

CANADIAN GAS DIALOGUES

APRIL 23, 2019 - CALGARY, ALBERTA

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OF STAKEHOLDERS IN CANADA'S
NATURAL GAS COMMUNITY

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THE ROLE OF NATURAL GAS IN THE CANADIAN ENERGY DEBATE

Across the country, Canadians are debating the future of energy – both for our own needs as a country and for the global energy consumer. Important topics including emissions, affordability, access and reliability are all at the forefront of a heightened Canadian public focus on energy matters.

Natural gas has largely been under-represented in the debate, which usually defaults quickly to electricity matters (prices) and/or crude oil (pipelines and production). Interestingly though, natural gas use and production continue to grow, both in Canada and around the world. In fact, this clean and affordable product has grown to meet 35% of Canada's energy needs, and the National Energy Board forecasts natural gas will surpass oil fuels to become the single largest source of energy for Canadians by 2035.

As we look to the future, the growth means our industry will gain profile. This represents an opportunity for us to play a leadership role in meeting the energy needs for Canada and the globe. Those needs are increasingly focused on innovation, and new technologies in our sector will be paramount as our industry gains profile. This won't be the first time our business has had to think about technology. In the late 1800's, Canadian natural gas companies re-invented themselves from street lighting/gas lamp service companies to modern energy infrastructure providers to homes, businesses and industrial facilities. As an industry we are undertaking that kind of pivot again with the Natural Gas Innovation Fund (NGIF).

The Canadian Gas Association launched NGIF (www.ngif.ca) in 2016 to fill a technology gap in the marketplace for natural gas. Currently funded by five natural gas utilities and seven natural gas producers in Canada, the vehicle provides project funding to small and medium enterprises developing technologies for gas, spanning the production, distribution and end-use of the fuel.

To date, NGIF has received over 200 technology submissions, has funded over 40 projects, has approved \$9 million in funding, and leveraged \$70 million. NGIF has developed trusted partnerships with public agencies in three provinces and with the federal government. Trusted partnership relationships allow public energy funding bodies to share process and deal flow with NGIF and in doing so, seek to better position applicants for success. NGIF is examining technologies in a variety of areas including renewable gases

(renewable natural gas and hydrogen), carbon capture and utilization, liquefied natural gas, methane capture/destruction, natural gas vehicles, and micro-combined heat and power, etc.

This innovation leadership helps us respond to one part of the complex energy narrative/puzzle. Addressing the need for public education and awareness is another that requires attention. Across Canada, all facets of the energy industry from wind turbines to oil pipelines and natural gas are facing heightened political and public pressure. For natural gas, the challenges are largely focused on the emissions related to the production and use of the fuel. But as an industry, we have a story around innovation and emissions reductions that remains untold. This warrants a coordinated response from Canada's natural gas value chain, to help the public understand the ways industry is working to meet a range of goals around emission reductions, resiliency, safety, and changing consumer demands.

CGA is working on a Canadian natural gas education initiative to do just that, engaging the entire natural gas value chain – from wellhead to burner tip, including transportation and LNG export. Our goal is to have all in the industry work with our many customer groups – representing millions of Canadians – to better understand and articulate the value proposition that they see in using our product and our infrastructure, and communicate that to others.

Now is the time to begin a new and exciting conversation about natural gas. If you wish to join us in this effort please contact us at pcheliak@cga.ca

– Canadian Gas Association

CANADIAN GAS DIALOGUES — PANEL REVIEW

More than 140 Canadian gas industry executives, consultants, managers and other stakeholders participated in Natural Gas World's inaugural Canadian Gas Dialogues conference April 23 in Calgary.

Structured around four panels, the conference explored major issues impacting the Canadian gas industry: public perception of the industry, domestic and export markets for its product, and regulatory forces that are reshaping how – and even if – the industry can move forward.

And a luncheon panel explored what can arguably be characterised as the biggest success story in the Canadian gas industry since the nation-building TransCanada pipeline system was built in the 1950s: the decision by the LNG Canada partnership to commit to building its \$40bn liquefaction terminal and pipeline on Canada's west coast – the

largest privately-funded infrastructure project in Canadian history.

A common thread ran through all four panels: social media has dramatically altered the way industry goes about its business and has significantly ramped up the rhetoric against virtually any fossil fuel development, whether it be an oil sands project, a bitumen pipeline, a natural gas pipeline or a natural gas liquefaction and LNG export terminal.

And despite the fact that Canada is amongst the most environmentally-sustainable and fiscally-responsible energy producers in the world, a very vocal silent majority has mounted a very effective social media campaign that threatens to block any major future energy developments in Canada aimed at sharing our resources with the world.

PUBLIC PERCEPTION

Moderated by David Yager, a well-known industry entrepreneur, observer and columnist, the first panel explored how the public views the Canadian gas industry and how First Nations are increasingly becoming involved in critical natural gas developments. In recent years, voices opposed to fossil fuel development in Canada have been dominating the narrative, and many natural gas infrastructure projects face severe headwinds in earning the social licence – not to mention the regulatory authorizations – to advance to construction and operation.

"Today we are behind the eight-ball in the public discussion about energy resource developments. Natural gas is a solution, not a problem. We spend as much time explaining that we are actually doing something useful as we actually do what we are there to do: discover and sell the product – in this case, natural gas. The public engagement and the public understanding of that process is more important than ever."

— David Yager

Much of the public discussion surrounding natural gas in Canada is being carried out on social media channels, where special interest organizations – many of them fiercely opposed to any fossil fuel development – spread misinformation and, in too many cases, outright lies about the industry in an effort to turn the public against the industry.

The industry itself has been slow to take up this social media challenge, and it is often left to small grassroots groups who support the industry – some founded by industry outsiders – to answer the disinformation campaigns through social media.

Panelist Cody Battershill, a Calgary realtor who founded canadaaction.ca, is amongst the most visible of those supporters, and his various social media channels reach tens of thousands of followers across Canada, the US and around the world. His voice – and the voices of thousands of his followers – are finally challenging the false narratives, and answering criticism of the industry with provable, fact-based information. But more, he stressed, still needs to be done to drown out the din of the anti-industry voices.



Cody Battershill
Founder
Canadaaction.ca



Richard Laszlo
President
Laszlo Energy Services



Michael Eddy
Head of Indigenous
Relations
LNG Canada

“Although we are continuing as an industry to build partnerships and deal with environmental issues, our story is not getting out.”
— *Cody Battershill, canadaaction.ca*

Richard Laszlo, an Ontario consultant specializing in developing relationships between the gas industry, its stakeholders – and indeed its opponents – cautioned that merely engaging on social media platforms is not enough to move the needle. The fringes of the anti-industry lobby are often the loudest, but the industry, he said, can’t waste its time trying to convert the fringes – they will always be opposed, and little can be done to move them from the position.

Rather, the industry should be engaging with influencers, those in the middle who are willing to listen to the industry. And again, social media isn’t always the answer – the industry must focus on the quality of conversations, not just the quantity of conversations.

“Social media has a place in the discussion but you have to be careful and concentrate on the quality conversations; small groups, one on one with businesses, one on one with individuals – those are the conversations we need to have.”

— *Richard Laszlo, Laszlo Energy Services*

On the subject of First Nations engagement, Mike Eddy, head of indigenous relations with LNG Canada, and Jason Majore, CEO of Haisla Nation Council, discussed the strategies both employed from the early days of the LNG Canada project. Early engagement is key, Eddy said, and above all it needs to be meaningful early engagement.

“We work with indigenous supporters and non-indigenous supporters inside and outside the province, getting them to spread the word to other FNs across Canada about what this project means for First Nations, for global emissions. Their voices are a lot more powerful than ours. There are tangible stories about what this project means for communities and the people who live in those communities and that resonates.”

— *Mike Eddy, LNG Canada*

“First Nations that are successful with industry have leadership that is stable and long-term. Ellis Ross was Haisla chief councillor for 13 years; Crystal Smith was his assistant for eight years, and she has been Haisla chief councillor for the last two years, since Ellis became a provincial politician.”

— *Jason Majore, CEO, Haisla Nation Council*

DOMESTIC MARKETS

The problems now facing the Canadian gas industry can be traced back to the same events that have proven so successful in unlocking the vast potential of natural gas – not just here in Canada, but also in the US. Horizontal drilling and multi-stage fracking opened up untold reserves of shale gas – gas locked in source rocks that previously fed conventional

reservoirs. In less than a decade, gas production in the US grew by as much as Canada’s total daily natural gas production, and the US – which was once the only export market for Canadian natural gas – is now a leading gas exporter in its own right.



Paul Cheliak
VP Public and
Regulatory Affairs
Canadian Gas
Association

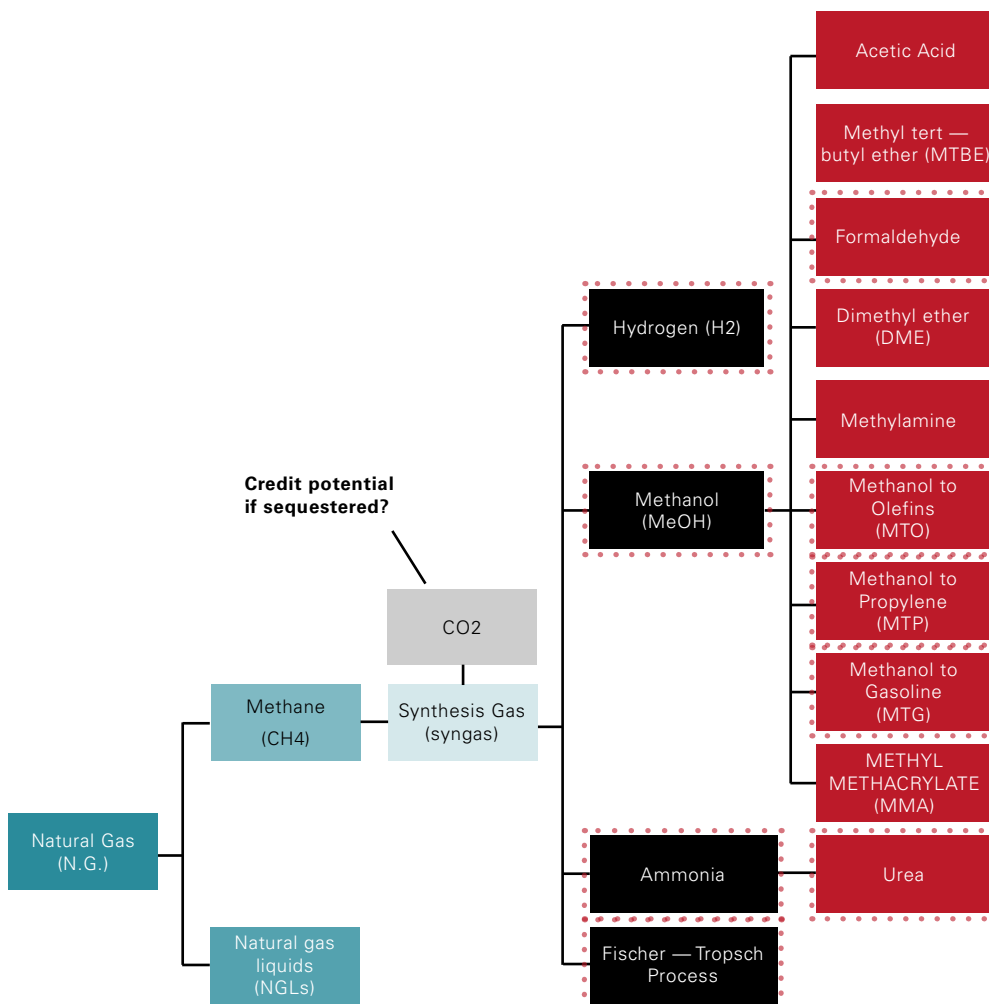
Canada, however, has not kept pace. While the same technology that unlocked US unconventional gas resources is being employed by Canadian producers, Canadian production has grown only modestly, and much of what is being produced can't find a market. Pipeline takeaway capacity in Canada – and especially in Alberta – has kept most of that productive potential in the ground, and LNG export projects, which have flourished in the US, are lagging, with only one project, LNG Canada in BC, in construction phase and a couple of others, in BC and in Nova Scotia, close to reaching that point.

That has left other, domestic markets, to take up the slack, but again, because of industry opposition, projects to take growing Canadian production have been slow to develop.

“Gas will take more market share than any other energy source in Canada. But I don’t think we’ve done enough to tell the gas story and the potential for emissions reductions – renewable gas etc – that can come from the natural gas industry. We need to be the ones telling the story. We can’t let social media tell the story.”

– Paul Cheliak, Canadian Gas Association

METHANE DERIVATIVES AVAILABLE IN THE NATURAL GAS VALUE CHAIN





Brent Graham
Manager, Public Policy
Fortis BC



Dinara Millington
VP Research, Canadian
Energy Research
Institute

Petrochemicals are considered a key domestic market for Canadian natural gas, and the former NDP government in Alberta structured policies to encourage an expansion of the petrochemical cluster in the province, largely concentrated in central Alberta, near Red Deer, but also in Alberta's Industrial Heartland, a cluster of refining, processing and petrochemical facilities on the outskirts of the capital city of Edmonton.

Dinara Millington, vice president of research at the Canadian Energy Research Institute (CERI) outlined the potential to attract increased investment in methane-derived petrochemicals, which could provide a market for about 500mn ft³/day of Alberta natural gas.

But there are also a number of other, less well-known market areas that Canadian producers would do well to explore, primarily in the areas of natural gas – both compressed and liquefied – as a fuel for transportation; small-scale LNG for marine bunkering and gas utilizing methane from landfills or large-scale agricultural operations.

"We need to take a solutions-based approach to selling the natural gas industry."

— Brent Graham, FortisBC

A major challenge, however, is getting the federal government to take seriously the contribution the natural gas industry can make towards helping Canada meet its global climate change obligations. Natural gas is already replacing coal for power generation, and efforts are underway in many cities to increase the use of natural gas-powered buses for public transportation.

Calgary is purchasing 400 CNG buses over the next 8 to 10 years – about half its fleet. But in Edmonton, city officials have taken a conscious decision to go electric, and just purchased 40 electric buses, with financial contribution from the federal government, which drew a lengthy comment from an Alberta gas utility delegate.

"We held discussions with several Edmonton city councillors and the message we got was that climate change is an



existential threat, natural gas is part of the problem, we're going electric, and cost doesn't matter. There is a very clear pro-electrification bent at Environment Canada. So we are really paddling upriver, especially in Edmonton, trying to get the message out. We put together a report comparing emissions from a CNG bus, a diesel bus, a CNG bus using RNG and an electric bus. Just so you know, the electric buses in Edmonton are actually equipped with diesel heaters for the winter because the batteries can't handle generating heat. When you look at the emissions profile, an electric bus with a diesel heater has the exact same emissions profile as a CNG bus – but they cost twice as much, and don't go as far."

"We are always working to get the federal government to better understand how natural gas can fit into the climate conversation. We will take market share from coal, we will change the way natural gas is used in transportation. We need to give them a story, show them how gas can make a difference."

— Paul Cheliak, Canadian Gas Association

In BC, FortisBC is taking a leading position in developing marine bunkering capabilities, and has two customers – BC Ferries and SeaSpan – which together have seven vessels powered by LNG. At the present time, it is offering shore-side bunkering services.

"As it relates to international traffic, the missing link in the value chain is the bunkering vessel that will take the LNG from the shore to the vessel for refueling."

— Brent Graham, FortisBC

FortisBC is also first into the LNG export market: it has recently signed a two-year contract to supply 60 ISO containers of LNG each week to a customer in China, with the LNG supplied from its recently expanded Tilbury liquefaction facility in BC's Lower Mainland.

LUNCHEON PRESENTATION – LNG CANADA



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"This is the story of LNG Canada, an absolutely audacious ambition that will change the narrative of Canadian energy. Gas from the Montney will flow through this project to China, to Korea, to Japan. There is nothing that will stop it. It is no longer a project being planned; it is a project under construction."

— Andy Calitz, CEO, LNG Canada

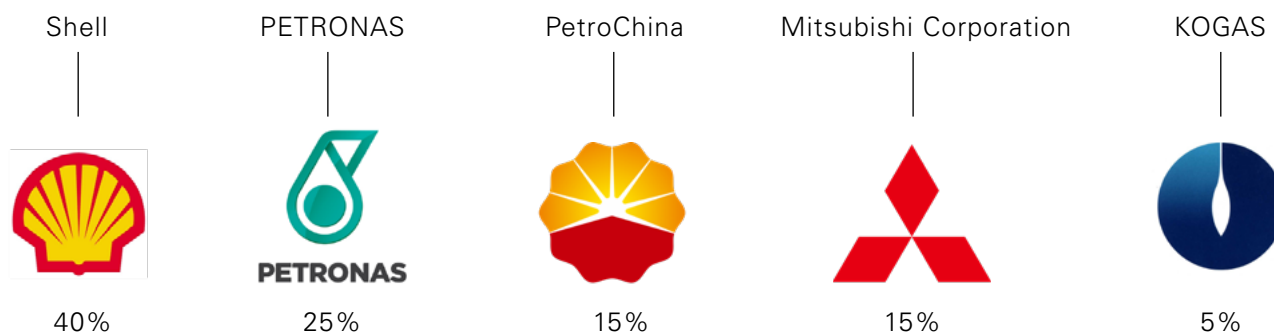
Andy Calitz, CEO of LNG Canada, told the story of how LNG Canada's proposed 14mn mt/yr liquefaction terminal in Kitimat, BC, is set to become Canada's first world-scale LNG export facility.

He assembled virtually his entire leadership team to relate the contributions of their numerous teams to the

C\$40bn (US\$31bn) project that reached a final investment decision in October 2018. The presentation served as a powerful counterpoint to the challenges that have beset the Canadian gas industry in recent years.

The seeds of what would become LNG Canada were sewn in 2008, when Korea Gas and Mitsubishi, with strong

LNG CANADA JOINT VENTURE PARTICIPANTS



Source: LNG Canada

resource positions in the Montney, saw the potential to export that resource to Asia. Lacking LNG expertise, they brought in Anglo-Dutch major Shell, who in turn brought in PetroChina. Petronas joined the LNG Canada family in 2018, essentially clearing the affordability path for the project partners to reach a positive final investment decision later that year.

Other aspects covered in the presentation included the importance of building relationships, with First Nations, with local communities, and with three levels of government, before building the project; the commercial structure of LNG Canada, with five joint venture participants and

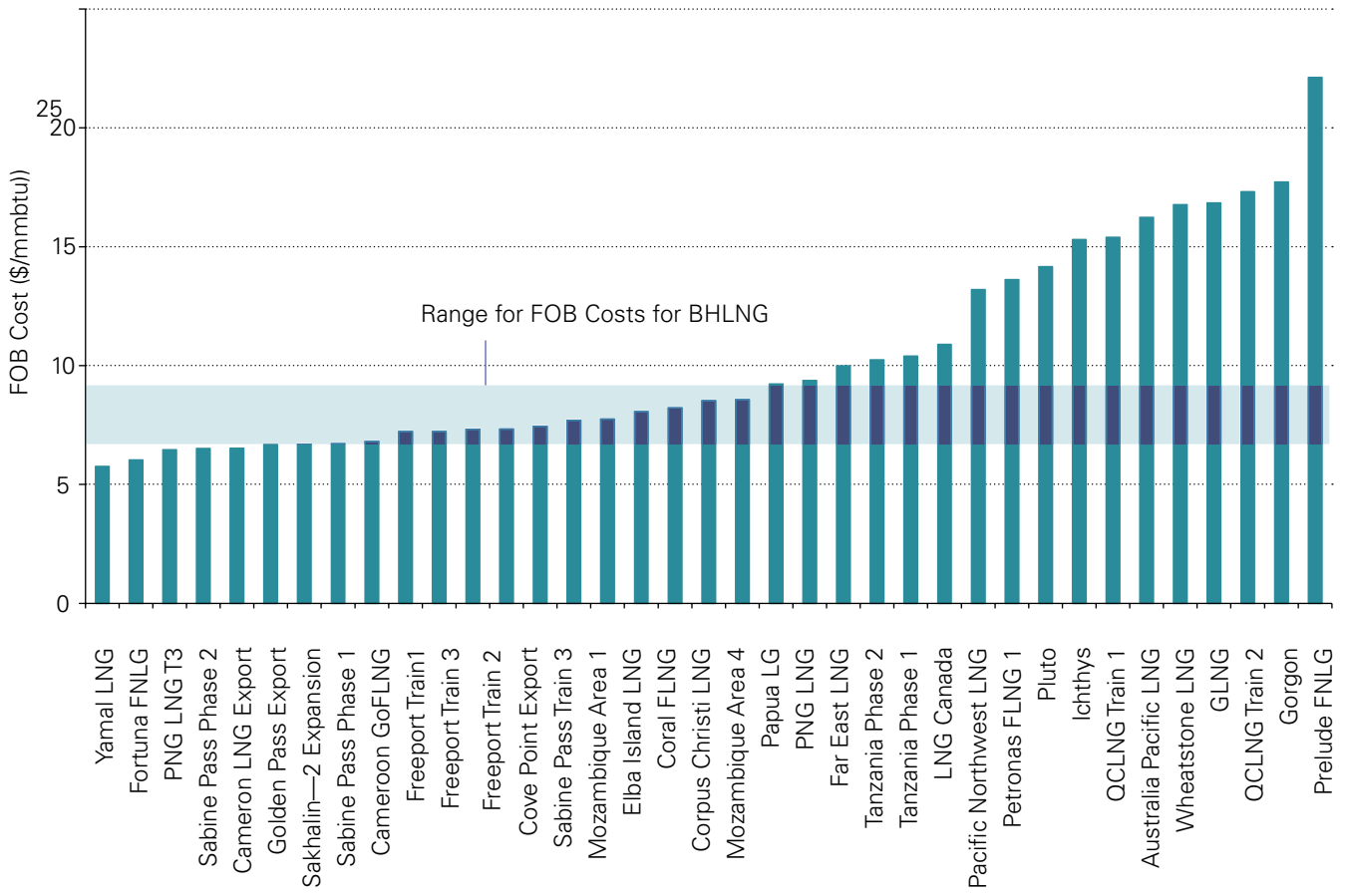
pipeline partner TC Energy, which will build, own and operate the Coastal GasLink pipeline from the Montney to Kitimat with the full support and participation of the elected leaders of all 20 First Nations along its route; building the project, which actually involves five construction projects: early works – levelling, clearing – and marine works, dredging the tanker turning basin; connections to the BC Hydro grid to provide 100 MW of clean hydroelectricity to the project; the CGL pipeline, which has been broken into eight construction spreads, with four contractors responsible for laying the pipe; the liquefaction plant itself, managed by a joint venture EPC partnership of Japan's JGC and North American engineering giant Fluor.

EXPORT MARKETS

On the heels of the LNG Canada luncheon presentation, the third panel of Canadian Gas Dialogues 2019 explored what comes next, as Canada is now a player on the global LNG stage. As recently as a decade ago, more than 20 LNG export projects were on the drawing boards. Those expectations have been reduced dramatically, and now the number of live, ready-for-FID proposals can be counted on one hand: Australia's Woodside Energy and Chevron Canada expect to make a final investment decision on their 18mn mt/yr Kitimat LNG project at Bish Cove, on the Douglas Channel not far from LNG Canada's site, as early as 2022; Woodfibre LNG, a project of Indonesia's privately-held

Pacific Oil & Gas, is expected to begin construction this summer on its 2.1mn mt/yr terminal near Squamish, north of Vancouver; in eastern Canada, GNL Quebec has been developing its 11mn mt/yr Energie Saguenay project on the shores of the Saguenay River, since 2014; and two projects in Nova Scotia – LNG Limited's 8–12mn mt/yr Bear Head LNG project at Point Tupper and Pieridae Energy's 10mn mt/yr Goldboro LNG project in Guysborough County. All that remains for either of those two projects to take a positive investment decision is finalization of gas supply – and routes to move it from western Canada.

BEAR HEAD AND THE GLOBAL LNG MARKET



Source: Wood Mackenzie



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“What we are waiting on is gas supply. We are working with TC Energy and other pipeline companies to bridge that gas supply gap and move incremental gas from western Canada to Bear Head.”

— Joe B’Oris, Chief Development Officer, Bear Head LNG



Tim McMillan
President & CEO
CAPP

Allan Fogwill, CEO of the respected Canadian Energy Research Institute (CERI), put Canada's LNG ambitions in a competitive context in his opening moderator remarks, noting that LNG from either coast is competitive in key Asian and European markets, and is much closer to both: sailing times from the west coast to Tokyo are under 10 days; the UK's Isle of Grain import terminal is reachable in less than a week from either Nova Scotia project.

It is this next tranche of Canadian LNG developments – apart from Woodfibre LNG – that Canada's beleaguered gas producers are looking to for new markets, but Akos Losz, from Columbia University's Center on Global Energy Policy, offered three sobering observations about what may – or more importantly, may not – transpire on global energy markets:

1. The global LNG industry may be betting too much of its future on continued LNG demand from China. Many industry forecasts expect China to remain the biggest driver of LNG demand growth, but there is no guarantee that this is going to be the case. It's not too difficult to put together a scenario that sees China's LNG demand flattening or even declining by the early part of the next decade. Government policies will provide strong support for the next two or three years; not so much after that as the Chinese economy slows and pipeline imports from Russia increase.
2. The next phase of LNG supply is being developed to feed gradually tightening LNG markets. There is no shortage of projects – adding up advanced projects with potential FID in the next year suggests 200mn mt/yr of new liquefaction capacity – three times the projected supply gap in 2025. Some projects with strong portfolio backers can reach FID without offtake agreements, but there remains a risk that capacity might be overbuilt, especially if demand doesn't materialize as expected.
3. Canada should set its LNG sights on the medium-term horizon. There is a large resource base that can feed several large projects over time, but Canada is a complex environment in which to build large-scale energy infrastructure projects,

whether those are liquefaction terminals or pipelines to deliver feed gas to them. For the next wave of Canadian LNG investment – Kitimat LNG and the three eastern Canadian projects, demand forecasts into the second half of the next decade are more important.

Tim McMillan, CEO of the Canadian Association of Petroleum Producers, which represents more than 80% of all Canadian oil and gas production, pointed out that Canada – despite the tough times now facing its gas industry – could easily move from 5th to 3rd on the list of global natural gas producers, behind only the US and Russia.

“Canada is uniquely positioned to be an important supplier – we have got hundreds and hundreds of years of supply and we are global leaders when it comes to how we produce it.”

— Tim McMillan, CEO, Canadian Association of Petroleum Producers

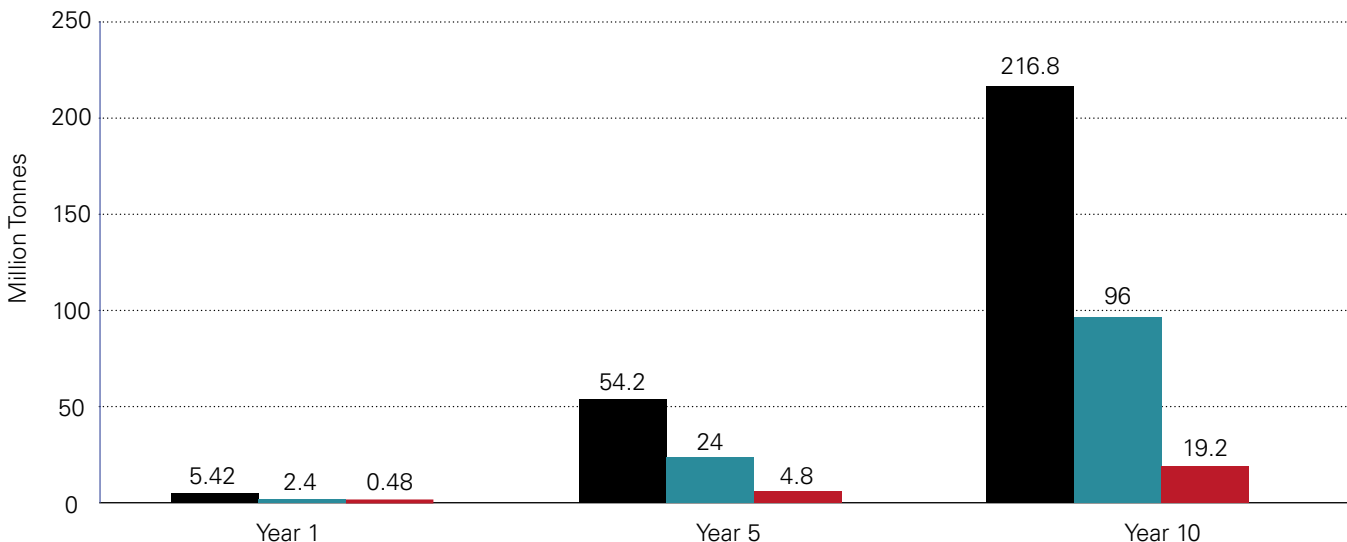
The effects that natural gas development have for Canada, he said, should be top of mind when setting policy direction that could impact the country's ability to contribute globally. Canadian natural gas is produced in the tightest regulatory environment in the world, with tight restraints on venting and flaring, targets to reduce methane emissions by 40%, and in some jurisdictions, a price on carbon.

Canada's Paris Agreement obligations, McMillan pointed out, call for cutting 220mn mt of CO₂ by 2030; current measures, however, will only produce 60mn mt of reductions, leaving a substantial gap. But Article 6 of the Paris Agreement needs to be negotiated so that Canada's exports of low-carbon LNG to displace coal consumption in other markets can be counted as contributing to meeting its Paris Agreement commitments.

“I believe the biggest effect we can have on global emission reductions, as well as Canada's ability to reach our own targets, is with natural gas displacing coal in jurisdictions like India and China. Article 6 is the one article (of the Paris Agreement) that is most the most important in allowing natural

CUMULATIVE CO2 EMISSIONS COMPARISON

■ Golden Pass ■ LNG Canada ■ BC eDrive LNG



Source: BC Energy Ministry



Dave Nikolejsin
Deputy Minister
BC Energy, Mines and
Petroleum Resources

gas offsets to be utilised where it is being produced. We need the Canadian government to take a leadership role in negotiating Article 6 to allow Canada to be a larger player in the world.”

— *Tim McMillan, CEO, CAPP*

Global demand for LNG will, according to most forecasts, increase in the next decades, but where that LNG comes from is becoming increasingly more important in the global markets, according to Dave Nikolejsin, deputy minister in BC’s energy, mines and petroleum resources department. Replacing coal with gas is the single most effective measure to reduce global emissions, and BC is selling a green brand of LNG – with the lowest carbon intensity of any major supply source in the world. LNG Canada set the standard; Woodfibre LNG and Kitimat LNG have exceeded that standard by committing to full electrification of their liquefaction terminals, using 100% renewable hydroelectricity from BC Hydro.



David Keane
Chief Executive Officer
Woodfibre LNG

“The mythology around renewables is that they are somehow going to solve the problem. The reality, however, is that renewables can’t even meet the growth in primary energy demand, let alone form the base of global energy consumption.”

— *Dave Nikolejsin, deputy minister, BC Energy, Mines and Petroleum Resources*

Meeting that green standard, Woodfibre LNG CEO David Keane said, is one of the aspects of his company’s project that sets it apart from others in Canada, and indeed from others around the world. It’s the only project in Canada to receive environmental approvals from federal, provincial and First Nations regulatory authorities, but it will produce the cleanest LNG in the world.

“Our LNG project will reduce greenhouse gas emissions by about 80% versus what they would be if we were gas-driven. Our intensity factor is going to be 0.058, so we will, in fact, be the cleanest LNG in the world.”

— *David Keane, CEO, Woodfibre LNG*

THE REGULATORY FRAMEWORK



Rowland Harrison
Former NEB Member,
Editor
Energy Regulation
Quarterly



Sander Duncanson
Environmental,
Regulatory and
Aboriginal Law
Osler, Hoskin and
Harcourt LLP



Martha Hall Findlay
President & CEO
Canada West Foundation

If the Canadian regulatory system is broken and gives serious pause to oil and gas investors, the passing of federal Bill C-69, as currently written, will slam the door shut on investment.

“Bill C-69 is clearly the federal government’s biggest intrusion into provincial resource management and ownership since the National Energy Program (NEP) of 1980.”
— Rowland Harrison, energy consultant and panel moderator

Bill C-69 is not the first instance of federal intrusion into the energy industry. The National Energy Program of the early 1980s, introduced by then-prime minister Pierre Trudeau, the father of the current prime minister, coincided with a global oil price collapse and crippled investment in the Canadian oil and gas industry.

“Most significantly and ominously, Bill C-69 would transfer all authority for approval or rejection of [major interprovincial infrastructure] projects to the federal minister or cabinet, with no effective accountability for final decision-making.”
— Rowland Harrison

Bill C-69 rejects the concept of an independent, expert and transparent quasi-judicial decision-maker and proposes to disband the globally-respected National Energy Board and replace it with a new government body, the Canadian Energy Regulator and possibly losing important regulatory experience.

Bill C-69 moves away from any sort of standing test to limit participation in impact assessments to parties that are actually affected by a project, removes specific timelines and introduces new concepts, such as gender-based analysis, that require further interpretation and understanding.

“You’re adding more opportunities for politicians to get involved and make decisions that are more based on policy rather than the merits of a specific project. In all, based on the current reading of the bill, it’s going to make the regulatory process less certain and more difficult to invest in this country.”

— Sander Duncanson, Osler

The impact of Bill C-69 will also extend beyond the oil and gas industry to all resource development, putting at risk investments in mining, forestry and renewables.

“Canada seems to have lost the understanding that we are actually a resource country. That’s what has provided the prosperity that we enjoy now, and we should be proud of it.”
— Martha Hall Findlay, CEO, Canada West Foundation

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