exploration in February 2016 (<http://www.naturalgaseurope.com/bulgaria-gears-up-for-exploration-black-sea-shelf-25077>).

recent significant rise in the domestic production (from less than 100mcm/year in 2010 to nearly 0,5 bcm in 2011 (Enerdata, 2015) and the original optimism regarding new finds, it is predicted that even full exploitation of domestic resources would not cover more than 1/3 of the total domestic consumption (Ministry of Foreign Affairs of Denmark, 2013). Moreover, the old gas plays have been facing gradual depletion and new finds only partly offset this decline. Impact of other prospective fields is yet unclear.

Although the share of gas supplies in the primary energy supply (around 13%) and the overall annual consumption (around 2,5 bcm) are not very high (Gazprom, 2014), it is still a pressing issue for the Bulgarian economy. From the energy security point of view, it is important to note that Bulgaria counts among the most import-dependent EU members that not only import 90% of their gas supplies, but these supplies come from a single source – Russia (International Renewable Energy Agency (IRENA), 2011; Energy Delta Institute, 2015; European Commission – Energy) and predictions say that the total domestic consumption may rise to 4,5 bcm/year by 2022 (Ministry of Foreign Affairs of Denmark, 2013). Bulgaria was estimated to have potentially large shale gas plays. According to the 2013 US Energy Information Administration report, Bulgaria possesses prospectively up to 481 bcm of shale gas which, if developed, would theoretically cover Bulgaria's needs for 100 years and in any way significantly alleviate its import dependence (U.S: Energy Information Administration, 2013). These resources remain untapped though, as the government issued a moratorium on shale gas extraction and even on exploration in 2012, and reassured it in recent months (Reuters, 2012; Novinite, 2015; Shale Gas Europe, 2014).

The unilateral dependence was highlighted by the 2009 gas crisis which hit Bulgaria in the coldest months of the year with only a limited amount of alternative fuel for heating available. Moreover, the crisis struck the industrial sector and power generation as the priority was given to residential sector³. Combined with the ongoing financial crisis, the gas crisis influenced the Bulgarian economy in very negative way, further deepening the economic contraction (Kovacevic, 2009). Despite the bitter experience of the 2009 gas crises and 90% dependence on Russian gas, only little has changed since the crisis in terms of enhancing the country's energy security. Bulgaria's dependency on Russian supplies through Ukraine, the only supply route available for the country, has not changed, and as recent study of the Institute of Energy Economics at the University of Cologne shows, Bulgaria would be the only EU member unable to substitute Russian gas supplies if the 2009 scenario repeats (Martinez, Paletar, & Hecking, 2015). That said, despite a slight decline in Bulgaria's gas consumption and an increase in domestic production (Energy management Institute, 2013), the situation is still very serious. The fact that Bulgaria has not managed to diversify its gas import portfolio is probably reflected in the price it pays for gas deliveries, as the country's negotiating position is very weak. Gazprom charges Bulgaria around USD 500/tcm (Radio Free Europe, Radio Liberty, 2015), while the average price for European customers lies more than 100 USD lower⁴ (Mazneva, 2014).

³ The most influenced part of the industrial sector was the chemical industry, the second biggest consumer of gas after power generation (Kovacevic, 2009).

⁴ Gazprom was accused by the European Commission for misusing its position in Bulgaria and other 7 CEE states (Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland and Slovakia). According to the

5.3.2 Bulgarian gas market overview

The national gas company – Bulgargaz – was split into two entities according to EU law from 2007, with which the country is entitled to comply, as it is a member of the Union. Since then, Bulgargaz imports and sells the gas and Bulgartransgaz operates the domestic transmission and transit system and is in charge of storage⁵. Bulgargaz controls around 84% of the domestic wholesale market; the company buys gas for the wholesale market supplying industry, some (non-Overgas, see below) distribution companies and distant-heating companies. The other Gazprom's customer on Bulgarian market, Overgas⁶, with about 50% of the company being in the ownership of Gazprom⁷, has a majority stake of around 70% in distribution and supplies households through local distributors, in which it owns stakes⁸ (Enerdata, 2015). That said, Overgas is the main supplier of households in Bulgaria⁹. The company is generally very active in the Bulgarian gas sector and it also used to be intermediary between Gazprom and Bulgargaz along with Wintershall¹⁰ and Gazpromexport until 2010. Until that time, Overgas had been buying discounted gas from Gazprom and reselling it to Bulgargaz, who was selling

accusation, Gazprom imposes territorial restrictions including export bans and destination clauses. If this is proven to be true, such behaviour clearly breaches the rules of the 3rd liberalization package (European Commission, 2015 a).

⁵ Bulgaria has only one storage facility at Chiren located in the North-Eastern part of the country with total capacity of 550 million cubic metres (Novinite, 2015). With regard to possible new gas supplies and Bulgarian potential to increase its importance in terms of regional gas supplies, possibilities for increasing storage capacity have been reviewed. These include increase in capacity of the current underground storage in Chiren and also new sites. Increase of Bulgarian storage capacity was recognized as a project of common interests by the European Commission (Bulgartransgaz, 2014).

⁶ While Bulgargaz buys gas for the wholesale market and is not active in distribution, Overgas dominates the distribution and currently buys gas for its own purposes.

⁷ More specifically, Gazprom owns 0,49% and Gazpromexport 49,51% (Overgas).

⁸ The distribution sector is fragmented between more than 30 companies (Enerdata, 2015).

⁹ Other major distribution companies are Citygaz Bulgaria owned by Italian Società Gas Rimini, and Rilagaz owned by the Italian group AcegasApsAmga (Rila Gas EAD).

¹⁰ Technically speaking, Wintershall had a 50% share in joint-venture with Gazprom in company WIEE (Wintershall Erdgas Handelshaus Zug AG) that was in charge of gas supplies (Daborowski, 2012).

gas to local distributors often owned by Overgas. Since 2010, Overgas has bought gas directly from Gazprom without reselling it to Bulgargaz, which currently also buys gas from Gazprom by itself. Indigenous gas production¹¹, around 10% of the total domestic consumption, is controlled by the former Petroceltic Bulgaria (former Petreco Bulgaria), which in 2012 merged with Melrose Resources. As the company provides only alternative supplies to Russian gas, it is highly valued by recent rightist administration of Prime Minister Boyko Borissov (consultations with Bulgarian analysts conducted in March and April 2015).

The over-arching issue of energy poverty remains one of the most serious ones that Bulgarian governments have been dealing with for a good deal of the country's post-communist era¹². The low supply diversification and interconnectivity due to which Bulgaria practically relies on a single supply source and transport route are thus definitely one of the most important issues on the energy-related agenda. That said, any curtailment in supplies can severely hit not only Bulgarian economy but also directly Bulgarian households. To enhance its energy security, several projects have been introduced, among which the most important are interconnectors with neighbouring countries and possibly also new pipelines. The country has built interconnectors to Macedonia, Greece, Turkey and Romania. Although enhancing the mutual interconnectivity with neighbouring states would substantially improve the country's energy security, activities are mostly stalled in this regard.

¹¹ Realized at Galata, Kaliakra and Kavarna gas deposits.

¹² Over 1/3 of Bulgarian households are unable to keep their homes adequately warm and 60% of households use wood for cooking and heating (Vassilev, Traikov, Mancheva, & Holliday, 2014, p. 32).

The project that would probably enhance Bulgarian energy security the easiest way would be the reverse flow interconnection with Romania. Provided that Romania is relatively independent on Russian gas and has substantial indigenous gas production with some capacity available to export (see respective chapter), it makes this option number one in terms of supply source diversification. The maximum capacity of this 25 km-long interconnector is envisaged to be 0,5 bcm/year in the direction from Romania¹³ and 1,5 bcm/year from Bulgaria. After a series of postponements, this interconnector is set to be opened in 2015 (Bulgartransgaz, 2014). Reverse flow on the existing pipeline through the entry point at Negru Voda has not yet been agreed as well (Gotev, 2015). The planned interconnector to Turkey that would allow Bulgaria to get gas supplies from Azerbaijan and related LNG terminals would be basically a pipeline allowing gas to flow in the opposite direction than it usually flows now. The interconnector to Serbia would predominantly mean enhancement of Serbian energy-security, but under certain circumstances, it might be also beneficial for Bulgaria as a diversification of routes supplying country with Russian gas. This project, however, is developing very slowly because of the unwillingness of local authorities to cooperate¹⁴. Interconnector to Serbia is in its early stages and its future is yet unclear (Bulgartransgaz, 2015).

¹³ This is caused by technical reasons, such as lower pressure in Roanian gas grid. To increase the capacity of this supply route, another compressor station would have to be built in Romania (Jekov, 2014).

¹⁴ Latest news indicate that the interconnector might be in operation from 2019.

The same basically applies to the Bulgaria-Greece interconnector to Greek Stara Zagora¹⁵ (also known as IGB), which would potentially enable Bulgaria to get supplies from Azerbaijan Shah-Deniz gas fields (Gotev, 2015; Bulgartransgaz, 2014, p. 16).

Tab. 5.3.1: Planned South Stream and Nabucco Gas Pipelines



Source: (BBC News)

5.3.3 Nabucco vs. South Stream

Bulgaria was about to strengthen its position of transit country as it was a part of a plan to build Nabucco pipeline, the project intended to carry up to 31 bcm/year (Hafner, 2015). The project that started in 2002 and was substantially spurred by the gas

¹⁵ The current connection had been already used during the 2009 gas crisis for reverse flows (Gotev, 2015) but it is fully booked from Gazprom's exports to Greece (consultations with Bulgarian analysts conducted in March and April 2015). This interconnector is also not a solution though, since Greece is a significant important of Russian gas as well and does not have enough gas to change the current supply situation in Bulgaria (Jekov, 2014).

crises in 2006 and 2009 was meant to be an important step forward in terms of diversification of the EU gas import portfolio ultimately bringing gas from non-Russian sources¹⁶ not only to the South-Eastern Europe but also further to the West, ultimately ending in Baumgarten, Austria. The project received the official recognition from the European Union and was backed by the concerned countries¹⁷, the EU and the United States. A consortium of companies formed to conduct the project consisted of the following companies - OMV of Austria, MOL of Hungary, Transgaz of Romania, Bulgargaz of Bulgaria and BOTAS of Turkey (Hafner, 2015). The spirit of cooperation and unity was forged by the gas crisis of 2009 and by the intergovernmental agreement between the transit countries in 2009 and between the consortium of the aforementioned companies and the transit countries in 2011 (ibid.). However, the project in the originally presented form failed and was aborted in 2013, mostly due to financial unviability and unclear demand for the transported gas in combination with the pressure exerted by the competing project of Gazprom's South Stream (EurActiv, 2013).

The South Stream, on the other hand, poses another interesting case of possible diversification of transit routes. This project, however, was not meant to be a diversification of source, but rather to be a route. The project was also not ignited by the consumers, but rather by the supplier – Gazprom that saw an opportunity to circumvent Ukraine and thus reach financially sound customers in Central Europe more easily. Bulgaria was a

¹⁶ The sources were expected to come from Iraq, Azerbaijan, Turkmenistan and Egypt (Daily News - Bloomberg, 2010).

¹⁷ On the EU level, these were Bulgaria, Romania, Hungary and Austria.

part of the project from the very beginning since it was meant to be one of the countries on the soil of which the pipeline would be laid (see map below). Although Gazprom considered replacing Bulgaria with Romania at one point due to Bulgaria's reluctance to participate in the project, this was mostly perceived as a way of exerting pressure on Bulgaria. Eventually, the country signed a bilateral deal with Gazprom along with Serbia, Hungary, Greece, Slovenia, Croatia and Austria cementing the cooperation on the project. These deals were subsequently impeached by the European Commission for breaching the EU law, specifically the third party access principle (EurActiv, 2013). The disputes ultimately ceased to be relevant when the whole project was cancelled by Gazprom in late 2014 (Kod'ousková & Jirušek, 2014)¹⁸. Provided that the economic viability of the project was questionable from the very beginning, it is understandable that some accuse South Stream project for being a tool to exert pressure on Nabucco.

18 Despite the announcement that the project had been cancelled made by Vladimir Putin at the beginning of December, reports say that pipe deliveries to Bulgaria were continuing even in the middle of December 2014 and the Bulgarian side has not received official announcement of the cancellation (Novinite, 2014; consultations with Bulgarian analysts conducted in March and April 2015). The rumors of ongoing construction works continued to emerge even during 2015, but were denied by the Bulgarian ministry (Natural Gas Europe, 2015). Also, some later news point to the fact that the project might not be completely discarded but the truth is that the original project of South Stream is not on Gazprom's agenda right now. Truth to be told, no solid evidence can be found in this regard (Deutsche Welle, 2015; FOCUS News Agency, 2015). Russia is now likely to push forward the idea of a different project building upon the basis of the South Stream not delivering gas directly to EU member states but merely to the EU borders – such as so called Turkish Stream (Novinite, 2015)(Mustafayeva, 2015). Bulgaria, for its part, is still trying to keep its chances of being important country for getting Russian gas supplies to Europe. One of the proposals included also creation of a gas hub in a place where the South Stream pipeline should originally reach Bulgarian soil (Novinite, 2015; Leviev-Sawyer, 2014).

5.3.4 Reflection of the indicators

Russian state representatives actively supporting state-owned energy enterprises and their activities in a respective country

According to information from Bulgarian energy sector related insiders, the representatives of Gazprom and Kremlin are interchangeable in the case of Bulgaria as deals are usually strongly supported by Russian officials (the consultations with Bulgarian analysts conducted in March and April 2015). Such pattern is in line of high influence of Russian companies on Bulgarian economy and also illustrated by high-level meeting concerned with energy related issues in 2008, where nuclear, gas and petroleum projects were discussed (Smolchenko, 2008; Novinite, 2012) and later in 2010, when mainly the South Stream project was in the centre of attention (Archive of the Official Site of the 2008-2012 Prime Minister of the Russian Federation Vladimir Putin, 2010).

The South Stream project is one of the most appropriate examples. It was supported by the Russian highest representatives from its very beginning and so were the negotiations between Gazprom and Bulgaria on the planned route of the project. Later disputes among the stance of Bulgarian government on the project also included involvement of high state representatives of Russia. When the government of Boyko Borissov expressed its reluctance to continue the construction without EU's approval in 2009, Russian Prime Minister Vladimir Putin and President Dmitry Medvedev were both involved in negotiations aimed to put a pressure on Bulgaria (EurActiv, 2011).

The latest manifestation of involvement of Russia's highest representatives was Putin's angry reaction to Bulgarian opposition to South Stream in late 2014, when he expressed his disappointment to Turkish president Erdogan by saying that he is “fed up with Bulgarians” and accusing Bulgaria for burying the South Stream project (Novinite, 2014).

The foreign supplier rewarding certain behaviour and linking energy prices to the client state's foreign policy orientation

Although there is usually a significant issue of insufficient financing from Bulgarian side when it comes to energy-related projects, Russia-related projects in Bulgaria often start during times when leftist governments (lead by Socialist party BSP¹⁹) are in power and end when the rightist cabinet steps in (GERB party of current PM Boyko Borissov). The example is not only the aforementioned project of the South Stream pipeline but also the cancelled project of Belene NPP (see respective chapter of the study). Also in relation to the South Stream, the latest drop in gas prices²⁰ for Bulgaria happened right after the bilateral deal on the pipeline was signed (consultation with Atanas Georgiev). Allegations of corruption that should have led to support of the South Stream project among Bulgarian officials were emerging during the course of the negotiations related to the project. According to NY Times, one of them was the effort of Aleksandr Babakov, member of the Russian Duma, who tried to persuade the then deputy energy minister in the interim government to support the South Stream project (Yardley & Becker, 2014).

¹⁹ The Socialist Party has traditionally closer ties to Russia based on the ideology and personal history of numerous members of the party.

²⁰ More specifically in formula under which the price is calculated.

Later in 2014, a series of behind-the-scenes negotiations led to issuing a bill proposal by pro-Russian coalition²¹ that would ultimately exempt the South Stream project from internal market rules by renaming the pipeline to “gas-sea” interconnector. Leaked documents allegedly proved that the bill was tailored according to Gazprom's needs (Yardley & Becker, 2014; EurActiv, 2014; Traufetter, 2014).

A link between Bulgarian foreign-policy stance and gas price charged on Sofia could be seen in the final deal on the South Stream project inked in summer of 2012. Gazprom then promised 11% gas discount if the agreement is signed and the project is speeded up by the Bulgarian side (Novinite, 2012). Allegedly, also the ‘take-or-pay’ condition was made somewhat softer than it used to be, but Gazprom representatives refused any linking of this agreement to the deal on South Stream and this condition is also missing in the deal (Tovalov, 2012; ZN.ua, 2012).

Mirroring of Bulgarian foreign policy in mutual energy relations with Russia became clear at the times of the rightist government²², when energy-related disputes usually occurred.

In April 2015, the European Commission started an investigating procedure against Gazprom for alleged abuse of dominant market position in Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland and Slovakia. The allegations pointed to unlawful use of destination clauses, export bans and unlawful conditionality in relation to these

²¹ The decisive player in the parliament at that time was the far-right party Ataka that had close ties to Russia (EurActiv, 2014).

²² This interlink became clear also in the case of the plans to build new NPP at the Belene site when the government negotiated with the European commission to find a non-Russian investor for the project (see respective part of the study)(EurActiv, 2010).

countries. In the case of Bulgaria, the accusation pointed to alleged conditionality between gas supplies and country's participation in the South Stream project (Matalucci, 2015)²³.

Abusing infrastructure (e.g. pipelines) and offering different pricing to exert pressure on the client state

Rather than misusing current setting as leverage to exert pressure, it was the planned project of South Stream that was seen as a factor potentially increasing Bulgaria's vulnerability in terms of energy security. During the planning process of the South Stream, the project was (mis)used by Gazprom to exert pressure on Bulgaria on several occasions. Originally, the pipeline was intended to go through Bulgaria, but at one point the negotiation process was facing an unstable stance of Bulgarian governments toward the project²⁴. When the government of Boyko Borisov assumed office in July 2009, it stated that Bulgarian support is not unconditional and that the government "needed time" to decide on the project (EurActiv, 2011). As a reaction, Gazprom and Russia's officials started to negotiate a new route which would bypass Bulgaria. Romania was part of these considerations and despite its general and historically rooted anti-Russia stance, the country was prone to take part in the project (Novinite, 2009; Novinite, 2014). Romanian stance was more pragmatic though, as the country's official policy is to keep energy relations with Russia clear of any politicization (see respective chapter of the study).

²³ Conclusion of this case was still unknown in time this study was being written.

²⁴ The support has basically relied on which government was in power in Bulgaria. The rightist governments of Boyko Borisov have been basically anti-Russian whilst the leftist were more prone to cooperate with Russia (Novinite, 2014).

Clearly, the fact that Bulgaria is unilaterally dependent on Russian supplies weakens the country's position in negotiations on price²⁵.

Efforts to take control of energy resources, transit routes and distribution networks of the client state

Formally, this is prevented by the fact that Bulgaria is a member of the European Union and applies Internal Energy Market rules. On the other hand, Overgas, one of the two customers of Gazprom in Bulgaria, in which Gazprom has 50% stake, has a supply contract with Gazprom and at the same time it is the biggest gas distributor in Bulgaria.

Disrupting (through various means) alternative supply routes/sources of supply

As Greece considered, pressed by its creditors, selling its national Public Gas Corporation DEPA in 2013 and Gazprom presented its interest in buying this company, concerns arose as Gazprom would ultimately become a dominant player in the South-eastern Europe. It would also ultimately mean that Gazprom would acquire control over the Greece-Bulgaria interconnector. However, this did not happen as Gazprom withdrew its bid (Natural Gas Europe, 2015).

The quick emergence of organized anti-shale movement prompted accusations of being organized and even funded by Gazprom, for whom an emergence of alternative gas supply in Bulgaria is undesirable (Yardley & Becker, 2014; Hope, 2014).

²⁵ On the other hand, changing conditions within the gas sector in last couple of years improved the position of Bulgaria enough to push Gazprom's officials within the negotiations to provide discounts – a situation never seen before in this regard (Marson & Parkinson, 2013).

Clear evidence proving the link between anti-shale movement and Russian stake in these activities has been missing though²⁶.

Efforts to eliminate competitive suppliers

This indicator is not relevant since there are currently no possibilities of supplying the country from other than Russian or domestic sources of gas. No official stance of Russian side towards the possibility of getting gas from non-Russian sources through projected interconnectors has been found. The economic logic would suggest that such possibility, along with development of domestic (shale) gas resources, is not desirable for Gazprom as it would lose part of its revenues.

Preference for long-term bilateral agreements and „take-or-pay“ contracts

Current long-term contracts on transmission and supplies were signed in 2006 and 2012 respectively with take-or-pay condition included. Due to the current state of diversification of Bulgarian supply portfolio, Gazprom naturally tries to use its position to the maximum and secure it for coming years when, as expected, Bulgarian situation in terms of diversification may improve. The inability of Bulgaria to get gas from different sources exposes the country to high price it pays and enables the supplier to capitalize itself at the expense of the country without breaching any rules of the internal energy market.

²⁶ The anti-fracking law that passed through the Bulgarian parliament in early 2012 not only stopped the extraction but also the exploration was effectively stopped. The bill thus prevented Chevron, who was granted with exploration permission in 2011, from further development of their projects. Later, in 2014, the company withdrew from Bulgaria completely (Natural gas Europe, 2014).

Efforts to gain a dominant market position in the client country

Overgas, which is in 50% ownership of Gazprom, holds majority in distribution and supplies 2/3 of households.

Diminishing the importance and influence of multilateral regimes like that of the EU; Acting against liberalization

The proposed project of the South Stream pipeline, or more specifically the bilateral agreements that Gazprom closed within the pipeline's planned path²⁷, was in contradiction to the planned project of the South Stream pipeline, which was intended exclusively for supplies of Russian gas. Such setting is against the Internal Energy Market rules, specifically the 'Ownership unbundling' and 'Third party access' principles. These principles enacts that a company cannot produce and supply gas while simultaneously owning the infrastructure, and that all pipelines within the internal market should have equal conditions for all suppliers that is willing to enter the market and supply customers (see respective chapter of the study dealing with the rules of the Internal Energy Market and their impact on Gazprom's strategy) (European Commission, 2011). Gazprom naturally tries to oppose any possibilities that would aggravate its position on the traditional markets in the region of CEE. Although the activities surrounding this project, including the legislation (see above), were often questionable, still, rationale behind it could still be ascribed to economic logic.

²⁷ Among these countries there were Bulgaria, Hungary, Greece, Slovenia, Croatia and Austria, and Serbia, which is a member of the Energy Community (EurActiv, 2013).

Attempts to control the entire supply chain (regardless of commercial rationale)

Formally prevented by the IEM rules.

Taking economically irrational steps in order to maintain a certain position in the client state's market

Economic rationale can be clearly found in the bulk of Gazprom's activities in Bulgaria.

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5.4 Country Case Study: Czech Republic

Martin Jirušek

5.4.1 Introduction

The Czech Republic was part of the so called Eastern Bloc until 1989 when the whole Soviet sphere of power crumbled. It is thus understandable that the nature of the whole industry and energy sector was oriented eastwards with the former Soviet Union as the main partner and supplier. The Czech Republic was thus supplied by the same pipelines that supplied the whole region with Russian energy sources. The 'Brotherhood' pipeline, that was commissioned in 1967 (GAS s.r.o., 2007)¹, supplied 100% of the country's gas demand and subsequently made the Czech Republic an important transit country (Štrejček, 2011).

Diversifying the import portfolio and getting rid of unilateral dependence became one of the main goals for the Czech energy sector after 1989. In gas sector, the goal was reached on May 1, 1997 when the Czech Republic managed to diversify its gas import portfolio by getting Norwegian gas from the North Sea by pipelines through Germany. This made the Czech Republic the first country of the former Soviet bloc to shake off the unilateral dependency in gas supplies (Štrejček, 2011). The contract on Norwegian gas stipulated to supply the Czech Republic with gas totalling to 23 bcm with the annual amount of 2,5 bcm. This amount represents around ¼ of total gas demand in the Czech Republic, however, currently all gas supplied to the

¹ The transit pipeline construction started in 1970 and the pipeline was commissioned in 1972. It supplied the German Democratic Republic and the Federal Republic of Germany through the connection points of Hora Svaté Kateřiny in North Bohemia and Waidhaus in South-Western Bohemia respectively. Austria and Italy were supplied through the interconnector from Slovakia to Baumgarten and der March in Austria (Vlček & Černoch, 2012, str. 192).

country is of Russian origin as the Norwegian gas is being replaced by Russian supplies from Germany through so called gas swap deals (International Energy Agency, 2014; BusinessInfo, 2015). The existence of alternative supply route is very important though as was proven during the 2009 gas supply crisis when, mostly thanks to this alternative supply route, the Czech Republic not only remained intact but also played substantial role in supplying its neighbours (Euroskop, 2009).

As foreshadowed above, the majority of gas supplies come from abroad. Only a small fraction of the total amount, specifically around 1% of the total domestic demand, is supplied from domestic sources located predominantly in the region of Southern Moravia (Ministerstvo průmyslu a obchodu České republiky, 2014, p. 16; Musil, 2004). 99% of gas is being imported on the basis of import contracts operated predominantly by RWE Transgas a.s. The second company importing gas is VEMEX s.r.o. RWE operates the long term contract with OAO Gazprom² that is valid until 2035. Supplies from the Norwegian sources are also contracted by RWE with consortium of suppliers developing these sources. These are ExxonMobil Production Norway Inc., Statoil Hydro ASA, Norske ConocoPhillips AS, TOTAL E&P Norge AS and ENI Norge AS. This contract is valid until 2017 (Vlček & Černoč, 2012, p. 197). The company VEMEX s.r.o. entered the Czech market in 2006 as an alternative supplier of Russian gas. It is in majority ownership of Gazprom³ Germania, a subsidiary of

² The contract with Gazprom comprises 70% of all long-term contracts of RWE. The original supply contract started in 1998 and the transit contract in 1999. They were prolonged in 2006 and stipulated 9 bcm/year in supplies and 30,5 bcm/year for transit (Ministerstvo průmyslu a obchodu České republiky, 2014; Vlček & Černoč, 2012, pp. 196 - 197).

³ The exact share is 50,14% (VEMEX s.r.o., 2013). 33% of shares are owned by Centrex Europe Energy AG – an international group of companies operating in the gas sector. It is likely that this group is connected to Gazprom (Kupchinsky, 2008).

OA O Gazprom. The current contract is valid until 2017 and stipulates annual supplies of 0,5 bcm annually (Gazprom Export).

Despite the development in last couple of years, the Czech republic remains important transit route not only through the transit pipeline supplying gas from the East but also thanks to the Gazela pipeline transporting gas in the North-South direction through West Bohemia. The position of important transit country may be even stronger in coming years thanks to the planned North-South Gas Corridor connecting Central European countries and LNG terminals in North and Adriatic Sea. Therefore, despite the predicted decrease in utilization of the transit pipeline through Slovakia⁴, position of the Czech Republic as an important transit country is predicted to remain stable.

The transit network is operated by company Net4Gas created in 2005 as RWE Transgas Net. RWE Transgas Net was created in 2005 when the RWE Transgas was undergoing so called 'unbundling' to comply with the Internal Market Rules. In 2010, RWE Transgas Net was renamed to Net4Gas and in 2013 it was sold to Allianz, German insurance company, and Borealis, Canadian investment company (Česká televize, 2013).

The case of 2009 gas crisis proved the importance of gas storages. The Czech Republic is relatively safe in this regard, since it has gas storages of total capacity of more than 1/3 of its annual consumption⁵. The underground gas storages are located

⁴ See more in Černoch et al. 2011: The future of natural gas security in V4 countries: A scenario analysis and the EU dimension.

⁵ The current storage capacity is 2,8 bcm while the annual consumption is 8,8 bcm (data from 2013). The Czech Republic is second in Europe, after Germany, in terms of storage capacity (Vlček, Černoch 2012, s. 205)(NET4GAS, 2013).

in Dolní Bojanovice, Háje, Lobodice Štramberk, Třanovice, Tvrdonice and Uhřice. Czech retailers also partially utilize the underground gas storage in Láb, Slovakia (Technický týdeník, 2006). Worth mentioning is also the plan to build a new underground storage with capacity of 448 mcm in Dambořice by 2016. The project is a joint venture of the Czech company Moravské naftové doly and Gazprom Germania. The project is worth CZK 2,5 billion (over EUR 90 mil.). According to the agreement, Gazprom Germania will utilize the storage at 90% for 15 years. This agreement is worth CZK 7,5 billion (over EUR 270 mil.)(E15, 2013).

Tab. 5.4.1: Amount of Gas Consumed and Transited Through the Czech Republic

Year	Amount of gas at the main entry point - gas transited to further markets - in mcm	Gas imported by the Czech Republic - in mcm
2004	33 977,50	8 860,50
2005	30 902,60	9 358,70
2006	26 599,10	9 794,10
2007	27 550,20	8 378,80
2008	27 678,70	8 692,50
2009	25 780,20	8 669,80
2010	31 903,30	8 510,10
2011	29 675,30	9 321,30
2012	32 267,00	7 471,20
2013	35 069,50	8 479,20

Source: (*Energetický regulační úřad*, 2013)

5.4.2 Reflection of the indicators

Russian state representatives actively supporting state-owned energy enterprises and their activities in the respective country

Gazprom's and Russian state officials opposed Czech diversification which was asserted by Czech representatives since the first half of the 1990s. At that time, majority of Czech politicians perceived diversification projects as another way of loosening ties to the former Soviet Union which finally led to the membership in the EU and NATO. The Russian side used the arguments of low price and stability of their supplies to persuade the Czech Republic not to diversify, but these arguments appeared to have no effect. Although some politicians, mostly from leftist parties, were opposing the idea of gas supply diversification claiming it unnecessary and opposing higher price comparing to Russian supplies, no direct influence of Russian stakeholders on this opinion group was proved⁶. Part of Czech experts and public was concerned regarding to aforementioned rhetorical opposition of Russian officials and alleged plans of Gazprom to circumvent the Czech Republic in gas supplies to the West or intentions to aggravate position of Czech exporters in Russia. None of these were realized and the Czech Republic thus managed to diversify its gas supply portfolio. Similar situation took place several months later with building an alternative oil supply route, the IKL pipeline, supplying the Czech Republic with oil from Italian Trieste. All these activities were typical for Czech political discourse in 1990s which was characteristic by its orientation to the West and its heading to western integration structures of NATO and EU. In

⁶ Those opposing the diversification were predominantly from the former communist party that has been well known for its sympathetic approach to Russia.

this sense, the diversification of gas import portfolio was presented by Czech representatives as a strategic decision (Poslanecká sněmovna Parlamentu České republiky, 1997).

Generally speaking, the relations with Russia in energy sector have not been problematic and energy-related issues are being brought into discussion only occasionally, for instance, during the 2009 gas crisis (Technický týdeník, 2006) or in 2014 during the crisis in Ukraine (Poslanecká sněmovna Parlamentu České republiky, 1997). Mutual relations are being strengthened also by the area-specific organizations like Chamber of Trade and Industry for CIS Countries (Chamber of Trade and Industry for CIS Countries) or Czech – Russian Consortium for CNG (Technický týdeník, 2014).

The foreign supplier rewarding certain behaviour and linking energy prices to the client state's foreign policy orientation

Since the Czech Republic managed to diversify its portfolio, there remained only little room for 'non-standard relations'. On the other hand, seemingly higher price of gas paid by the Czech Republic reflects overall cold relations between these two countries. The Czech Republic was maintaining strong pro-western foreign policy discourse in two decades after the fall of communism in CEE, which was aggravating relations with Russia. As mentioned above, Czech government's drive to diversify from 100% dependency on Russia in 1990s was perceived negatively by Russian side, but no open threats or supply cuts from the Russian side were noticed. On the other hand, the change in Czech supply portfolio definitely contributed to the bad state of mutual relations. This was highlighted by Czech accession to NATO, which was definitely

against Russian goals of preserving status quo in Central Europe.

It would not be probably far from the truth that these traditionally “not-so-good” relations might have contributed to higher price that the Czech Republic pays for Russian gas supplies. However, there is no clear logic in gas prices distribution among Russian gas importers in Europe. Therefore, claiming that there is a clear correlation between mutual relations of a particular country and Russia along with the gas price would be probably an oversimplification.

Supply disruptions have been an issue thing for years after the break of the century, but even then they have been rather of technical nature or justifiable by weather conditions, etc. However, this assumption ceased to be valid with the 2009 gas crisis. However, neither this supply cut was aimed against the Czech Republic.

Abusing the infrastructure (e.g. pipelines) and offering a different pricing to exert pressure on the client state

Technically speaking, Gazprom has not been able to misuse its position to cut-off the Czech Republic completely due to the infrastructure setting, which is favourable for the Czech Republic (alternative route from Northern Sea means diversification in terms of sources and alternative line for Russian gas connected to OPAL-Nord Stream means diversification in terms of routes). In fact, the Czech Republic not only found itself in secure position in 2009 thanks to the alternative supply route but also played an important role in terms of securing gas supplies by reverse flow to Slovakia, which was cut off completely having no alternative supply route.

In April 2015, the European Commission started an investigating procedure against Gazprom for alleged abuse of dominant market position in Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, and Slovakia. The allegations pointed to unlawful use of destination clauses, export bans and unlawful conditionality in relation to these countries. In the case of Bulgaria, the accusation pointed to alleged conditionality between gas supplies and country's participation in the South Stream project (Matalucci, 2015)⁷.

Efforts to take control of energy resources, transit routes and distribution networks of the client state

Czech government refused Russian bids to buy a transit route on the Czech soil. The first bid in 1994 was refused without providing any reasoning, but the overall discourse of the Czech foreign policy at that time suggests that due to historic experience and reorientation to the West after the fall of communism selling the strategically perceived asset was politically unacceptable. Second bid was refused in 2002 for political concerns as well. Sensitive perception of this issue by the Czech government was highlighted by the fact that Russian offer was refused despite the fact that it was worth the same amount as the bid of RWE and additional offsets in form of investments in Czech oil and gas infrastructure were promised by Russian side.

In the Czech Republic VEMEX – Gazprom's subsidiary is active in gas trading⁸. It is part of Gazprom's effort to be present at the Czech market and reach end customers. Also,

⁷ Conclusion of this case was still unknown in time this study was being written.

⁸ The company has been also active in electricity trading in last couple of years.

according to VEMEX's annual reports, the portion of end users supplied by this company is rising (VEMEX s.r.o., 2013). However, it should be noted that activities of VEMEX make perfect economic sense since the Czech gas market is liberalized and the effort to use this opportunity is thus natural.

The last spring, Gazprom signed a deal with the Czech company MND Group to build an underground storage facility in the region of South Moravia to make its supplies to the west through this line more predictable. This move is thus understandable as well. Moreover, it suggests that Gazprom is trying to be seen as a reliable supplier of its western customers.

The Czech Republic, along with other CEE countries, such as Bulgaria and Baltic states, expressed its reluctance towards unbundling within the implementation process of the 3rd liberalization package. These countries feared the penetration of foreign investment companies into their energy sectors that would happen after dissolution of their integrated national companies and that the position of these companies would be substantially weakened. Given their geographic location and historical experiences, these concerns were related mostly to Russia and its state-owned enterprises.

A person worth mentioning is Alena Vitásková, head of the Czech Energy Regulation Office that is the main regulation body in the Czech energy sector. Alena Vitásková was criticized for conflict of interests while chairing the Club of Gas Sector Entrepreneurs which owned 5% of the VEMEX company (Gazprom's subsidiary). However, in 2011, after being appointed as the head of the Czech Energy Regulatory Office, she sent the company into liquidation and it ceased to exist (Novák, 2013)(Klimeš, 2011).

Disrupting (through various means) alternative supply routes/sources of supply

In the case of the Czech Republic, Russian state officials verbally opposed Czech diversification efforts that ultimately led to establishing alternative supply route bringing gas from North Sea. Thanks to the then relative weak position of Russia in international relations, clear pro-western orientation of the Czech Republic and dependence on revenues from supplies of hydrocarbons, this negative stance remained in verbal form.

Efforts to eliminate competitive suppliers

Not present. Gazprom lacks tools to make this happen. The only opportunity for such activities was in the time when Czech officials were considering diversification of the Czech gas supply portfolio in mid-1990s. As mentioned above, these activities remained rhetorical.

Preference for long-term bilateral agreements and „take-or-pay“ contracts

The condition is present in the current contract, although Gazprom lost a lawsuit with RWE on this condition in 2012. Also ‘ship-or-pay’ condition is present.

Diminishing the importance and influence of multilateral regimes like that of the EU

Not possible since the Czech Republic is a member of the EU. However, Russia and Gazprom were clearly upset by the so called 3rd liberalization package since it seemed to be directed against them, and also that they were not consulted in the process of creating this legislation.

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5.5 Country Case Study: Estonia

Lukáš Lehotský

5.5.1 Introduction

Estonia, a former member of the Soviet Union, is highly dependent on Russian natural gas imports. Thus, energy grids of the country are more intertwined with Russia, compared to other European countries. However, Estonia is largely independent in terms of primary energy supply, as majority of energy comes from domestically-available oil shale. Natural gas and other sources therefore represent only about 15% of the primary energy supply (IEA, 2013, p. 20). Most of the gas is consumed on heating (41%) and in industrial production (40%). Moreover, heating sector is converting from gas to locally sourced renewables due to high price of gas (Estonian Competition Authority, 2014, p. 10).

Estonia consumes approximately 0.7 bcm of gas annually with no domestic production, and until very recently, there were no supply alternatives to Russian gas (IEA, 2014, p. 155). Only in the beginning of 2015, Lithuanian Litgas acquired a permit to supply gas to Estonia (Vaida, 2015), which brought more competition to Estonian market.¹ Despite occasional findings of some gas sources, there have not been discovered any commercially viable sources, either on land or in Estonian territorial waters (Teder, 2003).

The sole supplier of Russian gas is the company Eesti Gaas, privatized throughout 1990s. It is also the largest natural gas

¹ Both contracts were signed with competition of Eesti Gaas – company Eesti Energia and company Reola Gaas (Xinhuanet, 2015).

supplier in Estonia. The company supplied 90% of the retail market and 100% of the wholesale market in 2011 (Enerdata, 2013, p. 10). Moreover, almost all of the gas sold by other suppliers has been purchased from Eesti Gaas (Energy Regulators Regional Association, 2013, p. 10). Gazprom is a minority shareholder in the company, currently owning 37.03% of shares.² 10.02% is owned by Itera Latvija, a subsidiary of Russian Itera. Majority of shares is held by Finnish company Fortrum (Eesti Gaas a), which acquired more than 33% of Eesti Gaas from German E.ON, who left Estonian market in 2014 (BNS, 2014).

According to Agnia Grigas, Eesti Gaas is the least politicized of Baltic gas companies. Moreover, Gazprom has supposedly limited its influence in the company due to transparency of Eesti Gaas and shares distribution (Grigas, *The gas relationship between the Baltic States and Russia: politics and commercial realities*, 2012, p. 23).

Estonia raised gas prices as early as 1995, raising them sharply to bring them closer to the real costs of imported gas (Gas Strategies, 1995). Since 1998, market has been opened to all entities but households. Since 2007, the market has been fully liberalized. (Energy Market Inspectorate, 2006, p. 36)

In terms of diversification, Estonia has one interconnector with Latvia at Karski and two interconnectors with Russia at Narva and Värski. The question of diversification has been addressed in the discussion about the construction of LNG terminal. Various options were considered during the years of discussion. Finally, Estonia plans to build its own LNG

² Gazprom acquired 30% of shares during the initial stage of Eesti Gaas privatization in early 1990s. Remaining 7% were acquired only throughout 2000s (Grigas, *Politics of energy and memory*, 2013, p. 110).

terminal at Paldiski and there will probably emerge another small facility at Muuga port. Another diversification project is a submerged “Baltconnector” pipeline connecting Estonia with Finland (news.err.ee, 2014).

Even though Estonia was not obliged to unbundle its transit,³ Eesti Gaas was unbundled through a legislative action in 2012, when Estonian parliament accepted a bill requiring the transit to be sold by the end of 2014⁴ (Stratfor, 2012). The natural gas transit company, EG Võrguteenus, was separated from Eesti Gaas in 2013 and became 100% owned by holding company AS Võrguteenus Valdus. Võrguteenus Valdus retained the ownership structure of Eesti Gaas, but Fortrum’s share was sold to Elering, state-owned power grid operator. Elering hence became the majority owner. Gazprom had owned 37.03% of shares (Elering, n.d.) until June 2015, when it sold its share to Elering as well. It means that Itera Latvija is the only remaining larger shareholder in Estonian gas transmission, with 10% of shares in EG Võrguteenus Valdus. (Laats, 2015)

Estonia has very limited options to withstand supply shortages also because there are no storage facilities on its territory. The only accessible gas storage is the Inčukalns facility located in the neighbouring Latvia (IEA, 2014, p. 165), which supplies gas to neighbouring states. This facility is supplying gas to Estonia during winter seasons with Russian gas flowing through the storage instead of flowing directly from Russia into Estonia (IEA, 2013, pp. 58-59). Therefore, it’s worth noting that the reliance on the facility itself entails a kind of risk due to

³ The derogation from EU legal code is valid until Baltic states become connected to any other supplier (Estonian Competition Authority, 2014, p. 51).

⁴ If no unbundling occurred until the end of that year, Estonian state was allowed to nationalize the grid.

the network design and Inčukalns' importance in supplying some parts of Russian network itself (Pöyry, 2011, p. 25). Moreover, it is partially owned by Gazprom and storage volumes are booked by the company.⁵ Eesti Gaas had been renting storage volumes at Inčukalns facility until 2008, but since then, Eesti Gaas has bought gas Gazprom's facility instead.

Estonia raised gas prices as early as 1995, raising them sharply to bring them closer to the real costs of gas (Gas Strategies, 1995). Since 1998, market has been opened to all entities but households. Since 2007, the market has been fully liberalized (Energy Market Inspectorate, 2006, p. 36).

5.5.2 Reflection of the Indicators

Russian state representatives actively supporting state-owned energy enterprises and their activities in a respective country

High representatives of Russia have not fostered any energy projects in Estonia. It is important to say that Estonia is not a usual destination for Russian presidents, despite the large Russian population living in the country. Similarly, Estonian politicians do not visit Moscow. Thus, Estonian energy policy in general, and natural gas supplies in particular, have not been mentioned by high state officials, nor there was any outspoken pledge of Russian officials to support Gazprom's position in Estonia in any particular way.

According to the press office of Russian president, there have been very few meetings with Estonian representatives in the

⁵ That would mean a major dispute over gas supplies with Gazprom, for any of Baltic countries would get into a very limited legal access to supplies stored at Inčukalns. Yet, Gazprom has no physical control over the facility, so in the most extreme case, Gazprom would not be able to prevent withdrawal of gas from the storage (Grigas, Politics of energy and memory 2013, 82).

recent decade. A meeting of Russian and Estonian presidents took place in 2005 during the meeting of Estonian president and Russian patriarch (President of Russian Federation, 2005). Russian and Estonian presidents met again in June 2008 in Khanty-Mansiysk in central Russia (President of Russian Federation, 2008). Estonian PM Andrus Ansip was invited to meet Russian PM Medvedev at the environmental conference in Russia in 2013 (Postimees, 2013). There was no particular remark of energy at the meeting, (Leivat, 2013) as well as at the other two meetings mentioned earlier.

Because relations between Moscow and Tallinn are very cold, there are other more fundamental unsolved issues in their mutual relations, and thus no formulation of energy policy through high-level political exchange is possible.

The only way we may see high political representatives of Russian state interfere with Estonian energy policy is through verbal threats. To mention some, after 1993 supply cut, First Deputy Foreign Minister Vitalii Churkin addressed supply cuts as a probable option of leading foreign policy towards Estonia (Larsson, 2006, p. 190). Agnia Grigas mentions supply cut threats from Foreign Minister Yevgeny Primakov formulated in 1995, 1996 and 1997 (Grigas, Politics of energy and memory, 2013, p. 109). Russian Duma supposedly voted for a price increase for Estonia (among other countries) to European price level in 2005 (Stern, 2006).

Rewarding certain behaviour and linking energy prices to foreign policy orientation and reactions of consumer states

The price of the natural gas has been rising rapidly for Estonia, most significantly in the period of 2005-2007. It coincided with Estonian accession to the EU and NATO in 2004 (Grigas, Politics of energy and memory, 2013, p. 83), yet, gas price increase cannot be attributed solely to NATO accession, even though it could play a role. The price hike of those years seems to be part of a broader plan of Gazprom to increase the prices for post-Soviet countries back then (BBC, 2005).

In 2007, after Estonia approved the relocation of the war memorial, Russia cut supplies of oil products (Zhdannikov, 2007) and blocked off the railway link between Estonia and Russia (Stratfor, 2012). However, there was no gas shortage introduced, as well as no publicized price manipulation. Some sources claim that Russia, aside from the natural gas supplies, has other means of exerting pressure, which prove to be more efficient in achieving its foreign-policy goals (Stratfor, 2012).

Abusing infrastructure (e.g. pipelines) and offering different pricing to exert pressure on the client state

Gazprom halted gas supplies to Estonia as a direct reaction to the new Estonian foreign policy orientation on 25 June 1993. The official reason was unpaid debt, which amounted to approximately USD 11 million in that time. The supply cut followed Estonian parliament's approval of a new residency law, which introduced strict rules of acquiring citizenship, effectively preventing ethnic Russians from acquiring Estonian citizenship automatically (Bohlen, 1993). According to Russian side, Estonia had been warned of a potential gas cut before the law was

adopted. Estonian side claimed that Russia froze its assets in a reaction on dropping Russian ruble as the national currency (Efron, 1993). Supplies were resumed on July 1, 1993, after debt repayment arrangement was agreed (Carey, 1993). This is the only real supply cut, which occurred in Estonia. Infrastructure had been in the hands of Gazprom by 2015, thus the company was directly benefiting from the gas transit, as well as from sales.

When deciding about model of gas infrastructure unbundling, Estonian government initially sought ITO model (least harmful for Gazprom), but eventually switched and decided to implement full ownership unbundling in 2012 (Grigas, Politics of energy and memory, 2013, p. 87). This was deemed harmful for the interests of Eesti Gaas. The company was lobbying for the ITO model, which would retain the EG Võrguteenus in the ownership, though regulated, of Eesti Gaas (Tammik, 2011). Other arguments of the company included the claim of no effect of the transfer on gas price, and more importantly, accusation of bad investment of the government into unbundling instead of investing into construction of LNG terminal (Rikken, Gas Monopoly Complains About Divestment of Pipelines, 2012). It's impossible to assess, whether these arguments originated from Gazprom or other shareholders. E.ON and Fortrum addressed Estonian minister of economy directly, claiming that the imposed divestment was breaching of 'shareholders' property rights and investment protection agreements with partner countries" (Rikken, Gas Executives Collar PM Regarding Pipeline Divestment, 2012). As the law was being discussed in the parliament, there were

⁶ Chairman of the Energy Council of Estonian Academy of Sciences was according to the source also a

additional arguments provided by Estonian Academy of Sciences,⁶ claiming that alienating Gazprom might worsen Estonian relations with Moscow and also complicate access to Latvian Inčukalns storage facility (Rikken, Move to Separate Pipelines From Production Opposed by Energy Council, Gas Lobby, 2012). It is interesting that Gazprom did not directly participate in voicing of any of criticisms and kept a low profile in the whole case.

After parliament ordered ownership unbundling despite the criticism, shareholders of Eesti Gaas, mostly E.ON, were heard saying they would sue Estonian government to protect their interests (Ummelas, 2012). Gazprom, again, refrained from such comments. Similarly, there is no information available about Gazprom proceeding into any legal action against Estonia or even considering it openly.

In terms of pricing, Estonia probably enjoyed lower gas price compared to other European countries. According to Radio Free Europe research, Estonia's gas price is below Polish or Lithuanian price, yet higher than Finnish price at approximately USD 450 per thousand cubic meters (Kates & Luo, 2014). Eesti Gaas member of board even claimed anti-trust case against Gazprom might mean price increase for Estonia (news.err.ee, 2012).

consultant and adviser of Eesti Gaas (Rikken, Move to Separate Pipelines From Production Opposed by Energy Council, Gas Lobby, 2012).

Efforts to take control of energy resources, transit routes and distribution networks of the client state

Gazprom has a well-established position on the Estonian market. It has been an owner of Eesti Gaas since 1992, being the first foreign investor in the company. By 2002, its share rose to 37.03% (Eesti Gaas b), becoming the largest shareholder until transfer of E.ON shares to Finnish Fortrum in 2013.

After the implementation of Third Energy Package, Gazprom retained ownership of natural gas transit company EG Võrguteenus, which was legally separated from Eesti Gaas, through parent holding company Võrguteenus Valdus. Gazprom divested its shares in gas transit in mid-2015, as it has been mentioned before, thus leaving the natural gas transit. Some sources claim that Gazprom has little interest in managing and leveraging it, as the country's gas grid plays no role in Eurasian gas transit, and the value of Estonian grid for Gazprom is very negligible (Reimer, 2015).

Disrupting (through various means) alternative supply routes/sources of supply

There are some hints that Gazprom did take steps against the plans for alternative supply routes. Supply routes are in the case of Estonia represented by LNG terminals and Estonian-Finnish gas interconnector. Estonia is otherwise completely reliant on Gazprom-controlled transit routes, as Latvian gas grid is also co-owned by Gazprom and not separated from gas supply.

It is not possible to establish, whether Gazprom has somehow been involved in the decision-making over locating the regional Baltic LNG terminal in Estonia. There have been various models

considered. Since there was no agreement on the position of the terminal, Baltic states and Finland turned to the EU for selecting the best location. The EU selected Estonia and Finland in 2012 (Business News Europe, 2014). After that, Estonia got into competition with Finland over the location of the facility. In 2013, Gasum, Finnish national gas company, and Eesti Gaas's EG Võrguteenus stroke a deal on location of the terminal in Inkoo, Finland, in February 2013. Negotiations went ahead without consulting the issue with Estonian or Finnish state. Estonia was supposed to be connected through a pipeline. Supposedly, Gazprom was favouring such an arrangement (Postimees, 2013). In reply, Estonian minister of economy voiced a concern about supply security, since Gazprom was a shareholder in both companies (Reuters, 2013).

After pressure was exerted by Estonian government, it was agreed on a model of two terminals⁷ between the two countries, instead (Natural Gas Europe, 2014). However, the European Commission rejected to provide financial assistance for such a model (Reuters, 2014). Therefore, Estonia and Finland were forced to rethink the common project, proposing construction of large terminal in Finland and smaller distribution terminal in Estonia, connected by Baltconnector pipeline (Arola & Teivainen, 2014). Moreover, due to the escalation of crisis in Ukraine, Estonia announced in May 2015 that it decided to build its terminal regardless of financial support of the EU (Natural Gas Europe, 2015). Gazprom was left out of the plan, with Paldiski terminal being developed by Alexela Logistics group.

⁷ One in each country, Estonian being smaller and located in Paldiski, Finnish terminal being larger and located in Inkoo.

Apart from Paldiski, there were also two other proposals for terminal's location in game, since Estonia was selected as an ideal host country – the port of Muuga and the port of Sillmäe.

The Sillmäe project is worth noting. It was the least preferred location. Yet, it was developed regardless of that fact that it was out of question (Kõrbe Kaare, Koppel, & Leppiman, 2013, p. 163). According to some sources, the facility was completely privately owned (Visnapuu, 2014). Other sources, however, point to Gazprom. When the project was cancelled in January 2015, the project founder suggested that it was Gazprom who pulled out of the project. The terminal was supposedly planned as a facility to turn Gazprom-supplied gas into LNG, which could be exported to foreign markets. The plan was allegedly dismissed due to the EU sanctions on Russia (Ship & Bunker, 2015). There is no written evidence documenting Gazprom's involvement in the project, therefore it is not possible to assess, whether Russian company was somehow involved in the ownership or investment into the facility.

Efforts to eliminate competitive suppliers

There are no competitive suppliers, since there is no diversification project taking place within Estonia.

Apart from the EU-funded LNG terminal, plans to build a separate LNG facility in Sillamäe port in Estonia appeared at the end of 2013. A company named Sillgas was supposed to be the main investor in the project (news.err.ee, 2013).

Preference for long-term bilateral agreements and “take-or-pay” contracts

Long-term contract between Gazprom and Eesti Gaas was signed in 2000, with date of expiry in 2005. The contract was extended in 2003 until the end of 2015 (Teder, 2003), when the renegotiation of a new contract will be necessary. Before the signature of long-term contract, gas contracts with Gazprom were signed on an annual basis, with terms renegotiation taking place every year, leaving more space to manipulation of supplies and prices.

There is no clear notion about development of negotiations over the contract in the future or any projection of the future contractual terms available, but Estonian side and Gazprom are probably in the process of negotiation at the time of publication of this study.

Diminishing the importance and influence of multilateral regimes like that of the EU

In the case of Estonia, Gazprom is largely refraining from taking direct steps against Estonian drive for energy independence, which is supported and largely financed by the EU. Thus, as mentioned, Gazprom is not taking steps openly hostile to the construction of LNG terminal in Estonia. Moreover, Gazprom did not challenge the ownership separation of gas transit and downstream, as well as the loss of voting rights in EG Võrguteenus, even though this was clearly not in favour of Gazprom. There might have been some informal pressure behind the scenes though, yet it is hard to corroborate this.

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5.6 Country Case Study: Hungary

Lukáš Lehotský

5.6.1 Introduction

Hungary, similarly as its neighbours, was part of natural gas transit network from the Soviet Union to Western countries.

The country's consumption in 2013 was at the level of 10.12 bcm, with domestic production slightly above 19% of this volume. The rest of imports originates mostly in Russia and is imported from Ukraine and Austria (Hungarian Energy and Public Utility Regulatory Authority 2014, 52). Gas is one of the most important primary sources of energy with 40% share in total primary energy supply.

Contracted volumes in long-term contracts are 9 bcm yearly in contract with Gazprom and 0.5 bcm in contract with E.ON Ruhrgas. Both contracts are valid until 2015. (Hungarian Energy and Public Utility Regulatory Authority 2014, 59)

Gas sector has been regulated since 1993 and 1994, when Mining Act and Gas Act respectively were implemented. First price reform took place in 1995, but gas pricing was and still is a highly politicized topic (The World Bank 1999, 25-26). The market was partially liberalized, with prices' regulation for industrial sector being lifted in 2004.

Household sector prices are still regulated, with so called "universal service"¹ being implemented in the middle of 2009. Therefore, Hungarian market has a dual structure. Companies operating on both markets are mainly TIGÁZ, FŐGÁZ,

¹ Universal structure applies to small consumers and households. All other consumers' supply is operated on the free, non-regulated market.

E.ON, GDF SUEZ; operators of gas distribution networks. Along with them, also MET Magyarország and MVM entered the market. The main player on the market is TIGÁZ, which owned almost 35% of the market at the end of 2013, followed by FŐGÁZ and GDF SUEZ with 24 or 22% of the market, respectively (Hungarian Energy and Public Utility Regulatory Authority 2014, 52-54).

Until 2004, all the gas imports were controlled by Hungarian Oil Company (MOL), then vertically integrated company, which exercised control over all aspects of Hungarian gas industry except distribution. Distribution companies were restructured and privatized to foreign investors, with decision being taken in 1992 (The World Bank 1999, 26). MOL itself was completely privatized by 1998, with the state getting rid of any company shares in staged privatization (Case Study: MOL Hungarian Oil and Gas Company Limited - the report of the Supervisory Board 1998). After 2004, gas section of MOL has been restructured as a result of EU directives' implementation. Along with restructuring, a process of selling MOL gas assets started, with 75% of trading and storage activities and 50% of import activities (through company Panruszgas) being sold to German E.ON. Trade branch of E.ON has been renamed to E.ON Földgáz Trade, storage activities were operated by E.ON Földgáz Storage. German energy giant had also an option to take over gas transit company FGSZ, which it did not use (Enerdata 2012, 12). E.ON sold its shares in Földgáz Trade and Földgáz Storage to state-owned electricity wholesale company MVM in 2013 (E.On 2013), the state thus reacquired control over natural gas trading and storage. E.ON's stake in Panruszgáz was sold to MVM in 2015. Hungarian part of Hungary-

Slovakia gas interconnector is operated by company Magyar Gáz Tranzit, established solely for this purpose in 2011 and owned by MVM (Magyar Gáz Tranzit).

Along with domestic consumption, Hungary is an important gas transit country. There are two main entry points of natural gas to Hungary - via Ukrainian territory at Beregdaróc, or via Austrian territory at Mosonmagyaróvár. There are also gas interconnectors with Croatia, Serbia and Romania in operation, serving also as gas transit points (IEA 2011, 61). Even though Croatian and Romanian interconnectors are bidirectional, gas was flowing only from Hungary to these countries (Hungarian Energy and Public Utility Regulatory Authority 2014, 50). Gas interconnector with Slovakia became commercially operational in the summer of 2015, after its commissioning date being postponed from January 2015 due to technical issues on Hungarian side of the connection (Energia.sk 2015).

Hungary has a substantial storage capacity. There are 6 commercial underground storage facilities with working capacity of more than 5 bcm. In addition, there is one strategic underground storage facility at Szöreg with working capacity of 1.2 bcm (IEA 2011, 63). Strategic gas reserves are used only in case of gas crisis indication, with minister of national development having to approve any strategic gas stock release (IEA 2012, 21). Magyar Földgáztároló (MFGT, previously E.ON Földgáz Storage) owns 5 storage facilities with total working storage capacity of 4.43 bcm, and according to its own words is able to cover 55% of winter peak demand of the country (Magyar Földgáztároló n.d.). Strategic reserves are owned by Hungarian Hydrocarbons Stockpiling Association. Along with the strategic reserves, 0.7 bcm of gas can be stored

on a commercial basis at the Szöreg facility.

The Third Package was implemented into Hungarian legal code in 2010. An option of Independent Transmission Operator was selected, with FGSZ remaining a MOL-owned asset. However, MOL's influence over FGSZ is heavily regulated and monitored in order to ensure non-discriminatory access to pipeline network (IEA 2012, 20).

5.6.2 Reflection of the Indicators

Russian state representatives actively supporting state-owned energy enterprises and their activities in a respective country

The majority of official meetings of Russian state officials with their Hungarian counterparts was linked to discussions and negotiations over South Stream pipeline commissioning. However, there were few other issues that were covered during high-level official meetings (Logan, Government chooses pragmatism with influential power 2007).

Hungarian PM Ferenc Gyurcsány met with President Putin in Moscow in February 2005. According to the press office of Russian president, energy sector was mentioned by Putin as being of common interest of Hungary and Russia. There was little specific talk about gas, though (President of Russia 2005).

Putin visited Hungary for the first time in March 2006,² meeting both PM Gyurcsány and President László Sólyom (MTI 2006). After a meeting with Gyurcsány, Putin announced a plan to turn Hungary into an energy hub. When questioned why Hungary was the target country for such a development, Putin said that Russia needed politically friendly climate in

² It was the first visit of Russian president in Hungary since Yeltsin's visit in 1992.

order to decide on such investment, since friendliness builds trust and confidence in partnership. He mentioned benefits for Hungary too, particularly strengthening its position in the European energy sector, as well as strengthening its own supply security. Putin said Hungary was a potential strategic partner of Russia in Europe (President of Russia 2006).

Plans to cooperate with Hungary on a pipeline connection were mentioned again at a meeting of Gyurcsány and Putin in Sochi in mid-September 2006 (Gazdaság 2006). Gyurcsány met also with Viktor Zubkov, First Deputy Prime Minister of Russia, in 2007, discussing connection of South Stream pipeline to Hungary (Stop 2007). No particular details of agreed plans at these meetings are available, but it is probable that South Stream plans were taking more specific shape.

Another meeting of Putin and Gyurcsány took place on February 28, 2008² in Moscow, where an intergovernmental agreement on South Stream construction was signed. Putin stressed the potential growth of Hungary's role in European gas transit again. Additionally, he said he was convinced that Hungarian part of South Stream was going to be built and said Hungarian security of supply was going to improve (Index 2008). The meeting was attended by Dmitri Medvedev³ (Budapest Times 2008). Medvedev met with Gyurcsány two days earlier on his trip to Budapest to discuss the project and make preparations for agreement signature (Vesti 2008).

First Deputy Prime Minister Viktor Zubkov visited Hungary and met with Gyurcsány on January 24, 2009, almost immediately after the end of Russian-Ukrainian gas crisis (A

² It was the first visit of Russian president in Hungary since Yeltsin's visit in 1992.

gázkrízis akár meg is ismétlődhet n.d.). He acclaimed the behaviour of Hungary during the supply cut, saying the country was well-prepared and therefore was not hit hard. Dmitri Medvedev, by that time serving as the President of Russia, offered Hungary additional gas supplies, but the offer was declined by Hungarian side (Budapest Times 2009).

South Stream was the pinnacle of mutual relations at the time. Investment agreements were signed in March 2009 between Gazprom and Hungarian investor, when PM Gyurcsány visited Moscow and met with PM Putin.⁴ Deals concerning South Stream were part of a larger package of contracts, other concerning, for example, supply of nuclear material (Premier of Russian Federation n.d.). All of them were signed by both prime ministers. Gyurcsány also met with President Medvedev. Putin said the South Stream deal was a major and necessary step to ensure Hungarian energy security. Along with the mentioned documents, an agreement covering the construction of a new underground storage facility was signed too (Hodgson 2009).

Putin, already a Russian president again, labeled Hungary as a priority partner in Central Europe at a meeting with PM Orbán held in January 2013 in Moscow. Putin stressed the economic as well as supply security side of South Stream at the meeting (President of Russia 2013).

Putin and Orbán met again in January 2014 in Novo Ogaryovo presidential residence. Discussing energy issues was one of talks' topic, with primary focus on nuclear energy. In the gas sector, the main topic was again South Stream construction

⁴ Putin was by then serving as PM.

(President of Russia 2014). The meeting was followed by meeting of Russian and Hungarian diplomats in May 2014, discussing the implementation of agreements of the January meeting (TASS 2014 b).

At a meeting of ministers of foreign affairs in November 2014, Russian minister Lavrov has pointed to Hungary as a one of most important political and business partners of Russia, saying Russia was ready to increase the cooperation in large-scale investment projects in Hungary. Even though there was no explicit link to energy projects, it's fairly clear that Lavrov had them particularly in mind (TASS 2014 d).

Only a few days after the cancellation of South Stream project, Vladimir Putin held a telephone conversation with Hungarian PM, reportedly discussing the future of Russian-Hungarian energy cooperation after South Stream (TASS 2014 a). Other cooperation possibilities in various areas were proposed to Hungary, even though specific projects were not mentioned in the transcript of the press office of Russian president (President of Russia 2014).

In February 2015, Vladimir Putin visited Hungary along with high-level officials of energy companies, notwithstanding Gazprom and Rosatom. Looking at gas sector, the primary concern of Hungary was the unresolved question of undelivered gas volumes contracted in the 1996 long-term contract. It was agreed that unused volumes would be imported also after the end of the current contract in December 2015. Putin commented on this concession, saying he was glad that Russia was "a reliable partner for Europe and for Hungary" (Leifheit, Putin's Hungary visit: "win-win" 2015). Answering the question about South Stream, Putin stressed that Russia was

forced to abandon the project, but it was not a punishment or emotional decision. At the same time he mentioned Hungary was an important partner of Russia, Gazprom was ready to increase the use of Hungarian underground storage facilities' capacity and "Hungary's significance as a market for our [Russian] oil and gas and a potential transit country has not decreased for Russia." (President of Russia 2015).

It is apparent that Russian state officials, especially the President himself and PM were both involved in formulating and lobbying for South Stream project in Hungary along with Gazprom officials. Most notably, Russian state top brass frequently visited Hungary and led discussions about the project with their Hungarian counterparts. Additionally, the meeting in January 2015 showed willingness of both sides to negotiate energy issues at the highest political level.

The foreign supplier rewarding certain behaviour and linking energy prices to the client state's foreign policy orientation

According to some sources, terms of Hungarian 1996 long-term contract were unfavourable for Hungary, and compared to other similar contracts, provided very little maneuvering space for Hungarian side. This supposedly applied also to the price (Jenei 2012).

Warm relations between Russia and Hungary have been carefully built since PM Gyurcsány's tenure. His government of 2006-2009 was building so-called "pragmatic" relations with Russia (MTI 2009). Despite the fact that Viktor Orbán's party Fidesz was vocally critical of Gyurcsány's approach at the time, successive two Fidesz governments continued in extending and sealing Hungary-Russia relations.

Information about the price cut (announced as a “price revision”) to Panrusgáz and Centrex leaked in November 2013 (PRIME 2013). However, there is little information available about other price cuts and even in the case of this particular one, it is impossible to link it to a particular Hungarian foreign-policy move or set of moves.

It is not possible to rule out Russian price linking to Hungarian foreign policy, but it is not possible to corroborate it either.

Abusing infrastructure (e.g. pipelines) and offering different pricing to exert pressure on the client state

The most recent case of exerting pressure on Hungary through infrastructure is the cut of reverse-flow supplies from Hungary to Ukraine on September 25, 2014. The official reason stated technical difficulties. The supply halt, however, occurred unexpectedly, with no end date announced. More importantly, it happened only a few days after a meeting of Viktor Orbán and Alexei Miller (TASS 2014 c).

Deliveries were halted so Hungary was able to receive a large quantity of Russian gas, which was supposed to be stored in Hungarian storage facilities. This possibility was discussed between Hungarian development minister and Russian deputy energy minister on September 16 and approved at Orbán-Miller meeting. Such a move allowed Gazprom to store gas within the EU borders, so in case of necessity, gas would be available for European customers and Gazprom would become less dependent on storage facilities in eastern Ukraine (Natural Gas Europe 2014). In addition, the preceding increase of supply from Ukraine to Hungary occurred at the same time as

Gazprom's supply cut to Slovakia. Hungarian reverse-flow to Ukraine was resumed only in the middle of January 2015 (Natural Gas Europe 2015).

It's probable that infrastructure of Hungary, especially its storage facilities, became more important for Gazprom. Russia seemed to use infrastructure setting to put some pressure on Hungary in order to fill storage facilities before winter of 2014 and at the same time to curb supplies of gas to Ukraine.

Efforts to take control of energy resources, transit routes and distribution networks of the client state

According to some sources, Hungarian MOL invited Gazprom to form a 50-50 joint venture as early as in 1994 in order to repay debts from Soviet era and deal with negative balance of payments based on high energy prices (Grätz 2013, 369).

Based on Anita Orbán's⁵ analysis, Gazprom allegedly manifested its interest in buying gas business part of MOL again during its privatization. The first sign of interest appeared as early as 2002, when Moscow said it was interested in Hungarian gas business. Gazprom announced participation in tender for all the three parts of MOL's gas operations (wholesale, storage, transmission) in 2004. When privatization tender was officially announced, Gazprom allegedly submitted a bid with an undisclosed partner (allegedly Naftogaz Ukrajinu) (Orbán 2008, 157-158). The Gazprom's bid was however withdrawn and MOL gas operations were acquired by German E.ON. There was a speculation that withdrawal was caused by little impact of Gazprom on MOL's operations. There is no clear evidence to corroborate this claim.

⁵ Anita Orbán is not anyhow related to Hungarian PM Viktor Orbán.

With the decision to sell its gas operations, MOL also sought to sell its 50% stake in Panrusgáz, a gas intermediary company. In this case, MOL's shares could be transferred to a new owner only with the approval of Gazexport.⁶ The MOL's stake in Panrusgáz was sold to E.ON along with shares in other parts of MOL's gas operations (MOL and E.ON Ruhrgas International gas partnership 2004).

Information about E.ON's readiness to transfer its shares in MOL to Gazprom in exchange for E.ON's acquisition of almost 25% of Yuzhno-Russkoye field appeared in 2006, but this transaction did not take place (ICIS 2006).

In 2007, Austrian partially state-owned oil company OMV announced it was resolved to purchase additional shares in MOL, firstly increasing bulk of shares it owned from 10% to more than 18%, acquiring more than 8% from Megdet Rakhimkulov⁷ (Soccor 2007), after that acquiring another shares to the level of 21%, and additionally offering 20% higher price per share for even more additional shares (Chazan 2007). This move was surprising to MOL managers, unaware of OMV's intentions. A speculation that OMV was in fact serving only as an intermediary, potentially selling shares to Gazprom,⁸ appeared almost immediately after (Stratfor 2007). In the end, OMV cancelled the bid after an EU investigation into the attempt had set strict anti-monopoly criteria for the potential merger (Strohecker 2008).

⁶ Gazexport was Gazprom's export subsidiary in that time, later renamed to its current name Gazprom Export.

⁷ Megdet Rakhimkulov was the owner of a shady unknown company Interprocom, acted as the CEO of Panrusgáz, and was involved in shady hostile overtake of largest Hungarian chemical company Borsodchem in 2006, in which he supposedly acted on behalf of individuals connected to Gazprom (Orbán 2008, 119-124).

⁸ OMV has had an above-standard relationship with Gazprom.

Fears that Gazprom was behind the deal were not directly proven. Putin himself distanced Gazprom from the attempt at his meeting with PM Gyurcsány in 2007, but Gyurcsány allegedly signaled that there was a potential connection (Orbán 2008, 196). After failing the hostile overtake attempt, OMV sold its 21% stake in MOL to other Russian company, Surgutneftegaz, only months later in March 2009 (Reuters 2009). This bulk of shares were bought back by Hungarian state in 2011 through MVM, allowing state to re-enter MOL. The buy-back was at a significantly higher price than OMV-Surgutneftegaz deal (Reuters 2012). If Gazprom would acquire the share in MOL, it would be able to exert some pressure or at least harvest information about Hungarian natural gas transit network.

Moreover, Gazprom would have become involved in Hungarian gas transit, had the proposed construction of Hungarian section of South Stream pipeline been materialized. A joint company, which was supposed to construct Hungarian part, was established under the name Déli Áramlat Magyarország (South Stream Hungary) (Tóth 2014). Shares in the company were equally divided between Gazprom and Hungarian state-run and state-owned bank MFB, which was eventually replaced by state-owned electricity wholesale company MVM in 2012 (Natural Gas Europe 2012). The interesting fact is that unlike the Nabucco project, the Hungarian share in South Stream is owned directly by the state instead of MOL (MTI 2008).

In addition, Gazprom supplies majority of gas to Hungary through an intermediary company Panrusgáz. It was created as a joint venture of Gazexport and MOL in 1994. Apart from

these two, there were more local companies with unclear background involved. Panrusgáz replaced company Mineralimpex, which had been importing Russian gas into Hungary before 1994. Company Interprocom, allegedly personally connected to Gazprom⁹ (Vedomosti 2001), was also among companies owning minority shares in Panrusgáz (Gazprom 2003). Nowadays, the company is owned by Gazprom Export, MVM (previously MOL)¹⁰ and Centrex Hungaria (Panrusgáz), a subsidiary of Austria-based Centrex Europe Energy and Gas, company supposedly connected to Gazprom too.¹¹

Not MOL, but rather Panrusgáz signed a long-term contract with Gazexport and became an exclusive supplier of Russian gas in Hungary since 1994 (Nosko 2013, 177). Panrusgáz was created allegedly due to pressure of Russian side. Its existence is not favourable for Hungary, since it is forced to buy gas from intermediary company selling Gazprom's gas with profit. During the 90s, there was allegedly a plan, where Panrusgáz was supposed to build a pipeline connection to Northern Italy, but this was not materialize (Orbán 2008, 66-68).

It is apparent that Gazprom was active on Hungarian market and was considering taking part in Hungarian resources. Moreover, this has not been done overtly, but rather through behind-the-scenes operations.

⁹ One of the share owners in Interprocom was also Tatiana Dedikova, daughter of Rem Viakhyrev, the CEO of Gazprom throughout 1990s.

¹⁰ The MOL share in Panrusgáz was sold to E.ON during MOL gas operations' branch privatization. The 50% share in Panrusgáz was later acquired by MVM, thus Hungarian state, as mentioned earlier.

¹¹ Gazprom owns 50% of the company, MVM (previously MOL) 40% and 10% share is owned by Centrex. Centrex is allegedly connected to Gazprom (Kupchinski, *The Shadowy Side of Gazprom's Expanding Central European Gas Hub* 2008). This might be corroborated by Gazprom itself, which claims that Centrex was created by Gazprombank, the then 100% subsidiary of Gazprom (Gazprom 2006). Moreover, Centrex itself trades gas in Hungary and elsewhere, which seems to be sourced by Gazprom only (European Commission 2008).

Disrupting (through various means) alternative supply routes/sources of supply

Gazprom was active in countering alternative supply routes in Hungary, since South Stream was directly competing Nabucco pipeline. The official Hungarian position under Prime Minister Gyurcsány was supportive towards both Nabucco and South Stream projects, claiming they were not mutually exclusive. The Orbán government, in power since 2010, became a staunch supporter of South Stream pipeline at the expense of Nabucco¹² (Alexeev 2014).

Measures against Nabucco were not directly confrontational, though. Russia has been fairly eloquent and consistent in providing arguments in favour of South Stream construction. Gazprom, as well as state officials, made sure to support the project, stressing it was better than Nabucco. There were no direct steps against Nabucco pipeline, with rhetoric being non-confrontational, highlighting the strengths of South Stream instead. Arguments that South Stream was contributing to energy security of Hungary were central to Russian effort.

Central argument claimed that South Stream, unlike Nabucco, was backed by real and existing resources. When Dmitri Medvedev visited Hungary to prepare grounds for signing of intergovernmental agreement between Russia and Hungary in 2008, Alexei Miller said Nabucco lacked resources, while Gazprom was ready to supply the gas necessary to fill the pipeline (Schedrov 2008). Gazprom was always mentioned as a guarantee of sufficient supply (Logan, Hungary-Russia deal strikes blow to EU-backed Nabucco 2008). Medvedev stressed

¹² Oddly, during the PM Gyurcsány's tenure, Victor Orbán was as a leader of the opposition and the most vocal opponent of government's warm stance towards Russia.

South Stream was not mutually exclusive with Nabucco but also maintained these two projects were not competing each other (Schedrov 2008).

In 2009, PM Putin stressed that there is no problem with gas supplies to Europe, the problem is with transit countries. He stressed Nabucco, unlike South Stream, was not lowering the number of transit countries, on the contrary, it was increasing it (Posolstvo Rossijskoj Federacii v Vengerskoj Respublike 2009).

At the joint press conference held after a 2013 Putin-Orbán meeting, Putin mentioned a potential income from transit fees to Hungarian budget as an additional argument to the importance of South Stream construction (President of Russia 2013). Moreover, he thanked Hungary for the support of the South Stream project, which, according to his words, added more than 600 million of Russian investment into Hungary (MTI 2013).

It is worth noting that Hungary agreed to participate in South Stream despite the fact that MOL had been already a shareholder and a partner in the Nabucco project. Coincidence or not, MOL was the first company to announce its serious doubts about Nabucco commissioning, when company leadership announced considerations on selling its stake, and also announced stop on increase of capital expenditures in the project in first half of 2012¹³ (MOL 2012). Conservative Magyar Nemzet even claimed there was a possibility of PM Gyurcsány's early resignation in 2008, as he was offered to head a Hungarian joint company owning Hungarian part of South Stream (Hungary around the clock 2008). However, this has not been realized.

¹³ This happened at the moment when Hungarian state already became an owner of MOL shares through a buy-back of shares from Surgutneftegaz in 2011.

The Russian side focused on maintaining the contact with their partners, made sure schedules were met to largest possible extent, and Gazprom and state officials made regular visits to Hungary, as well as to other countries (Alexeev 2014). This can be seen as a complex strategy of putting Hungary under pressure to choose South Stream project over Nabucco, even though this cannot be regarded as a single reason for Nabucco failure and MOL's walk-out from the Nabucco project.

Efforts to eliminate competitive suppliers

A potential Gazprom involvement can be seen behind a loss of license of Emfesz, an independent gas supplier operating on Hungarian market. Emfesz belonged to Dmitro Firtash, Ukrainian businessman with dubious reputation (BBC 2006), through Cypriot company Mabofi Holding. It was created in 2003, and managed to gain a substantial market share in Hungary. It had a 10-year long contract on gas supply from RosUkrEnergo¹⁴ and planned to build a gas power plant in Hungary (Ukrinform 2013). Emfesz was a subject of hostile and apparently illegal takeover in 2009, only a few weeks after RosUkrEnergo was forced out of gas trade between Russia and Ukraine. Management of Emfesz announced it was changing its gas supplier from RosUkrEnergo to an unknown Swiss company RosGas, and subsequently the management of Emfesz transferred its shares to RosGas without the consent of Emfesz owners (Kupchinski, *The Gazprom-Hungarian Gas Scam* 2009). Even though Emfesz shares eventually returned to

¹⁴ RosUkrEnergo is a former intermediary in Russia-Ukraine gas trade and is 50% owned by Gazprom and 50% by Dmitro Firtash (Kupchinski, *The Gazprom-Hungarian Gas Scam* 2009). Gazprom's share was firstly owned by its subsidiary Gazprombank. Gazprom acquired a share in RosUkrEnergo in 2006 (Gazprom 2006).

Firtash's group, Emfesz was not able to supply gas to its customers in the meantime, which resulted in suspension of system-using contract with TSO and subsequently revoking its gas trading license (IEA 2011, 60).

Gazprom denied it was anyhow linked to RosGas and it's impossible to prove this beyond speculation. However, the takeover and bankruptcy of Emfesz was clearly Gazprom's interest.

Preference for long-term bilateral agreements and "take-or-pay" contracts

The take-or-pay clause is present in the current contract between Gazprom and Panrusgáz valid until December 2015. Fines stemming from take-or-pay clause had been threatening Hungary, since Hungary has not been able to fulfill its yearly obligations to consume minimal contracted volumes. Therefore, take-or-pay clause has not been favoured by Hungarian government. On the contrary, it was among economic interests of Gazprom.

Unused gas volumes were thus at the centre of January 2015 Putin-Orbán meeting, where an agreement to supply the unused volumes of gas also after the end of 2015 was reached¹⁵ (Leifheit, Putin's Hungary visit: "win-win" 2015). Plans for a new gas contract were discussed too, with the possibility of lifting "take-or-pay" clause from the contract completely (TASS 2015).

¹⁵ Hungarian PM commented on this as a huge relief, which would secure Hungarian households cheaper energy and allow Hungarian Government to continue in utility prices' cuts.

With gas supplies potentially continuing also after the end of contractual period, Russia effectively removed the take-or-pay clause from the actual contract in its common understanding. Hungary would be obliged to take off the currently contracted volume, based not on the long-term agreement, but rather on the basis of real consumption. It is expected that the volume of unused contracted gas would be sufficient for the next 4-5 years (Hungary Today 2015).

This has clearly not been in favour of Gazprom or Russia. Gazprom would have been able to extract significant financial resources from Hungary, had the clause remained in place.

Diminishing the importance and influence of multilateral regimes like that of the EU

Position of Orbán's 2010 and 2014 governments has become increasingly critical of the EU. Having his own issues and disputes with the EU over various domestic policies and using anti-EU rhetoric, Orbán gratefully turned to Russia for cooperation (Dempsey 2014).

It may be claimed that Gazprom and Russian leadership have been well-aware of this and have been using Orbán's benevolence for their benefit.

Putin and other state officials have mentioned that Hungary was strategic and important partner of Russia, offering Hungary various concessions not only in energy sector. After the 2015 Orbán-Putin meeting in Budapest, Hungarian PM said he was ready to go against the whole EU in order to secure available and cheap energy for Hungarian population. PM has told reporters after the meeting that he was not supporting integration of energy policies into the so called "energy union".

He also mentioned that Hungary would not re-sell Russian gas to Ukraine (Balazs and Simon 2015).

Another illustrative case of this approach occurred in November 2014, when Hungarian parliament passed a law allowing to continue with the construction of Hungarian part of South Stream pipeline regardless of the EU's objections. The parliament was 2/3 controlled by Orbán's Fidesz (Leifheit, Hungarian energy policy: alarm bells are ringing 2014).

Putin has consistently apprehended mutual Russia-Hungary trade ties, stressing the importance of trade exchange increases. At the Orbán's visit in January 2014, Putin reiterated commitment of Russia to invest into large-scale projects in Hungary, notwithstanding South Stream construction, Paks NPP extension and other (Lyulko 2014).

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5.7 Country Case Study: Latvia

Veronika Zapletalová

5.7.1 Introduction

In 2012, the total consumption of TPES in Latvia amounted to 50,8 TWh. Natural gas was the main resource for generating heat energy and electric energy. The total consumption of natural gas reached 14,1 TWh, which corresponds to 28 % of TPES. There is no indigenous gas production in Latvia. All the gas consumed in the country is imported from the Russian Federation by two 700 mm pipelines (ENTSO, 2014, p. 23).

Among the Baltic States, Latvia is the most active one in the field of introduction of renewable energy sources (RES) into its energy mix. The reason is quite prosaic – due to marginal domestic energy material sources; this is a possibility to reduce the dependence on external suppliers. The country's renewables target for 2020 is 40% (the EU average is 20%) and Latvia is currently on track to achieve it (ibid.). The most used RESs in Latvia are firewood, hydro resources and wind energy. The RES share in the TPES increased from 9.6% in 1990 up to 32.6% in 2012. This happened due to the wide utilization of wood fuel. The production of electricity from RES in 2012 was 55.03% of the total electricity production. Firewood with its total consumption representing 12.9 TWh was the most widely used local energy resource in 2012. Electricity generated in hydropower stations and wind power stations constituted 3.8 TWh in the same year (International Energy Agency, 2015).

5.7.2 Natural Gas Sector in Latvia

Gas supply system in this country is not connected to the EU common gas grid and there is still one main gas supplier – OAO Gazprom. The other supplier is ITERA Latvia, which delivers less than 25% of the total gas consumption in Latvia. ITERA Latvia is also controlled by Gazprom (ENTSOG, 2014).

The Latvian transmission system was designed in 1962 for annual consumption of up to 4 bcm, which is more than two times higher than it is in present. Modernization of this transmission system started in 1997 and has been carried out in the last decade. From 1997 until 2013, AS Latvijas Gāze had spent EUR 384.7 million to achieve this (ibid.).

Liberalization of gas market in Latvia, compared to the same process in Lithuania, is much more affected by the possible consequences on relations with the Russian Federation. The implementation of the rules of the Third Energy Package is therefore much slower in this country. Latvia was granted a derogation from the Third Energy Package as an emergent gas market. Latvia and Estonia both opted for the ITO option, which allowed energy companies to retain ownership of their transmission networks, but made the transmission subsidiaries legally independent stock companies operating under their own brand name. These companies are also obliged to have different management and strict regulatory oversight. This was the most favourable option for Gazprom.

Dominant position on the market is hold by one company - JSC Latvijas Gāze (LG). This company was a part of Soviet era state-owned Gazprom. After reestablishment of Latvia's independence, LG was owned by the Latvian state. In 1997,

there was a decision to privatize LG and the company was sold to private stakeholders – AAS Gazprom and a consortium of energy companies created by the German companies Ruhrgas AG and PreussenElektra AG (E.ON Ruhrgas International AG). The proportions of shares held by each stakeholder has changed several times. Since the end of 2002, the Latvian state has no longer held any shares, because the last 3% of state owned shares were sold (Āboltiņš & Akule, 2014).

There were many factors which influenced Latvian privatization process. With the break-up of Soviet era, national gas consumption declined by 52 % and Latvijas Gāze was taking large credits from the Bank of Latvia and the World Bank to postpone insolvency. During the first round of privatization in 1997, privatization process followed the rules set out by the Latvian Privatization Agency (LPA). These rules proposed that Latvija Gāze would be privatized by attracting two investors and one of the investors had to be a gas supplier. Gazprom was realistically the only supplier of gas and the only supplier with LPA requirements. The second investor had to be a “strategic investor”, and E.ON Ruhrgas went to fill this role. Latvia's domestic policy was also quite positively inclined towards the acquisition by Gazprom, because the Latvian government was a centre-right coalition with more moderate views towards Russia than it might have been expected of the rightist government (read more Grigas, 2013 and Grigas, 2012).

According to Agnia Grigas, timing was another factor that set the context for Latvia's policy choices vis-à-vis Russia. For example, in 1997, the Russian army was still present in Latvia and the Latvian government did not want to risk any delay in its departure. A further factor was the fact that Latvian-Russian

border treaty was not ratified. This agreement was crucial for Latvia because Latvia's membership application to the EU would be jeopardized without it. In August 1997, three months after Gazprom's acquisition, a draft border agreement was completed (Grigas, 2012).

JSC Latvijas Gāze has exclusive rights on transmission, storage, distribution until 2017, and also a license for sale of natural gas. JSC Latvijas Gāze has also an unlimited and exclusive right to use Inčukalns underground gas storage (UGS) until 2017. Latvijas Gāze is the only player in the wholesale gas market with a market share of 100%. The same situation is on the retail market. Switching the supplier is therefore not an option. The price is indexed to oil derivatives (Pakalkaite, 2014). The largest consumers of gas are the power company AS Latvenergo and heat supply companies, as well as manufacturing sector. Riga region accounts for about 70 % of the total natural gas consumed in Latvia (ENTSO, 2014, p. 24).

In 2005, the Latvian parliament decided to liberalize the natural market by April 4, 2014. On December 3, 2009, Latvian parliament adopted another decision to postpone the liberalization of the natural gas market in Latvia until April 4, 2014. After an intensive discussion, on March 13, 2014 (two weeks before the deadline), the same parliament approved amendments to the Energy Law providing introduction of TPA in Latvia from April 4, 2014, and unbundling of AS Latvijas Gāze as of April 3, 2017, or earlier, in case the conditions of one major gas supplier and no connection to the common EU gas grid will not be fulfilled (Lithuania's energy minister concerned about gas market liberalization in Latvia, 2014). Latvian authorities stipulate that they are still obliged to 1997

agreement that guarantees exclusivity to the country's main supplier – Gazprom. The lack of progress in reform of the Latvian energy market is probably the major obstacle in integration of the Baltic region (Āboltiņš & Akule, 2014).

UGS Inčukalns plays very important role in natural gas sector in Latvia. This UGS started its operation in 1968. Its total volume is 4.4 bcm including working gas volume of 2.3 bcm. It is important to note that the Inčukalns does not belong to the Latvian state. It belongs to the stakeholders of JSC Latvijas Gāze, but the land is leased from private landholders. During the warm period of the year, which means during April – September, a part of received gas is injected into the UGS and the rest delivered directly to consumers. During winter, gas from the UGS is delivered to Latvian consumers as well as consumers in Estonia and NW Russia, and thus securing reliable gas supply for the whole region. Latvia has also a gas connection to Lithuania, but it has been used only in emergency cases. The enhancement of the Latvian-Lithuanian interconnection was realized in early 2013 by increasing the cross-border capacity to more than 6 mcm/day in both directions. Nowadays, further enhancements are planned: between Daugmale and Iecava and between Estonia and Latvia. Both projects are parts of PCI list of the European Union (ENTSOG, 2014, pp. 26-27).

Questions of modernization and expansion of Inčukalns are very sensitive topics in the whole Baltic region. There are two main aims: technical upgrade, and increase of gas withdrawal capacity up to 35 mcm and increase of volume of working gas from 2.3 bcm to 2.835 bcm. New Inčukalns will not only boost security of supply in the entire East-Baltic region, but also will

improve efficiency of the regional LNG in Klaipeda. There is an expectation that around 200 mcm of gas coming from Klaipeda will be stored in the UGS. After completion of the interconnection between Finland and Estonia, gas supply security for Finland will also be improved because gas reserves can be kept in it. For these reasons, modernization of Inčukalns was part of the framework of European Energy Programme for Recovery (EEPR), and this project is included in the list of EU PCIs (total estimated costs – 376.5 million EUR) (Latvijas Gāze, 2015).

The key problem in these plans is a lack of progress in the reform of Latvian energy market, and prevailing very strong position of Gazprom on this market. Due to parliament's decision from March 2014, access to Inčukalns UGS remains under complete control of JSC Latvijas Gāze (respectively Gazprom) in the coming years (Dudzińska, 2015).

5.7.3 Reflection of the indicators

Russian state representatives actively supporting state-owned energy enterprises and their activities in a respective country

Yes. Especially in the case of Latvian opposition toward Nordstream. Along with other Baltic countries, Latvian representatives have pointed to the political motivations behind this project. Russian representatives have acknowledged both implicitly and explicitly the importance of political consideration in the decision to bypass the Baltic countries. For example, Viktor Kaluzhny, Russia's ambassador to Latvia pinpointed the failure to find a mutual political understanding between Russia and the transit countries, such as Latvia, as one of the key factors of designing Nordstream. „..Russia has never

advanced any preconditions to Latvia..... on the contrary, Latvian politicians have demanded on every occasion that Russia, above all, must apologize for the occupation [of the Baltic countries in 1940]" Kaluzhny claimed (Sprūds, 2006, pp. 116-117).

The foreign supplier rewarding certain behaviour and linking energy prices to the client state's foreign policy orientation; Abusing infrastructure (e.g. pipelines) and offering different pricing to exert pressure on the client state

Yes. These indicators are valid for Latvia. In early 1990s, the Baltic states benefited from lower gas prices than those in other Western States. Prices in Latvia had increased by the 2000s. The increase in gas prices was particularly notable after the accession to the EU and NATO. The most visible comparison is between 2005 and 2007, when the price of gas imports rose to 2.4 times their 2005 rates (Grigas, 2012, p. 11). Developments in the natural gas sector in Latvia have reflected the overall character of Latvian-Russian political relations (Sprūds, 2006).

Efforts to take control of energy resources, transit routes and distribution networks of the client state; Disrupting (through various means) alternative supply routes/sources of supply

Yes. These indicators are also relevant for Latvia because of monopoly position of Latvijas Gāze in the Latvian gas market and Gazprom's shares in this company.

Efforts to gain a dominant market position in the client country

Yes. The three national gas companies, Eesti Gaas, Latvijas Gāze, and for many years also Lietuvos dujos, served as monopoly distributors, which purchased gas from Gazprom and delivered gas to households and business. The ownership of these companies was quite similar. In each company Gazprom owned significant shareholdings, which it acquired through incremental purchases of Itera. This company has not transparent ownership structure, but is generally believed to be a Russian company which was previously close to Gazprom. The other main investor in the Baltic gas companies was E.ON Ruhrgas which had a complex relationship with Gazprom and Itera (Grigas, 2012).

Efforts to eliminate competitive suppliers; Acting against liberalization

Yes. These indicators are relevant in the case of Latvia. For example, in 2014, Gazprom's officials actively lobbied for postponing of liberalization process in Latvia. On the other hand, some Latvian business lobbies also played a significant role in this process. This is because they have historical relations with Russian firms coming from the Soviet era.

Preference for long-term bilateral agreements and "take-or-pay" contracts;

Yes. This indicator is relevant for Latvia, especially provided that the Russian Federation is the country's only supplier of gas.

Diminishing the importance and influence of multilateral regimes like that of the EU

Yes. For example, in the case of reform of the Latvian energy market, Gazprom and Itera did not agree with the rules of EU's Third Energy Package.

Attempts to control the entire supply chain (regardless of commercial rationale)

Yes. This situation is most apparent in the Russian attempts to control Latvijas Gāze via Gazprom's share and also via Itera's share (read more in previous sub-chapters). Nowadays, Gazprom controls country's gas supplies and the possibility to use its infrastructure, which is important for the whole Baltic region.

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5.8 Country Case Study: Lithuania

Veronika Zapletalová

5.8.1 Introduction

Baltic energy sectors are quite specific among others within the European Union. They are connected not only in terms of their similarity but also in terms of their setting, and mainly due to historical ties with the Russian Federation or the Soviet Union respectively. Thanks to these reminiscences, the Baltic region forms a so called “energy island” on the current energy map of Europe.¹ Efforts to overcome this isolation, to build a functional and effective interconnection with the European network, as well as the aim to break the influence of Russian energy sector, is the main challenge these three countries face. The following passage is dedicated to Lithuania, which represents an exception among the Baltic States, especially regarding its attitude towards liberalization of their gas market.

Lithuanian energy sector is, except for the above mentioned characteristics, limited by other factors, which will be now discussed. Firstly, the primary source of energy is absent in Lithuania, which makes it one of the most energy-dependent countries of Europe. In 2012, the country's dependency reached 75%. In the past, non-existence of domestic resources were at least partially covered by production of electricity using nuclear power plant Ignalina. Nevertheless, after the completion of accession negotiations with the EU, the two units of this power plant were closed. Lithuanian government tries to revert this

¹ The European Union defines the energy island as: „space with an area of at least one square km, which is located at a distance of at least one kilometer from the continent, having at least 50 inhabitants, which is still not connected to the mainland and is not the capital city of the EU“ (EURELECTRIC, 2012).

negative situation in two ways. First, it plans to build a new Visaginas power plant² in a medium-term time horizon, and secondly, it tries to reinforce the position of renewable energy sources in the Lithuanian energy mix (in the context of fulfilling its Union commitments). It is estimated that until 2030 the proportion of RES could increase from 23% in 2013 to the level between 25 - 45% of TPES (International Energy Agency, 2014).

Secondly, since the restoration of sovereignty, the overall energy consumption in the country has been significantly decreasing thanks to the reduction of energy demands. Until 2012, the total primary energy supply had been reduced for more than 50% compared to the 1990. After the closure of the Ignalina NPP, the energy mix of the country consists mainly of crude oil as well as of natural gas, besides the already mentioned renewable energy sources. The share of the natural gas had been more or less constant since 1990, while it has been slightly increasing since 2000. The turning point occurred after the mentioned decommissioning of Ignalina nuclear power plant, when the proportion of the natural gas increased to nearly 40%. Its share in electricity production has also increased, with natural gas displacing mainly oil, and since 2010 it has also substituted the production capacity of the Ignalina NPP. Specifically, a sharp increase might be observed between 14% in 2009 and subsequently 55% in 2010 (ibid.).

² See more on the plan of building a nuclear power plant in Lithuania in the part dedicated to nuclear power sector.

From the previous lines it is more than obvious that the importance of natural gas in the Lithuanian energy sector has been increasing in the recent years, which, regarding the zero country's production, entails the risk of import dependency.

Thirdly and lastly, it is the distinctive view of national energy security which to a great extent forms Lithuania's attitude towards natural gas. Specifically, it is mainly the mentioned import dependence on foreign supplies. More or less, all the strategic government documents address this situation in a certain way and strive to somehow eliminate the risk of import dependency. Ensuring energy security in terms of sufficient energy supplies thus became a part of the overall security policy of Lithuania. In practice, this approach to the Lithuanian energy sector is reflected in the building of a floating LNG terminal that has become one of the government's priorities, as well as in the efforts to maintain strategic governmental shares in dominant energy companies operating on the Lithuanian market (Janeliunas & Tumkevič, 2013).

5.8.2 Natural Gas Sector in Lithuania

As it has been already mentioned, Lithuania does not have its own gas production on its territory. Overview of consumption, import and the share of gas in TPES is shown in the following Table 5.8.1.

All PNG is imported via Belarus using the Kolovka gas grid, through which gas is supplied also to Kaliningrad Oblast. This gas transit from Russia to Kaliningrad Oblast serves as a sort of guarantee of gas supply to Vilnius, since any interruption to Lithuania would directly affect Kaliningrad. Lithuanian government has used Kaliningrad's

reliance on Lithuania for gas, oil, and electricity transit and supply, as a bargaining tool with Moscow in the 1990s, and again in the more recent years. Gazprom is trying to reduce this comparative advantage of Lithuania due to its plans for building LNG terminal in Kaliningrad (Grigas, 2013).

Tab. 5.8.1: Natural Gas in Lithuania - Overview of Consumption, Import and TPES Share

	Production (bcm)	Import (bcm)	Consumption (bcm)	Share of Gas in TPES (%)
2010	0	2.999	2.991	35.3
2011	0	3.280	3.271	37.2
2012	0	3.197	3.194	36.0

Source: *International Energy Agency, 2014*

The Minsk-Vilnius gas network has a capacity of 8 bcm yearly. The Lithuanian gas system is still separate from the other EU countries except for one connection to Latvia (Kiemėnai) which is used as an emergency in case of disruption of gas supplies or in case of an increase in demand. Lithuania plans to build the Poland-Lithuania gas interconnection probably by the end of 2017.³ This pipeline is very important for Lithuania, especially due to its ambitions to become a regional gas hub. Due to this plan, Lithuania also supports the building of the Estonia-Finland Baltic connector. The launch of

³ For many years Warsaw has been lukewarm about the project due to projected gas over-supply in 2017-2020 in Poland. Gas Interconnection Poland-Lithuania (GIPL) is planned as a 562 km long pipeline with the capacity of 2.3 bcm. The project could ensure increased competition among gas suppliers in Lithuania by providing the customers with diversified gas supplies and access to the EU gas spot market in the North Sea basin. This pipeline would also afford Lithuania an access to the benefits LNG terminal at Swinoujście. Poland's Gaz System and Lithuania's Amber Grid received EU funding amounting to EUR 10.6 million for preparatory work on GIPL (Tuohy & Bryza, 2013, pp. 6-7).

these projects would allow Lithuania to gain access to the regional market and sales potential of 25 bcm of gas per year (ENTSOG, 2014, pp. 30-31).

The value chain of the natural gas market consists of gas supply, transmission and distribution. Natural gas is imported to Lithuania by five companies, including three gas supply companies: AB Lietuvos dujos (in 2013 imported 37% of Lithuanian gas), UAB Dujotekana and UAB Haupas, and two major importers AB Achema (in 2013 imported 40 % of Lithuanian gas) and UAB Kauno Termofikacine Elektrine (Kaunas Combined Heat and Power Plant, which import mainly for own needs). For a long time, gas sector made a little progress in Lithuania. The market concentration was maximum, i.e. Lithuania was fully dependent on the sole gas supplier, Gazprom OAO, though gas was partly bought through LT Gas Stream AG. Some gas companies were licensed as gas suppliers, but in real terms, gas quotas were shared between Lietuvos dujos AB and Dujotekana UAB. In 2010, the sole company, Lietuvos dujos AB, was licensed as the Transmission System Operator for the entire territory of the Republic of Lithuania. The same firm – Lietuvos dujos AB – was also the number one in the distribution of gas. It had around 99% of the distribution market share. Some other companies were entitled to engage in distribution activities, but they provided distribution services only in individual regions and their total distribution market share was 1% (ibid., p. 30).

The situation changed in 2011, when Lithuanian government revealed its plans to implement the EU Third Energy Package. Lithuania was the first among the Baltic countries to have started the implementation of this

liberalization provisions, hoping for a more robust gas market as soon as possible. One of the key point of the Third Energy Package was „unbundling“. Lithuania adopted amendments to the country's laws on natural gas and it plans the unbundling in its strictest version, which requires the separation of the production, trade and transmission of gas (Grigas, 2012, pp. 13-16).

In practice, this decision leads to a limitation of Gazprom's influence in the Lithuanian energy sector, because of changing of the position of the monopoly company Lietuvos dujos. This company is largely owned by Gazprom (it holds 37.1% of the shares, while German E.ON holds 38.9% of the company and the Lithuanian government owns 17.7%). According to the Package, a new company was established – Amber Grid – which was spun off from Lietuvos dujos. Moreover, the decision-making rights regarding the transmission business were shifted to the Lithuanian State. After the implementation of gas directive, Gazprom sold its share in Lietuvos dujos to the Lithuanian government (Main gas pipelines in Lithuania will be transferred to new company Amber Grid, 2013).

5.8.3 Reflection of the indicators

Russian state representatives actively supporting state-owned energy enterprises and their activities in a respective country

Yes, Russian state representatives (even Vladimir Putin) were very active and tried to lobby Lithuanian Government and public opinion during the implementation of the Third Energy Package, and also during the preparation of the project of the floating LNG terminal (read more, for example, Grigas, 2013).

The foreign supplier rewarding certain behaviour and linking energy prices to the client state's foreign policy orientation

Yes, Lithuanian liberalization attempts were seen in a very negative light from Russian point of view. For example, at the beginning of 2011, Vice-president of Gazprom, Valery Golubev, announced that the holding company will sell gas to Latvia and Estonia 15% cheaper than to Lithuania. The reason for such a decision was, according to Golubev, an "inadequate" Vilnius's behaviour while restructuring the gas sector, and trying to separate the gas transfer pipelines from SC Lietuvos dujos. In August 2013, Lithuanian Minister Neverovič announced the completion of expert negotiations with Gazprom and he was waiting for a specific offer from the Russian company. He also emphasized that Lithuania is paying the highest price for gas in Europe (20% more than Germany and up to 35% more than Latvia) (Staselis & Zinios, 2012a).

In March 2012, Gazprom took Lithuania to international arbitration at the UN, according to UNCITRAL rules, over the plans of Vilnius to dissolve Lietuvos dujos, and disagreements over heat tariffs in Kaunas, where Gazprom owns a thermal power plant. This arbitration ended in April 2015, when Gazprom canceled it. According to Gazprom, this arbitration was no longer relevant, since Gazprom had profitably sold its interests in Lietuvos dujos and its associated gas network operator Amber Grid (Grigas, 2013, p. 76).

The officials of the Lithuanian government unofficially confirmed that they understood such statements as a declaration of war. Therefore, without waiting for Latvia's or Estonia's self-determination on restructuring the gas sector, the three most important decisions were made: to report Gazprom to the

Directorate-General for Competition of the EU on account of applying discriminating gas prices; to build an LNG terminal in Klaipeda for “national necessity,” and to turn, with a claim, to the Stockholm Court of Arbitration (Staselis & Zinios, 2012b). In 2014, Lithuania obtained a price reduction to 370 USD per thousand cubic meters, but more important will be the renegotiation of gas contract with Gazprom at the end of 2015 (Martewicz & Strzelecki, 2014).

Lithuania's aim in gas sector is not only to enhance the energy security of the state, but also to strengthen its position as a regional leader, a role for which Lithuania is consistently striving. For example, gas network operator Amber Grid is expanding the Klaipeda-Kuršėnai pipeline as a part of infrastructure connecting the Latvian gas storage facility in Inčukalns, which should serve as a basis for cooperation in the region. However, there is one big problem in Lithuanian plans – Gazprom. This Russian company has the monopoly of Latvijas Gaze, which has a unique access to the storage facility. For this reason, Lithuania also plans to build its own storage capacity in Syderial (Telšiai) with the capacity of 0.5 bcm (Dudzińska, 2015).

Abusing infrastructure (e.g. pipelines) and offering different pricing to exert pressure on the client state

Yes, especially in 2011, while Lithuania was trying to restructure the gas sector (see above). The Lithuanian long term gas contract is set to expire at the end of 2015. In this context, Energy Minister Rokas Masiulis said that a new contract with Gazprom could be concluded for a period until 2019 and he stated that the current talks with Gazprom are not as important as those which had been before, due to a new LNG terminal

and a gas contract with Statoil. He expected that this new situation would lead to a decrease in Gazprom's price of natural gas for Lithuania (Talks with Gazprom not as important as before, Lithuanian energy minister says, 2015).

Efforts to take control of energy resources, transit routes and distribution networks of the client state

The answer regarding this indicator could have been „yes“, until a new gas law was implemented in 2011. After that, Gazprom lost its position in the market and also lost its position as a dominant importer of gas to Lithuania.

Disrupting (through various means) alternative supply routes/sources of supply

Yes, especially in the case of floating LNG terminal in Klaipeda. This LNG unit was assessed by Elering Pöyry's report in 2012 as the most advanced of any LNG project in all Baltic States. In December 2012, the outgoing government of Prime Minister Kubilius convinced Lithuanian parliament to pass a law to protect the future LNG terminal against Gazprom's potential unfair trade practices (e.g. export subsidies) by requiring Lithuania's largest gas consumers to procure 25% of their gas from the terminal. Of course, Gazprom was not satisfied with this law and lobbied against it, arguing that it will “severely restrict and distort competition” (Tuohy & Bryza, 2013, p. 8).

At the end of 2014, the floating LNG re-gasification terminal was launched rented by Norwegian company Hoegh. Lithuanian government signed a lease on it for 10 years with the possibility of a renewal at a cost of app. USD 690 million. There are assumptions that in 2015 the terminal will take in up

to 1.5 bcm, which means around half of the annual Lithuanian consumption of gas (in 2012 - 3.194 bcm). Moreover, terminal's capacity is 4 bcm/y. This number corresponds to 80% of the demand of gas in all of Baltic States (Dudzińska, 2015).

The profitability of this terminal is quite questionable. Lithuania has some plans to re-export certain amount of gas, but Latvia has not shown any interest, as there is still no gas connection to Poland, and Gazprom's plans to build its own LNG terminal in Kaliningrad. In 2015, it is expected that the revenue from re-gasification will be up to EUR 5.4 billion. It means that only one-twelfth of the annual cost will be covered. Despite these economic problems, Lithuanian motivation for a working LNG terminal lies mostly in providing itself with alternative supplies of gas (EurActiv, 2014).

Efforts to gain a dominant market position in the client country

Gazprom was holding the majority of the Lithuanian gas market via its share of Lietuvos dujos. After new gas law was implemented in 2011, Gazprom lost its position in the market and also lost its position as a dominant importer of gas to Lithuania. Situation changed due to opening of a new LNG terminal in Klaipeda and due to the gas contract with Statoil.

Efforts to eliminate competitive suppliers

For a long time, Gazprom has eliminated competitive gas suppliers because of holding all the transport routes thanks to its position in Lietuvos dujos. After implementation of the rules of Third Energy Package, the situation has dramatically changed (e.g. opening the LNG terminal in Klaipeda).

Acting against liberalization

Yes, especially in the case of Lietuvos dujos unbundling, Gazprom strongly opposed the implementation of the Third Energy Package. The most visible step in fighting with Lithuanian gas liberalization was the price of imported gas. For Lithuania it was around 15% higher than for the rest of the Baltic states, which chose to implement the Gas Directive after 2017. In this fight against Lithuanian liberalization, also indirect threats of international arbitration and media assaults were used.⁴ All Russian attempts failed and in May 2012 Gazprom and Lithuanian government came to an agreement regarding the unbundling (Grigas, 2012, p. 6).

Preference of long-term bilateral agreements and/or „take-or-pay“ contracts

Yes, Lithuania signed a long-term bilateral agreement on the gas supply from the Russian Federation. In 2004, the Lithuanian government negotiated a ten-year deal with Gazprom. This contract was signed according to a “take-or-pay” principle. Lithuania is contractually obligated to pay one year in advance, even if the negotiated amount of gas is not exhausted.

⁴ According to Agnia Grigas, Russian government often uses media to spread its own influence. For example, in Lithuania, there is a small minority of Russian speakers, but Russian capital has come to dominate the media. In 2009, the Russian-owned Lithuanian bank Snoras increased its stake to 34 per cent in the largest Lithuanian media group Lietuvos Rytas, which consists of the main daily newspaper, a television station, a news portal and several publications (Grigas, 2012, p. 10).

Diminishing the importance and influence of multilateral regimes like that of the EU

Yes, Gazprom was trying to diminish the importance and influence of the EU liberalization law, especially in the case of Third Energy Liberalization Package, and the position of Lietuvos dujos (see previous indicators).

Attempts to control the entire supply chain (regardless of commercial rationale)

Yes. This indicator could be seen especially in the case of privatizing Lietuvos dujos. The ownership of this company was the milestone in Gazprom's attempts to gain control over the majority of the Lithuanian market and also to control the whole supply chain in Lithuania. Lietuvos dujos was a strategic national enterprise, but it played less dominant role in the Lithuanian gas sector than Eesti Gaas in the Estonian or Latvijas Gaze in the Latvian gas sector. The reason behind this difference was that Lithuanian natural gas market had been open to competition since 1992 and there were other sizeable players in the market, such as Dujotekana, Stella Vitae and Vikonda (Grigas, 2012, pp. 49-53).

Privatization of Lithuanian national gas company Lietuvos dujos was marked by highly adverse and radical policies towards Russian investment. This long process started in 2000 and demonstrated the dominant role of partisan preferences of domestic political parties and their business interests. Before the privatization started in two phases, Lietuvos dujos was performing poorly, with debts around USD 100 million. Provisions for the first sale of a 34% share were published in the fall of 2001, and indicated that the share will be allocated to a

strategic foreign investor from the West. The prime candidates Gaz de France and E.ON Ruhrgas with its close ties to Gazprom seemed as best competitors. With Gaz de France pulling out of the race at the end of 2001, E.ON Ruhrgas became the only contender and acquired the 34% stake in 2002 (ibid.).

The second phase regarded the 34% share, which was allocated to a commodity supplier by the privatization provisions. In those times Lithuania had no alternative gas pipeline infrastructure, therefore no Western investor could fully guarantee the gas supplies. The privatization provisions (the possible investor would guarantee the gas supplies) almost ensured that there would be only one buyer - Gazprom. The only other possible investor who was interested in Lietuvos dujos was another Russian company - Itera. From the government's point of view, Itera did not fulfil the tender conditions, especially those regarding at least ten years of experience in managing gas distribution systems. This condition was probably drawn up to exclude Itera, which otherwise would have been a contender, as it already had shares in both Eesti Gaas and Latvijas Gaze. This second phase of privatization was closed in 2004, when Lithuanian State Property Fund allowed Gazprom to participate in the tender and purchased the share package. After Gazprom's acquisition, Lietuvos dujos's share of the market increased the expenses of the other companies to 45% assuming the same importance as Eesti Gaas in Estonia, and Latvijas Gaze in Latvia.

Privatization was definitely determined by domestic political environment which represented the most influencing factor. The whole privatization process occurred under the Social

Democratic government, which favoured cooperative policies towards Gazprom or the Russian government respectively. This position was also reflected in their positive attitudes towards Russian investment, for example, in Mažeikiu Nafta and KHPP. On the other hand, there was Lithuanian rightist Homeland Union which completely opposed the growing influence of Russian companies in Lithuania, either when it was in the government, or in the opposition. However, due to its weak position in the domestic policy, they were unable to change privatization provisions set out by the Social Democratic Government from 2000 to 2004 (Grigas, 2012, pp. 49-52).

There were also other two factors which influenced the privatization process. Firstly, there were strong personal ties of a few Lithuanian businessmen with Gazprom, which had played an important role in Lithuania's policy choices through lobbying and potentially non-transparent funding. Secondly, there were precedents set by privatizations of Eesti Gaas and Latvijas Gaze, and also the earlier sale of MN to American energy company Williams (*ibid.*).

Taking economically irrational steps in order to maintain a certain position in the client state's market

No, e.g. after liberalization of the Lithuanian gas market, situation became less favourable and Gazprom therefore sold its stakes in Lietuvos dujos.

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5.9 Country Case Study: Moldova

Martin Jirušek

5.9.1 Introduction

The Republic of Moldova emerged as a sovereign state after the dissolution of the Soviet Union at the beginning of the 1990s, but follows the earlier state history, especially in medieval times, when Moldova played an important role as a defence against Ottoman Empire. The bulk of the country lies between the river Prut on the west and the Dniester River, which also forms a natural border of the separatist region of Transnistria. This part of Moldova forms a problematic region, unilaterally self-proclaimed as independent and strongly leaning towards Russia. The unwillingness of this region to separate from the former Soviet Union at the times of its dissolution eventually led to military clash between Moldova and this region supported by Russian military troops. The conflict was ended by ceasefire in 1992, but the troubled status of this region has affected the country's situation up to the present day, not only in the energy sector (Upsala University, n.d.)¹. In the energy sector, the situation is being complicated by the fact that the country has strong infrastructural ties to Ukraine. Namely the electricity transmission system, which is synchronized with Ukraine, and gas pipeline system, which operates at pressures different from neighbouring countries.

The symptomatic feature of majority of the post-communist countries in the region - strong dependency on Russian energy sources – is very much the case of Moldova. In the gas sector,

¹ Russia still keeps its troops in the region as a peacekeeping contingent (Socor, 2013).

the dependency means that practically the whole consumption, which accounts for about 40% of country's total primary energy supply (U. S. Energy Information Administration, n.d.) is covered from Russian sources. Moldova itself does not produce any gas at all. The only connections with neighbouring countries that would potentially offer gas from different source are used for transit further to Europe. Additionally, Moldova does not have any gas storage capacity to defend itself against gas supply disruptions². Only recently, so called Iasi-Ungeni gas interconnector between Romania and Moldova was built between August 2013 and August 2014, and put into service at the end of March 2015, delivering gas at a price competitive with that charged by Gazprom³. However, to have real impact on Moldavian gas import portfolio, this interconnector needs to be extended further to the main centres of consumption. The final extension reaching the capital of Chisinau is expected to be ready in 2018⁴. For operating the pipeline, a new company, Vestmoldtransgaz, was founded by the Moldavian government in order to comply with the so called 3rd liberalization package. When ready, this pipeline may serve up to 50% of Moldavian gas imports which are now slightly above 1 bcm/year, with additional 1,3 bcm consumed in the region of Transnistria. This will improve the country's energy security, as Moldova might be able to get gas supplies other than those of Russian origin.

² Moldova is entitled to use some gas stored in Ukrainian storages, however, it is not likely that Ukraine will make this gas available to Moldova if disruptions of Russian gas occur (Calus, 2014).

³ The price is said to be USD 260/1000 bcm (Natural Gas Europe, 2015).

⁴ The existing portion is 43 km long, costs around EUR 26 mil., and was partly financed by the European Union. To complete the whole project that will be able to supply Moldova with up to 1,5 bcm/year, another more than 100 km need to be built. Chances are, however, that Gazprom will try fend off non-Russian gas, at least until the rules of the 3rd liberalization package are implemented (information based on a field research conducted in March 2015).

However, to make this happen, due to different pressure in Romanian gas network, a compression station needs to be built along with the pipeline extension (Info Market, 2015; information based on a field research conducted in March 2015). The legislative framework for the new pipeline is yet to be sorted out though. Potential obstacle might also be the position of Moldova Gaz that is unlikely to give up its positions to the new company once it is able to reach major customers (Surugiu, 2011; Sुरुceanu, 2012; Zadnipru, 2011).

In the last decade, the prices Charged by Gazprom have been rising from what was a fraction of a typical European price (USD 60/tcm) to “European levels” of USD 368/tcm today (Calus, 2013) (Radio Free Europe, Radio Liberty, 2015). Allegedly, the steep rise was accelerated by worsening mutual relations between Moldova and Russia (information based on a field research conducted in March 2015) triggered by the then Moldovan president Voronin rejection of the so called Kozak Memorandum in 2003, which was a Moscow's attempt to settle down the dispute between Moldova and Transnistria (Calus, 2013; information based on a field research conducted in March 2015).

Tab. 5.9.1: Moldovan Gas Infrastructure



Source: *Gazprom*, 2012

The Moldavian natural gas sector is dominated by the company called Moldova Gaz, which is formally responsible for natural gas management in the whole country. On the right bank of the Dniester River it is Moldovatrangas, and in Transnistria it is Tiraspoltrangas. This company is divided between three shareholders, out of which Gazprom holds 50%⁵, Government of the Republic of Moldova holds 36,6%, and

⁵ In fact, Gazprom holds 50% + 1 share according to consulted Moldova-based energy experts and employees of the Ministry of Economy (information based on a field research conducted in March 2015).

Tiraspoltransgas from the autonomous region of Transnistria holds 13,4%. This setting basically gives Gazprom the control over the whole Moldavian gas sector. To make things more complicated, the biggest power plant, Cuciurgan, with the capacity of more than 2500 MW of electricity, lies in the region of Transnistria. This gas-fired power plant has been owned by a Russian company Inter RAO UES since 2004 (Calus, 2014) and lies directly on the main pipeline bringing gas to Moldova (see the respective chapter dealing with the electricity sector). The problem here is that Transnistria does not pay for the gas supplies, but the debt is charged to government in Chisinau, which has very little power to change the situation. The situation is quite unclear due to the status of the region of Transnistria, which is formally recognized by Russia, but according to the original supply contract, which has been extended every year since its original end in 2011, it is the government in Chisinau that is liable for the debt. Meanwhile, the debt has reached about USD 3-4 billion, which adds up to the debt of Moldova itself that owes around USD 400 million. In 2012, Russian Deputy Prime Minister Dmitry Rogozin said that until Chisinau does not recognize Transnistria, it is liable for its debts (RBC.ru, 2012).

The origins of Gazprom's presence in Moldova basically dates back to the first half of 1990s. In 1995, Moldovagaz started to accumulate the debt when Gazprom was charging unusually high fines for late payments. As the company (i.e. the government) was unable to repay the debt, Gazprom acquired shares in the company as a compensation (information based on a field research conducted in March 2015). The strong anchor of Gazprom in Moldova in combination of strong Russian

influence in the country also influences the procedure of unbundling⁶. In this regard, according to consultations conducted in the country, Moldova is favouring the unbundling only officially, but unofficially the strong lobbying opposition is slowing down the whole process.

The de facto majority share of Gazprom and friendly subjects in Moldovagaz, unilateral dependency on Russian gas troubled Russian-oriented region of Transnistria producing majority of Moldavian electricity and often corrupted elites generally put strong tool to exert pressure on Moldova. The complicated reality has been illustrated by numerous events. As Moldova is still an important transit country for gas export southward, it tried to increase the transit fees but was strongly discouraged from doing so (information based on a field research conducted in March 2015). Probably the finest example is the current state of Moldavian gas import contracts. The original long-term contract expired in 2011 and since then it has been only prolonged year by year⁷. This situation is caused by the Gazprom's reluctance to sign a new deal related to the fact that Chisinau has shown its willingness to implement the so called 3rd energy package⁸ and is a member of the Energy Community; an undesirable situation for Gazprom and its traditional business model since the 3rd package rules will result, among other consequences, into dividing the Moldova Gaz (Calus, 2014; Gazprom, 2014; information based on a field research conducted in March 2015). The uncertainty in terms

⁶ Separating production and distribution – one of the key principles of liberalization within EU energy market. See above in respective chapter.

⁷ The latest prolongation was agreed upon in November 2014 and secured gas supplies until the end of 2015 (Natural Gas Europe, 2014).

⁸ The full implementation is planned to be finished by 2020 (Calus, 2013).

of gas supply agreement surely puts a pressure on Chisinau especially with regard to the situation in neighbouring Ukraine.

5.9.2 Reflection of the indicators

Russian state representatives actively supporting state-owned energy enterprises and their activities in a respective country

Russian Deputy Prime Minister Dmitry Rogozin explicitly coupled Moldavian gas debt with settling the disputes on status of Transnistria between Chisinau and Tiraspol. He also personally discouraged Moldova from increasing transit fees claiming that it might have serious consequences (information based on a field research conducted in March 2015).

In September 2013, during his visit to Moldova, Rogozin said the following: “Take care not to freeze in the winter and not to lose a train in the vortex of European integration you are caught it” (Molnar, 2013), probably addressing Moldova's accession to the Energy Community. Such statement could easily be interpreted as a de facto tacit threat.

The foreign supplier rewarding certain behaviour and linking energy prices to the client state's foreign policy orientation

Leaning towards the European Union correlates with Gazprom's reluctance to sign a new long-term contract on gas since 2011, when the last long-term agreement expired. Steep incline in gas prices correlates with worsening of mutual relations triggered by non-signing of the so called Kozak memorandum in 2003 (information based on a field research conducted in March 2015).

The era of pro-western orientation of Moldovan foreign policy, especially since the signing of the Association

Agreement with the EU, also correlates with a number of other economic sanctions that Russia imposed on Moldovan exports, workforce, etc. (Calus, 2014).

Abusing infrastructure (e.g. pipelines) and offering different pricing to exert pressure on the client state

The misuse of infrastructure is visible in several regards. Foremost, the fact that gas used in Transnistrian power plant of Kuchurgan is not being paid by the plant operator and the debt is not charged to the officials in Transnistria but to the government in Chisinau. The fact that Moldova is basically dependant on the single pipeline bringing gas from Russia is used in the current dispute over a new long-term agreement on gas supplies (see above).

Efforts to take control of energy resources, transit routes and distribution networks of the client state

Gazprom succeed in acquiring control over Moldavian gas sector, as it used its position and Russian-leaning elites to assume control in Moldovagaz. Although the way this was achieved may be seen as purely commercial, the fact that in 1990s Gazprom charged unrealistically high fines and subsequently exchanged the debt for shares points to, at least, violation of fair commercial principles.

Disrupting (through various means) alternative supply routes/sources of supply

The issue of gas supply diversification through the Iasi-Ungeni interconnector is part of a bigger picture of Gaszprom's efforts to protect its dominance over Moldovan energy market.

Gazprom controls basically the whole Moldovan gas sector through its majority stake in Moldovagaz, but implementation of the 3rd liberalization package requiring decoupling transmission, production and sale was postponed to 2020, partly as a result of a pressure exerted directly by some Russian officials (EurActiv, 2012) or indirectly by Gazprom's reluctance to sign a new long-term agreement on gas imports. The newly established TSO Vestmoldtransgaz operating the interconnector will therefore probably encounter some obstacles in the effort to get the non-Russian gas to the market⁹. One of them might be exerting pressure on consumers that would like to change the gas supplier. It is likely that Moldovagaz might use debts that many consumers, including industry, have generated so far to prevent them from leaving (Mihalache, 2014).

Efforts to eliminate competitive suppliers

Since Moldovagaz is in majority ownership of Gazprom and is in charge of supply, transmission and distribution, it is likely that it that it will problematize supplies of non-Russian gas into the network when the extension of Iasi-Ungeni pipeline is built. The issue is very much interconnected with the implementation of the 3rd energy package rules due to which Moldova already founded a new transmission system operator (TSO) of Vestmoldtransgaz to take care of the supplies through the newly built pipeline. Gazprom has shown its opposition against implementing the rules in Moldova several times in the past (Tanas, 2013).

⁹ This assumption actually proved to be correct right from the start when the Iasi-Ungheni pipeline was inaugurated in August 2014. The rather sluggish activity of Moldovagaz – a company controlled by Gazprom – was preventing the gas flow at that time (Barbarosic, Coalson, & Jozwiak, 2014).

Preference for long-term bilateral agreements and „take-or-pay“ contracts

Contrary to the traditional perception of Gazprom favouring long-term contracts for their stability and rigidity, this is not the case of Moldova, which has not signed a new long-term contract since the previous one expired in 2011. On the other hand, the fact that Gazprom has been refusing to sign a new long-term contract as a reaction to Moldovan strengthening of relations with the EU points to the fact that gas supplies are misused as a leverage in this regard. This leaves a great deal of uncertainty in mutual gas relations.

Diminishing the importance and influence of multilateral regimes like that of the EU; Acting against liberalization

Implementing of the 3rd liberalization package and ultimately the rules of the EU internal energy market is clearly not a desirable situation for Gazprom. The fact that Moldova committed itself to implement the rules is perceived as the main reason why the negotiations on new gas import deal has been stalled and no new long-term contract has been signed so far. Similarly, the postponement of the third package implementation is perceived as a result of Gazprom's pressure exerted on Moldova as the issue of possible gas price cuts was openly coupled with non-implementation of the internal market rules by the Russian side (EurActiv, 2012).

Taking economically irrational steps in order to maintain a certain position in the client state's market

Gazprom is charging debts generated by the power plant in Transnistria to the government in Chisinau, which is, strictly speaking, not against economic logic, but rather unreasonable, since it clearly creates basis for disputes and increases tension between Moldova and the region of Transnistria.

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5.10 Country Case Study: Poland

Veronika Zapletalová

5.10.1 Natural Gas Sector in Poland

In Poland, the role of natural gas has been relatively minor, and per capita consumption is a consequence of the predominance of cheap local coal in the country's energy industry.

In 2013, consumption amounted to 16.7 bcm, which is comparable to the consumption in 2012 – 16.6 bcm. Poland's own production was 4.2 bcm (4.3 bcm in 2012) and the rest of demands were covered from imports, 9.6 bcm of which was purchased from Russia, 1.8 bcm came mainly from Germany. The production on this level is expected to continue in the following medium-term time horizon. Not even the plans for shale gas production, which have appeared in Poland in recent years, changed anything about this arrangement. Due to the problems which accompanied the whole proces, the original optimistic expectations about the role of Poland as „Central European Qatar“ had been significantly reduced. Poland is among the least advanced EU member states in terms of market liberalization, especially because of slow diversification and slow market opening. The Polish wholesale market has not been very attractive so far, mainly because of its price regulatory status and its nearly monopolistic structure. Domestic market is monopolised by PGNiG, which, in practice, controls 100% of imported gas and accounts for over 95% of the domestic production. PGNiG is also the sole operator of the underground gas storage system. The TSO is Gaz-System S.A. which was certified as an ownership unbundled TSO in the

course of 2014. The rules on certification of independent system operators were adopted only recently in 2013. In 2013, distribution of gas was performed by 40 system operators including one incumbent system operator subject to legal unbundling. Legal form of Gaz-System is a joint-stock company (100% shares belong to the State Treasury) (Osička, Plenta, & Zapletalová, 2015, pp. 14-16).

A high level of concentration on the Polish gas market, mainly because of the dominant position of the PGNiG, is still influencing the structure of the retail market and the pace of changes taking place on the market. In 2013, about 94.42% of the natural gas sales were performed by PGNiG SA, while the remaining 5.58% were performed by other trading companies active on the market. In 2012, PGNiG SA's share in the sale of natural gas was equal to 95.22%, while the share of other companies amounted to 4.78%, which is the proof of slow changes occurring on the retail gas market (ibid.).

5.10.2 Reflection of the indicators

Russian state representatives actively supporting state-owned energy enterprises and their activities in a respective country

Russian officials, mainly represented by Vladimir Putin, have commented on the Polish gas sector in the recent years especially regarding the following issues: the future of Yamal pipeline, building of an LNG terminal in Świnoujście, Polish protests against Nordstream, and eventual development of Polish shale gas.

1) *The future and extension of Yamal pipeline*

The issue of building another branch of Yamal pipeline has been discussed since 2005, nevertheless, it has never gained clear outlines. The whole project received a fatal blow when the Russian side definitely decided to build the Nordstream gas pipeline. Since then, the issue of extending the Yamal pipeline remained on a rather theoretical level, provided that it will be extended when Poles double their gas import from the Russian Federation. More interesting situation occurred in 2013, when on April 3, 2013, Putin urged Gazprom to turn the attention to the building of Yamal II pipeline so that it would avoid the Ukrainian territory and reach Central European markets (Russian President Vladimir Putin entrusts Gazprom with getting back to Yamal – Europe-2 and gas branch to Kaliningrad Region projects, 2013).

Warsaw responded rather promptly: "No one, except for the Polish company [PGNiG] and the Polish government is entitled to make decisions about transit via the Polish territory," Treasury Minister Mikolaj Budzanowski thundered, according to RIA Novosti. "That's why we would like to tactfully remind that we are not going to build a new gas transportation network to Poland or the European Union on instructions from anyone, especially from Gazprom." Polish leaders thus acknowledged the whole situation negatively, stating they think it is a political move of the Russian side, which was supposed to increase the pressure on the Ukrainian government (Poland gives Gazprom cold shoulder in pipeline deal, 2013).

2) *Building of Świnoujście LNG terminal*

The fact that the building of Nordstream gas pipeline will have serious consequences on the development of their LNG terminals was often pointed out in Poland around 2010. Often mentioned was the relationship between the necessary depth of the draft of the vessels importing liquefied natural gas and the depth in which the Nordstream pipeline is laid (*Gazociąg Nord Stream blokuje rozwój portu w Szczecinie i Gazoportu w Świnoujściu*, 2012). Polish side pointed out several times that the shallow depth in which the pipeline is laid will significantly reduce the possibility of the arrival of large ships into LNG terminal. Poles repeatedly discussed this issue with Germany as well as with Russia. The Russian reaction was repeated multiple times by then Prime Minister Vladimir Putin. For example, in an interview with Russian daily Kommersant published on Tuesday 14th September 2010, Mr. Putin said “Unexpectedly, Poles have said now the pipeline should be going through the waterway at a much bigger depth than expected because in the future they plan to deepen their port and have larger ships use the waterway. Until now, they haven’t said anything of such intentions,” Mr. Putin reportedly said (Sobczyk, 2010).

3) *Polish protests against the Nordstream pipeline*

The long-term sharp disagreement of Poland with building of the Nordstream gas pipeline has been generally known. In April 2006, then Minister of Defence and Foreign Minister after – Sikorski – stated that “Poland has a particular sensitivity to corridors and deals above its head. That was the Locarno tradition, and the Molotov-Ribbentrop tradition. That was the 20th century. We don’t want any repetition of that.” From the

Russian side, representatives of Gazprom as well as political representatives commented on this issue. The Kremlin reacted by characterising the Polish attitude as “hysterical” while the German government called it an “absurd comparison” and the European Commission called it “unhelpful” (European Parliament, 2007). Mr. Putin claimed that building Nord Stream had been his dream for a long time and that he thought nothing would stop the project. During a Valdai Club meeting several years ago, Mr. Putin, still in his office as the president of Russia, rhetorically asked: “Why does everything have to go through Poland?” A pipeline through the Baltic Sea provides the only option for Russia to link its gas system directly with that of Germany, circumventing transit countries in continental Europe (Sobczyk, 2010).

4) Development of Polish shale gas

Comments of Vladimir Putin on this issue were part of the response on (eventual) shale gas revolution in Europe, when several EU member states have initiated exploration of shale gas resources on their territory. In Poland, the eventual production of shale gas was interpreted mainly in the context of strengthening the Polish independence from the Russian gas import. The commentators also noticed the transformation of rhetoric of Russian president towards Poland at the time when the issue of shale gas was much discussed (e.g. see rather harsh offensive of Russian government-controlled media towards Poland regarding the anniversary of the Katyn massacre, etc.). However, Putin alone remained convinced that the shale gas revolution would not influence the Russian interests in Poland or Europe respectively. At this time, Russian officials carefully

monitored primarily the political development in Poland, mainly for one reason.

As Wall Street Journal stated in 2010, the Kremlin realized that the question of how much shale gas will be extracted in Poland will depend on which political party wins the next elections in 2011. One option was the party of late Polish President Lech Kaczynski. He was an ardent nationalist, populist, anti-Communist, and a man who experienced deep personal pain over the Katyn massacre. Kaczynski made a point of attending commemorations at the site every year. The other option was the party of Prime Minister Donald Tusk, a pragmatist who was ready to be friends with everyone, except Kaczynski — the two refused to even speak to each other. And then, three days before the commemoration, the two prime ministers, Putin and Tusk, met at Katyn. They purportedly came in advance so as not to invite Kaczynski and to outflank him (Latynina, 2010). Donald Tusk's victory in 2011 elections should represent some kind of reassurance for the Russian Federation that the shale gas development in Poland will not be primarily aimed at forcing Gazprom out of being the main supplier of gas to Poland.

However, worsening Polish-Russian relations and a still more realistic possibility of shale gas being produced in Poland gradually caused change in Putin's attitude towards shale gas. But we must not forget that we refer to a period when Polish-Russian relations started to become more sober after a short warming up following the crash of an airplane with Polish elites in Smolensk.

The foreign supplier rewarding certain behaviour and linking energy prices to the client state's foreign policy orientation

Within the negotiations on long-term contract on gas supply which took place around 2010, the Russian side had a stronger position, mainly because the gas supplies from Ukraine to Poland were interrupted immediately after the gas crisis in 2009 and Poland was able to replace them only via the Russian Yamal pipeline. The Russian side was aware of this. Commentators therefore frequently mentioned that the Russian side often pulled the “Yamal card”, when it pointed out to the fact that Poland is directly dependent on the existence and functioning of the Yamal transit gas pipeline (Černoch, et al., 2011).

Abusing infrastructure (e.g. pipelines) and offering different pricing to exert pressure on the client state

Generally complicated relationship of Poland towards the Russian Federation in the field of foreign relations is reflected also in the issue of energy supplies. In this context, it is related especially to the development of situation in Ukraine in the recent years. Poland has long been a supporter of Ukraine's integration to the West European structures and still actively pursues this aim also inside the European Union. It is therefore not surprising that in 2013, the Polish government immediately adopted an uncompromising attitude towards the Ukrainian crisis, which was completely different from the attitude of the Russian officials. One of the steps taken by the Polish side was supplying Ukraine with gas by the reverse flow, with which Russia did not agree. For example, Gazprom and Russian President Vladimir Putin warned about the consequences in case EU member states went ahead with reverse-flow deliveries to Ukraine.

In the autumn of 2014, it seemed that Polish fears of the Russian revenge were fulfilled. In the first half of September 2014, the Polish state-owned company PGNiG announced that the decrease in gas supplies from Russia to the Polish network occurred repeatedly within a few days (20% on Sept. 8 and by 24% on Sept. 9.). As a response to the situation the Polish side stated that it was forced to stop the gas reverse flow to strife-torn Ukraine. Polish officials have also accused the Kremlin of using Gazprom to achieve its political ambitions in the region. Russia responded rather quickly. On Wednesday, September 11, Russia's state gas monopoly Gazprom denied Poland's allegation of reduced gas supplies (Tully, 2014).

"Currently exactly the same volume of gas is being delivered to Poland as on previous days - 23m cubic metres daily," Gazprom said in a statement quoted by Russia's Ria Novosti news agency. In that time, Poland asked Russia for extra gas supplies because of a cold snap, but Gazprom refused, saying it did not have enough gas to pump into Russia's underground storage tanks (Russia reduces gas exports to Poland, 2014).

Of course, the situation is not as straightforward as it may seem from the above mentioned description. At that time, Poland was not the only country which supplied Ukraine with gas. Significantly larger reverse flow supplies flowed to Ukraine through Hungary and Slovakia. However, neither of the countries reported any supply interruptions. Therefore there appeared a few opinions that it was a purposeful desinterpretation from the Polish side, which aimed at discrediting the Russian supplier.

Efforts to take control of energy resources, transit routes and distribution networks of the client state

Applicable only on transit pipeline. Irrelevant for the other parts of Poland, because production and distribution is now in the hands of Polish state-controlled companies. Concerning the transport routes, Russian gas is transported to Poland through Yamal transit pipeline, with Germany being the final destination. The pipeline should remain in operation at least until 2035. It was Yamal pipeline which became the main tool of Gazprom's strategic actions on the Polish market, and de facto has remained that way until today. In this respect, it was/is crucial for the Russian Federation to maintain its position in the ownership structure of Yamal transit pipeline.

Disrupting (through various means) alternative supply routes/sources of supply

Yes. The Polish market has still a limited access to supplies other than those from Russia (through either Belarus or Ukraine), but some progress has been made in the recent years (especially connection with the Czech Republic and with Germany). The efforts to restrict Poland's room for maneuver in case of building routes for gas supplies was apparent in on the case of building of Nordstream as well as in the process of renegotiation of the supply contract.

Efforts to gain a dominant market position in the client country

None. This indicator is irrelevant in the light of the setting of the Polish gas market, where the key company – PGNiG – is in the hands of state. As long as the liberation of the Polish market

is concerned, the process is rather slow. In 2012, for example, PGNiG's share was 95,22%. Russian companies have been long unable to penetrate the Polish gas market directly. They indirectly tried to achieve it in 2008 when they tried to sell gas directly to a chemical plant in Puławy through a Hungarian company Emfesz, which is directly connected to Gazprom. However, this contract was cancelled without being fulfilled, due to formal reasons (Osička, Plenta, & Zapletalová, 2015).

Efforts to eliminate competitive suppliers

Currently, Russian gas in Poland is the most preferable choice due to its cost. The “Qatari contract” which Poland has signed on gas supplies is quite uncompetitive, regarding its scope as well as the price. However, Poland negotiates on the supplies from the USA (see the subchapter on arbitration with Gazprom).

Acting against liberalization

In Poland, liberalisation and market opening takes place very slowly, despite the fears of penetration of foreign investments (including Russian ones) on the Polish market. In this regard, Gazprom is rather a supporter of liberalization of the Polish market, but of course, this is meant only for downstream. Liberalisation of Yamal pipeline is strongly refused.

Diminishing the importance and influence of multilateral regimes like that of the EU

Yes. All the sub-indicators primarily comprise the situation connected to the long-term renegotiations of the contract with the Russian Federation between GazSystem and Gazprom

from 1993 (Agreement between the Government of the Republic of Poland and the Government of the Russian Federation on construction of system gas mains for transit of Russian gas through the Polish territory and supplies of Russian gas to the Republic of Poland - "IGA"). Renegotiations took place around 2009/2010, i.e. immediately after the gas crisis, when Poland's position was not very stable, also thanks to the fact that they had to replace the existing amount of supplies from Ukraine with supplies from a Russian supplier. The first version of the contract was fairly unfavourable for Poland (2009 - February 2010 round of negotiations), and it was also criticized by the European Commission, mainly because there was a suspicion that in case the provisions of the contract were put into practice, a significant breach of the EU liberalization principles would occur (July 2010). The European Commission even warned Poland that if they will not remove the controversial provisions, they would bring the case to the European Court of Justice. There was a conflict on the Polish political scene between the main negotiator Minister Pawlak and Minister of Foreign Affairs Sikorski (he agreed with the contract, however, only under the condition that the EU norms would be given the highest priority). After the European Commission's investigation a new round of negotiations took place (September 2010 - October 17, 2010) between GazSystem and Gazprom and the terms of the contract were adjusted again. However, the new version of the contract did not manage to avoid the criticism as well (speculations regarding the volume, TSO positions, etc.). The term of the contract lasts until 2022 (with the possibility to renew the contract until 2037) (Černoch, et al., 2011).

The mutual relations between the Polish state and Gazprom also needed to be settled by arbitration. Specifically, the Stockholm arbitration, which ended on November 6, 2012 (and started in November 2011) and which aimed at reducing the price. Regarding this arbitration, there has been much speculation about background negotiations between Poland and Russia, also mentioned were eventual Russian investments into the Polish energy sector or building another branch of Yamal pipeline (Piotrowska-Oliwa, 2012). Nothing has been officially confirmed. An ordinary take-or-pay contract was signed; the destination clause was removed in 2010, after the renegotiation of the original contract.

**Attempts to control the entire supply chain
(regardless of commercial rationale)**

As it has been stated above, regarding the setting of the Polish gas sector, the primary aim for the Russian Federation is to secure its position as a dominant supplier of natural gas.

**Taking economically irrational steps in order
to maintain a certain position in the client state's market**

This indicator was not proven in the case of Poland.

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5.11 Country Case Study: Romania

Martin Jirušek

5.11.1 Introduction

Although being counted among the group of post - communist countries of the Central and Eastern Europe, Romania represents an example different from its neighbouring countries. First and foremost difference is that the country is not unilaterally dependent on Russian supplies. In fact, Romania is the biggest oil and gas producer in the Central and Eastern Europe. It is, however, a net importer of oil and gas importing these hydrocarbons exclusively from Russia (Pachiu, Dudau, & Mustaciosu, 2014). Nevertheless, Romania finds itself in a specific situation compared to other states in the region. This includes also a different setting of its homeland gas infrastructure making it an “island of its own” in terms of gas distribution. This specific position is rooted in the history; the aversion between Moscow and Bucharest that lasted for the good deal of the communist period after the WWII was reflected also in the energy sector and has more or less lasted until the present day, when being pro-Russian is basically a self-defeating stance on the Romanian political scene. The result of these rather cold relations was among other things the specific technology implemented in Romanian nuclear sector (see the respective chapter dealing with the Romanian nuclear sector) and general reluctance of the former Soviet Union to share technologies with Romanian state.

As stated above, Romania has always been important country in terms of hydrocarbons, but its major production fields, both oil and gas, peaked in 1970s and have been in decline since

then. In 2013, Romania's proved reserves in 2012 totalled to about 100 bcm of natural gas, being the third largest in the EU. The annual domestic production of natural gas reached 10.9 bcm of natural gas, which, along with the average annual consumption of 13.5 bcm, left around 3,5 bcm that need to be imported (Natural Gas Europe, 2014 a); Pachiu, Dudau, & Mustaciosu, 2014) at price around 430 USD 430/tcm (Radio Free Europe, Radio Liberty). The share of natural gas in country's total primary energy supply is roughly 30%. The domestic production is dominated by state-owned company Romgaz, which also owns a majority of the Romanian underground storage facilities of total storage capacity of 3135 bcm (KPMG, 2015).

Gas in Romania is mostly used for power generation, industrial purposes and household heating (International Energy Agency, 2012). There are two major gas producers in the country – a state-owned company Romgaz, with 51% share of the domestic market, and private-owned OMV Petrom¹, serving 46% of the market needs, which is primarily an oil company and produces gas as a by-product of its oil-related activities. There are also some independent producers whose share is rather negligible (up to 3% in total) (Pachiu, Dudau, & Mustaciosu, 2014).

As stated above, Romania is relatively well secured in terms of possible one-sided dependency on gas supplies, as it is currently one of the least dependent countries in the EU regarding energy imports. Romania started importing gas from Russia in times when the Soviets started exporting gas

¹ Romgaz is 70% owned by Romanian state, while in Petrom the government holds only 20,64% (Rebegea, 2014).

westwards through the Orenburg – Western Soviet Border gas pipeline. The gas is being transported by 3 parallel pipelines commissioned in 1974, 1986 and 1996 respectively, entering Romania in Issacea entry point. Today 15-24% (5-6 bcm) of gas consumption is being imported from Russia², which accounts for 100% of Romanian gas imports. The pipeline entering Romania in Medeiesu-Aurit is used mainly for gas imports, while the other three are used mainly for transit (Transgaz, n.d.; Gazprom Export; Transgaz, 2013). Romania serves as a transit country for Bulgaria, Macedonia, Turkey and Greece.

From the numbers stated above it is clear that without expanding its reserves Romanian gas import dependency would rise substantially in the near future. After the Nabucco pipeline project was cancelled in 2013 and the South Stream project was dismissed at the end of last year, the import options are now following. First, Romania can import more gas from Russia by an already existing route. Second, it can use the recently built interconnector from Hungary to get the gas from Central European Gas Hub in Baumgarten an der March in Austria. Third, it can wait until the so called Southern Gas Corridor is built, including interconnectors through Greece and Bulgaria³, but this scenario is unlikely to happen before 2020 and is dependent on massive investments of tens of billions USD and development of the Shah-Deniz field (Natural Gas Europe, 2014). Fourth, it can carry on the efforts to build its own LNG regasification facility to import gas from overseas, most

² However, in 2013 Gazprom sold only 1,19 bcm (Gazprom Export).

³ This route in combination with LNG facilities would be probably suitable also if gas fields in Eastern Mediterranean are developed. The problem here is the troubled nature and mutual conflicts in the region and economic viability of such endeavour (Dudau, Romania's Energy Strategy Options: Current Trends in Eastern Europe's Natural Gas Markets, 2014, pp. 8-9).

probably as a part of the Azerbaijan – Georgia – Romania Interconnector, often referred to as AGRI. This, however, seems to be also a question of 5 or more years before it reaches operational stage (Natural Gas Europe, 2014 a); Dudau, 2014).

However, thanks to the structural changes in Romanian economy and declining demand in power generation⁴, the overall gas imports have been in decline, which has been especially steep since 2006 (U.S. Energy Information Administration, 2014). Furthermore, future prospects seem to be quite positive for Romanian gas sector, as it is planned to expand domestic production aiming at offshore sources in the Black Sea⁵ and implement methods enhancing old wells productivity. The effort has been already paying off, as the company Petrom managed to stabilize the production rate and even recorded a slight increase in production (Dudau, Romania's Energy Strategy Options: Current Trends in Eastern Europe's Natural Gas Markets, 2014). Apart from conventional resources, Romania has also promising shale gas fields. According to the U.S. Energy Information Administration (2013), the technically recoverable shale gas deposits account to more than 1,5 trillion cubic meters, which would mean a great addition to the overall gas reserves. However, although Romania has gone quite far regarding the shale gas development, economic reasons and some public controversy are still

⁴ The trend of declining gas demand in power generation was speeded up in 2007 by commissioning of a new reactor in Cernavoda NPP and by the advent of renewables. However, it is possible that the need for gas-fired power plants able to meet the changing load in the grid related to the higher use of renewables will rise in the future. See the respective chapter of the study dealing with Romanian nuclear sector.

⁵ It is interesting that regarding the Black Sea resources, annexation of Crimea means a substantial change to the ownership of underwater resources in the continental shelf. This applies, among other resources, to gas plays as most of them lie in the Eastern part of the sea. Romania, for its part, might probably need to decide whether to recognize the annexation of Crimea or not, to be able to reach deals related to natural resources (information based on field research conducted in March 2015).

preventing this source from being added to the country's gas portfolio⁶. In February, the U.S. energy giant Chevron gave up its shale gas exploration plans in Romania because of their economic unprofitability (Marinas & Pomeroy, 2015). Apart from the US major, more than ten remain active in terms of shale gas exploration (Natural Gas Europe, 2013).

The regime under which gas has been supplied to Romania is unique as well. As Romania did not want to sign a long term contract with Gazprom since it was able to cover its own needs for most of the time except the cold days in winter, the conditions under which Russian gas is imported are totally different from the other states in the region. Romania does not buy Russian gas directly from Gazprom, but from intermediaries that have long-term contracts with Gazprom⁷. These intermediaries are Wintershall Erdgas Handelshaus Zug AG (WIEE), in which Gazprom has a majority stake, and Imex Oil Ltd, controlled by Russian-owned Conef Energy (Semykoz, 2011). Both companies have long-term contracts valid until 2030. This situation has its pros and cons. Thanks to this setting, intermediaries pose a certain buffer between Gazprom and Romania, which leaves less room for politicization of gas supplies. According to the consultations that the research team conducted in Bucharest in March 2015, thanks to historical connotations, rather low and irregular demand for Russian supplies and Romanian unwillingness to sign a long-term contract, Gazprom has seen very little chance to get involved

⁶ Although the country did not impose comprehensive ban on fracking, it did impose moratorium on extraction that expired in March 2013. The technology and unclear way Chevron acquired its concession sparked some public controversy. As this was quite an unusual situation, since the public opposition in Romania is not very active in this regard, some allegations appeared, accusing Gazprom from financing these protest (information based on field research conducted in March 2015; Higgins, 2014).

⁷ The physical delivery has been done by several smaller companies (KPMG, 2015).

directly in the Romanian gas sector and his efforts to do so have been very limited (information based on field research conducted in in March 2015). On the other hand, the intermediaries and absence of long-term contract caused Romania to pay prices comparable to the highest prices paid by Gazprom's European customers.

Potential gas exports from Romania to neighbouring countries have experiencing several major obstacles. First, the Romanian pipeline system works on lower pressure compared to the neighbouring states. To make exports possible, compressor stations would need to be built first; to this date, the exit points are made only for transit⁸. Only recently the Arad-Szeged interconnector was built, but it only allows the gas to be shipped from Hungary to Romania, the reverse flow is yet to be implemented⁹. The reason is the lower pressure in Romanian network compared to the Hungarian. When finished by 2019, the interconnector should be able to ship up to 4.4 bcm to Hungary (information based on field research conducted in in March 2015). Similar pressure-related issues need to be solved in the case of the Giurgiu-Ruse interconnector to Bulgaria and Iasi-Ungeni interconnector to Moldova, but these pipelines are meant rather for gas exports from Romania¹⁰. The Mokrin-Arad interconnector between Serbia and Romania is in a conceptual stage and possible interconnector to Ukraine is

⁸ Despite the aforementioned conditions preventing physical gas flow, some gas exports are being realized through swaps and virtual exports (Pachiu, Dudau, & Mustaciosu, 2014).

⁹ This very interconnector can be used for supplying Romania with Russian gas, or hub-traded gas from Central European Gas Hub in Baumgarten an der March. Such option would probably suit Romania regarding its irregular need for additional supplies (see above). The annual capacity of the interconnector is 5 bcm, which would currently cover the margin between domestic production and peak demand in winter (Pipeline & Gas Journal, 2013).

¹⁰ Despite being a significant contribution to the energy security of Moldova, majority of the costs so far – EUR 26,4 million – were covered by Romania and the European Union (Mihalache, 2014).

currently not among the state's priorities (information based on field research conducted in March 2015; Natural Gas Europe, 2014) (see the respective chapters of the study)¹¹. Second, the gas exports are being further complicated by the government's reluctance in this regard (Natural Gas Europe, 2012). Building interconnectors to neighbours would mean leveling the gas price¹² and probably an increase in prices for domestic Romanian consumers, as Romanian gas would be exported to lucrative markets. As the domestic gas companies have been de facto forced by the legislation to sell their gas to homeland customers at lower price¹³ than they could charge to customers abroad, it is understandable that the opportunity to sell Romanian gas abroad is appealing to them. On the other hand, this outcome does not seem to be that appealing for the government. The limited amount of gas extracted in Romania and legislation binding gas companies to prioritize domestic customers would ultimately mean a higher need of imported (most probably Russian) gas. As the Russian gas that is being bought through intermediaries is priced at what is called a "European level", it is significantly more expensive than the current, still partly regulated, price charged by domestic producers, which is around USD 160/tcm (Pachiu, Dudau, & Mustaciosu, 2014). This, combined with progressing liberalization, might mean a certain price shock for domestic consumers (Dudau, 2015). Therefore, the slow progress in

¹¹ There have been plans to import LNG from Azerbaijan through regasification LNG station in Constanta, but the project is stalled at the moment (Pachiu, Dudau, & Mustaciosu, 2014).

¹² The domestic gas market is still not completely deregulated. The Romanian gas market is deregulated at only about 60%, with household prices to be regulated by 2021 (Reuters, 2014; Pachiu, Dudau, & Mustaciosu, 2014).

¹³ Prices for industrial customers were fully deregulated only recently in 2014, while household prices will remain regulated to a certain point up until 2018 (Pachiu, Dudau, & Mustaciosu, 2014).

building interconnectors might be caused by the government's reluctance in order to avoid this shock and the subsequent disappointment of voters (information based on field research conducted in March 2015). Third, it's the already mentioned domestic legal framework that binds domestic producers to give priority to customers on the Romanian market. Although being rooted in the tight margin between the domestic need and overall producing capacity, this provision has already caught attention of the European Commission that started infringement procedure against Romania (European Commission, 2014)¹⁴.

5.11.2 Reflection of the indicators

Russian state representatives actively supporting state-owned energy enterprises and their activities in a respective country

Due to rather cold relations, a specific nature of Romanian gas sector, and indirect relation to Gazprom through intermediaries, no significant contacts or backing by Russian officials have been made in this regard. Romania was considered to be a plan B for the South Stream route instead of Bulgaria, but the willingness to take part in the Russian project may be ascribed to the country's pragmatic effort to get involved in all major projects in the region and keep the mutual relations with Russia on purely commercial basis (Novinite, 2009). Gazprom, for its part, perceived this as rather a toll to exert pressure on Bulgaria. The potential violation of the Internal Energy Market rules in the case of the South Stream project was never a big problem for

¹⁴ This framework also enumerates priority customers. In case of supply curtailments, it is the industrial facilities, not households, to be first cut off from the grid. What may also play a role in potential supply disruptions is the fact that some Russian owned facilities on Romanian soil would be then among the first to be cut off from supplies (information based on field research conducted in March 2015).

Romania, since it never came down to realization or even signing the agreement on placing part of the South Stream pipeline on Romanian soil. Willingness to be a transit country in the South Stream project was thus never a sign of turning away from the European Union (information based on field research conducted in March 2015).

The foreign supplier rewarding certain behaviour and linking energy prices to the client state's foreign policy orientation

In autumn 2014, supplies of Russian gas decreased by 10%. Romanian energy minister Răzvan-Eugen Nicolescu accused Russia for “playing games” on the gas market linking this situation to similar one that happened in Poland, Slovakia and Austria. These supply curtailments along with the statement of Alexei Miller that companies providing reverse supplies to Ukraine may face supply cuts were perceived as an effort to stop reverse supplies to Ukraine (Румыния сообщила о сокращении поставок российского газа на 10%, 2014). Despite technical inability to reverse gas supplies from Romania to Ukraine, the country perceived this as a signal¹⁵. Romania is generally an anti-Russian country, although in the current conflict it keeps a rather pragmatic stance (information based on field research conducted in March 2015).

¹⁵ However, there is still a possibility for Romanian gas to be eventually exported to Ukraine, as Ukraine itself showed interested in such a deal (World Bulletin, 2015).

Abusing infrastructure (e.g. pipelines) and offering different pricing to exert pressure on the client state

Romania buys Russian gas through intermediaries that serve as a kind of a buffer and therefore leave less room for politicization of supplies. On the other hand, such relation leaves also less room for negotiations on gas price or possible discounts. Therefore, Romania pays relatively high price per tcm of natural gas.

The different (lower pressure) under which the Romanian gas infrastructure operates, makes it an “island” on its own. It is also currently impossible for the country to physically revert gas supplies to Ukraine. Still, the statement of Alexei Miller (see above) and the subsequent supply cuts of about 10% of the usual amount were taken seriously, despite being labeled as of purely technical nature.

Efforts to take control of energy resources, transit routes and distribution networks of the client state

Due to an unfriendly nature of mutual contracts and different infrastructure setting, Gazprom gave up efforts for major involvement in the gas sector. The company is only present in intermediaries carrying out gas supplies from Russia and partly in upstream through Wintershall, where it operates the Sighisoara gas field with Romgaz (Wintershall, 2007).

Disrupting (through various means) alternative supply routes/sources of supply; Efforts to gain a dominant market position in the client country

Gazprom's opposition against growing interconnectivity in the region has been exerted rather towards non-EU members (see the case study of Moldova). Romania, for its part, has the advantage of being a member of the EU and simultaneously importing relatively low amounts of Russian gas.

Efforts to eliminate competitive suppliers

As there have been no competitive suppliers and the overall gas consumption along with imports of Russian gas have been in decline, this feature is irrelevant. Also the prospects of increasing domestic production make the possibility of a new player on the market improbable. The interconnectors that would make it possible to get the gas supplies from different sources are advancing slowly with no significant impact on the gas supply so far. Romania is also a member of the European Union, which makes any possible efforts to squeeze competitors out of the market complicated if not impossible.

Preference of long-term bilateral agreements and "take-or-pay" contracts

Technically speaking, Romania does not have a long-term contract with Russia. Its relations with the Russian gas giant are indirect as there are intermediaries between Gazprom and Romania. These intermediaries, WIEE and Imex Oil Ltd., have long-term contract with Gazprom valid until 2030. WIEE is controlled by Gazprom and Imex Oil by other Russian company Conef Energy. The nature of the contracts that are

used rather for short-term supplies in times when domestic supply cannot meet the demand determines the price, which is set on the “European level” – around USD 430/tcm (Radio Free Europe, Radio Liberty). Provided that the price is already relatively high and that Gazprom has no direct relation to Romania, this situation leaves rather small room for bargaining or even politicization of gas supplies.

Diminishing the importance and influence of multilateral regimes like that of the EU; Acting against liberalization

Romania has been a member of the European Union since 2007 and the liberalization was taking place since the early 2000s. The gas market reached a relatively high degree of liberalization, as the production, transport, distribution, and retail activities were separated to comply with the Internal Energy Market rules. The gas transit, for its part, is carried out by Transgaz, partly privatized company with the majority stake (58,5%) owned by the Romanian state (Transgaz). The gas market setting therefore prevents Gazprom from implementing its traditional policy (see the respective chapter dealing with impact of the Internal Energy Market rules on Gazprom), although signs or rhetorical reminders of this policy may appear from time to time. This happened in autumn 2014, when Gazprom's CEO Alexei Miller indirectly threatened countries providing reverse gas supplies to Ukraine and gas supplies to Romania were cut by 10% (see above) (Румыния сообщила о сокращении поставок российского газа на 10%, 2014)¹⁶.

¹⁶ This case has been a bit fuzzy though, as it involves members and non-members of the European Union/internal energy market.

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5.12 Country Case Study: Slovak Republic

Lukáš Lehotský

5.12.1 Introduction

Slovak Republic has played a key role in transit of natural gas from Russia to Western Europe, the domestic demand of country is not very significant. It has oscillated between 4.5 to 7 billions of cubic meters (bcm) annually for the last 30 years. The final consumption of gas in Slovakia was expected to be slightly above 5 bcm in 2014. According to IEA data from 2012, share of gas in total final consumption of gas was slightly above 30%.

Historically, the main transit route of Russian supply from Ukraine - the Brotherhood pipeline - leads through Slovakia. The pipeline splits into two branches in the Slovak territory, one supplying gas primarily to Germany and Netherlands via the Czech Republic, the other supplying primarily Italy via Austria. The pipeline system has been built in 1970s, with the current technical input capacity of 220 mcm (millions of cubic meters) daily – approximately 80 bcm annually – at Ukraine - Slovakia border (Eustream).

Slovakia is almost dependent on natural gas imports. According to the Ministry of Economy, domestic production in 2013 reached almost 95 mcm, not even 2% of the total 5.1 bcm of Slovak gas consumption of that year (Správa o výsledkoch monitorovania bezpečnosti dodávok plynu, 2014, p. 2). There is a little chance this situation will change dramatically in the future. Current conventional resource reserves are small and little new exploration is expected.

Most of gas imports come from Russia, with slight diversification of supply occurring only lately. There had been some diversification attempts before 2009. Negotiations with Norway took place as early as 1990s and diversification from Norway has been considered several times. Gas supplies were discussed for example in 2001 at the Slovak PM Dzurinda's visit in Norway (Úrad vlády Slovenskej republiky, 2001). Despite that Slovakia maintained its total dependence on supplies from Russia and there had been no alternative supplier of gas until after the crisis of 2009. Based on field research conducted in August 2014, the dominant reason for this was high price and lower quality of Norwegian gas compared to Russian supplies.

Slovak gas market is liberalized and follows European legislation. There are more than 20 companies selling gas on Slovak gas market, with one dominant player – Slovak Gas Company (Slovenský plynárenský priemysel, SPP). It controlled 64% of gas sales in 2014 (SPP, 2014). SPP is a descendant of national gas monopoly, which used to control all aspects of gas supply in Slovakia. RWE Gas is the second largest gas supplier on Slovak market, with its share over 20 percent in 2014 (TASR, 2015). Other suppliers are rather small players.

SPP was privatized in 2002 and renationalized in 2014. It is now fully owned by the Slovak state. SPP has a 51% majority in subsidiary company SPP Infrastructure, which owns transit operator company Eustream; distribution operator SPP Distribúcia; shares in gas drilling companies; companies operating Slovak storage facilities and other. Minority of shares is owned by Czech company EPH, which also has managerial control over the SPP Infrastructure.

As for the diversification, Slovakia has diversified its natural gas transit routes only recently. Improvised possibility of reversing gas flow from the Czech Republic to Slovakia was introduced during the January 2009 gas crisis. A permanent solution was implemented in following years, along with a reverse-flow capability on the Slovak-Austrian branch of Brotherhood pipeline.

The Slovak-Hungarian pipeline interconnector became technically functional in 2014 and has a capacity of 4.4 bcm annually (energia.sk, 2014). Its commercial operation started in July 2015, half a year behind the schedule, after technical issues on Hungarian side had been resolved (EurActiv, 2015).

Slovak-Polish interconnector is in planning stage, progressing towards the construction phase. Despite the gas shortage in January 2009, it was still deemed as economically unreasonable in November 2009 by both sides (SITA, 2009). The situation changed after the EU added the interconnector to the list of Projects of common interest. The intergovernmental agreement between Slovakia and Poland was signed in November 2013 (SITA, 2013).

In addition, possibility of reversing gas flow from Slovakia to Ukraine via an unused Vojany - Uzhhorod pipeline was assessed and reviewed during 2013. The connection became commercially operational in September 2014, providing technical capacity of more than 10 bcm annually (SITA, 2014). The capacity was gradually extended to 14.5 bcm annually (TASR, 2015). Slovakia is currently in a dispute with Ukraine about allowing larger reverse capacity through one of four lines of Brotherhood pipelines (Euractiv, 2015).

There is a substantial storage capacity available in Slovakia. Four underground storage facilities are located in the vicinity of village Láb in the western part of Slovakia and one facility is located in Dolní Dunajovice in border area of the Czech Republic, which is connected to Slovak gas grid. Majority of shares in companies owning Slovak storage are directly or indirectly owned by SPP Infrastructure. The combined capacity of Slovak facilities is 3.15 bcm (Nafta; Pozagas) – volume equal to more than half-year consumption of the country. The additional storage capacity of Dolní Dunajovice facility is 0.57 bcm and is used to balance Slovak distribution network (International Energy Agency, 2014, p. 401). The capacity of gas storage has been significantly upgraded during the past 5 years as a reaction to natural gas supply shortage of 2009.

Energy policy is coordinated primarily by the Ministry of Economy. Prices of certain energy commodities are regulated. Independent body – Regulatory Office for Network Industries – sets prices for various energy commodities, including electricity and natural gas.

The current Slovak natural gas sector has been hugely influenced by supply disruption of January 2009. There were several initiatives launched after the disruption, mainly focused on increasing the capacity, enhancing interoperability between storage and transmission network and reversibility. Moreover, legislative rules dealing with crisis response were implemented (International Energy Agency, 2014, p. 401).

Slovak state representatives are divided over their approach towards Russia at large. This foreign policy orientation has an influence on the understanding of energy security and the role of Russian companies by Slovak representatives, and thus is

partly reflected in policies in gas sector.

Governments of Vladimír Mečiar in the office during the period from 1992 to 1998 were friendly towards Russia, trying to build a good relationship with Russian state.

Successive governments of Mikuláš Dzurinda which held the office from 1998 until 2006 were primarily oriented on integration with Western security and economic structures. Relations with Russia got colder, more reserved and framed only in terms of integration efforts.

Governments of Róbert Fico, in the office in 2006-2010 and 2012 until now, have been more benevolent in their position towards Russia. This may be illustrated by the governments' reaction to 2008 Georgian war;¹ 2009 Russia-Ukraine gas dispute;² and reaction to the current Russia-Ukraine crisis.³ It is worth noting that practical steps of Slovak foreign policy do not always follow verbal statements of government officials, especially PM.

In last few years, practical foreign policy of Slovakia towards Russia seemed to be fairly pragmatic, primarily protecting Slovak national interests.

¹ In 2008, PM Fico put blame on Georgia, which provoked the war with Russia. This claim countered the position of other EU and NATO leaders.

² During the crisis, Fico travelled to both Ukraine and Russia to negotiate issue separately. Russia refused to make significant concessions (Tóda and Procházková, Fico hľadal plyn v Moskve. Zatiaľ ho nemožno čakať 2009), apart from a swap deal, which was refused by Ukrainian side (iDnes.cz 2009). In reaction, Fico clearly stated that Ukraine was to blame for the crisis as such. This countered the official EU stance, which refused to blame any of the two countries and demanded a solution of the crisis instead.

³ Currently, Fico is again taking a very reserved and ambiguous position towards the current crisis, refusing to put blame on Russia for annexation of Crimea, or verbally opposing EU sanctions despite accepting them.

5.12.2 Reflection of the indicators

Russian state representatives actively supporting state-owned energy enterprises and their activities in a respective country

There have been several occasions, when Russian officials met with Slovak political leaders and discussed matters relating natural gas supplies. In some cases, Russian state representatives actively contributed to the formulation of business relations of SPP and Gazprom.

Russian Prime Minister Viktor Chernomyrdin promised back in years 1993-1995 that natural gas transit position of Slovakia would not decrease in importance. Despite that Gazprom dismissed the Slovak pledge to extend the planned Yamal – Europe pipeline to Slovakia during the same period. As a compensation, PM Chernomyrdin proposed to establish a joint trading house SloVRusGas during his visit in Bratislava in 1995. This was rejected by the Slovak side (Duleba, Slovensko-ruské hospodárske vzťahy - viac otázok ako odpovedí: Obchodné problémy, vízie, suroviny a záujmy, 1997, stránky 34-36). The 1995 deal was supposedly conditioned by Gazprom's access to SPP shares or SPP transit infrastructure. However, the establishment of joint trading house SloVRusGas as well as a long-term bilateral contract on natural gas supplies was agreed upon during the 1997 high-level visit of PM Chernomyrdin in Bratislava (Duleba, From Domination to Partnership: the Perspectives of Russian-Central-East European Relations, 1998, p. 86). More details about joint trading house will be analyzed in one of the subsequent chapters.

Press office of Russian president mentions negotiations and a deal between Slovakia and Russia about energy transit concluded in February 2001 (President of Russia b, 2001), but

particular details are not available. Putin met with the Slovak President in November 2001. Slovak President reassured Putin that NATO and EU accession will not affect their mutual relations. There are no hints of natural gas being on the agenda of discussions from available sources of Russian president's press office (President of Russia, 2001), as well as Slovak president's press office (Prezident SR, 2001). Other sources claim that natural gas business issues, particularly SPP privatization, were part of talks (Nosko, 2013, s. 167) (Orbán, 2008, str. 188), as well as energy commodities transit (Marušiak, Duleba, & Mates-Belišová, 2002, s. 380). Another sources quote Putin underlining the importance of Russian-Slovak natural gas transit cooperation at the meeting (Duleba, Stefan Batory Foundation, 2002). It's important to note that three months before the visit, a tender for 49% of SPP stake had been announced (Marušiak, Duleba, & Mates-Belišová, 2002, str. 384).

Slovak president visited Moscow immediately after the dismissal of the Yamal 2⁴ pipeline construction plans in February 2002 (Lelyveld, Russia: Gazprom Finds Export Route Through Slovakia, 2002), however, it is not possible to establish a clear connection between the two events, as no details about discussions are available apart from a brief official notice of a discussion about natural gas and oil transport from Russia through Slovakia (President of Russia, 2002). Press office of Slovak President does not mention any energy-related issues as part of discussions at all (Prezident SR, 2002).

⁴ The pipeline was supposed to bypass Ukraine. The route would follow Yamal Europe through Belarus to Poland, where it would head southwards to Slovakia and connect to the existing Brotherhood transit pipelines.

When Putin met Slovak PM Dzurinda in 2003, he mentioned energy as one of the most important area of economic cooperation (President of Russia, 2003), yet there were no particular issues at hand at the time.

Russian President mentioned that he and PM Dzurinda negotiated over energy issues and assured the audience that the supplies to Slovakia would remain stable over the next years, when both met with Ivan Gasparovič, the Slovak President, in February 2005. He stressed Russia was a reliable partner, which was committed to fulfil its contractual obligations (President of Russia, 2005). Energy as a topic was mentioned also by Slovak president's press office, however, there were no particular details discussed (Prezident SR, 2005).

High-level political meeting of Slovak and Russian representatives took place in May 2007, when Slovak PM Róbert Fico, accompanied by four ministers of his government, met with Putin and other high-level Russian politicians in Putin's presidential residence in Novo Ogaryovo. Energy was part of the agenda, however, discussions about natural gas supplies were more specific this time. According to available bits of transcript from the Russian President's press office, Russia stressed the importance of energy sector, while Slovakia expressed its wish for favourable long-term contract terms of the then future gas supply contract, which was to be signed in 2008 (President of Russia, 2007). Other energy issues were discussed as well, mainly nuclear and oil cooperation (Tóda, Fico chce ruské koľajnice (VIDEO), 2007). No particular information about deals made at the meeting are available, yet the visit of the executive members of both sides might hint that more particular talks were conducted.

Slovak PM met again with Russian President Dmitri Medvedev at the height of Russian-Ukrainian gas crisis in Moscow on January 14, 2009, discussing possibilities of reestablishing gas supplies through Ukraine (President of Russia, 2009). According to available sources, the main focus of the talks was on particular issue at hand (Tóda & Procházková, Fico hľadal plyn v Moskve. Zatiaľ ho nemožno čakať, 2009). Three days later, a conference on supply crisis had been held in Kremlin, with PM Putin and President Medvedev discussing ways how to resume supplies with various stakeholders. Slovakia was represented by its Minister of Economy.

Mutual assurances concerning the necessity of Slovak-Russian cooperation in nuclear and gas energy sectors were made during PM Fico's meeting with Vladimir Putin and Alexei Miller in November 2009. Putin said that Slovakia had been a stable and reliable partner and stressed that it would do everything it could to fulfill all the contractual obligations. He also said that Russia would continue to use Slovak transit route for shipping European supplies (TASR, 2009). Moreover, Putin and Fico acknowledged there were no obstacles in expanding Slovak cooperation with Gazprom, oriented specifically toward establishing a joint company and expanding Slovak natural gas storage capacities (SITA, 2009). These plans never materialized.

According to Press office of Russian President, energy cooperation at large was mentioned as a "backbone" of mutual relations at the April 2010 meeting of Russian and Slovak Presidents. However, President Medvedev also stressed that the orientation only on energy supplies and transit was harming mutual trade exchange (President of Russia, 2010).

PM Fico visited Moscow in May and also in June 2015. Reportedly, energy relations were part of PM Fico's meeting with his counterpart in June 2015, discussing gas supply transit situation after cancellation of South Stream project. Slovak PM supposedly proposed that the Russian side could participate in Slovak gas pipeline project, presumably the Eastring pipeline⁵ (ČTK, 2015). Also, the question of natural gas transit after 2019 Russian-Ukrainian transit contract expiration was supposedly discussed (Jancová, 2015).

Even though there was some influence of Russian state officials over negotiating energy policy of Slovakia in 1990's and early 2000's, there has not been visible any apparent pressure on changing Slovak behaviour in the form of Russian state officials' public pressure on Slovak establishment.

The foreign supplier rewarding certain behaviour and linking energy prices to the client state's foreign policy orientation

There are some hints of political influence over prices in earlier periods of 1990s. Gas prices in 1994 were supposedly politically agreed upon between Slovak and Russian political leaders (Duleba, Slovensko-ruské hospodárske vzťahy - viac otázok ako odpovedí: Obchodné problémy, vízie, suroviny a záujmy, 1997, p. 41).

Terms of deals between Gazprom Export and Slovak companies – most importantly SPP – are not public. It is therefore not possible to conclude directly from open sources whether energy prices have been recently linked to foreign policy orientation of Slovakia. However, all consulted experts

⁵ Eastring project, if realized, would connect Turkish Stream with Slovak transit infrastructure via Bulgaria, Romania, and either Hungary or Ukraine. It is a project of Eustream, Slovak TSO, supposed to provide an alternative to the failed South Stream project. One of primary goals of the envisaged pipeline is to preserve important position of Slovakia in European natural gas transit.

during a field research in August 2014 agreed there was no direct link between foreign policy orientation and prices of natural gas. Energy prices are established following long-term gas contract pricing formula and are adjusted based on contractual terms.

Neither shifts in foreign policy affected supply security, nor were there any immediate publicly announced price fluctuations linked to the foreign policy orientation. Moreover, no significant price concessions have been negotiated during periods of more pragmatic or even pro-Russian Slovak foreign policy.

If we look at the case of 2014 price adjustment, which took place at about the same time as the finishing of Slovakia-Hungary gas interconnection, it supports the previously mentioned analysis. Moreover, negotiations with Ukraine about reverse flow pipeline commissioning were already ongoing at the time. Despite the fact that reverse flow had allowed Ukraine to withstand the pressure from Gazprom, the Slovak price renegotiation supposedly resulted in lower price per thousand cubic meters. It is expected that low spot-market prices of natural gas are the most probable reason of the renegotiation outcome (Carney, 2014), not the political setting. Similarly, prices were not raised after commissioning the Slovak-Ukrainian pipeline connection.

It is not possible to rule out any informal and behind-the-scenes political pressure on pricing, yet it is not possible to corroborate it either. It is possible to say that Gazprom has other means of exerting pressure on Slovakia more directly with less efforts compared to price manipulation.

Abusing infrastructure (e.g. pipelines) and offering different pricing to exert pressure on the client state

Pressure from Gazprom could be seen in the period between years 2000 and 2001. Slovak and Polish governments were presented with the proposal of so called “Yamal 2” pipeline. According to available sources, Gazprom put Slovak government before a choice – either cooperate with Gazprom and participate in the project construction or loose transit position as a result of Gazprom’s alternative plan to construct a pipeline under the Baltic Sea (Nicholson, 2000). The Slovak government, unlike its Polish and Ukrainian counterparts, agreed immediately, without consulting with its neighbours. After Gazprom canceled the project in 2002, Slovakia was left with no improvement in energy security and at odds with Poland and Ukraine (Marušiak, Duleba, & Mates-Belišová, 2002, str. 385).

Despite Gazprom’s public claims in 2008, when Slovakia was labeled as a strategic transit partner (Eustream, 2008), Slovak infrastructure has become less and less relevant⁶ since commissioning of first North Stream pipeline in late 2011. It is possible to speculate that Slovak infrastructure would be of no use unless Gazprom had an influence over Ukrainian transit network.

Gazprom’s proposition to impose restrictions on companies providing gas to Ukraine via reverse flow might be perceived as a threat to Slovak TSO, who operates a reverse-flow gas pipeline from Vojany to Uzhhorod. Supply import shortages

⁶ Since 2011, there has been steady but continuous decline of gas transit volumes through Slovakia. This leads to thinner revenues from gas transit to Eustream, thus thinner revenues to state, who is the majority shareholder.

coinciding with the commission of the interconnection were recorded. Supply volumes were reduced by 20% in September 2014, and further reduced in October by another 50%, and prompted SPP to buy gas at spot markets (TASR, 2014). According to available sources, the supply shortage was initially on the domestic market, not in the gas transit (Krajanová, 2014). The shortage was covered from other sources (TASR a, 2014). PM Fico swiftly claimed that it was a political move by Russia (TASR b, 2014), contradicting his generally pragmatic tone towards Russia. He dispatched Ministry of Economy to discuss the issue in Moscow (energia.sk, 2014). Shortages were recorded also in other EU countries, especially Hungary and Poland. Gazprom, on the contrary, claimed that the supplies were not shortened (ČTK, 2014). Russian side said that it was fulfilling its contractual obligations, yet these were at the level of minimal obligations, not usual volumes for the respective period, or volumes demanded by SPP, alternatively. Gazprom said in the autumn that this was due to the necessity to fill western Ukrainian gas storage facilities in preparations for winter of 2014-2015. The usual supply volumes, however, were resumed only after the winter, at the beginning of March 2015 (energia.sk, 2015).

Recently, Ukraine has been trying to persuade Slovakia to revise its agreements with Gazprom Export, which prohibit reverse flow through main Brotherhood pipeline system. Slovakia, both on governmental level and on the level of TSO, has been reluctant to even discuss the question. It is clear that this is serving Gazprom's interest in Ukraine. However, it is not possible to assess, whether this stems from the Slovak position itself or there is any background involvement of Gazprom in

the matter. Eustream claims it is not a salient question, since Ukrainian side is using the current reverse flow capability only to about 50% of its maximal capacity (Energia.sk, 2015).

Disrupting (through various means) alternative supply routes/sources of supply

Even though Slovak Energy Strategies explicitly support diversification of supply, there had been little efforts until 2009, as mentioned earlier. Yet, Russian side did not make any openly hostile moves towards Slovak efforts to diversify supply routes.

The reverse flow possibility on the Slovak-Czech gas interconnection was implemented temporarily during gas crisis in January 2009. Permanent solution was implemented in 2011 (Eustream, 2011), along with Slovak-Austrian interconnection. Slovak-Hungarian interconnection finished in 2014, and Slovak-Polish interconnection, which has been in progress, have not prompted any significant reaction from Russian officials or Gazprom.

Efforts to take control of energy resources, transit routes and distribution networks of the client state

Gazprom was trying to be active on Slovak gas market in 1990s, when it established SlovRusGas – a joint trading house owned symmetrically by SPP and Gazprom. The main aim of the company was supplying Slovakia with gas necessary to cover demand peaks, especially in winter periods. Imported volumes of commodity were supposed to supplement contracted volumes agreed on with SPP and Gazprom Export in long-term contract valid from 1998 until 2008. SlovRusGas was allowed to import at most 1 bcm annually. According to available

information, first supplies were imported in April 1998, when SloVRusGas imported approx. 50 mcm (Hirman, 1998). When paying for gas supplies, it was agreed that 60% of price was sent directly to Gazprom and 40% of gas price was supposed to be deposited in Slovak banks and used for buying Slovak goods for Gazprom and its subsidiaries (such as medical supplies). Other barter deals were also considered (SME, 1999).

There is very little information about this joint venture available. While SPP mentions SloVRusGas as the natural gas supplier explicitly in 2002 (Slovenský plynárenský priemysel a.s., 2002, s. 15), there is no similar notion in later annual reports of the company, but the company is listed as a subsidiary of SPP. This notion is absent since the 2005 annual report. There are no systematic data on volumes or revenues available.

Gazprom was in a good position to acquire a significant influence over Slovak gas market in early 2000s, as it was a partner of GDF Suez and Ruhrgas⁷ in a Slovak Gas Holding (SGH) consortium, which bought 49% of SPP shares in 2001 and acquired a managerial control over the company. Gazprom was not able to provide sufficient financial backing in 2001, quoting primarily a lack of time to prepare appropriate amount of resources. It therefore did not acquire any shares, but was offered a 2-year long offer to buy a third of the shares bulk. Gazprom did not seize the opportunity and left the consortium after the offer's deadline passed (SITA, 2002).

If Gazprom had had entered SPP, it would have not only acquired a share in the ownership of the then vertically integrated SPP, but would have taken part in management of

⁷ Ruhrgas later merged with E.ON.

the company too. It would therefore have a say over natural gas transit, gas storage, as well as gas supply and wholesale. It was unclear why Ruhrgas and GDF Suez agreed on buying stocks that would have been resold to Gazprom. There was no price agreed in the transaction. Some media speculated that motivation of Ruhrgas and GDF was to acquire a better position in the case of expected growth of transit and supply to Europe from new fields, especially in Yamal peninsula. Acquiring Slovak network would thus make it easier for Gazprom to finish the proposed second line of Yamal Europe pipeline that would bypass Ukraine (Lelyveld, Russia: Gazprom Finds Export Route Through Slovakia, 2002).

Since then, Gazprom has not been overtly trying to enter Slovak natural gas industry. However, there were notions that Gazprom was interested in acquiring shares of Transpetrol, Slovak oil TSO in 2006⁸ (Marušiak, Bates, Duleba, Strážay, & Žemlová-Shepperd, 2007, s. 308).

Efforts to eliminate competitive suppliers

Gazprom is present as a natural gas trading company on Slovak market, but there are no signs of efforts to eliminate the competitive supplier. The company Vemex Energo s.r.o. is a 100% subsidiary of Czech company Vemex s.r.o.⁹ According to available information, Vemex is buying gas directly from Gazprom (Vemex Energie) instead from SPP. Slovak branch of

⁸ Transpetrol was sold to Yukos. After Yukos was forced into insolvency, its assets, Transpetrol including, were sold at auctions in Russia.

⁹ 50.14 % of Vemex shares are owned by Gazprom Germania GmbH, 100% subsidiary of OAO Gazprom; 33% of shares are owned by Centrex Europe Energy & Gas A.G.; and 16.86% by MND a.s. (Vemex 2013, 7). Interestingly, Centrex Europe is a company, which has been set up by Gazprombank (Gazprom 2006). It does not disclose its ownership structure. According to EU anti-monopoly regulation on E.ON and MOL, it is believed to be closely linked to Gazprom (Commission Of The European Communities, 2005).

Vemex is keeping fairly low profile in terms of marketing and only information about its activities is available in annual reports of its mother company Vemex.

Though Vemex Energo's gas supply volumes are rising every year, the company has had a little impact on Slovak energy market yet. Field research corroborated this claim. The company started trading supplies in 2011.¹⁰ Volumes of supplied gas in 2011 were equal to approximately 31 mcm (Vemex, 2011, str. 43), in 2012 it amounted to 80 mcm (Vemex, 2012, str. 27). In 2013, it sold approximately 200 mcm of natural gas (Vemex, 2013, str. 33). The amount sold in 2014 is expected to be around 300 mcm (energia.sk, 2014), which is approximately 5 – 6 percent of expected overall Slovak 2014 gas consumption.

Information about prices it buys gas for are not publicly available. It is possible that it buys gas for a lesser price compared to SPP (Offerman, 2007), even though the company denies any preferential treatment, claiming otherwise it would hurt its reputation (energia.sk, 2014). It is not possible to verify Gazprom's pricing towards Vemex Energo.

Neither directly Gazprom nor Vemex Energo made any openly hostile moves towards any other gas supplier in Slovakia. On the contrary, it is well possible that Gazprom is trying to extract additional income by operating on the Slovak gas market, while playing by the market rules.

¹⁰ It is worth noting that the company was set up as early as in 2003, but it was not active on the market for 8 years. It started negotiations about gas deliveries to individual Slovak customers only after a long-term contract between SPP and Gazprom Export was signed in 2008.

Preference for long-term bilateral agreements and “take-or-pay” contracts

According to available information, take-or-pay clause is present in the current contract with Gazprom.

Slovakia had several short-term contracts on gas supply during the early 1990s. Moreover, substantial amounts of gas were supplied as a payment for transit in opaque barter scheme. For illustration, Duleba claims that gas contract of 1996 was signed in silence, without any discussion (Duleba, *Slovensko-ruské hospodárske vzťahy - viac otázok ako odpovedí: Obchodné problémy, vízie, suroviny a záujmy*, 1997, p. 45).

The first long-term contract was agreed with Slovakia in 1997 for period of 1998-2008. It is worth noting that this was a first-of-its-kind deal of Gazprom and foreign company closed for such a long period (Duleba, *From Domination To Partnership: The Perspectives Of Russian-Central-East European Relations*, 1998, p. 86).

At the time when Gazprom Export negotiated a new long-term contract in 2008, it had become a preferable way of governing bilateral relations for both parties, and standard way of governing relations between Gazprom and its consumers generally. The current contract was signed in 2008 and will be valid until December 2028.

Ship-or-pay clause is present in the current natural-gas transit contract, set at the level of 50 bcm annually. The contract is valid until 2028. As mentioned, Nord Stream pipeline commission resulted in reduced gas flows. Transit of 50 bcm yearly is significantly less than Slovakia was used to. The transit in 2010 and 2011 was above the 70 bcm/y. After commissioning of Nord Stream pipeline, the gas transit through Slovakia

decreased to 56.5 bcm in 2012, or 58.5 bcm in 2013 respectively. Eustream, Slovak TSO, is feeling this impact.

If Russia means its intentions to avoid gas transit through Ukraine and thus through Slovakia as well, ship-or-pay clause in the Slovak contract will pose unnecessary financial burden for Gazprom once it is able to avoid Ukraine. Gazprom has so far avoided talking about cancellation of natural gas transit through Slovak territory. There have been no mentions about the viability of Slovak transit either. All in all, ship-or-pay is clearly contradicting current interests of Gazprom.

5.12.3 Sources

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5.13 Country Case Study: Ukraine¹

Anna Leshchenko

5.13.1 Introduction

Regarding their geographical closeness and historical interconnection of economies, Russia and Ukraine maintained high level of political and economic cooperation even after the end of the so called Cold War. In the 1990s of 20th century under President Leonid Kuchma Ukrainian foreign policy was characterized by being “multi-vectoral”, when attempts to establish closer relations with EU states and the US were compensated by active political and economic cooperation with Russia. However, at the beginning of the 21st century the relations began to be relatively complicated because a great majority of political representation aimed at tighter cooperation with the West and integration into western political and economic organizations at the expense of traditional relations with former member states of The Soviet Union and Russia. The first step to the sharp worsening of relations between Ukraine and Russia was the so called Orange Revolution at the turn of 2004/2005 and the following establishment of the government of President V. Yushchenko and Prime Minister J. Tymoshenko with their agenda comprising accession of the Ukraine to the EU and NATO. Tense relations between the neighbours had certainly an impact on incitement of oil (in 2005) and gas (in 2006 and 2009) relations². The proverbial last

¹ The chapter is based on the article previously published in the *Geopolitics of Energy* journal in April 2015, where preliminary outcomes of the research were presented. (see Jirušek, Leshchenko, & Černoč, 2015)

² It is necessary to note that the timing of both conflicts was not accidental and both of them were rather an escalation of long-term disputes resulting from the disagreements between Russia and Ukraine

straw for incitement of gas conflict at the turn of 2008/2009 was probably Ukrainian support of Georgia in Russo-Georgian war of August 2008. The settlement of 2009 gas conflict (to which contributed also EU representatives) also did not make the relations between the neighbours warmer. An open letter of Russian President D. Medvedev from August 2009, in which he directly blamed his Ukrainian partner Viktor Yushchenko of leading anti-Russian foreign policy, was the escalation of the long-term tense political relationship between Russia and Ukraine (Poslanie Prezidentu Ukrainy Viktoru Yushchenko, 2009; Gonchar, 2015). The establishment of more balanced relationship between both countries did not occur until the presidential elections in 2010 won by Viktor Yanukovich and his Partija Regionov (Party of Regions), supporters of tighter political and economic relations with Russia. This helped to set suitable conditions for the cooperation. After Party of Regions took the power, an extensive administrative reform occurred in the Ukrainian state and significant changes in personnel even at lower levels of administration³. The change of government also contributed to the situation in energy sector: in 2010, the prices of Russian gas significantly decreased (see below)⁴. A delicate issue for Russia – Ukrainian aspirations on membership in NATO – was also banished. Although the new president did

regarding the priority payment of gas supplies. Even though some details of the conflicts give rise to questions related to the influence of political situation and mutual relations of both countries on the development of the said crises, we suppose that the business aspect of the conflict was certainly dominant. Both gas conflicts had significant impact on mutual relations of the said countries as well as on their reputation as a trustworthy supplier (Russia) or transit country (Ukraine).

³ Allegedly it was the most extensive reform since gaining the independence according to deputies from Ministry of Energy of Ukraine (Deputies of the Ministry of Energy of Ukraine, 2014, consultation).

⁴ However, it is not possible to generalize the correlation character of Russia – Ukraine political relations and cooperation in the energy sector onto the level “change of government – change in energy prices” as the change of Ukrainian government from pro-western to pro-Russian or vice versa did not completely correspond with the price of Russian resources.

not fully dismiss the idea of integration into the EU, he categorically denied the membership in North Atlantic Alliance. On the other hand, although Partija Regionov supported the pro-Russian political-economic orientation, it also realized the importance of relations with European states and European integration preferences of Ukrainian citizens.

Probably the tensest period in Russian-Ukrainian international relations in modern history began at the end of 2013. Long-term disagreements in the area of economic policy between the neighbours, which were reflected in prohibitions and restrictions of import, were to a great extent correlative to the on-going negotiations about signing a so called Association Agreement between Ukraine and the EU in 2012-2013. Therefore it could be expected that after Kyiv refused to sign the mentioned document, political as well as economic relations returned to the more acceptable limits for Moscow. Occasional unrests which broke out in the streets of Kyiv and consequently in other cities had again, along with the following events and the turn of political representation back to the West, a negative impact on the relations with Russia.

5.13.2 Economic Relations with Russia

Ukrainian sectors of gas and oil extraction as well as power engineering are fully open to foreign investments (World Bank Group, 2010). Russia is the 4th biggest investor in Ukraine, however, according to Mikhail Gonchar, Ukrainian analyst for energy sector from Centre for Global Studies „Strategy XXI“ think-tank, its investments were always perceived with certain caution or even negatively. One of the reasons was the often problematic realization of investments. An example is the

acquisition of Ukrainian refineries in Lysychansk and Odessa by Russian companies TNK and Lukoil. Refineries which desperately needed modernisation were operated with minimal investments and entirely exhausted their technical potential (Gonchar, 2015 consultation).

Regarding the economic cooperation, Russia lost its position of the biggest business partner of Ukraine at the turn of 2008/2009 (Ministerstvo Ekonomichnogo Rozvitku i Torgili Ukrainy, 2010)⁵, when the mutual trade dropped by 42,5%. Despite the undisputed impact of the global financial crisis, it is not possible to omit the fact that the structural factor – accession of Ukraine to WTO – also played its role. Consequently, Ukrainian exporters began to be oriented on western markets. Although the Russian initiative of the Common Economic Space (or Customs Union), into which Belarus and Kazakhstan should be involved as well, was supported by Yanukovych, at the same time the Ukrainian president agreed on accession to the organization under the condition that Russia will become a member of WTO. Even though Russia became a member of WTO after the complicated negotiation process in 2012, Ukraine still did not apply for a membership in Customs Union. Moreover, as events of 2013 indicated, Kyiv preferred a tighter political-economic cooperation with the EU and signing of the Association Agreement which eliminated the involvement of Ukraine into the aforementioned Customs Union. Although the Customs Union project is primarily based on an idea of

⁵ 65% of Russian export to Ukraine is represented by energy resources. Ukraine exports machinery and metallurgical production, export of services and labour represents nearly 30% share in export to Russia (see more at Ministerstvo Ekonomichnogo Rozvitku i Torgili Ukrainy (2010). Approximately 40% of Ukrainian foreign trade goes to the members of Customs Union (Russia, Belarus, Kazakhstan).

intensification of economic cooperation, Ukrainian political leadership as well as the public is certainly aware of the political undertone of tighter cooperation with Russia.

Tab. 5.13.1: Russian Share of Import, Export and the Overall Foreign Trade of Goods with Ukraine

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Export	30,8	29,0	25,0	23,8	21,6	24,9	25,7	27,6	24,9	24,3	29,5	31,0	28,0	26,3
Import	39,2	35,5	35,5	36,6	39,2	34,0	29,5	26,7	22,0	27,4	34,7	34,2	31,5	28,9
Turnover	34,7	32,0	30,0	29,8	29,5	29,4	27,6	27,1	23,3	25,9	32,2	32,7	29,8	27,7

Source: *Posolstvo Ukrainy v Rossiyskiy Federacii*; „Yanukovych: Tovarobig“; *Ministerstvo Ekonomichnogo Rozvitku i Torgili Ukrainy* (n.d.).

Political disagreements between both neighbours have finally reflected in the decline of foreign trade in 2012. It is not possible to exclude that Moscow's dissatisfaction with the ongoing negotiations between Kyiv and Brussels was the impulse for the following trade war. The political conditionality of trade disputes between Russia and Ukraine is evidenced by the fact that in December 2013 at the Putin and Yanukovych meeting, after Ukraine decided not to sign the Association Agreement with the EU, it was decided, among other things, on the cancellation of trade restrictions from the Russian side (Radio Free Europe, 2013). After the events in the Kyiv Maidan square and the reorientation of the new Ukrainian government to the West, obstructions in the Russia-Ukraine foreign trade re-emerged at the beginning of 2014. Consequently, also an agreement about support of the mutual trade between Putin and Yanukovych from December 2013 was cancelled.

5.13.3 Reflection of the Indicators

Russian state representatives actively supporting state-owned energy enterprises and their activities in a respective country

Russian state officials have been involved in a number of energy disputes with Ukraine as the whole issue is often politicized. In fact, almost every event and change in energy relations between Russia and Ukraine is commented by politicians from both sides. A few recent events may well serve as examples: Ukrainian's recent decision to import more nuclear fuel from American Westinghouse was criticised by Russian foreign ministry as dangerous and irresponsible. A few months earlier in October 2014, Russian president Vladimir Putin was eager to interfere in complicated negotiations between Ukrainian and Russian representatives concerning the renewal of gas trade. Putin threatened that Russia may again employ supply cuts if Ukraine will not pay for its deliveries referring to similar situation that triggered the 2009 crisis.

Serious conflicts between Gazprom and Ukrainian Naftogaz have always been managed with the involvement of the highest political representatives. In fact, not only Ukrainian and Russian politicians were involved in widely discussed gas conflicts between Russia and Ukraine in 2006 and 2009, but also EU representatives were actively participating in related negotiations. This scenario was repeated in 2014 when Vice-President of the European Commission Gunther H. Oettinger moderated gas negotiations between Russia and Ukraine. On the other hand, involvement of high-level state representatives is understandable given the financial aspects of respective deals and importance of Russian state-owned enterprises for Russian economy.

The foreign supplier rewarding certain behaviour and linking energy prices to the client state's foreign policy orientation

There have been a number of examples in history of energy cooperation between Russia and Ukraine when conditions for smoother gas trade were introduced after the change in Ukrainian foreign policy orientation. The Kharkiv agreement upon which the Russian Black sea fleet was allowed to stay in Ukrainian Sevastopol until 2042 in exchange for a discount on Russian gas for Ukraine was a clear manifestation of such pattern. In this case, Kremlin was eager to lower gas price by 100 dollars/tcm (thousand cubic metres) to secure its strategic position in Black Sea area. However, the price discount applied only to a certain part of supplies. The discount agreement was meant to last until 2019 and should not exceed USD 40 billion altogether (Ukrainskaya Pravda, 2010a; 2010b). The aforementioned agreement had several consequences. First, the rather commercially-based relations based on the agreement from 2009⁶ were reversed once again as the Kharkiv agreement was political and not commercial. Proof of the political nature of this agreement is that the gas discount was offered at the direct expense of Russian state budget (Yafimava, 2011, p. 201). Second, the agreement only seemed to be favourable for Ukraine but rather the opposite was true as it included disadvantageous conditions like high baseline price and absence of “ship or pay” condition which would guarantee stable gas flow. Third, a number of appendices were supplemented to the

⁶ Then determined base price of gas USD 450/tcm was nevertheless set too high. Moreover, “take-or-pay” condition for 52 bcm of gas yearly contracted Ukrainians to buy such amounts of gas that exceeded decreasing needs of their economy (see more in Duleba, 2012). Chances are that the complicated situation during the crisis was misused by Russia to exert pressure on Ukraine and make Tymoshenko sign unfavourable deal.

agreement, aiming at intensifying cooperation in various areas in energy sector as well as in research and development, media, etc. (Pirani, 2007; Pirani, 2014). Allowing Russian presence on Crimea was clearly in contradiction with the idea of full and unquestionable sovereignty of Ukraine. It is thus possible to say that from Ukraine's point of view, solution of a short-term financial problem was prioritized over long-term state security issues. The de facto Russian accession of the peninsula in spring 2014 proved this barter trade between Putin and Tymoshenko to be rather short-sighted from Ukraine's national interests' point of view.

More recent example took place in 2013. Russia was keen to convince Ukraine to take part in Russian Customs Union project and promised to lower the gas price from 416 to 160 USD/tcm as soon as Ukraine becomes a member of this organization (Interfax-Ukraine, 2012)⁷. With regard to heavy dependence of Ukrainian power generation and chemical industry on gas (the share of gas on Ukrainian total primary energy consumption is 40%), such huge difference in gas price was undoubtedly persuasive (International Energy Agency, 2012). Additionally, just a few weeks after Ukrainian president refused to sign the EU Association Agreement, Putin and Yanukovich signed a deal in which Russia agreed to remove trade barriers imposed earlier, convert USD 15 billion into Ukrainian bonds (Smirnoc, 2013) and reduce gas price by about one-third from about USD 400/tcm to USD 268,5/tcm (Dudzinska a Gawlikovska-Fyk, 2014; Pirani, 2014) with that

⁷ Generally speaking, the negotiations between Putin and Yanukovich at the end of 2013 related to intensification of mutual trade, lowering of gas price and financial aid for Ukraine had potentially great significance for the unbalanced Ukrainian economy, especially at the time of social unrests.

the overall amount of gas supplies will remain the same (Tschernaya, 2014). The deal was of huge significance for Ukrainian indebted economy as such price discount could save around USD 7 billion in 2014 (Oreskovic & Babic, 2014). Putin commented the offer as an act of help to Ukrainian brothers that were having hard times and rejected an assumption that this accord was meant to support pro-Russian Ukrainian president. According to M. Gonchar, another important factor for this offer to Ukraine was meeting the condition of stopping reverse gas supplies to Ukraine from the EU states (see below). Despite the Ukrainian economy got worse towards the end of 2013 and the beginning of 2014, Russia decided to cancel the previous offer of low gas price as soon as the existing pro-Russian political representation was deposed after the incidents at the Kyiv Majdan square and the foreign policy orientation changed (Nacionalnyj Priority, 2013; Gonchar & Unigoskyi, 2015 consultation)

Worsening political and economic relations between Russia and Ukraine at the beginning of 2014, when social unrests were going on in Ukrainian cities demanding (among other) establishment of pro-western foreign policy discourse, were reflected also in the cooperation and trade exchange in energy sector. During the single week in April 2014 Gazprom annulled two discounts for its Ukrainian partner straight away. As the first one, the agreement from the end of 2013 negotiated by Putin and Yanukovych after the Ukraine's resignation to sign an Association Agreement with EU stopped being valid. Because of this, from April 1, 2014 Russia raised the price for Ukraine by 44% for failing to meet the conditions of repaying the debts and for timely payments for gas supplies (Walker,

2014)⁸. Consequently, Russia terminated the Kharkiv agreements (see above), which guaranteed a discount on gas price for Ukraine in exchange for extension of the permission for the Black Sea Fleet to stay in the port of Sevastopol, and returned to the conditions of 2009⁹ agreement (Frolov, 2014). Because of this, the situation de facto returned to the conditions of the international agreement of 2009 which determined USD 450/tcm as a base for gas price calculation, while an average gas price for Europeans in 2014 was set between USD 370 - 380 (Mazneva, 2014).

Abusing infrastructure (e.g. pipelines) and offering different pricing to exert pressure on the client state

In the past, various supply disruptions of Russian gas to EU occurred for various reasons, technical as well as non-technical ones. It is necessary to say that from the economic point of view Gazprom's later approach of "closing the taps" because of poor payment morale of Ukraine and Belarus is seen as quite logical. Moreover, CIS states (Commonwealth of Independent States) often tended to illegally take gas intended for EU customers for their own consumption. Disruptions of supplies had rather a symbolic meaning than being meant as an attempt to cause these states any harm (Yafimava, 2011, p. 81). On the other hand, it is worth mentioning that, contrary to the economic logic, in case of

⁸ Regarding the fact that Ukraine has paid for gas with a delay ever since gaining the independence, it was an unrealizable condition. We therefore assume that the condition was a kind of prearranged mechanism which activates as soon as Moscow perceives it as suitable. It is possible to predict that in case of warm political relations between the two countries the delays in payment of supplies would be treated with "greater understanding" from Moscow.

⁹ After the annexation of Crimea, Russia did not feel the need to provide a discount on gas supplies in exchange for lease of the port of Sevastopol which had been in fact already controlled by Russia (Mazneva, 2014; Walker, 2014).

Ukraine Gazprom let the debt ascend to high amounts before dealing with this situation. The usual logic would suggest to deal with this situation with the first undelivered payment. Accumulated debt along with interests of late payment understandably meant a greater leverage in following negotiations (consultations Henderson, 2014; Pirani, 2014).

An example of Russia misusing its infrastructure setting was the effective cut-off of Turkmen gas supplies that were meant to diversify Ukrainian gas supply portfolio. In this case, Russia had used its position as a shipper of Turkmen gas and in 2005 raised transportation prices. This put Gazprom into more advantageous position and effectively cut off the Ukrainian diversification attempts (Olcott, 2006, p. 225). On the other hand, Ukraine is one of the biggest consumers of Russian gas and from that point of view Gazprom was thus defending its position on the market. Moreover, fighting competitors in supplying gas westwards is understandable not only in relation to Ukraine.

Although the share of Russian gas which is transported across Ukrainian territory is gradually decreasing at the expense of diversification projects transporting gas through Belarus and Nord Stream, around a half of Russian gas export still flows through the Ukrainian route. For Kyiv, the transit of Russian gas represents not inconsiderable state budget revenues. The Ukrainian interest of maximum utilization of transit capacity was often misused by Russia during mutual negotiations, when Gazprom alternately pulled diversification projects or promised to increase the volume transit through the Ukrainian territory. However, it cannot be left out that Kyiv considered gas pipeline infrastructure as a triumph in its relations with Russia. In recent

years, the Ukrainian position was to a great extent weakened by the completion of Nord Stream project and decrease of Russian export to European customers.

Efforts to take control of energy resources, transit routes and distribution networks of the client state

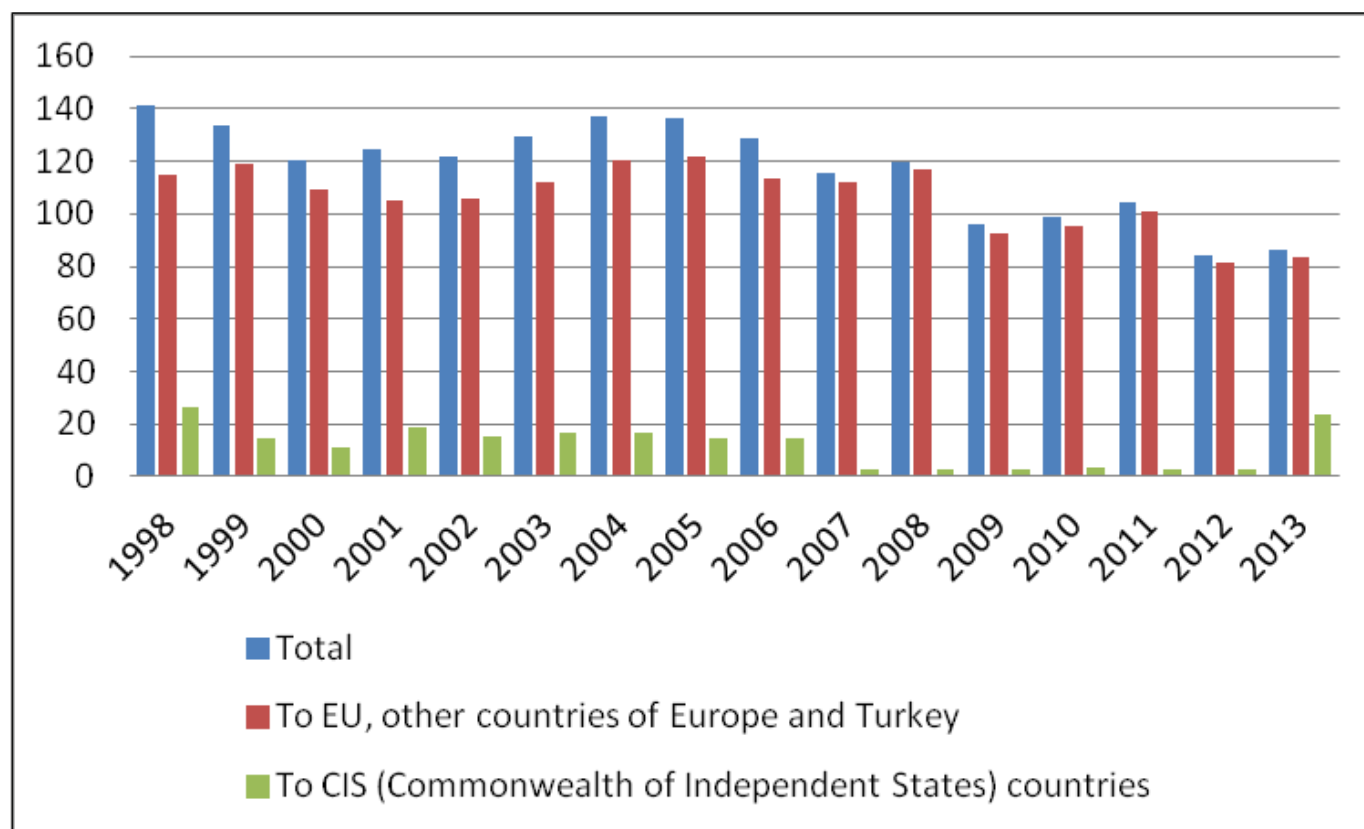
Russia as an energy resources exporter whose economy is to a large extent dependable on these exports, quite understandably aims to remove any constraints preventing its shipments to reach consumers. Moscow has been persistently trying to buy one of the traditionally most important transport routes going through Ukraine or, at least, rent it since the dissolution of the USSR. Ownership of this transport route have become even more attractive for Gazprom especially after the EU introduced its 3rd liberalization package prohibiting ownership of transit infrastructure by provider of the commodity¹⁰. Gazprom perceived this opportunity as a way to cement its position of stable and reliable gas supplier of rich western consumers and reduce risk of supply cuts both from technical and political reasons. For Kremlin the control of Ukrainian transit routes would mean elimination of Ukraine's ability to exert pressure via this asset in mutual negotiations. Understandably, this was not desirable for Ukraine not only from political but also financial reasons¹¹. Recently, Russia has been expressing declining interest in buying Ukrainian gas infrastructure as new

¹⁰ Ukraine bound itself to implement principles of the Third Liberalization Package within the process of accommodating to the European acquis, however, it is still not clear when the full implementation will be finished.

¹¹ There have been numerous proposals aiming at getting a share in Ukraine's transport infrastructure or its full takeover took place including solely Russian bids or bids including also European partners such as Ruhrgas AG, Gaz de France, ENI and others (Mizhnarodniy konsorcium z upravlinnya HTS Ukrainy: Khronolohiya podiy, n.d.). Various options were presented over the time including also the Russian proposal to invest Ukrainian debt instead of financial amount into the project. All bids eventually failed.

transport pipelines and plans to circumvent Ukraine have emerged¹² (Liga-Novosti, 2013).

Tab. 5.13.2: Transit of Gas Across Ukrainian Territory (in bcm/year)



Source: *Naftogaz Europe 2014*

At the same time, the current development in Ukraine does not indicate that Kyiv would be willing to negotiate the sale of pipeline structure to Russia (Deputies of the Ministry of Energy of Ukraine, 2014 consultation). Mikhail Gonchar holds

Moreover, in 2006, patriotically-oriented Ukrainian parliament passed a law which prohibited anyone except Ukraine to own Ukrainian pipeline infrastructure (Pirani, 2007).

¹² The 2006 and 2009 gas crises were among the most important incentives for Russia to start building new transit routes but Russia had already been trying to build alternative pipelines before. For instance, the Nord Stream project commenced with feasibility study back in 1997 (Nord Stream, n.d.). Gazprom has been expanding its export infrastructure despite the fact that investing in its current pipelines would be economically more sensible. Gazprom has been claiming that relying on its traditional export pipelines would lead to inability to satisfy the demand of its current and prospective customers (Pirani, Stern and Yafimava, 2009; Pirani, Stern and Yafimava, 2010).

a similar opinion. In his view, privatisation is unacceptable as well as participation of Russia in eventual consortium. Latest change in legislation that took place in autumn 2014 confirms this assumption. It allows foreign capital to participate in the infrastructure but strictly controls its origin accepting bids from US or EU investors only (Gonchar, 2015 consultations).

Regarding Gazprom's PR activities, we may say that the company keeps rather a low-profile in Ukraine. Representatives of Ukrainian Ministry of Energy explain Gazprom's behaviour by healthy rationality: Gazprom was, is and will remain a key gas player in the state. Therefore there is no need to invest into an already won "war" and into activities supporting the gas sale to the Ukrainian end customer.

Disrupting (through various means) alternative supply routes/sources of supply

Russia is not the only possible source of supply for Ukraine. In 2012, Ukrainian Naftogaz imported relatively limited volumes of gas from Ukrainian western borders. This gas was shipped from the EU countries thanks to the reverse flow operations within the existing supply infrastructure. However, these trade operations had more a political and symbolical effect as they accounted for less than 2 bcm – (5 % of Ukrainian annual import). Moreover, Ukraine actually stopped import from the West at the beginning of 2014 describing European imports as economically unviable when Gazprom was eager to sell gas at 268,5 USD/thousand m³. According to Mikhail Gonchar, Ukrainian representatives had to refuse imports from Europe as a *conditio sine qua non* in the aforementioned deal between Putin and Yanukovych at the end of 2013¹³ (Gonchar, 2015

consultations). As Gazprom raised the gas price in second quarter of 2014, Ukraine had to look for diversification options once again. In the second half of 2014, Russia was actively exerting pressure on Slovakia, Poland and Hungary to stop reverse flow of gas to Ukraine stating that these activities were illegal. Ukraine's Uktransgaz CEO Igor Prokopiv even accused Russia of reducing supplies to Poland to disrupt reverse supplies (Prentice and Piper, 2014). Hungary suspended gas supplies to Ukraine under the Moscow's pressure and after Russia threatened to cut off countries re-exporting its gas to Kiev (RBC, 2014).

Efforts to eliminate competitive suppliers

Efforts to eliminate competitive suppliers have been taking place simultaneously with Russian efforts to eliminate alternative import routes to Ukraine (see above). As it has been already mentioned, these activities included fending off supplies from Turkmenistan and later from Poland, Slovakia and Hungary. In the 1990s Itera, Russian privately-owned energy company, was active on the Ukrainian market (Itera, n.d.). However, its activities abroad had been limited and the company later focused primarily on internal Russian market. Evidence proving that Gazprom was trying to squeeze the company out of the Ukrainian market is hard to prove.

¹³ Gazprom's CEO A. Miller later during the escalation of the crisis in 2014 stated on numerous occasions that the reverse supplies of Russian gas across the Ukraine's western border are not unimpeachable from a legal perspective and European companies which will provide these supplies should be thus very careful. Miller has also expressed doubts regarding the feasibility of such reverse gas supplies (Prentice and Piper, 2014; Reuters, 2014).

Preference for long-term bilateral agreements and „take-or-pay“ contracts

The ‘take or pay’ condition was included in 2009 agreement between Russia and Ukraine (see above). However, in current deal confirming transit and supply conditions until March 2015, this condition was not included. A clear strategy behind this is hard to derive though, as the condition has been traditionally a part of Gazprom's supply contracts.

Diminishing the importance and influence of multilateral regimes like that of the EU Russian resistance against implementing EU's internal energy market rules can be traced in this case. The reasoning for this approach has been rather commercial. It is understandable since, in traditional gas trading model, Gazprom was the actual creator of the environment and was setting the conditions. On the EU market however, Gazprom is a subject subordinated to the market conditions which are in opposition to some of the traditional features of supply agreements¹⁴.

¹⁴ Destination clause prohibiting re-sales of supplied gas, coupling gas prices to oil, long-term take-or-contracts, etc.

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5.14 Activities of Gazprom in Asia and the "Eastern Dimension" in Russian Energy Policy

Hedvika Kodoušková

In the 1990s and at the beginning of the 2000s, there were practically no major efforts of Russia to diversify its oil and gas exports beyond Europe. Except for some preliminary agreements between Russian private players with potential Asian consumers (see below), there were no gas purchase and sale contracts concluded as well as no major infrastructure constructed, which would connect Russian vast but untapped Eastern Siberian and the Far Eastern gas resources with Asian market.

This complicates the assessment of presence or absence of certain behavioural indicators in Gazprom's energy policies towards prospective Asian consumers, as was carried out in the case of Gazprom's long-term energy strategies towards its European customers. Still, some features of Gazprom behaviour can be identified. As they are to a large extent related to the overall Russian Federation Eastern strategy, we start with its brief overview.

Only since the consolidation of Vladimir Putin's control over the development of state's energy sector after 2003/4, the "Eastern dimension" in Russian energy policy has gained attention (Henderson, 2011; Hill & Lo, 2013; Mareš & Laryš, 2012; Poussenkova, 2009; Sevastyanov, 2008).

Official proclamations of the state confirm gradual reorientation of the Russian Federation to the East. In 2003, a document titled "The Energy Strategy of Russia for the Period of up to 2020" was approved. In the section dedicated to the

external energy policy, the strengthening of Russian position on the world oil and gas markets is described as a strategically important task. The state will foster the participation of Russian joint-stock companies in development and realization of the great international projects of transport of gas, oil and energy both in Western and Eastern direction. The European market remains one of the greatest for the forthcoming 20 years, according to the Strategy (released before the world economic crisis). However, the Strategy presupposes that for the natural gas export, the part of Asia will rise up to 25 % (with China, Korea, Japan and India as the main partners). The gas production will be realized and developed both in traditional gas producing regions (Western Siberia) and in new areas: the Eastern Siberia and on the Far East, Arctic areas and the Yamal peninsula (Ministry of Energy of the Russian Federation [ME], 2003, p. 12).

The growing importance of Asian markets is also reflected in “The Energy Strategy of Russia for the period up to 2030” adopted in 2009. In the section dedicated to foreign energy policy, the Strategy identifies several problems, which have to be handled by Russia (ME, 2010, p. 57).¹ These factors seemed to reflect the changing situation in regional gas markets after the world economic crisis as well as the complexity of EU-Russian relations after the 2006 and 2009 gas disputes. The strategy envisages numerous strategic objectives, which have to be pursued, including: diversification of export energy markets;

¹ Problems identified by the Energy Strategy of Russia from 2009 are following: reduction in demand and cut in prices due to the world economic crisis; insufficient diversification of sale markets for Russian energy resources; preservation of the Russian export dependence on transit countries; politicization in energy relationships between Russia and foreign countries; low level of Russian energy companies activity in foreign markets (ME, 2010, p. 57).

provision of stable conditions on energy markets, including guaranteed demand and sound prices; enhancement of leading Russian energy companies' positions abroad (ME, 2010, p. 57). As the strategy puts it, the abovementioned goals should be realized with the diplomatic support of Russian energy companies abroad as well as by active state energy policy (ME, 2010, p. 58). As far as gas sector is concerned, development of the unified system of gas supply and its expansion to the East of Russia is desired. The Strategy states that the volume of gas supply to the European market will be retained at the necessary level, while the eastern direction of export (China, Japan, the Republic of Korea) will face a multiple increase (ME, 2010, p. 80). In the Strategy's third implementation phase, the proportion of Eastern energy markets in the Russian natural gas export should grow from 0 to 19-20 % (ME, 2010, p. 23).

The amendment of the Strategy for the period up to 2035 released in 2014 alerts that the demand for energy resources will grow especially in countries and regions with so far limited Russian presence. The Asian region is understood to be one of the most promising in the world. The emphasis should be put not only on the construction of gas pipelines, but mainly on boosting the Russian LNG export potential, where the country will be forced to face the growing competition from the U.S., Canadian, Australian and East African producers. Russia therefore has to seek immediate strengthening of its position in world LNG markets. Successful implementation of recommended strategies should lead to even higher growth of the share of Asian countries in the overall Russian natural gas export from current 6 % (provided by Sakhalin II. LNG) to 31% (ME, 2014).

Finally, the “Concept of the Foreign Policy of the Russian Federation” from February 2013 clearly demonstrates Russian commitment to pursue the Eastern policy as one of its foreign policy priorities. As it puts it, the current stage of the world development is characterized by profound changes in the geopolitical landscape largely provoked or accelerated by the global financial and economic crisis. The ability of the West to dominate world economy and politics continues to diminish. The global power and development potential is now more dispersed and is shifting to the East, primarily to the Asia-Pacific region, the document states. As far as energy security is concerned, measures should be taken to secure the status of the Russian Federation as a key country in the context of trade and economic relations between Europe and the Asia-Pacific region, including through an increased participation in transcontinental transport corridors that are currently in the process of formation. Strengthening Russia's presence in the Asia-Pacific region (APR) is becoming increasingly important, according to the 2013 Strategy. Russia is interested in participating actively in the APR integration process, using the possibilities offered by the region to implement programs meant to boost Siberian and Far Eastern economy. East Asia Summits are seen as desired mechanism for strategic dialogue between leaders (MFA, 2013).

In fact, the development of East Siberia and the Russian Far East should serve many governmental goals, which cover not only economic objectives (substitution for declining production in traditional areas, need to bolster Russian national budget... etc.), but also geopolitical considerations. Among them the development of geographically distant, economically less

developed and politically more unstable regions is pursued internally, together with external goal of growing Russian leverage vis-à-vis well diversified interconnected export markets.

As far as internal issues are concerned, after the disintegration of the USSR, East Siberia and the Far East regions suffered mostly from deindustrialization and depopulation. Possible migration from heavily populated Chinese north-east provinces is perceived as a real geopolitical concern in Moscow. The slow economic development in the Russian East is another pressing issue. Russia's average national GDP is growing faster than that of the regions, and this gap is widening (Poussenkova, 2009, p. 136). Economically, these regions are very active with the neighbouring countries, which are physically much closer than Russia's federal centre. As the distance of Eastern regions from Moscow is immense, they have developed specific cultures. Many Russian inhabitants even perceive them as self-contained entities not belonging to Russia (Mareš & Laryš, 2012, p. 438). As such, it is therefore vital for Russia to achieve the “dual integration” of its eastern provinces by keeping them a part of Russian territory while also incorporating them into dynamically-growing Asian markets (Poussenkova, 2009, p. 136). Developing energy resources and building transport infrastructure to foreign markets both serve these targets, as Putin himself underlined in May 2004,² together with the establishment of new “Ministry for the

² As Putin put it when he gave his annual address to the Federal Assembly in May, 2004: “...The development of infrastructure is more than an economic task. Solving it will not just directly affect the state of affairs in the economy, but ensure the unity of the country as a whole whether people feel they are citizens of a united, large nation, and whether they can make use of its advantages... a modern, well developed transport infrastructure is capable of turning Russia's geographical features into a real competitive advantage for the country” (cited from Motomura, 2014, p. 68).

Development of the Russian Far East” in 2012, and a very close attention attached to some of the centres – e.g. Vladivostok, a city that hosted the APEC summit in September 2012.

Other rather external issues stem from current development in the regional gas markets. Whereas gas demand in Europe weakens, the Asian market has witnessed its unprecedented rise. China's consumption rose from 34 bcm to 162 bcm in just one decade from 2003 to 2013. Japan's demand grew from 80 bcm to 117 bcm during the same period, whereas South Korea, another prospective consumer of Russian Eastern gas, witnessed its natural gas consumption rise from 24 bcm in 2003 to nearly 53 bcm in 2013. Overall gas consumption in the Asia Pacific region has almost doubled in last ten years (from 350 bcm to 640 bcm), whereas total amounts consumed in Europe & Euroasia remained approximately on the same level (around 1060 bcm) (BP, 2014, p. 23). According to International Energy Agency (IEA, 2013, p. 63) we can expect this trend to continue in future. In its New Policies Scenario over the period to 2035, IEA assumes that non-OECD countries account for more than 80% of global gas demand growth. Demand for gas in developing Asia grows by around 680 bcm, equivalent of the total amount of gas traded inter-regionally nowadays. Demand grows mainly in China (nearly 400 bcm), India (over 110 bcm) and Indonesia (40 bcm) (IEA, 2013). Russia's growing focus on the development of Eastern Siberia and the Far East energy resources thus reflects the fact that most promising future markets have been developing in Asia.

Except for economic considerations, a geopolitical overtone can be traced back in Russian Eastern energy policy since the EU-Russian relations have deteriorated because of the

Ukrainian crisis. Growing Sino-Russian energy cooperation aims to show the world that Russia is not isolated in the international society.

The worsening relations with the EU have economic repercussions to the Russian Federation, as Western financial institutions, under the effect of anti-Russian sanctions, were reluctant to provide loans to Russian energy companies. A “self sanctions” phenomenon has been persistent in Russia since the early day of the Ukraine crisis, as Western banks and financial institutions are refusing to finance even those Russian companies that face no sanctions at all, to insulate themselves from any potential risk. Some of the Russian companies, including Gazprom, have started considering the opportunity of diversifying the sources of financing through the Asian capital markets thus again looking Eastward (Gazprom, 2014, October 21).

The above mentioned development does not mean that Russian future gas export will be switched from Europe to Asia. The growing aim of Russia to materialize oil and gas pipelines running from Eastern Siberia to Asian markets however indicate its endeavor to have the most diversified structure of future customers. Russia wants to diversify not just between its Western and Eastern export markets, but also among Asian customers, by building projects to the Pacific coast (East Siberia Pacific Ocean pipeline - ESPO, Power of Siberia – see below). End stations of these projects on the Pacific coast increase the list of potential customers beyond China.

5.14.1 Development of negotiations between Russia and prospective Asian consumers

Three different regional gas markets can be distinguished in Asia: a mature market in Japan or South Korea mostly turned toward liquefied natural gas supplies (LNG); the new global consumer markets – China and India – with growing import needs; and Southeast Asia slowly emerging as a new centre for LNG imports (IEA, 2012, p. 130). China is the only one where pipelines as well as LNG terminals construction have been considered and implemented. To analyze the character of Gazprom's energy policy towards prospective Asian customers, we have chosen case-study of Sino-Russian negotiations about cooperation in gas sector. If relevant, dealings with Japan and other Asian consumers are analyzed as well. Before the occurrence or absence of strategic approach indicators defined above will be assessed, short overview of negotiations is following.

As far as gas supplies to China are concerned, the very first plans can be traced back to the 1990s. That time, an idea of Kovykta deposit development, one of the largest undeveloped gas fields in Irkutsk region in Eastern Siberia, came from.³ Through its 62 % stake in RUSIA Petroleum, TNK-BP was the ultimate owner of the Kovykta field and had long-term preferences to export gas to China.

However, the aim of the state to gain the control over production and exports of Russian Eastern Siberian and the Far East gas resources heavily influenced these plans. Gazprom

³ The final version of the project from 2003 envisaged a gas pipeline running from Eastern Siberia to China (20 bcm) and then under the sea to South Korea (10 bcm), with some supplies dedicated to local markets (4 bcm) (Andrews-Speed & Dannreuther, 2011, p. 119).

gained majority in the most important assets in the region intended for gas export to Asian market, including Kovykta. Moreover, it was authorized by the government to implement the “Eastern Gas Program” (EGP), and thus also to oversee the export of gas to China and other Asia-Pacific countries. Because of different preferences of Gazprom especially at the beginning of the 2000s and disputes over Kovykta's ownership between TNK-BP and Gazprom, which had not been resolved until 2011 (see below), the option of gas pipeline running from Eastern Siberia to China (Eastern route) has been abandoned for some time. An alternative plan of Gazprom had been considered instead that would see the construction of Altai pipeline from Western Siberia (gas fields Urengoi and Nadym) to China's Xinjiang region (Western route) (see the map). The question of gas imports remained the subject of negotiation between China and Russia. The long-standing negotiations between CNPC and Gazprom have been nevertheless hampered by disagreements concerning the route of the proposed pipeline (until 2011) and gas prices (until 2014). The negotiations illustrate the complicated position of Gazprom as a state company, which has to take into account goals of the state as well as its own corporate agenda (profit), and are analyzed in detail below.

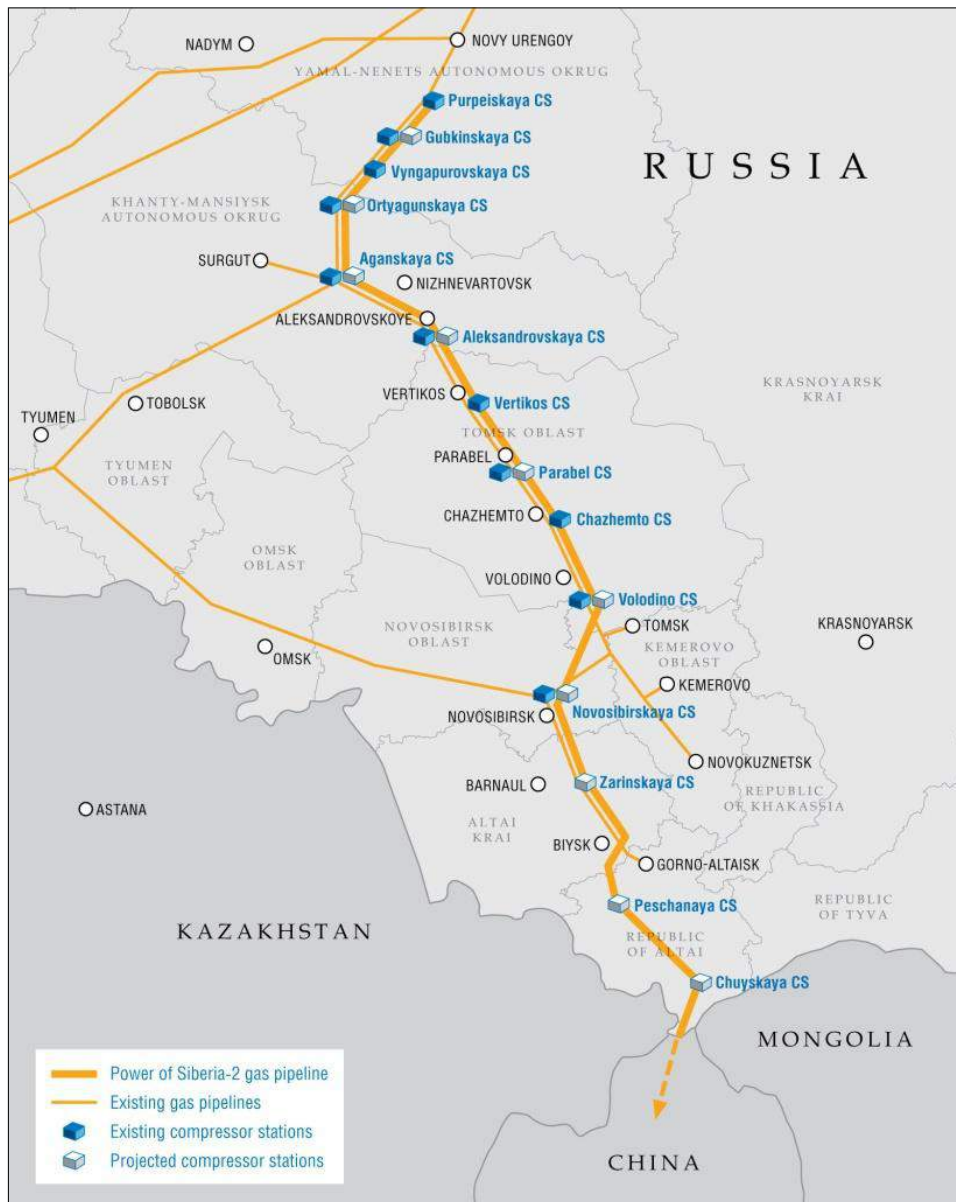
In May 2014, in Shanghai, after ten years of negotiations, in the presence of the Russian president Putin and his Chinese counterpart Xi, the two parties finally signed a purchase and sales contract on gas supply via the Eastern route pipeline. The plan envisaged the construction of the “Power of Siberia” pipeline, a unified gas transmission system from the Yakutia gas production center (Chayanda gas field – see below), which

should convey gas via Khabarovsk to Vladivostok on the Pacific coast. A pipeline spur to China from the border point of Blagoveshchensk is part of the project. With the length of 4000 km, the “Power of Siberia” (PofS) is expected to have the annual capacity of 61 bcm: 38 bcm is planned for China, 9 bcm for domestic market and 14 bcm as an LNG to other Asian customers. The Vladivostok LNG terminal is projected to stand at the end of the gas pipeline in the Khasan District of the Primorye Territory (see the map). The terminal should comprise three production trains with the annual capacity of 5 mt/y each (Gazprom, n.d.).

The Vladivostok LNG was particularly interesting for another Russian prospective customer – Japan. In 2005, Japan's Agency for Natural Resources and Energy (ANRE), a branch of the Japanese Ministry of Economy, Trade and Industry, signed a framework cooperation agreement with Gazprom. In 2011, Gazprom together with ANRE as well as Japan Far East Gas Company (JFG) – the consortium of Japanese companies – conducted a preliminary feasibility study on the project. In March 2013, the action plan for constructing the LNG plant was approved together with the plan for establishing the project's resource base. In June, 2013, as part of the St. Petersburg International Economic Forum, Gazprom and JFG signed a MoFU regarding the discussions on foundation of a joint project company as well as joint marketing activity in Japan, which would contribute to the realization of Vladivostok LNG project (INPEX, 2013). It was unclear for a long time, however, where the LNG plant would be supplied from: if it will be via PofS, or from Sakhalin III (another Gazprom's project in the Far East) and the Sakhalin-Khabarovsk-

Vladivostok pipeline (SKV) (coming on line in 2011), or both. Moreover, the cooperation with Japan has not seen much development since the MofU was signed and may be further constrained by the latest Gazprom decision to proceed with pipeline projects to China first rather than its LNG projects (see below).

Tab. 5.14.1: Western Gas Pipeline Route from Russia to China



Source: *Gazprom* (n.d.)

Tab. 5.14.2: Eastern Gas Pipeline Route from Russia to China



Source: *Gazprom* (n.d.)

5.14.2 Indicators assessment

Efforts to take control of energy resources, transit routes and distribution network of the client state; Disrupting (through various means) alternative supply routes/sources of supply; Restrictions placed on influence of homeland and foreign private actors;

Based on both the internal significance of territorial integrity and political stability in the Russian East, and external goal of growing Russian presence in Asian energy markets, the task of developing oil and gas reserves in Eastern Siberia and the Far East and building energy ties with Asian consumers was not left without governmental control.

After the inauguration of Vladimir Putin as a Russian president an effort has been made to ensure strong state control over the distribution of energy resources in the Russian territory and subsequently over the production, processing and transportation of oil and gas from Russia to Asian customers.

As Sevastyanov (2008, p. 36) puts it: during his second term, Putin introduced “New Energy Policy” (NEP) based on following principles: diversification of the energy supply markets; sustaining sovereign control over strategic decisions on oil and gas exploration and transit routes; signing long-term contracts with foreigners to develop Russian natural resources; and regulating foreign access to these resources (Sevastyanov, 2008; similarly Kozyrev, 2008).

As far as foreign investments are concerned, new legislation was approved and signed by Putin before his second term ended. According to the law, any foreign purchase of a controlling stake in a state-owned or private company in strategic sectors or a purchase of more than 10 % in larger oil and gas deposits are subject to approval by a governmental commission (Pleines, 2009, p. 74). This signifies only limited role of foreign investors as minor partners of Russian state-own companies.

As we can see on the case of the Russian Eastern energy policy (EEP), in accordance with the new strategy, the Russian state both restored its control over important oil and gas fields in the Eastern parts of Russia and significantly limited the operations of private domestic players and foreign international oil companies (IOCs). During 2004-2008, the Russian state managed to restore its majority ownership in Gazprom and gained control over about half of the Russian oil industry.⁴ Control was established over important oil and gas fields in Eastern parts of Russia at the expense of domestic and foreign private investors, who were previously involved in their

⁴ By relying on heavy pressure and legally dubious measures (see e.g. Pleines, 2009, p. 76-77; Sevastyanov, 2008, p. 42-43).

development (Kuchyňková, 2014, p. 193-194; Poussenkova, 2009, p. 138; Pleines, 2009, p. 78). In most cases, the state did not directly acquire their ownership, but rather acted through its state-owned companies - Rosneft, Transneft and Gazprom.

The latter gradually increased its dominant position in the development of Eastern Siberia and the Far East energy resources and construction of major export projects with direct repercussions to the preliminary energy agreements between privately owned Russian energy companies and prospective Asian consumers. For example, in 2006, a strong pressure was put on one of the largest foreign investment in Russia – the Sakhalin Energy Investment Corporation (SEIC). Foreign investors were accused of environmental degradation and forced to pay fines and fees to cover environmental costs of the project to Sakhalin Island. Shell and other foreign companies involved decided to renegotiate the ownership terms of the Sakhalin-2 project and to sign a new protocol to the project agreement with Gazprom (Sevastyanov, 2008, p. 43). According to the Purchase and Sale agreement from April 2007, Gazprom acquired 50 % plus one share, while foreign investors decreased the number of their total project shares in the project.⁵ By this acquisition, Gazprom entered the LNG business focused on the Asian market. Former accusation of environmental degradation was recalled by publication of the Sakhalin II project environmental report in October 2007, stating that it “meets Russian and international regulatory requirements related to environmental and process safety” (Gazprom, n.d.).

⁵ Nowadays, the Sakhalin Energy Investment Company Ltd. (Sakhalin Energy) is formed by following shareholders: Gazprom (50 % plus one share); Shell (27,5 % minus one share); Mitsui (12,5 %) and Mitsubishi (10 %) (Gazprom, n.d.).

Similar development occurred in case of Kovykta's ownership in 2006. Russian regulatory agencies threatened to revoke its license for Kovykta (due to alleged adverse environmental impact and non-compliance with the terms of the license given to the RUSIA Petroleum) (Sevastyanov, 2008, p. 43). Based on the pressure, BP was forced to bring Gazprom into the project. Control over Kovykta became the subject of the dispute between TNK-BP and Gazprom and was not resolved until 2011. In 2007, TNK-BP agreed to sell the gas field to Gazprom for \$1 billion. However, the sale was not concluded because of economic crisis and financial difficulties faced by Gazprom. In 2010, the bankruptcy of RUSIA Petroleum, a TNK-BP subsidiary, was announced. In 2011, the company was auctioned off to Gazprom, which bid more than \$700 million (UPI, 2011).

A special treatment occurred in case of the Chayanda gas field. In 2007, it was added to Russia's list of "strategic" assets, so in 2008, Gazprom was awarded the rights to develop it without an auction (Reuters, 2008, April 14).

To sum up, Gazprom has gained majority in the most important assets in the region intended for gas export to Asian market up to now: small fields in Krasnoiarsk region; Chayandiskoye field in Yakutia; Kovyktinskoye field in the Irkutsk region; Sakhalin II and Sakhalin III projects (with promising production from Kirinsky block); and fields on the west coast of the Kamchatka peninsula (see the map). Moreover, in September 2007, the company was authorized by the government to implement the state-run "Development Program for an integrated gas production, transportation and supply system in Eastern Siberia and the Far East" (Eastern

Gas Program - EGP), and thus also to oversee the export of gas to China and other Asia-Pacific countries (Blank, 2006, p. 30-31; Gazprom, n.d.; Kozyrev, 2008, p. 215). In future, the gas transmission system should be integrated into the “Unified Gas Supply System of Russia”, as declared by the company (Gazprom, n.d.), in compliance with the governmental goal to develop the united European-Russian-Asian energy area. By gaining assets and possessing monopoly on export Gazprom has built a strong position to fulfill governmental energy policy goals in the Eastern Siberia and the Far East often to the detriment of domestic and foreign private investors.

As far as the activities of Asian companies in Russia are concerned, China was rather unsuccessful in terms of obtaining equity gas, in contrast to what it achieved in Turkmenistan (see e.g. Handke, 2006; Kozyrev, 2008, pp. 202-251; Yenikeyeff, 2011, pp. 61-78), despite the diplomatic activities of China's leadership and the growing cooperation between China's and Russia's NOCs. A synopsis of the contracts agreed by China's and Russia's companies is provided below.

Tab. 5.14.3: Chinese NOCs Energy Assets in Russia

Company	Project	Ownership	Date
CNPC	Vostok Energy Ltd.	49% (51% Rosneft)	2006
Sinopec	Udmurtneft	49% (51% Rosneft)	2006
Sinopec	Sakhalin III.	25,1% (74,9% Rosneft)	2007
CNPC	Yamal LNG	20% (60% Novatek)	2013
CNPC	Vankor oil field	10% (TPC) (Rosneft)	2014

Source: Compiled by the author

Obviously, if China could obtain equity stakes in the development of Russia's natural gas fields similarly to what it secured e.g. in Turkmenistan, it would be very much welcomed by China's NOCs.⁶ However, due to Gazprom's tenacious policy, China's NOCs failed to obtain any equity stakes in the Gazprom-owned fields. One possible explanation derives from the above mentioned principles of Putin's NEP. Moscow would give foreign investors limited access to its major deposits only in exchange for allowing Russian companies access to foreign pipelines and retail networks (Sevastyanov, 2008, p. 36). However, the idea of opening its own gas sector to Russian investment was not viewed favourably in China, even if Gazprom showed interest in investing into the gas network, natural gas treatment plants, and electricity generation in China (Paik, 2012, pp. 352, 354). China was apparently afraid of becoming too dependent on Russia in its potential triple capacity of gas supplier, processor, and distributor. Although cooperation negotiations were held also with other Asian countries, mainly Japan, the only example of such reciprocal agreement is that of Vietnam. A joint companies Gazpromviet and Vietgazprom were established to jointly pursue exploration and production activities in Russia, respectively Vietnam (Gazprom, n.d.; Vietgazprom, n.d.).⁷ The fact, that this is the only case which brought particular results indicates that Russia is probably more open to cooperate in partnerships, where it has the political as well as economic superiority.

⁶ Equity gas allows Chinese companies to decrease losses caused by the difference between imported and domestic gas prices (see e.g. Higashi, 2011).

⁷ In November 2014, Gazprom and PetroVietnam signed a framework agreement to jointly develop Nagumanovskoye oil, gas and condensate field in Orenburg and Severo-Purovskoye gas and condensate field in Yamal. As Miller put it: "This is for the first time when a company from Asia-Pacific acts as a

Russian state representatives actively supporting state-owned energy enterprises and their activities in a respective country/The foreign supplier rewarding certain behaviour and linking energy prices to the client state's foreign policy orientation/Abusing infrastructure (e.g. pipelines) and offering different pricing to exert pressure on the client state

It is troublesome to assess presence or absence of above mentioned indicators as the Sino-Russian gas deal was concluded only last year and major gas pipelines running from Eastern Siberia towards prospective Asian customers have not been built yet. What is confirmed below is the fact that Russian state representatives were heavily involved in Gazprom's Eastern energy strategies development and implementation. It is apparent when we compare the Gazprom's behaviour in 2000s, when it mostly followed its own agenda that differed in many respects from the Eastern strategy asserted by Putin, and the situation after 2012, when strong pressure was put on the company to proceed with the EGP and to conclude the gas deal with China.

Around 2004, when the Russian “Eastern dimension” strategy was being created, the reasons of Gazprom for not

business partner and co-investor of Gazprom's promising fields in Russia.” A joint company Gazpromviet (Gazprom 51%, PetroVietnam – 49%) holds a subsurface use license for both fields. Another joint operating company Vietgazprom is engaged in exploration and production activities in Vietnam. Gazprom obtained 49% in the PSA for offshore blocks 05.2 and 05.3 in the South China Sea. In 2013, commercial gas production was launched from the Moc Tinh and Hai Thach fields of licensed blocks. Moreover, in November 2014, cooperation in the exploration and development of the Dolginskoye oil field located in the Pechora Sea shelf was discussed between Gazprom Neft and PetroVietnam. An agreement was signed to begin exclusive negotiations. As part of the agreement, PetroVietnam gains access to relevant information regarding the field, Gazprom Neft refrains from entering discussions with other third parties for six months. Both sides intended to sign an operating agreement by May, 2015. In 2013, the companies entered into the framework agreement in setting out the key terms and conditions of acquiring a stake in Dung Quat, Vietnam's only oil refinery, and its future upgrade (increase in capacity from the existing 6.5 mt/y to 8.5 mt/y and efficiency improvement). In April, 2014, an agreement was signed setting down a period, during which Gazprom Neft would have exclusive rights to negotiate with PetroVietnam on acquiring its shares in the refinery (49%).

focusing on prospective Eastern customers were basically twofold. First, it did not possess assets in Eastern Siberia crucial for supplying potential customers on the Eastern markets (see above). Second, it was against Gazprom's preference. At that time, Gazprom was more interested in building export pipelines, and joining projects that were already underway than in commissioning new fields. Thus when Gazprom was designing the EGP and studying different options for developing the region, it chose the cheapest alternatives with minimum export risks (Poussenkova, 2009, p. 145-146). Gazprom plans e.g. envisaged conservation of the Chayanda field until at least 2030. They also differed from that of TNK-BP in case of Kovykta gas field. Whereas TNK-BP wanted to sell gas to China and possibly further to South Korea (see above), Gazprom proposed conservation of the field until at least 2015-2020. Possible gas pipeline from Kovykta should be constructed westward.⁸ An alternative plan of Gazprom was considered instead that would see the construction of Altai pipeline from Western Siberia (gas fields Urengoi and Nadym) to China's Xinjiang region (Western route). This pipeline would mean an extension of the existing pipeline infrastructure in Western Siberia southwards to the short Sino-Russian border between Kazakhstan and Mongolia. The Altai project would allow Gazprom to re-allocate more gas to China should demand fall in Europe, thus effectively connecting the two markets. This project could give Gazprom "swing supplier" status (see e.g. Paik, 2012, pp. 360-361). Only in 2011, when the

⁸ As company's key consumers were in Europe, Gazprom's priorities were to ensure continued supply to its major customers. It was also more constrained by its obligations as a state company to ensure adequate gas supplies for domestic market (Andrews-Speed & Dannreuther, 2011, p. 121; Mommen, 2007, p. 446).

Kovykta's gas field ownership was effectively resolved, it was conceded that gas might be imported into China not from Western, but from Eastern Siberia (Interfax, 2011, October 7). On the top of the above mentioned reasons, Gazprom was also unwilling to conclude the gas purchase and sale deal with China, which would not bring adequate profit. In line with the western variant of the pipeline, the company for a long time linked the price of gas for China to the price paid by its European customers. As China was not willing to accept that price, negotiations were stuck.

However, since May 2012, when Vladimir Putin was re-elected as Russian president, a strong governmental pressure has been put on Gazprom to make progress in the Sino-Russian gas supplies negotiations. One of the reasons Putin presented during his final address to the Russian Duma in April, 2012, and many times later, was the US shale gas production, which might substantially change supply and demand patterns on the global scale. As Putin put it: "Our country's energy companies absolutely have to be ready right now to meet this challenge." Russia has to be prepared for "any external shocks" and "a new wave of technological change" that was "changing the configuration of global markets" (EurActiv, 2012, April 18).

Putin was convinced that Sino-Russian cooperation in the gas sector could help Russia to establish its position in the Asian markets and to successfully face the changing geopolitical conditions. Ahead of Putin's state visit to China, in an article published in the Renmin Ribao journal, Putin said that: "Our (Sino-Russian) joint projects have a big impact in shaping the global energy market's entire configuration" (PR, 2012, June 5). In the official press statement following Sino-Russian talks, Putin

claimed that Russia was: “Ready to intensify the program of cooperation between the Russian Far East, Eastern Siberia and Northeast China.” According to Putin: “Agreements in energy sphere are being implemented with significant progress” (PR, 2012, June 5). Similar statement occurred in Putin's speech at St. Petersburg International Economic Forum, in June 2012: “We will substantially expand the energy sector's resource base over the coming years, with offshore development of new oil and gas fields, including in Eastern Siberia, Yamal, and Sakhalin. We are developing infrastructure and building a series of new energy transport routes, including routes that will supply the Asia-Pacific region countries” (PR, 2012, June 21). Apparently, there was no lack of strong political will to proceed with the EGP at the beginning of Putin's third presidential term.

Following the official proclamations, further negotiations between senior Gazprom and CNPC representatives were held in May, and then in July and September of 2012, to discuss the terms and conditions for Russian gas supplies to China (Gazprom, 2012, April 17, July 17, September 27). However, despite official Russian optimistic proclamations, the biggest obstacle for practical implementation of mutual Sino-Russian gas cooperation - disagreements over the price - persisted.

In June 2012, the new Presidential Commission for Strategic Development of the Fuel and Energy Sector and Environmental Security was established with Putin as a chair and Gazprom CEO Miller as one of the Commission's members (PR, 2012, June 15). The Commission met in October, 2012. Here Putin openly admitted that changing conditions in the international gas markets are not favourable for Russia: “European countries are working to create a

common gas market”, “there is though competition among gas exporters”, “in the US, new technology is used to increase the cost-effectiveness of shale gas production”, “important global trend is the growth of trade in LNG.” Taking this into consideration, Russia has to be very prudent in its actions and at the same time very flexible, according to Putin (PR, 2012, October 23). The perceived need for quick responses and flexibility possibly let to political push Gazprom received from the country's leadership. As part of the Presidential commission meeting, Gazprom was asked to “conduct the necessary analysis and report on the main principles of its gas export policy (as the great deal in the Russian economy depends on the effectiveness of Gazprom).” The Energy Ministry was asked to make adjustments to the gas industry development plan to 2030 and the EGP, and report on the results to the Commission (PR, 2012, October 23).

A working meeting with Gazprom CEO Miller followed in October 2012, where Putin again urged Gazprom to proceed with EGP implementation (PR, 2012, October 29). Putin described Chayanda and Kovykta as international-level fields in terms of their reserves and reminded Gazprom about previous agreement that “once the work there begins, we (Russia) will carry out our plans to develop new transport possibilities.” Putin underlined that export center focused on the Asia-Pacific region should be set-up and LNG exports developed. In his answer, Miller assured the president, that Chayanda, Kovykta and Krasnoyarsk center would be developed one-by-one together with a pipeline from Yakutia to Vladivostok via Khabarovsk. Soon afterwards, a final investment decision was announced by Gazprom about the establishment of a large gas

production center in Yakutia and a pipeline running to Vladivostok (named “Power of Siberia” in December) (Gazprom, 2012, October 30). The decision did not mention a spur to China at all. Negotiations were held between Gazprom and its Japanese counterparts instead, regarding LNG project in Vladivostok and their cooperation on Sakhalin II project (Gazprom, 2012, November 26), leading to discussions about the commercial logic of the project if China is not included (see e.g. Henderson & Stern, 2014).

Strong Putin intervention into the development of the Eastern Siberia and the Far East projects can be traced back in 2013 as well. New elected Chinese President Xi Jinping made an official visit in Moscow in March 2013, the first one in abroad after his inauguration. In the press statement following the Russian-Chinese talks “breakthrough” agreements on additional oil supplies, the pipeline construction and the import of Russian LNG were announced.

Another MofU between Gazprom and CNPC for cooperation in pipeline gas deliveries to China via the eastern route followed (Gazprom, 2013, March 22). However, the price of exported gas remained a problem (Reuters, 2013, March 25). A final deal was held up by Gazprom's determination to match the returns it made on European deliveries. Gazprom remained reluctant to accept any price formation mechanism that would lead to lesser profits, suggesting it still hoped for parity with its European oil-linked prices (Reuters, 2013, March 25). In June 2013, Gazprom even suggested it would rather make no agreement with China and abandon the Power of Siberia project than to do an unfavourable deal (Henderson, 2014a, p. 237), so again, preferring its economic interests.

In the presence of both presidents, a deal defining the volumes, start of deliveries, payments, “take-or-pay” amendment and other issues was signed in September 2013, leaving the question of price as the last thing to agree on (Reuters, 2013, September 5). A plan to sign the final supply deal by year-end was announced. However, despite the fact that in October 2013 the parties seemed to reach final agreement on the price formation mechanism, the deadline of final agreement was postponed to the Putin's visit in China scheduled for May 2014 (Gazprom, 2014, January 22), when the contract was finally signed after many years of mutual talks. Once again, the person of Russian president played a strong role in pushing the negotiations ahead. As Putin put it replying to journalists' questions following a visit to China: “through mutual compromises we managed to settle on contract terms which satisfy both sides” (PR, 2014, May 21).

Which particular compromises were agreed on when the Sino-Russian gas deal was signed in May is a matter of speculations (this issue is discussed below). What is clear is Putin's determination to finalize gas supply deal with China and put pressure on Gazprom to proceed with its practical implementation. Putin's speech at a meeting of the Commission for Strategic Development of the Fuel and Energy Sector and Environmental Security, which took place at the beginning of June 2014, confirmed this assumption. According to the president, Russia has to build the necessary infrastructure, which will bring its gas exports to the Asia-Pacific region. The government and the Ministry of finance should look into the possibility of “topping up Gazprom's capitalization to the cost of the new infrastructure's construction”. Putin expressed his belief

that the contracts are long-term and will definitely pay for themselves and that this kind of practice would enable Russia to cement its position on the biggest and fastest-growing world markets (PR, 2014, June, 4).

This reasserts a strong political will to implement the countries' Eastern energy policy goals, even if commercial logic of particular projects is debatable at least in short or mid-terms. The government is willing to support its national champion with a long-term vision of many benefits the Eastern gas program could bring. As such, the indicator presuming the Russian state representatives involved in energy policy implementation, influencing and supporting state-owned energy companies, definitely has to be confirmed in case of the Sino-Russian gas supplies negotiations.

On the other hand, the relationship between Gazprom and the Russian government is not one-sided. The above mentioned concessions (together with other financial incentives the project will most probably get) might also point to the influence of Gazprom to the government and the company's determination to negotiate some reliefs in exchange of not so favourable deal concluded with China. As the next research outcomes reveal, in its strategies, Gazprom not only reflects governmental interests, but also flexibly adjust its conduct based on the opportunities and obstacles present in the domestic as well as international markets.

Efforts to gain a dominant market position in the client country; Efforts to eliminate competitive suppliers; Acting against liberalization

The clear aim of Gazprom is to restrict maneuvering field for competitive suppliers, to keep its dominance inside Russia as well as gain a strong presence on Asian gas market. This is apparent from several changes Gazprom made in its export strategy in 2014 and in early 2015. Before the Sino-Russian gas deal was signed in May 2014, there were two other Russian companies planning to develop major LNG projects in Russia with a focus on sales to the Asian market – Rosneft with the Sakhalin I. project and Novatek with the Yamal LNG. These projects gained political support at the end of 2013, when the Russian government discontinued Gazprom's monopoly over LNG exports, which it had held since 2006 (Reuters, 2013, December 2). Whereas Gazprom's monopoly on pipeline gas export stayed untouched, an enacted amendment package to the "Gas Export Law" opened up a possibility of exporting LNG from particular sources. This enabled Rosneft and Novatek to launch their projects.

Putin has urged Russian gas producers to develop production of seaborne LNG and increase their global reach to diversify gas supplies away from Europe. A clear effort of this step was to double the Russian share of the global LNG market to around 10% by 2020 (from current 10 mt/y to around 35-40 mt/y by 2020) (Reuters, 2013, October 30). However, according to OSW, the president's decision to partially restrict Gazprom's gas monopoly was also influenced by the fact that the companies' efficiency was constantly falling (Kardaś, 2013). Gazprom's rivals could benefit from such a situation. According

to Henderson & Stern (2014, p. 8): if Gazprom continued to delay with the piped export sales to China, Rosneft could start to promote itself as a possible leader for Russia's entire eastern gas strategy, having demonstrated its capabilities in the oil sector (with the ESPO pipeline). This was not a likely outcome, it was however possible, according to these analysts. So, if Gazprom failed to penetrate the lucrative Asian market in the next few years, it could soon face competitive supplies from the independent producer as well as Russian state-owned oil company.

Taking into account the growing governmental support of its rivals, Gazprom stepped to demonstrate its determination to keep its dominant role in the East. Soon after a new law on LNG exports took effect in December 2013, Gazprom approved long opposed idea of the Sakhalin II LNG plant expansion. The project of two trains with a capacity of 10 mt/y was launched in 2009. Whereas Gazprom's project partners (Shell; Mitsui; and Mitsubishi – see above) welcomed the idea of constructing a third line, Gazprom had cited different reasons for refusing to expand the plant including Sakhalin II not having sufficient reserves for a third plain (Reuters, 2013, December 23). It rather preferred its own LNG terminal planned in Vladivostok, which could be supplied from Gazprom Sakhalin III blocks. In February 2014, however, Gazprom and Shell signed a memorandum-roadmap for the third train of Sakhalin II LNG project (Gazprom, 2014, February 23). Later, the Board of Directors declared LNG market as one of the company's core businesses (Gazprom, 2014, March 26). According to the announcement, Gazprom would focus on marketing gas from new plants, i.e. looking at

the possible ways to increase its supplies from the Sakhalin II project (through addition of a third train) as well as sell gas from Vladivostok LNG. Thus we may assume that governmental pressure together with alternatives developed by its domestic rivals led Gazprom to give more attention to its various export possibilities including LNG.

However, in autumn there was another shift in Gazprom's export strategies. In September 2014, at the meeting between Putin and Gazprom's CEO Alexei Miller, the Western route to China was discussed. For Gazprom, this option was declared to be even easier to build and operate than the Eastern route as it uses existing gas transmission system in Western Siberia and has no need to build new gas chemical or gas processing facilities, which are largely missing in the East. Miller praised the potential of this pipeline as it could easily and quickly raise the volume of gas exported to China (PR, 2014, September 17). In October 2014, Gazprom announced that it was ready to consider the possibility of pipeline gas export to China as an alternative to the Vladivostok LNG project (Gazprom, 2014, October 10) and in the end of the year, Gazprom Management Committee again pointed out to this route as an alternative option of gas supply to China (Gazprom, 2014, December 11). A Framework agreement on gas supplies via the Western route was signed with CNCP as part of the APEC summit in Beijing (Gazprom, 2014, November 9).⁹

⁹ In particular, the document reflects such conditions as the volume and terms of supply, the take-or-pay level, the location of the gas delivery point on the border. The Framework Agreement defines the schedule of compiling a gas purchase and sale agreement, a technical agreement and an intergovernmental agreement on the western route. Under the agreement Gazprom will transmit natural gas to China for 30 years with gas delivery gradually increasing to 30 bcm/y.

As Gazprom is more experienced in building pipeline infrastructure than LNG export facilities, it is not surprising that it came back to negotiations with China about the Western route once the deal on export via the Eastern pipeline was concluded in May 2014. However, there were also other factors, which most probably led to changes in its export strategy. Reconsideration of the LNG projects could be ascribed to the anti-Russian sanctions (imposed from spring 2014) that might complicate Gazprom's subsidiaries to gain key technologies and components as well as necessary funds from western banks and investors. With limited financial resources, pipelines to China have been given priority. Moreover, the U.S. and the EU sanction hit Gazprom's domestic competitors as well as their alternative LNG projects. Novatek was included in the U.S. sanctions based on the stake of Gennady Timchenko in the company. Rosneft under Igor Sechin was added to the U.S. sanctions list in July and to the EU list in September 2014 (BBC, 2014, December 19), which limits its access to capital markets and according to some, could affect the company's oil-field development plans in Siberia. This influenced Gazprom's relative position in the domestic market with likely consequences to the company's reconsideration of its export strategies. LNG export options are not entirely abandoned, it is nevertheless apparent that they have not been given priority recently. In February 2015, more than a year after a MoFU with Shell was signed, Gazprom presented nothing but very vague proclamations that it intended to construct new LNG plants and that it considered a possibility of Sakhalin II plant expansion (Gazprom, 2015, February 24). Uncertainty engulfs the Vladivostok LNG project as well.

Preference of long-term bilateral agreements and "take-or-pay" contracts; Diminishing the importance and influence of multilateral regimes like that of the EU

Under the purchase and sales contract, Russia is to supply China with 38 bcm/y of natural gas for the next 30 years. This is definitely a long-term deal signed after more than a decade of bilateral negotiations.

Attempts to control the entire supply chain (regardless of commercial rationale); Taking economically irrational steps in order to maintain a certain position in the client state's market

It is hard to assess the presence or absence of the last indicator, as details of the Sino-Russian gas deal are not publicly disclosed. Nevertheless, we can conclude from the general characteristics of the Power of Siberia project and from what has been made public that Gazprom preferred long-term goal of establishing its position in Asian market in accordance with geopolitical interests of the Russian state (see above) and against short or mid-term profits. For many reasons, the Power of Siberia is definitely not a project which would bring Gazprom easy money. First of all, the exploration and production in East Siberia and the Far East is not an easy task, largely because of the harsh climatic and geological conditions in these areas. The major gas fields in Irkutsk and Yakutia are rich in resources valuable to the chemical industry. So, in addition to the construction of the fields, it is necessary to establish chemical enterprises and maintain storage facilities (Poussenkova, 2009, p. 143). Basic infrastructure in East Siberia and the Far East is largely missing. All of these contribute to

the fact that the Power of Siberia is an expensive pipeline project, even for such a company as Gazprom. Its price was estimated around \$55 or \$60 billion when the Sino-Russian gas deal was signed, however, the current development (anti-Russian sanctions, devaluation of ruble, low oil prices etc.) could cause the final price to be even higher.

Secondly, the gas price finally provided to China is most likely a compromise between what was preferred by Gazprom and what was achievable under the current circumstances (given the governmental pressure, domestic as well as foreign competition, etc.). So, whereas Gazprom had been determined to match the price for China with the returns it had made on European deliveries (see the notes), which, according to many, made economic sense (e.g. Simonov, 2010 in Mareš & Laryš, 2012, p. 443-444), the final gas price level agreed is most likely more favourable for China and bringing lesser profit to Gazprom. The result is that most of the financial analyses available found the project barely profitable (see e.g. Kardaś, 2014), while other more optimistic assessments from the end of the year 2014 expected relatively low level of return compared to what is usually expected (see e.g. Henderson, 2014b, p. 3-4).¹⁰

Finally, another pressing issue is Gazprom's current financial

¹⁰ Most of the analyses start their calculations at the price of gas supply deal worth \$400 billion. According to OSW (Kardaś, 2014): a comparison of the announced contract value and the total contracted supply gives an average price equal to US\$387 per 1000 m³. This would be similar to the prices set in Gazprom's contracts with the European customers (the average price in 2013 was US\$380 per 1000 m³). A gas price at this level could mean that Gazprom would have to carry out supplies to China below the break-even point (Yakutia fields can remain profitable if the gas price on Russian-Chinese border is not lower than US\$400). Even if fiscal preferences from government are imposed and the break-even point lowered, than the project would be barely profitable. Other assessments are more optimistic. As Henderson (2014b, p. 3-4) demonstrates, the project is not a disaster for Gazprom, even if the level of return is relatively low (and the price of gas much more favourable for China). The return for Gazprom, based on a total capital expenditure of \$60 billion, is calculated by this author as being in the range 7-8% real. This is relatively low compared to a likely minimum expected return of 10% real, but it is arguably acceptable for a project that can be the foundation for Russia's EGP, adds Henderson.

situation. The anti-Russian sanctions, limited funds from western banks and investors as well as sharp decrease in oil prices, which are just half the price compared to May 2014 now, led to speculations, if Gazprom will be able to proceed with the project (see e.g. Reuters, 2015, March 18), if it will be postponed (and the Western route build first) or abandoned as in the case of the South Stream pipeline.

Irrespective of the above mentioned difficulties, the Power of Siberia project is a flagship in establishing Gazprom (Russian) position in the Asian market. From the Russian perspective, it makes a lot of sense to take an advantage of huge but untapped East Siberian gas resources (see the “Context”). If Gazprom manages to develop them in timely manner and proceed with infrastructure build-up, it can find an opportunity to grow and a new source of income in Asia compared to important, but stagnating European market. If Gazprom manages to deal with extraordinary costs to launch its Eastern exports, The EGP could bring long-term returns adding new export markets to the company's portfolio. This would also consolidate Gazprom's position in the domestic market vis-à-vis its competitors and its prime role in Russian gas exports. By the time of writing this chapter, Gazprom gave many public assurances, that it would fulfill its obligations regarding the Power of Siberia (see e.g. Gazprom, 2015, June). The likely implementation of the project is also supported by the fact that in June 2015, CNPC launched construction of the Chinese section of the gas pipeline (CNPC, 2015, June 30).

5.14.3 Conclusion

The assessment above revealed that the Russian Eastern energy policy largely corresponds to the strategic approach to energy security. The distinctive features of this policy include strengthening the role of the state over the energy sector through its state-owned energy companies. During Putin's second term in office (2004-2008) Gazprom had gradually gained majority in the most important assets in Eastern Siberia and the Far East intended for gas export to Asia. In 2007, the company was authorized by the government to implement the state-run Eastern Gas Program. Strong “resource nationalism” is apparent. The legislation is not favourable to foreign investments and Gazprom has not invited partners from abroad to joint development of its fields. There is only one exception in case of Vietnam, where, however, Gazprom has a clear superior position. If foreign companies had had some stakes, their participation was limited after 2004 (Sakhalin II). The Russian government also significantly interfered into Gazprom's external energy policy, especially after Putin's re-election in 2012. It can be assumed that the pressure from the government was one of the factors that contributed to the conclusion of a long-awaited gas deal with China in May 2014.

However, the policy framework is not the only one which affects the future steps of the company, and Gazprom, cannot be considered to be just an instrument of the Russian government to accomplish its geopolitical goals. During the negotiations on gas supplies to China, Gazprom insisted on its economic interests. It repeatedly demonstrated its determination to gain an adequate profit from the project (meaningful gas prices). The compromise solution, which was

most likely eventually reached, and that is probably more favourable for China than Gazprom, cannot be considered only as a result of political pressure on Gazprom from the Russian government. The company also reflected its position vis-à-vis its rivals in the domestic and international markets, the negative consequences in terms of loss of future markets if negotiations with China would be unsuccessful, and vice versa, the possibility of future growth and profits that exports to the East could bring. Several changes in Gazprom's export strategy, which were observed in 2014, indicate that the company flexibly adjusts its steps based on the opportunities and obstacles present in the domestic arena as well as regional gas markets, and carefully monitors its relative position. Emphasis on an adequate profit versus governmental (geopolitical) interest and overall circumstances in the domestic and international markets - that is the overall framework in which Gazprom operates.

5.14.4 Sources

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5.15 Summary of findings

5.15.1 The Sector of Natural Gas in Central and Eastern Europe

Martin Jirušek

The aim of the research was to provide an insight into the conduct of Russian state-owned enterprises (SOEs) in natural gas and nuclear sector and test the following hypothesis: „Russian energy companies in natural gas and nuclear sector act in order to maximize their influence on CEE markets and to strengthen Russian geopolitical influence in this region.“ This section is intended to address the natural gas sector, i. e. Gazprom's conduct in the region of Central and Eastern Europe. For this purpose, a theoretical model based on the strategic approach to energy policy was developed. The strategic approach defines a certain policy which, in this case, can be generally characterized as a policy of misusing energy and energy commodities by a state as tools to achieve certain foreign policy goals. This approach is usually implemented by energy producers and in terms of the examined region such behaviour is perceived sensitively with regard to the past and present geopolitical aspirations of Russia.

Based on the behavioural model characterised by features describing generally the strategically based behaviour, the research team was able to find out whether Gazprom behaves strategically in gas sectors of the countries under scrutiny. These countries are the Czech Republic, Slovakia, Poland, Hungary, Bulgaria, Romania, Latvia, Lithuania, Estonia, Ukraine, Belarus and Moldova. They comprise an extensive and heterogeneous

population of countries bound with common history under the reign of the Soviet Union and geographical area that Russia has perceived as its sphere of influence. These countries have different characteristics in terms of inner structure of their economies, energy mixes, foreign policy, import dependence and membership in international organizations. Given the wide variety of characteristics, the research team was able to gather enough evidence to describe Gazprom's behaviour in different environments.

As mentioned in the previous paragraph, to derive the Gazprom's pattern of behaviour, the research team had to compare the company's behaviour in various environments. Therefore, and also with regard to the nature of the region, it appeared necessary to include both EU members and non-member states. Thanks to this, the team was able to assess the effect of the EU's internal energy market on the Gazprom's strategy and energy security of examined countries respectively. Given the global nature of Gazprom's activities and rapid growth of Asian consumers, the team also conducted an overview of the company's activities in this region. This overview was also conducted with regard to the strategically motivated behaviour and the related behavioural model and as such provided valuable comparison to the situation in Europe.

Based on the conducted research, the research team came up with the following main findings addressing the hypothesis. Given the sheer scope of research and substantially different cases, the findings are divided into subsections addressing concrete findings stemming out of the research.

Finding 1: Gazprom follows setting of the environment

Despite being accused of misusing its position and forcing consumers to follow its own will, such accusations appear to be over-exaggerated in most of the cases under scrutiny. In fact, Gazprom follows the rules, although it often stretches these rules to the maximum extent. We may say that from the individual countries' point of view, Gazprom only makes what is allowed to do. That means, if country is unilaterally dependent on supplies from Russia with no alternative supply route and its economy is based on high intensive use of gas, it is highly probable that Gazprom will use this situation to the fullest. However, this does not necessarily mean that the respective relation is politicized. In most cases it can be economically reasoned. Additionally, the politics that may intervene in certain cases is also more likely to occur in aforementioned 'vulnerable' countries.

The research team found following conditions that influence and mould Gazprom's behaviour on a certain market.

a) State of diversification

Gazprom's monopolistic position on CEE markets evolved in times when the Russian gas was the only available option. In a situation when the countries had only one source of gas, it was exclusively up to Gazprom's discretion to justify what the gas price would be. The situation started to change after the fall of the Soviet Union in 1990s, when the former communist countries reoriented their foreign policy discourse to the west and their energy policy naturally followed the suit. In this regard, it is symptomatic that in countries that managed to

diversify its portfolio from other foreign or domestic sources. Gazprom keeps low profile and gas deals are conducted under the 'business as usual' scenario with little if any disputes on pricing or stability of supplies. The Czech Republic or Romania are great examples in this regard.

The Czech Republic managed to diversify its gas import portfolio in 1996 by building the pipeline supplying the country with Norway gas. Thanks to the source diversification, any politicization of supplies is absent in this case. Moreover, the country also served as the player helping to mitigate impacts of the 2009 gas crisis by supplying its neighbours with gas from Northern Sea.

Romania, for its part, has a specific history of relatively cold mutual relations with the Soviet Union as well as with Russia. It affected many parts of the country's economy and the energy sector is no exception. In the last decade, the country managed to substantially decrease its dependence on foreign gas supplies and has been simultaneously developing its domestic resources. It also does not buy gas directly from Gazprom but through intermediaries, which further helps eliminate politicization including personal involvement of Russian officials, linking Romanian foreign policy discourse to gas prices, etc.

b) Foreign policy discourse & stability of democratic institutions as important factors in Gazprom's case-based approach

The condition of general foreign policy discourse and stability of democratic institutions is related to the previous subsection. Gazprom is far from perceiving the CEE region as homogenous entity and sticking to basically same measures for everyone. Experience suggests that Gazprom is capable of

adapting its strategy and applies case-based approach based on the general foreign policy discourse of the country, mutual relations and market setting. If a country is characterized by traditionally anti-Russian foreign policy discourse and is firmly anchored in multilateral commercial regimes like Poland, Romania or the Czech Republic, then the politicization, conditionality or individualized contracts in gas deals are less likely to occur. Also, the inclination to shady deals, individually-tailored contracts and non-adherence to EU internal market rules is little among politicians within these countries, despite substantial dependence on Russian supplies. An opposite example is represented by Moldova. The fact that even the EU membership cannot guarantee that there will not be any individual deals often on the edge of breaching the EU energy sector regulations can be seen in Hungary.

Hungary, for its part, has been prone to closing individually tailored deals within both gas and nuclear sectors. A highly appropriate example is the deal closed during Vladimir Putin's visit to Budapest in February 2015. On this visit, Putin and Hungarian Prime Minister Orbán agreed that Hungary will not have to follow the take-or-pay condition within the current deal which is about to expire in following months. Instead, Hungary can continue using the remaining contracted gas with no additional payment required. Such deal effectively abolishes the take-or-pay condition, something that has been unimaginable for most of the Gazprom trading partners. The February meeting was a continuation of strengthening of mutual energy deals between these two countries, as last year Putin and Orbán cemented an important deal on Paks NPP, under which Russia will construct two new nuclear units and will also provide

Hungary with EUR 10 billion loan. Such deals, despite the potential impact on country's energy security in future, seem mutually beneficial for both parties. Hungary represents a stable and reliable customer and the Hungarian Prime Minister can present these agreements as a way of stabilization of Hungarian energy sector with some financial benefits in case of the gas deal as an additional 'sweetener'.

Moldova is another example of a country where another traditional contract feature – the long-term nature of contracts – is currently not being implemented. The reason is different from that of Hungary though. As in Hungary, the basis for non-standard deals is the overall good state of mutual relations, while in Moldova the reason is quite the opposite. Gazprom has been reluctant to sign a new contract as it has been opposing Moldova's willingness to implement the 3rd liberalization package rules which would harm Gazprom's dominating position on the market.

These two countries thus provide different examples of Gazprom always seeking an opportunity to reach bilateral deal that is as little influenced by multilateral regimes as possible. It also proves that such deals can be traced in countries whose foreign policy discourse is friendly towards Russia, or which are less secure in terms of diversification and legislation. The fact that the involvement of Russian high representatives is often present in such deals only underlines the importance given to such deals.

c) EU membership & implementation of IEM rules

Generally speaking, the EU under its third liberalization package imposed certain rules that effectively undermined the

Gazprom's traditional marketing strategy. The main rules that go against this strategy are ownership unbundling principle, third party access principle, and prohibition of 'destination clause'. The first means that a company cannot produce and supply gas while simultaneously owning the infrastructure, second that all pipelines within the internal market should have equal conditions for all suppliers that are willing to enter the market and supply customers, and the third that a country cannot be ordered not to resell the gas it receives. These principles were the stable pillars of the Gazprom's strategy for years and cemented its position on the targeted markets. However, to be fair, it has to be noted that such strategy was introduced rather to ensure the economic viability of supplies for the company than to primarily serve as basis for exerting political pressure.

The situation on gas markets has been changing in recent years putting a great pressure on traditional patterns upon which gas has been traded. The global gas glut along with LNG and growing market liquidity enhanced by interconnectors allows gas flow more easily than before. The European Union, for its part, has been stressing the energy security issue in the last decade as well, and by introducing the aforementioned rules it aims to enhance the stability of supply, protection against supply curtailments and unilateral dependence. Although the rules are not aimed namely against Gazprom, it has been clear that it will be the Russian energy giant that will be forced to accommodate the most. As a matter of fact, in countries that implemented the aforementioned rules, substantial amount of strategically motivated conduct is made impossible and thus room for politicization of supplies is highly restricted. It is

therefore safe to say that these rules serve as ‘buffer’ between Gazprom and its customers defining strict rules under which contracts can be conducted.

d) Changing environment –Gazprom is becoming a subject to the market rather than its creator

Traditionally, the Gazprom's trade strategy in Europe was based on the long-term take-or-pay contracts indexed to the costs of alternative non-gas fuels¹ and destination clause enabling to charge different markets with different prices. Both Gazprom and EU purchasers accepted this as a legitimate risk sharing mechanism related to the immense investments needed to develop gas reserves and deliver gas to Europe.

This model enables Gazprom to exercise substantial relational power over the purchasers and their government.² The terms and conditions of the gas contracts therefore resulted from the balancing of relational powers between Gazprom and its customers. Given the historical development of the gas sector, we may say that Gazprom was, to a certain extent, the creator of the environment within which gas contracts were realized. Based on this trade model, Gazprom has been able to treat its customers differently, charging them with different and often unpredictable prices. In 1990s, the situation started to change with the European Community initiating a long process of development of the unified and liberalized internal energy market (IEM) with gas. Through the liberalization packages and increasingly rigid enforcement of anti-trust and

¹ Primarily heavy fuel oil, light fuel oil, crude oil or a combination of these.

² Relational power is defined as an ability to impose one's will on the others, with direct link of authority between the one who holds that power and others who do not.

competition rules, the European Commission (EC) started to replace the traditional market model with a completely different one: believing that the legislative actions will alter the structure of the industry, weakening the power of the incumbents, forcing diversification of imports, changing pricing and contracting method between parties.

The following cornerstones of Gazprom's trade strategy in Europe have been questioned based on this new market model:

- a) Linkage of gas prices on competing sources of energy. Even if the reasons for oil-indexation are not valid any longer, Gazprom defends this pricing mechanism as a crucial mean of its business in Europe. EC questioned oil-indexation together with long-term take-or-pay clause in its 2012 antitrust proceeding against Gazprom.
- b) Destination clause and territorial sales. They prohibit the buyer from re-selling the gas into other countries or areas than those for which it was intended, enabling Gazprom to charge different clients different prices at the same delivery point. EC moved against these clauses many times asking their deletion from contracts, including the above mentioned antitrust proceeding.

Moreover, in 2009, the EC accelerated the process of building the IEM issuing the third liberalisation package. In an effort to strengthen competition on the gas market, the existing rules were amended and tightened up, such as obligation of operator of networks to allow third parties to access this infrastructure (TPA principle), differentiation between competitive and non-competitive parts of gas industry (unbundling provision), removing barriers preventing alternative suppliers from importing or producing energy, or free choice of consumers to

choose their supplier. Since 2009, the European gas market has been undergoing significant changes in terms of market design and regulations.³ Based on the third liberalisation package, the framework guidelines and network codes are being prepared to complete the IEM.

The process of building the IEM have been gradually restricting Gazprom's trade strategy of providing the different customers with different prices and conditions of contracts. Moreover, in this process the importance of relational power is declining in favour of structural power.⁴ As we witnessed in case of destination clause or oil-indexing, the conditions of contracts are no longer result of bilateral negotiations between Gazprom and its clients balancing their relational powers exclusively. New actor, the European Commission, has emerged rigidly enforcing the competitive rules of IEM regardless the actual preferences of either Gazprom or its client. To continue in its trade strategy based on different prices for different markets, Gazprom would need not only to address its individual customers using the relational power but also the European Commission and challenge its structural power to change the very rules of IEM. In this new environment, the position of Gazprom is considerably weaker, having only limited leverage to the EC, and thus shifting from the creator of the environment to its subject.

e) Differences within the EU – Western vs. Eastern states

Despite the aforementioned changes in gas sector, Gazprom is still very strong in some European regions. Analyzing the prices

³ With the most visible trend of implementing Gas Target Model, alternating the long-term bilateral contracts with hub trading.

⁴ Structural power is the ability to shape or determine the functioning of certain structures in one's own interest.

of gas (on the wholesale market) in the EU member states (MS) we notice the price divergence above the transmission tariffs. Especially Central and Eastern MS continue paying the premium over the Western Europe MS. In other words, CEE countries are still subjects of individual pricing by Gazprom and their ability to level up the prices with the rest of the EU gas market is limited.

The explanation is as follows. To create a competitive common market in the EU, a combination of three following elements is essential. However, we see stark differences in implementation of these elements between western and eastern part of the Union:

- a) The regulatory regime removing formal and informal barriers to competition and creating a common market model. This has been introduced by the bulk of legislation described above.
- b) The infrastructure enabling the transportation and storage of gas. Although the network in CEE countries has become more flexible in delivering gas via new routes in the last years, bottlenecks still persist preventing the market to respond to the price signals effectively.
- c) Liquidity of the market.⁵ In Central Western markets integration led to an increase in trade and liquidity and price convergence at the major gas hubs, but this is not the case of CEE countries (see the very low churn ratios in the hubs close to CEE countries on the graph below). Majority of

⁵ Liquidity is directly connected with the level of competition and the efficiency of price formation in gas wholesale market. The number and diversity of market participants and the volume of gas trades at gas trading hubs are important liquidity indicators. Competitive hubs attract contending market participants and provide more options to source and hedge supplies. This places downward pressure on gas prices. (ACER 2014, p. 169).

CEE countries rely on a single country of origin for more than 75 % of their supply, also the absence of hubs, high market concentration, capacity hoarding, existence of vertically integrated incumbents and oligopolistic market structure persist limiting the liquidity and competition.

Finding 2: In most cases, Gazprom's behaviour can be economically justified

Contrary to the popular perception, there is economic rationale behind most Gazprom's activities, be it in EU members or non-members. Even cases like Ukraine or Moldova that may appear as clear examples of exerting political pressure can be actually explained on the basis of ordinary supplier – consumer relations. The supply cuts in Ukrainian case make sense from Gazprom's point of view because of the overall poor payment morale of the country. The same applies to Russia's efforts to stop alternative supplies to the country by raising the transit fees for Turkmen gas aimed for Ukrainian market. Ukraine is one of the biggest Gazprom's customers and any diversification is thus against the company's interests. In case of Moldova, the resistance against the country's efforts to implement EU's internal market rules is also understandable given the dominant role of the company on the Moldovan market. This is not to say that these activities are acceptable or even absolutely legal, but at least they make sense economically.

Finding 3: It is not the measures that are suspicious, but rather the timing

Despite what has been said in the previous paragraph, Gazprom's behaviour has not been always crystal clear. Although the

measures may have economic rationale behind them, the timing is not always the case. For instance, in the Ukrainian case Gazprom started to deal with Ukrainian debt long after it had reached its enormous height and also after two decades of experiencing Ukrainian overdue payments. In the case of Moldova, steep increase of gas price correlates with rapid worsening of mutual relations after 2003. The series of economic sanctions imposed on Moldova also correlates with signing of the Association Agreement between Moldova and the EU. Last but not least, in Bulgaria, the gas price discount was offered to Bulgaria along with signing the bilateral deal on South Stream in 2012.

Finding 4: Gazprom is still a ‘normal’ company...

Gazprom is still a regular company trying to make a profit in the first place, but Gazprom and Russian state, its majority shareholder, are two different entities, whose interests may be similar, but at some point they may also be quite divergent. Gazprom might be thus facing pressure from the Russian state to behave in a certain way, which may not be completely corresponding with the general economic profit-oriented logic. These pressures may be based upon various reasons related to foreign policy as well as internal affairs. Nevertheless, unveiling these pressures or even intentions behind them is almost, if not completely, impossible to do without having internal information from within the Russian state administration.

Finding 5: ...but at the same time, a state-owned enterprise and easy-to-use tool

The fact that Russian state is a majority shareholder of Gazprom and that the company is the crucial supplier of gas to countries historically and often politically bound to Russia cannot be neglected though. Given the nature of Russian foreign policy and its past of global superpower, such entity definitely belongs to the toolkit of the state administration.

Furthermore, it is not just a one way relation. Given the historical roots, certain social and political groups in the CEE countries are still prone to make deals with Russia regardless potential impact on country's energy security or Russian foreign policy discourse. It is no wonder that shady deals including bribery occur in such environment.

5.15.2 Gazprom's Activities in the Asian market

Hedvika Kodousková

Basically, the findings above can also be confirmed in the case of the Asian gas market. It means that we took note of the dynamic between for-profit business and Russian geopolitical goals, with an emphasis on the former, all shaped by local and international markets. In short, this is the framework in which Gazprom operates on Asian gas markets. The main findings appear below.

Finding 1: Gazprom is a commercial entity, but also a state-owned policy tool when necessary

Similar to the company's position vis-a-vis Europe going back decades, Gazprom has been under considerable pressure to perform in the context of Moscow's Eastern energy strategy. This strategy reflects various factors related to both internal concerns (e.g. gaining better control of the Russian Far East region afflicted by deindustrialization and depopulation) and foreign policy goals (e.g. strengthening Russia's position on the rising Asian energy market). During Putin's second term in office (2004-2008), Gazprom was gradually strengthening its position in Eastern Siberia and the Far East, preparing for gas exports to Asia, often through "resource nationalist efforts."

In 2007, the company was authorized to implement the Kremlin's Eastern Gas Program. The Russian government also interfered significantly with Gazprom's external energy business plan, especially after Putin's re-election in 2012. Pressure from the government was one of many factors that contributed to the conclusion of a long-awaited gas deal with China in May 2014.

That said, the government's policy framework is not the only factor affecting the company's conduct, hence Gazprom cannot be considered as just an instrument of the Russian government, at least on a day to day basis. For instance, during the negotiations on gas supplies to China, Gazprom clearly insisted on more favourable commercial terms as well as improved economic viability.

Finding 2: In most cases, Gazprom's behaviour can be economically justified

Also in its Eastern energy strategy, there is generally an economic rationale underpinning most of Gazprom's activities in the implementation of Russia's Eastern energy strategy. The company repeatedly demonstrated its determination to achieve business goals in the gas export projects it has pursued in China and elsewhere in the region. The compromises which were most often reached tended to be more favourable for China than Gazprom, but this is not solely the result of political pressure from Moscow, but also the company's deteriorating position vis-à-vis its competitors on the international markets.

Finding 3: Gazprom tracks with its business environment

In the case of Asian gas markets, Gazprom typically does what the market allows it to do and nothing more. Several changes in Gazprom's export strategy, which were observed during the course of 2014, indicate that the company flexibly adjusts its conduct based on the opportunities and obstacles present in the local market as well as other regional gas markets. The new "Gas Export Law" reduced Gazprom's monopoly over LNG exports in December 2013. Nonetheless, Gazprom pressed

ahead with its determination to maintain the dominant role in the East by proceeding with its operating, as well as planned, LNG export projects.

When the U.S. and the EU imposed sanctions against Russia, it started to affect the position of Gazprom's domestic rivals as well as its own LNG projects developed since 2014. The company announced another switch in its export strategy, returning to gas pipelines to China (the Eastern as well as Western routes). Concerning external factors, Gazprom was aware of the potential negative consequences of its gas deal with China being unsuccessful (i.e. losing its position in a rapidly growing market to competing international suppliers). It is, however, rather easy to understand Gazprom taking the long view of the East's market potential and its willingness to sacrifice some short-term gains to secure its position.

Tab. 5.15.1 Summary of findings: The Sector of Natural Gas

	Czech Republic	Slovakia	Poland	Hungary	Latvia	Lithuania	Estonia	Bulgaria	Romania	Moldova	Belarus	Ukraine	Asian markets
Russian state representatives actively supporting state-owned energy enterprises and their activities in a respective country	No	No	Yes	Yes	Yes	Yes	No - no official relations	Yes - very much	No	Yes	Yes	Yes	Yes
The foreign supplier rewarding certain behaviour and linking energy prices to the client state's foreign policy orientation	No	No	Yes	Rather yes	Yes	Yes	Not overtly	Yes	Rather not	Yes	Yes	Yes	Cannot be assessed
Abusing infrastructure (e.g. pipelines) and offering different pricing to exert pressure on the client state	No	Yes	Yes	Yes	Yes	Yes	No	Indirectly - through planned South Stream	No	Yes	Yes	Yes	Cannot be assessed
Efforts to take control of energy resources, transit routes and distribution networks of the client state	Not currently. Few bids in the past.	Not currently. Was supposed to take part in gas incumbent in early 2000's	Yes; but relevant only for the Yamal pipeline	Yes	Yes	Yes, until 2011	Yes, until 2015	Partly (Overgas - 50% owned by Gazprom)	No	Yes	Yes	Yes	Yes
Disrupting (through various means) alternative supply routes/sources of supply	No - not possible. Verbal opposition against diversification in the past	No	Yes	Yes - in case of South Stream	Yes	Yes	Allegedly - supporting LNG option, which was not favoured by Estonia	Allegations of Russia having a hand in anti-shale protests	No	Likely - when this issue becomes relevant	Not relevant	Yes	Yes
Efforts to gain a dominant market position in the client country	Not in retail but Russia still supplies CZ with majority of gas	Not in retail but Russia still supplies SK with majority of gas	No	Not directly present in retail, but Russia supplies with majority of gas through	Yes	Yes, until 2011	Yes	Overgas dominates distribution to households	No	Yes - already achieved	Gazprom have always had a dominant position on Belorussian gas market	Yes	Yes

	Czech Republic	Slovakia	Poland	Hungary	Latvia	Lithuania	Estonia	Bulgaria	Romania	Moldova	Belarus	Ukraine	Asian markets
Efforts to eliminate competitive suppliers	No	No	Yes	Allegedly	Yes	Yes, until 2011	No competitive suppliers in Estonia	No - no competitive suppliers available	No	Likely - when this issue becomes relevant	Not relevant	Yes	Yes
Acting against liberalization	No	No	Yes, in the case of Yamal pipeline; not in the case of privatization of the Polish gas companies	No	Yes	Yes	No	Violation of IEM rules in the case of agreement on South Stream	No. Apart from verbal threats to stop reverse flows to Ukraine (that are not currently possible).	Yes	Not relevant	Yes	Cannot be assessed
Preference for long-term bilateral agreements and „take-or-pay“ type of contracts	Yes	Yes	Yes	Ambiguous - LTC not signed, political concessions and special regime instead	Yes	Yes	Yes	Yes	No - different type of contract	Currently not	Yes	In most cases	Yes
Diminishing the importance and influence of multilateral regimes like that of the EU	No	No	Yes	Yes	Yes	Yes	No	Violation of IEM rules in the case of agreement on South Stream	No	Yes	Not relevant	Yes	Cannot be assessed
Attempts to control the entire supply chain (regardless of commercial rationale)	No - not possible	No - not possible	Not relevant for Poland	No - not possible	Yes	Yes	Yes	No - not possible	No	Yes (achieved)	Yes	Yes (commercially justifiable)	Rather yes
Taking economically irrational steps in order to maintain a certain position in the client state's market	No	No	No	Yes	No	Yes	No	No	No	Rather formally unreasonable - charging Transnistrian debt on Chisinau.	Rather yes	Yes	Rather yes

Overall Conclusion

Roger W. Robinson, Jr., Martin Jirušek

After an exhaustive research process, several popular assumptions about the operations and behaviour of Rosatom and Gazprom were validated, while several others proved exaggerated or outright incorrect. Rosatom, in particular, faces competitors in a high-end (technically), high-cost marketplace, and hence is visible and monitored by prospective sovereign customers. The company, therefore, must show extra caution concerning the politicization of any of its actions for fear of market estrangement.

Even though it appears that Rosatom is inclined to avoid politicization, when a smaller country takes on a multi-billion-dollar, 30-year or more commitment to Russian nuclear power plants (NPPs) and a nuclear fuel supply exclusive, they are being locked in strategically because of largely structural reasons (i.e. the inherent path-dependency nature of the industry). This is why Moscow is prone to package NPP deals with long-term, subsidized financing, non-market terms and conditions and other “sweeteners” that Western competitors cannot hope to provide (e.g. arms sales and other “bigger picture” bilateral benefits).

With respect to Gazprom, it already has a reputation of acting periodically as a “weaponized” state-owned energy enterprise. However, the research findings indicated that commercial and economic considerations clearly dominate the landscape in the day-to-day operations of the company, particularly in the Asian market and within diversified and regulated European markets. Its past record indicates that it will go to the water’s edge as to what is allowable in the host country, but no further.

Arguably, this is even more the case today given the European market reaction to the Ukraine conflict (and its role in it) and the arrival of competitive new sources of gas, perhaps soon to include U.S. supplies. The Asian market is looking better to Gazprom in the present environment, but it needs to be aware of China’s perception that it has the upper hand in gas-related negotiations. Sadly for Gazprom, the research indicated that its dominant position in the CEE countries will likely deteriorate further, as the balance of negotiating power shifts decidedly in favour of the consuming country. A slow-motion escape from undue regional dependency on Russian gas – that has plagued CEE countries for decades – is underway.

Rosatom continues to prosper, but this could be slowed if the EU were to become more robust in holding EU member states, like Hungary, to account for their dismissal of the provisions of EU law. In addition, it is only a matter of time before the non-market, subsidized nature of Rosatom’s NPP and fuel contract bids is deemed unacceptable by its global competitors and their respective governments.

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