



АНАЛИТИЧЕСКИЙ ЦЕНТР  
ПРИ ПРАВИТЕЛЬСТВЕ  
РОССИЙСКОЙ ФЕДЕРАЦИИ

# Energy in Europe

Wien - July 2 - 2014

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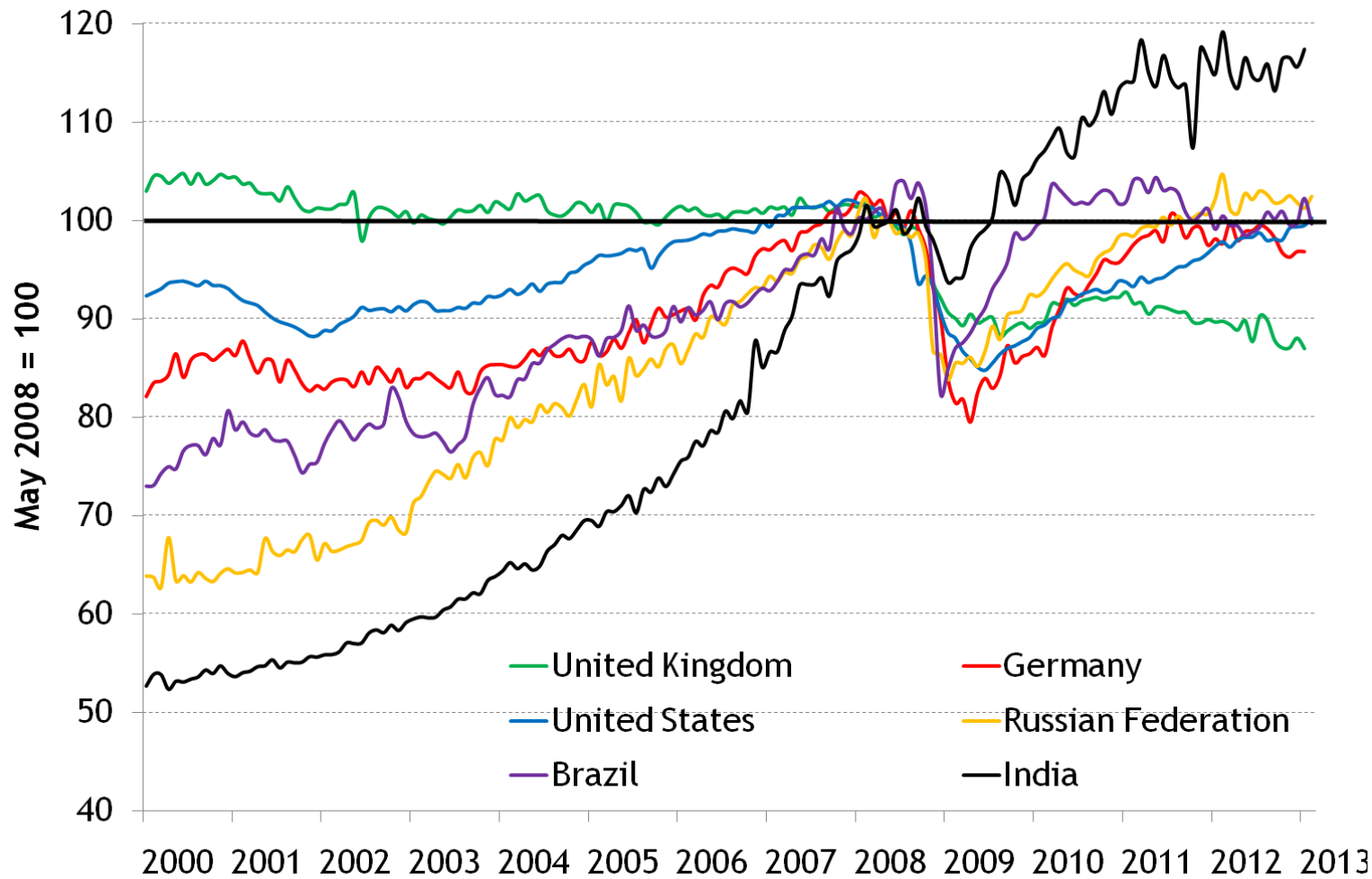


## Main topics:

- Great Recession in the time of high energy prices
- Irreversibility of fixed assets and Climate problem
- European energy situation - “Coal is back”.
- All consumer countries seek some solution: Coal wins, RES brakes, Shale gas wins Anglo-Saxons
- Preconditions for Shale gas revolution: Anglo-Saxon legal regime + water + risk taking +...
- Elasticity of Primary Energy (by GDP) in 2010-2013 globally are the same as before the Recession!
- Russia produces 10% of Global Primary Energy and exports roughly 5% of global consumption.
- Energy Security: Politics against Economics



# Industrial production 2000 - 2013, by country



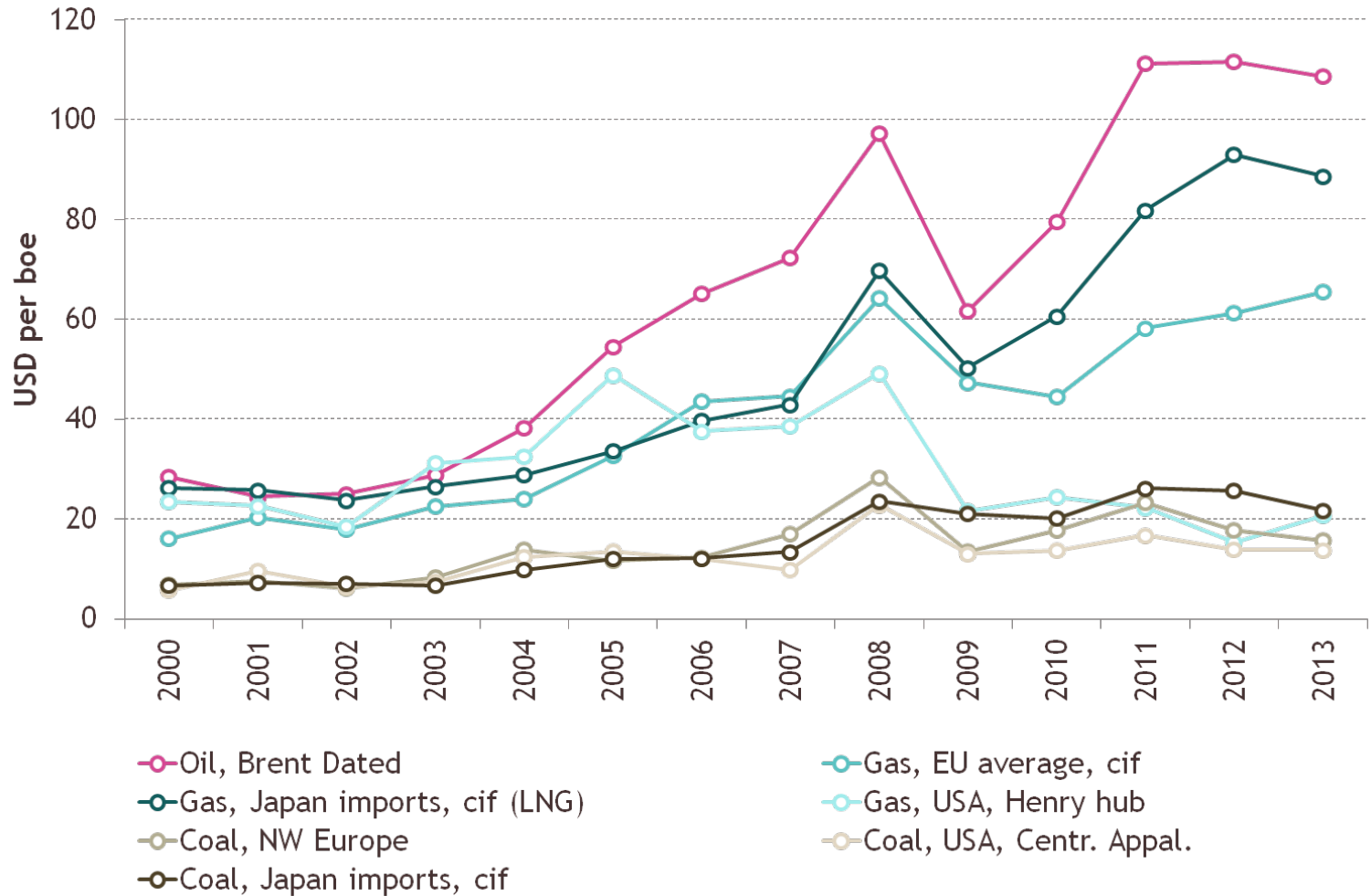
Source: World Bank

# Great Recession “Recovery” and Energy

- Painful EU Recovery for 5 years made everybody quite nervous. Bureaucracy does not help... Only investments in the Future may help...
- EU is losing long-term competition not to China or “Asia”, but to the USA... Energy intensive EU MFG export share (IEA) goes from 38% to 28% by 2035.
- Energy input price are the target of EU policy by “competition” policy to create the buyers market. It does not work due for many reasons.
- Low prices are political, High prices - commercial
- Hope for cheap gas never dies
- Story of Siberian gas - 30-y years ago...

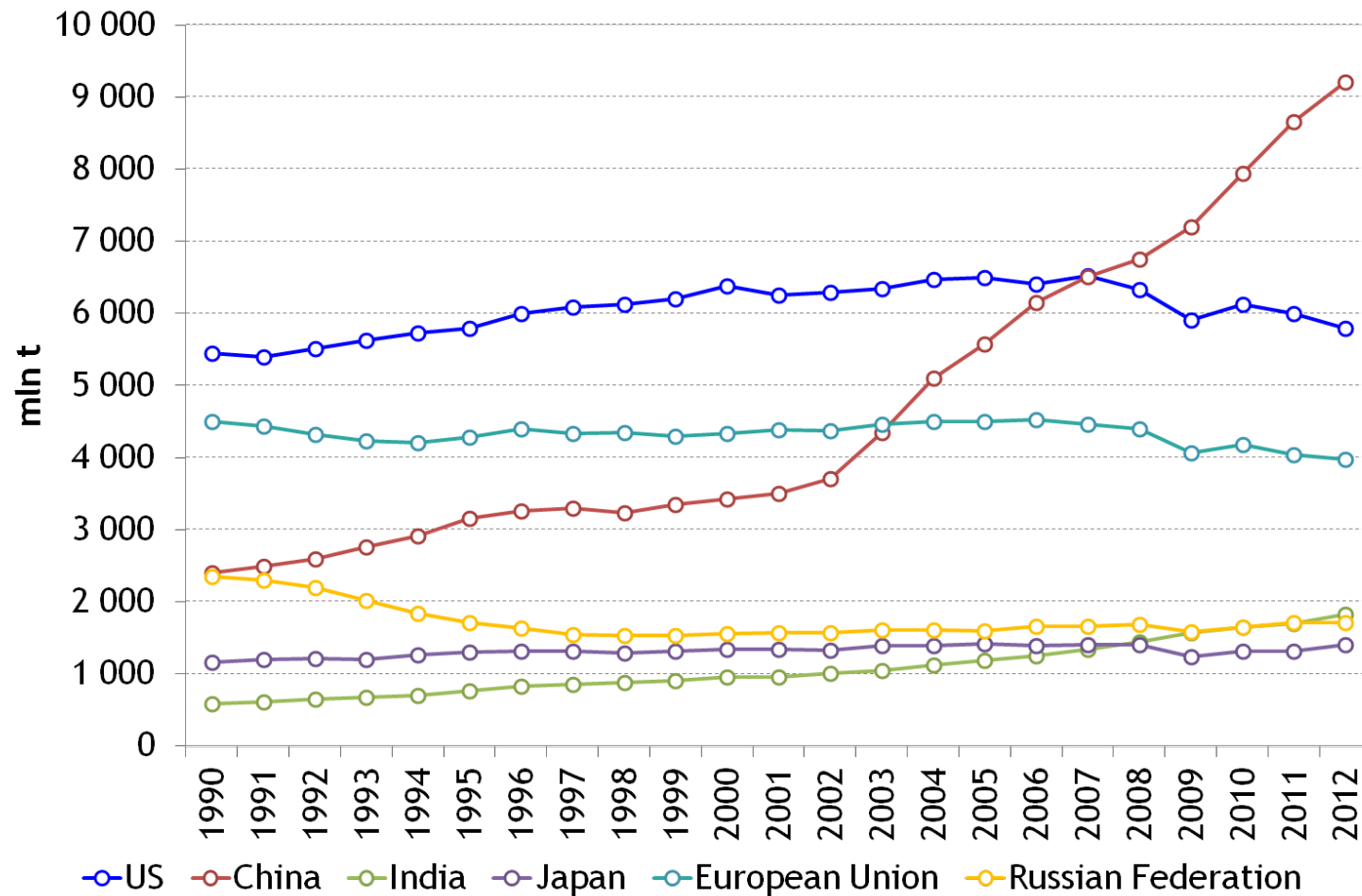


# Global energy prices 2000 - 2013, \$ per boe



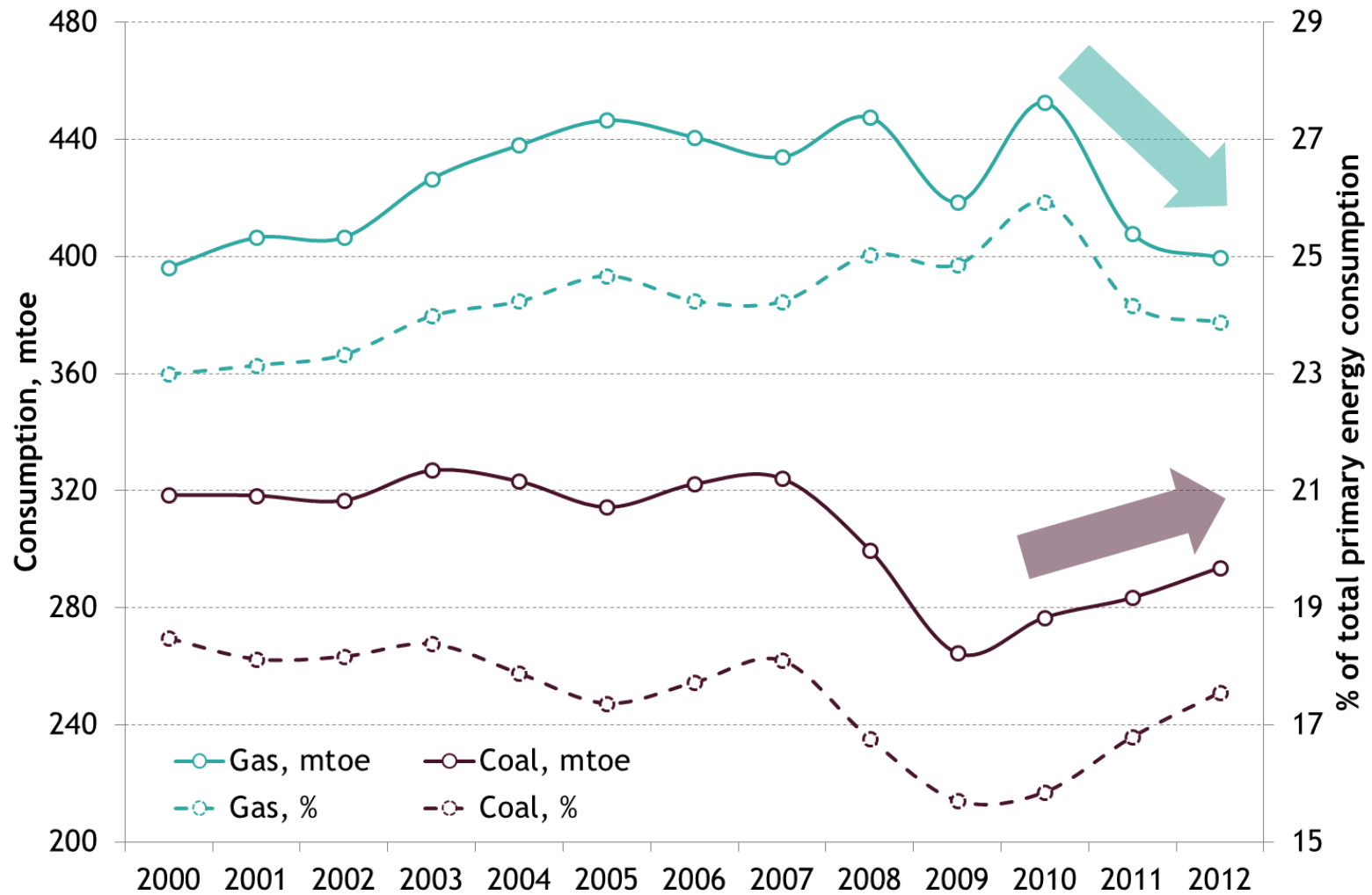
Source: BP, Thomson Reuters, World Bank, US EIA, Institute for Energy Economics (Japan)

# Global CO2 emission 1990 - 2012, by country



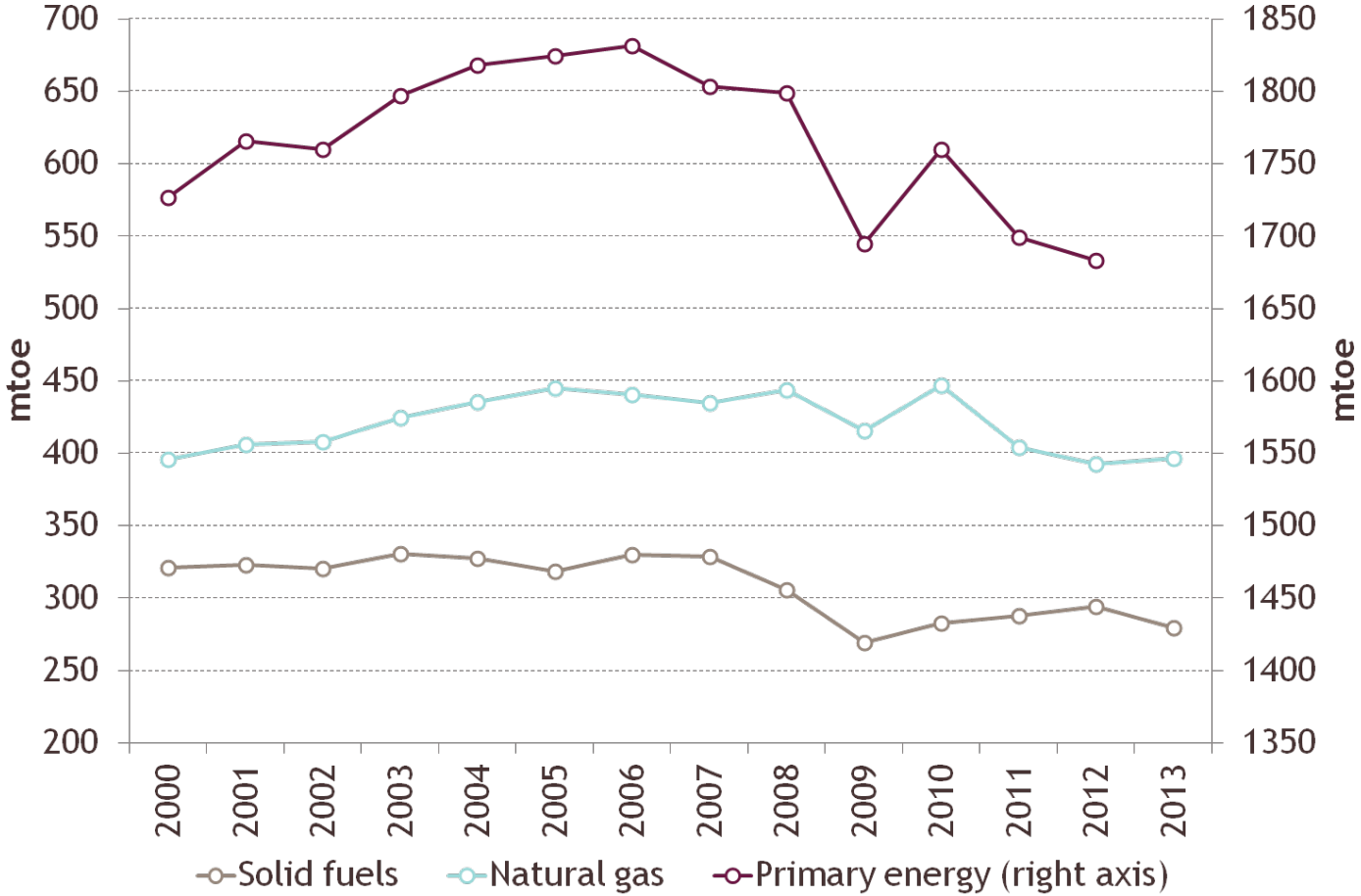
Source: BP

# Gas-to-Coal Switching in European Union, 2010 - ...



Source: BP

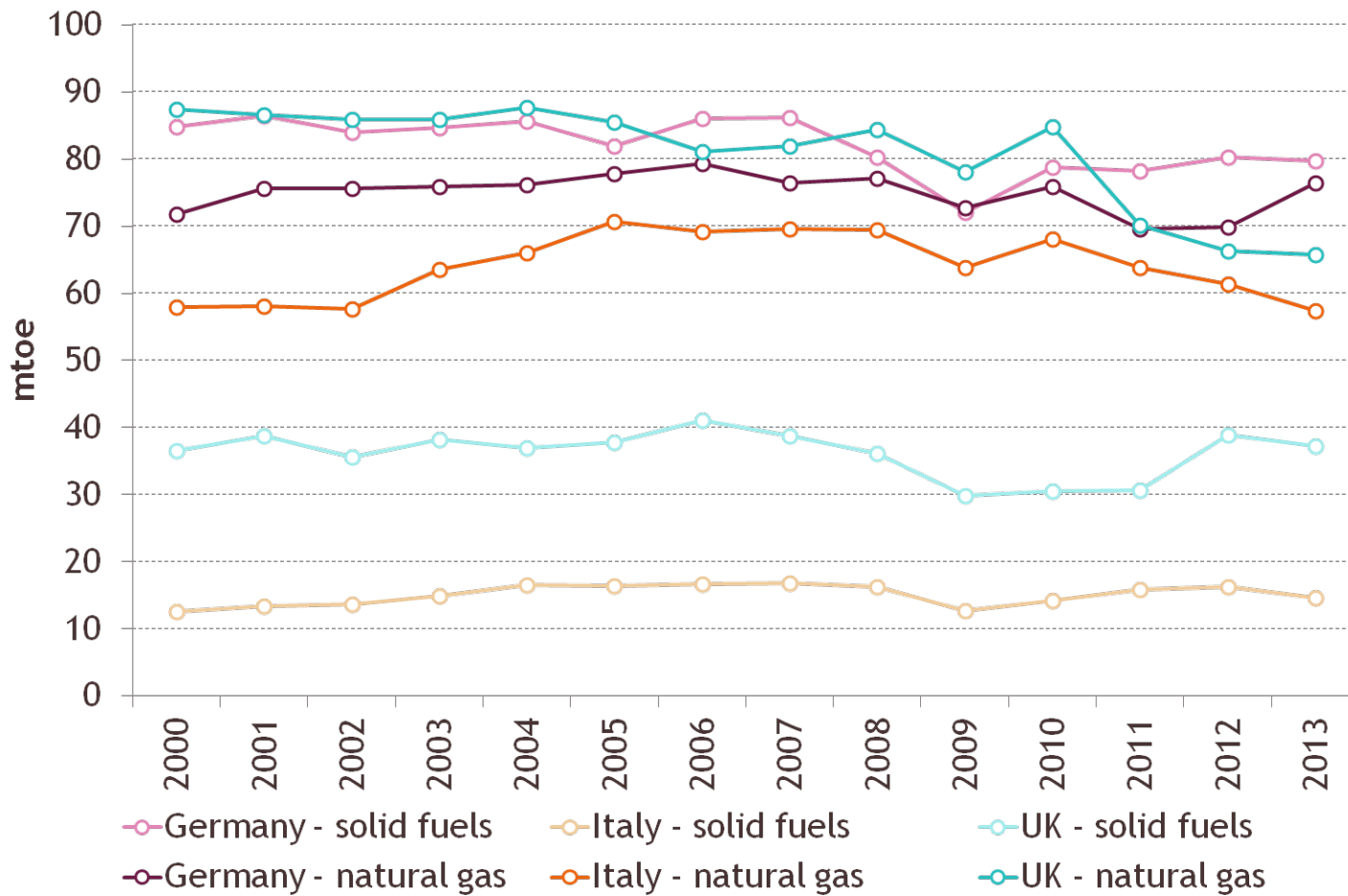
# Primary energy, natural gas and solid fuels consumption in EU 28 = mtoe, 2000 - 2013



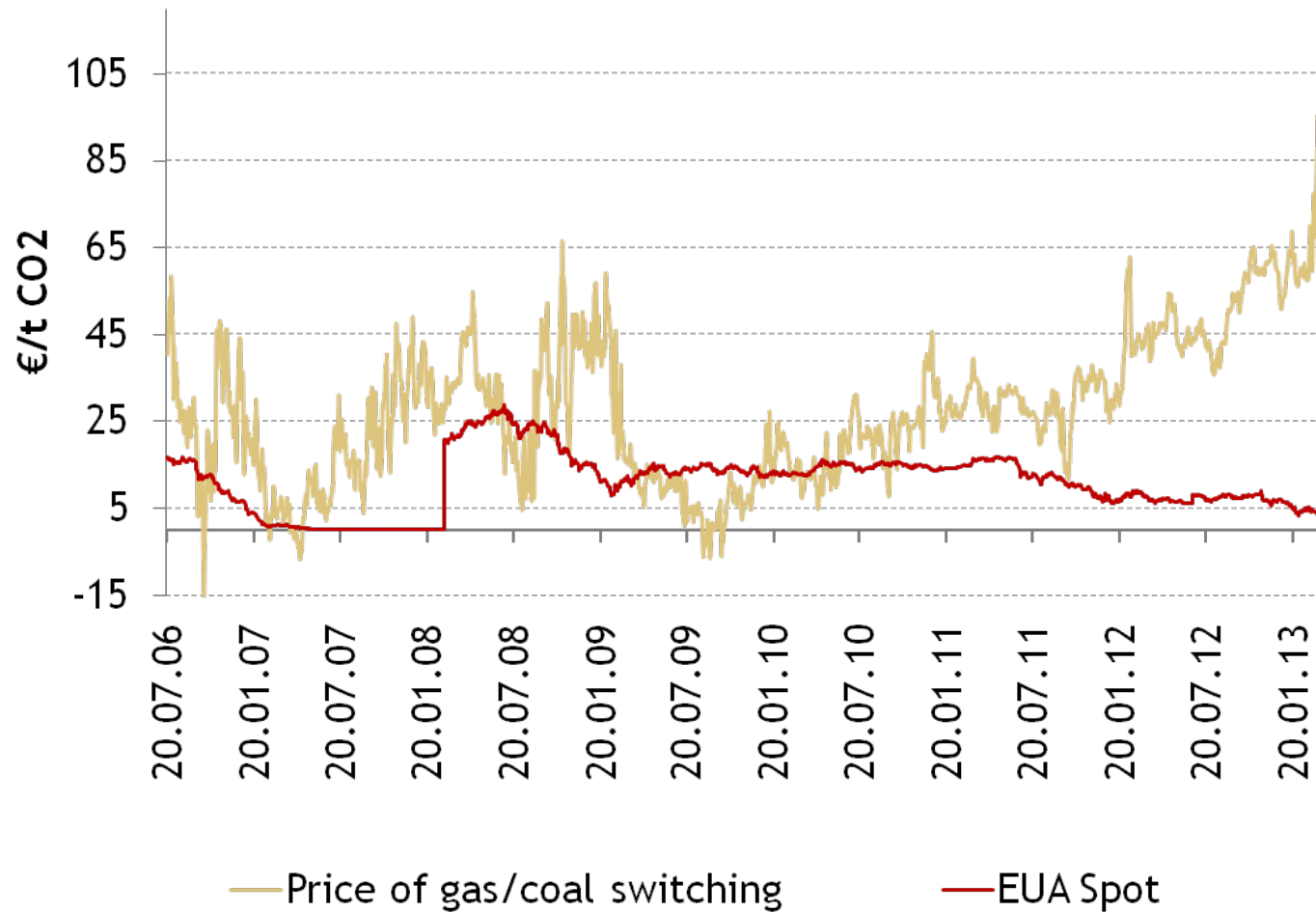


# Natural gas and solid fuels consumption in European countries

mtoe, 2000 - 2013



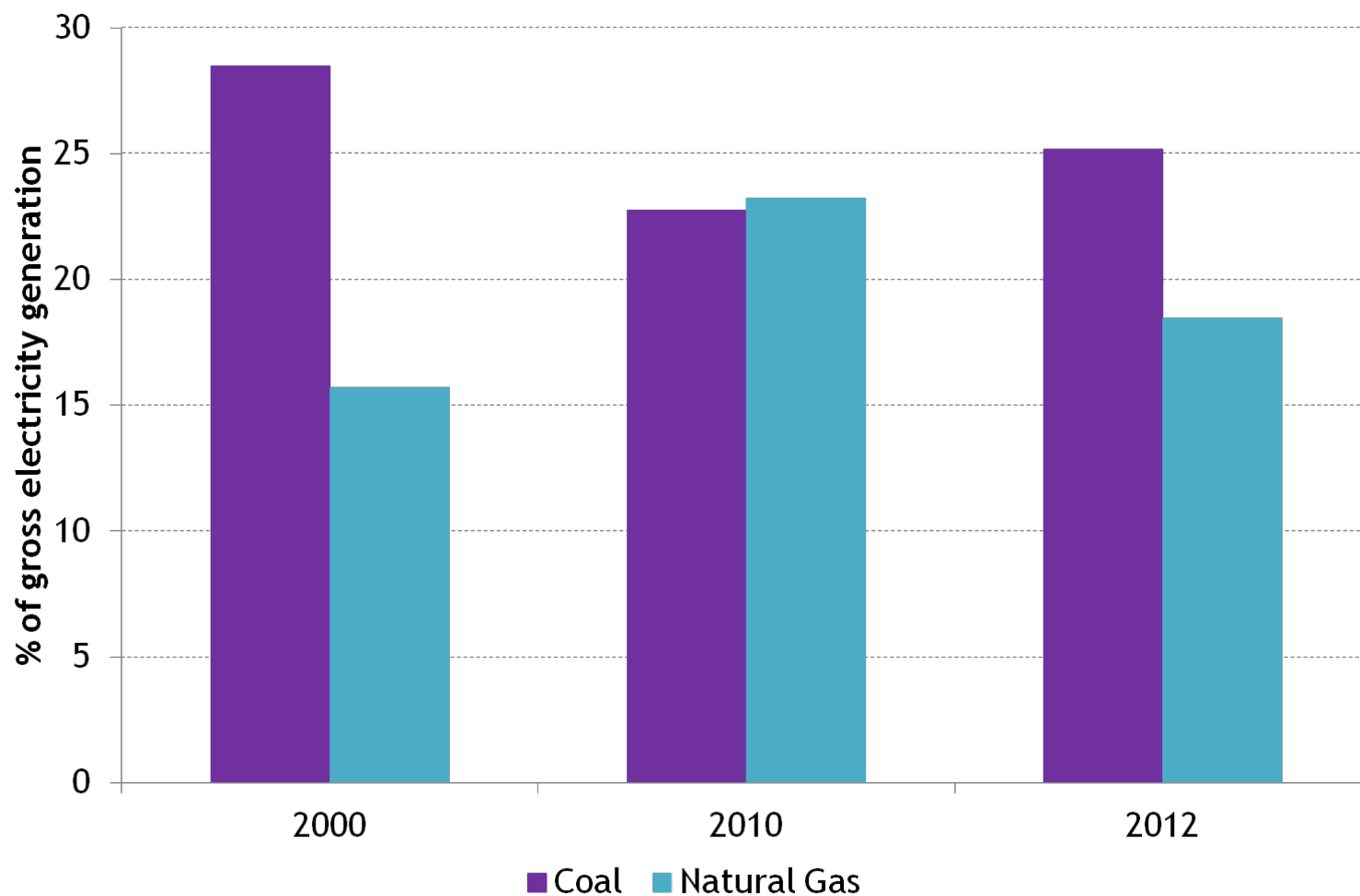
# European carbon price (EUA) and price of gas/coal switching for power stations, 2006 - 2013



Source: Thomson Reuters, AC estimates

# Structure of electricity generation in Europe (OECD)

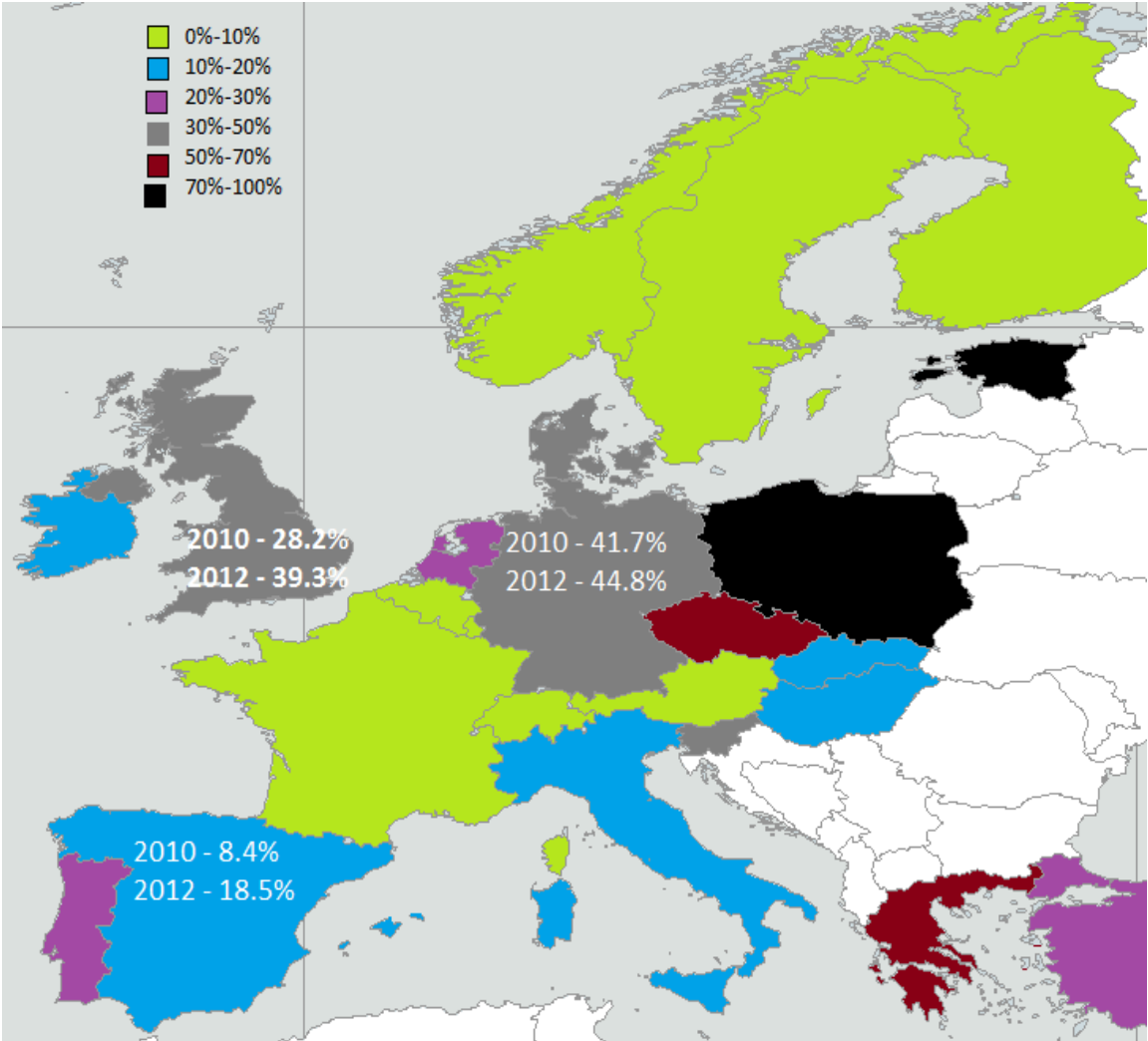
2000, 2010, 2012, % of gross generation



Source: IEA

# Coal-based electricity generation in Europe (OECD)

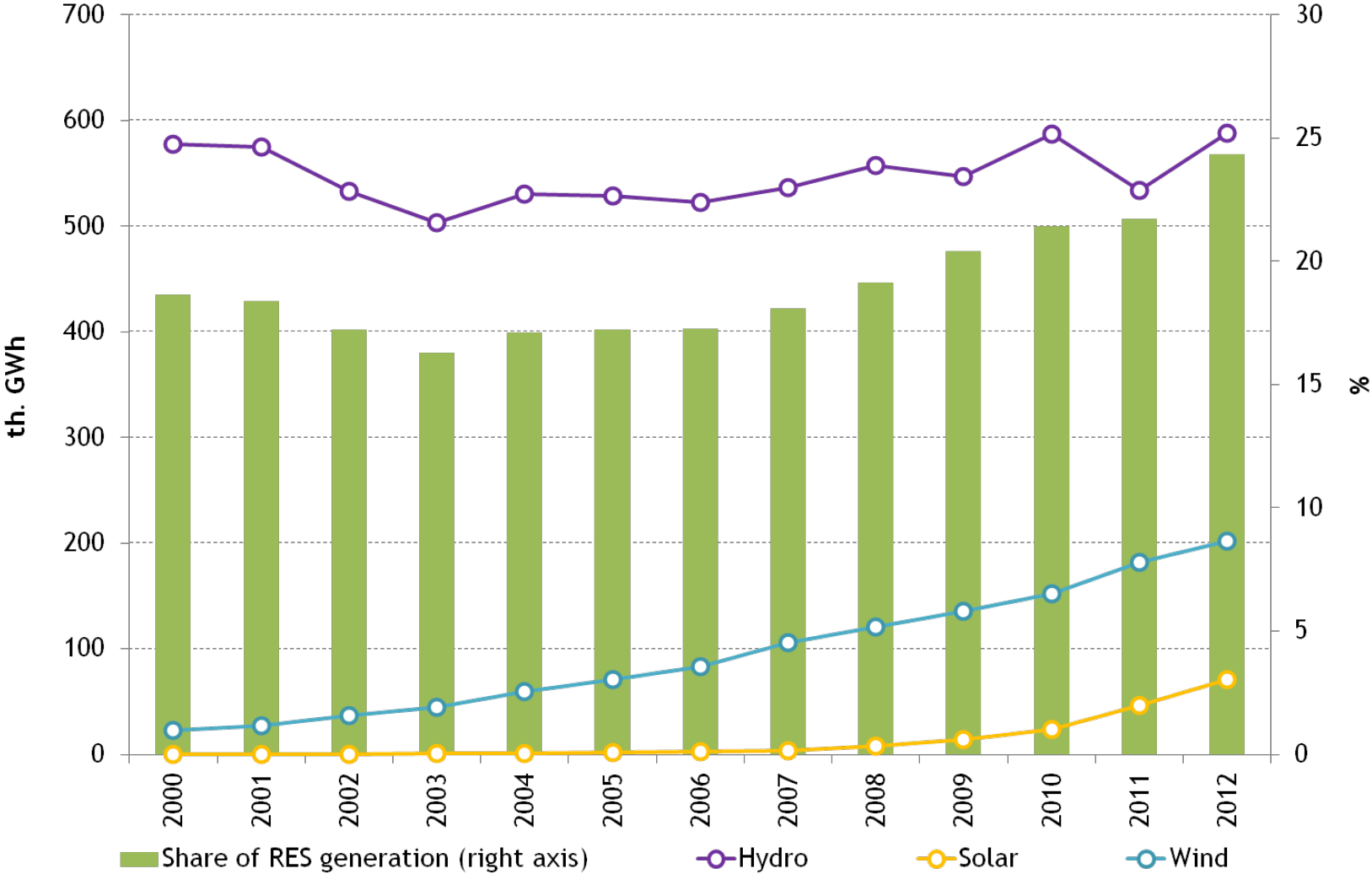
2012, share of gross generation, %



Source: IEA

# RES-based (incl. hydro) electricity generation in Europe (OECD)

by source, th. GWh, and share of total, %



Source: IEA

# Inter fuel competition these days:

- Coal “Renaissance” after Recession in EU
- European Union shifts to Coal, quietly
- Renewables are coming but not immediately
- Carbon prices down
- Unexpected turns in 2010-2013
- Shale gas has been getting its share in the USA and Australia, but slow in EU
- Debates in Europe: between gas - RES - coal
- Pragmatic economics after Recession



# Globe: Energy Intensive Growth

- GDP of OECD is equal to the Rest of the World
- Capital formation is larger in the RoW than OECD
- Primary Energy Consumption is flat in EU and Japan, some what in the USA
- Elasticities after Recession close to Old ones
- Industrialization is going on.
- WEIO (IEA) June 2014 says in 2013 Energy investments = \$1,6 trln - doubling in real terms since 2000< heading to \$2 trln a year.
- Altogether = \$48 trillion till 2035...
- *Russian share in Energy Investments = 6%*



# GDP and primary energy consumption

average annual growth, 1986 - 2012, %

	GDP (PPP)				Primary energy consumption			
	1986-2002	2003-2008	2009	2010-2012	1986-2002	2003-2008	2009	2010-2012
<i>World</i>	3,1	4,3	-0,8	4,0	1,7	3,0	-1,1	3,3
<i>OECD</i>	2,8	2,3	-3,8	2,1	1,6	0,6	-4,8	0,5
USA	3,1	2,2	-3,5	2,3	1,6	0,2	-4,9	0,0
EU-27	2,4	2,3	-4,3	1,1	0,5	0,4	-5,8	-0,2
Japan	2,2	1,4	-5,5	1,9	1,9	0,2	-8,2	0,0
<b><i>Non-OECD</i></b>	<b>3,6</b>	<b>7,4</b>	<b>3,2</b>	<b>6,4</b>	<b>2,0</b>	<b>5,7</b>	<b>2,4</b>	<b>5,7</b>
Brazil	2,3	4,2	-0,3	3,7	3,2	4,0	-0,4	5,3
Russia*	-2,5	7,1	-7,8	4,0	-1,5	1,4	-5,2	2,3
India	5,5	8,0	8,5	6,9	5,1	6,2	8,4	5,2
China	9,5	11,3	9,2	9,2	4,2	10,6	6,7	9,2
<i>Energy consumption-to-GDP elasticity</i>								
<i>World</i>					0,56	0,69	1,35	0,83
<i>OECD</i>					0,55	0,28	1,26	0,27
<i>Non-OECD</i>					0,55	0,77	0,77	0,90

Source: BP, World Bank, IMF, OECD;  
\* - Russian economic growth since 1990



# Oil and gas consumption

average annual growth, 1986 - 2012, %

	Oil consumption				Natural gas consumption			
	1986-2002	2003-2008	2009	2010-2012	1986-2002	2003-2008	2009	2010-2012
<i>World</i>	1,7	1,5	-1,1	1,8	2,5	3,0	-2,2	4,0
<i>OECD</i>	1,5	-0,1	-4,2	-0,3	2,6	1,6	-2,8	2,8
USA	1,4	-0,2	-3,7	-0,4	1,7	0,2	-1,6	3,6
EU-27	0,7	-0,1	-5,0	-2,7	2,5	1,6	-6,5	-1,5
Japan	1,1	-1,5	-9,3	2,1	3,8	4,3	-6,7	10,1
<i>Non-OECD</i>	1,9	3,9	2,7	4,2	2,4	4,6	-1,6	5,2
Brazil	2,9	3,1	1,2	4,4	10,7	10,0	-19,5	13,2
Russia	-3,8	1,9	-3,2	4,6	0,3	1,9	-6,3	2,2
India	6,0	4,1	5,2	4,1	11,3	7,0	23,4	2,3
China	6,4	7,1	3,5	7,5	4,9	18,6	10,1	17,1
<i>Oil/gas consumption-to-GDP elasticity</i>								
<i>World</i>	0,54	0,36	1,37	0,45	0,82	0,70	2,68	1,01
<i>OECD</i>	0,53	-0,04	1,12	-0,16	0,92	0,67	0,75	1,36
<i>Non-OECD</i>	0,55	0,53	0,86	0,66	0,69	0,62	-0,52	0,82

Source: BP, World Bank, IMF, OECD

# Coal consumption & electricity generation

average annual growth, 1986 - 2012, %

	Coal consumption				Electricity generation			
	1986-2002	2003-2008	2009	2010-2012	1986-2002	2003-2008	2009	2010-2012
<i>World</i>	0,9	5,1	-0,5	4,8	2,9	3,8	-0,8	3,8
<i>OECD</i>	0,3	0,7	-10,4	-0,1	2,5	1,6	-4,1	1,1
USA	1,3	0,4	-12,0	-4,1	2,4	1,1	-4,1	0,9
EU-27	-2,6	-0,9	-11,8	3,6	1,8	1,2	-4,9	0,5
Japan	2,2	3,2	-15,5	4,6	2,7	1,9	-5,9	-0,4
<b><i>Non-OECD</i></b>	<b>1,5</b>	<b>8,4</b>	<b>5,1</b>	<b>7,0</b>	<b>3,6</b>	<b>7,0</b>	<b>3,1</b>	<b>6,6</b>
Brazil	0,5	2,7	-14,9	7,6	3,5	5,0	0,0	6,1
Russia	-3,7	-0,4	-8,4	0,7	-0,4	2,6	-4,5	2,4
India	4,4	7,2	9,2	5,8	7,3	5,7	5,5	6,6
China	3,5	11,1	7,4	8,4	8,5	13,1	7,1	10,0
<i>Coal/electricity-to-GDP elasticity</i>								
<i>World</i>	0,29	1,20	0,65	1,21	0,94	0,90	0,94	0,95
<i>OECD</i>	0,09	0,29	2,76	-0,04	0,88	0,67	1,09	0,51
<i>Non-OECD</i>	0,43	1,14	1,60	1,10	1,02	0,95	0,97	1,04

Source: BP, World Bank, IMF, OECD

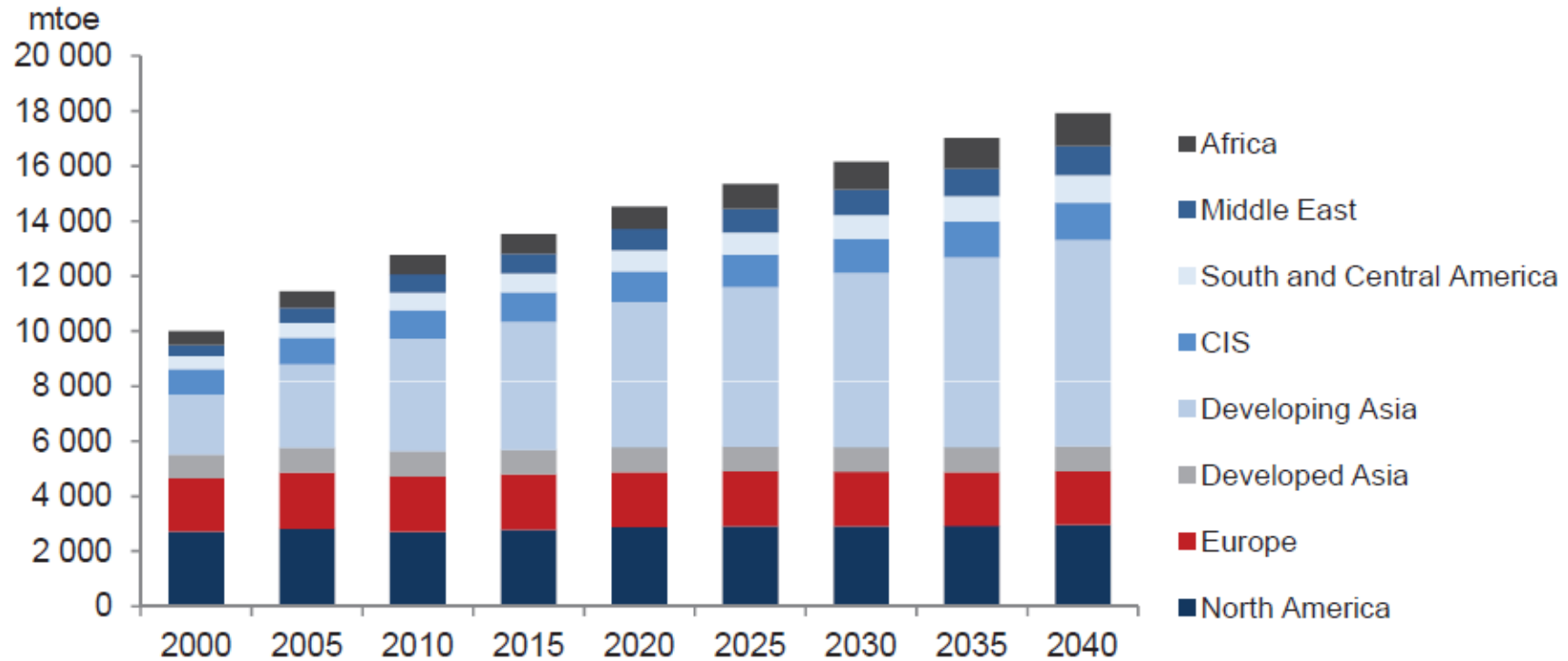
## Our Forecast for 2040

- Part of the Process with: IEA, USA, OPEC, EU
- EU forecast for EU future consumption usually 50-100 bcm down from average of other fcasts
- This Fcast was presented in Washington on 6<sup>th</sup> of Dec. 2013 with American Agency participation
- New 2014 available - may be sent from Hosts to all participants or taken down from the site of Analytical Center under the Govt. of EU
- New Prospects for 2040 - somewhat better for suppliers = OPEC will be back plus Peak Coal in China and India by mid 2020s



# World primary energy consumption

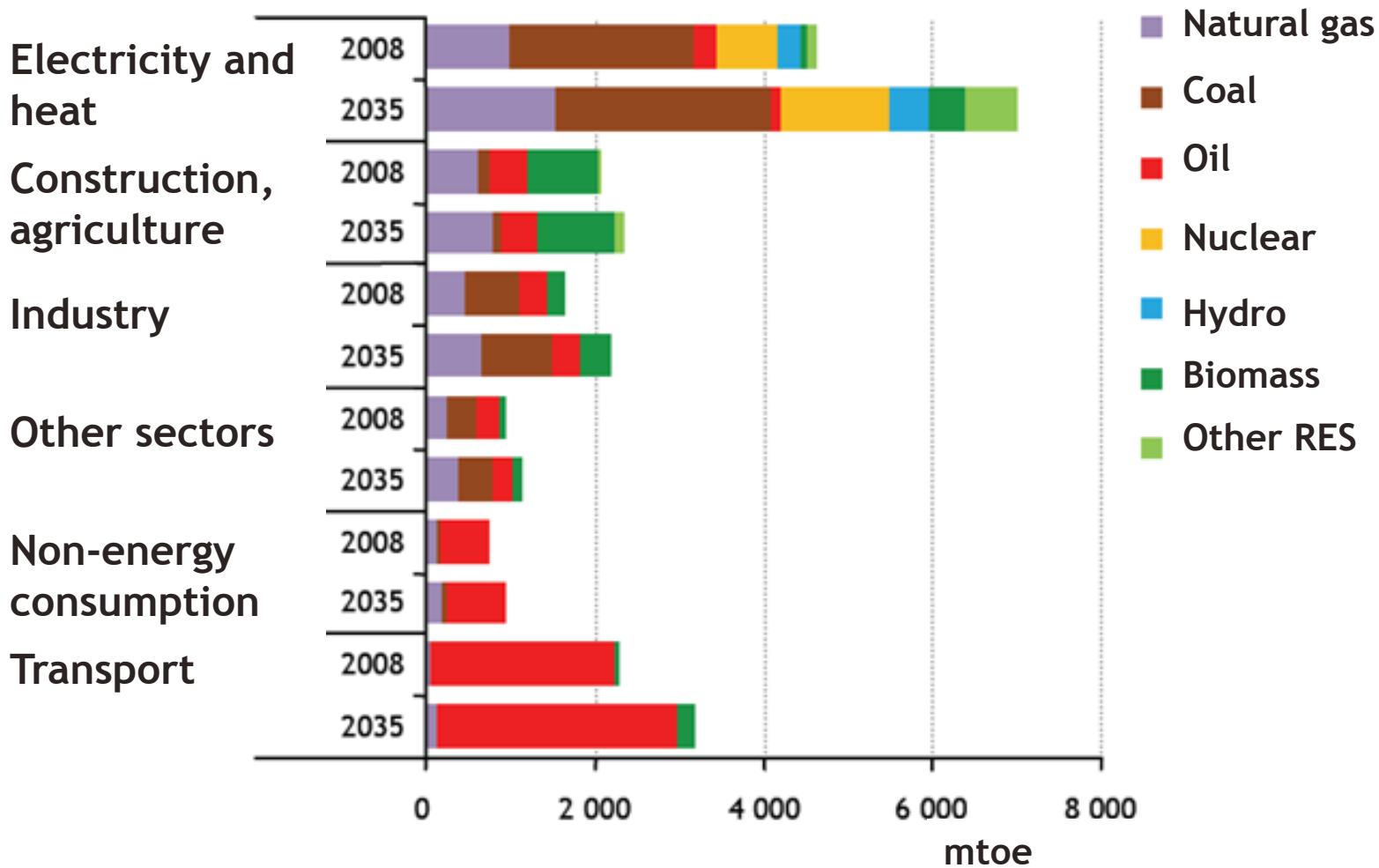
## ERI RAS / AC forecast, 2010 - 2040, by region



Source: ERI RAS



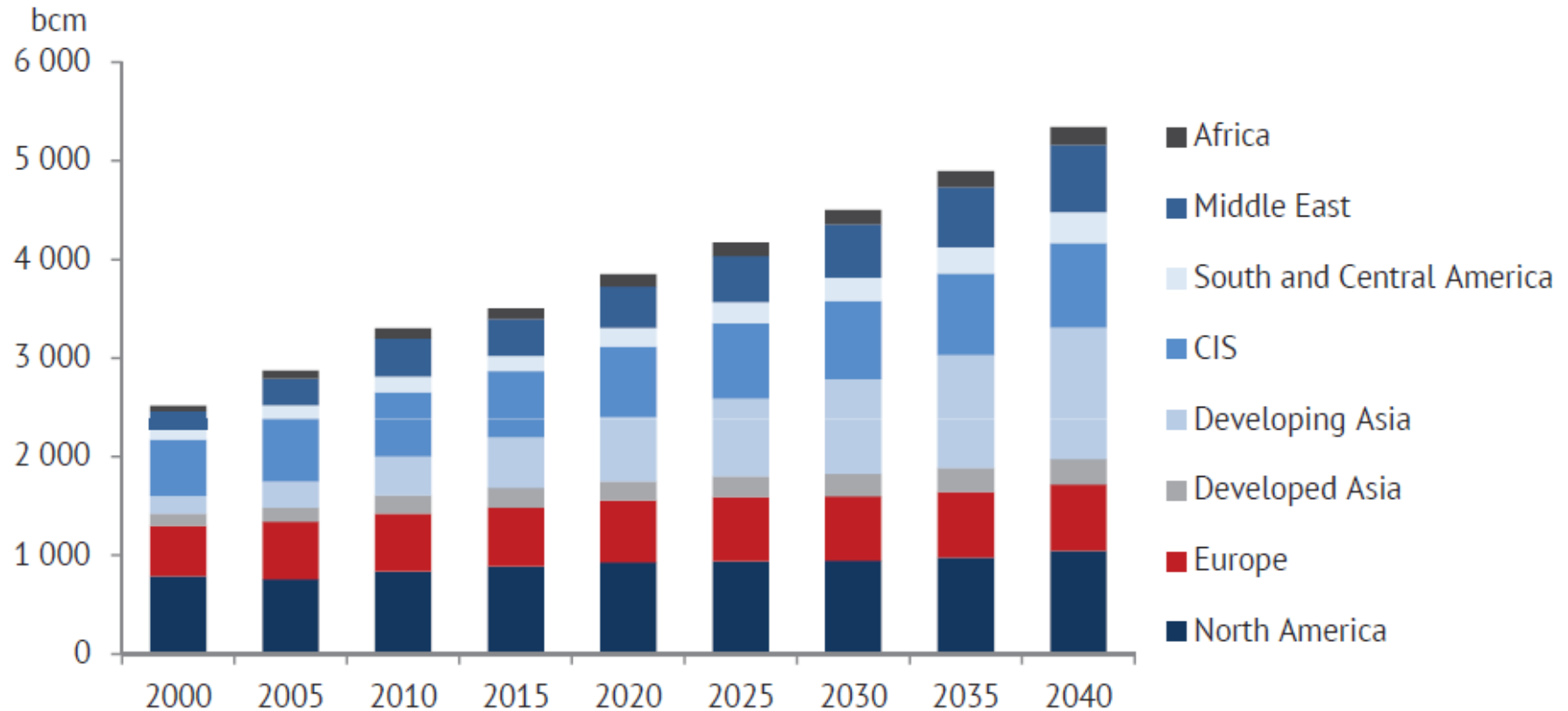
# Structure of global consumption of energy sources by sector, mtoe



Source: IEA World Energy Outlook 2011

# Natural gas consumption

## ERI RAS / AC forecast, 2010 - 2040, by region

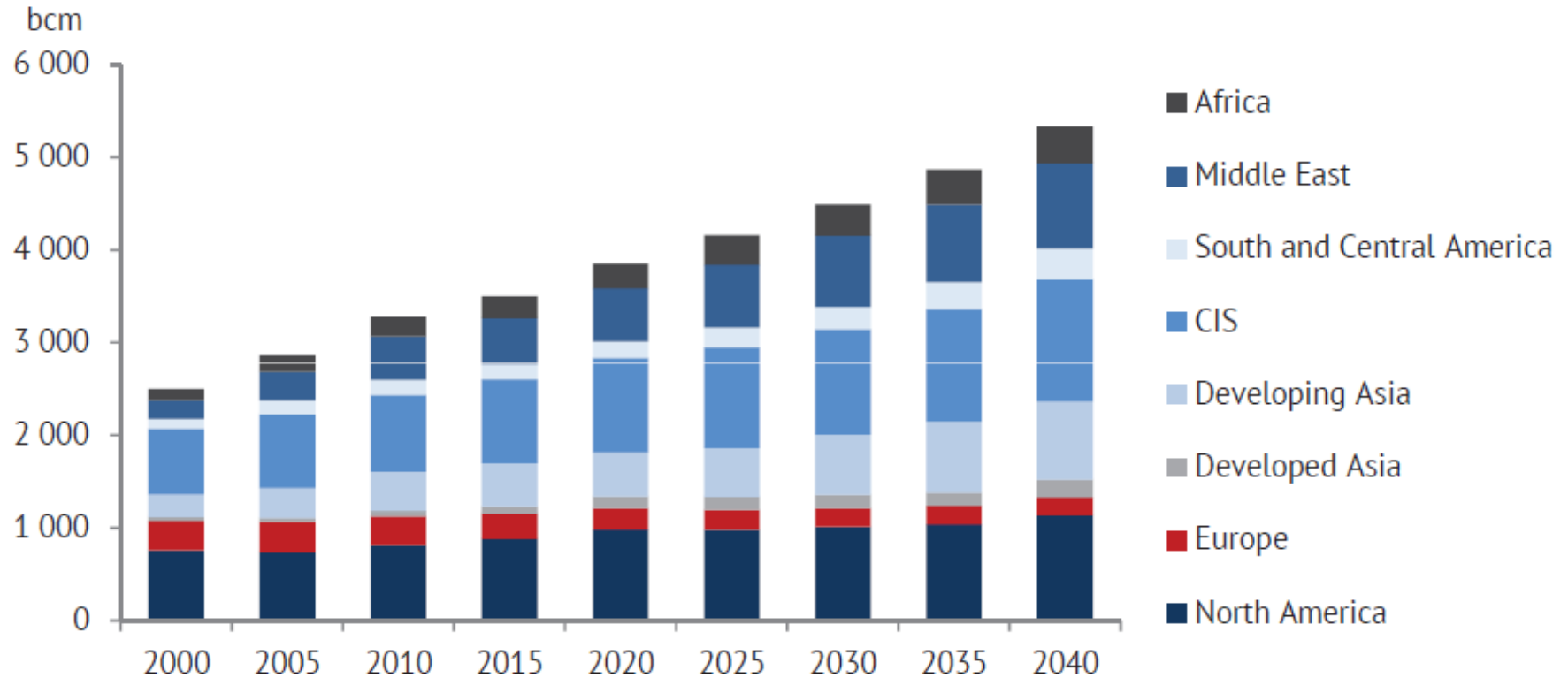


Source: ERI RAS



# Natural gas production

ERI RAS / AC forecast, 2010 - 2040, by region

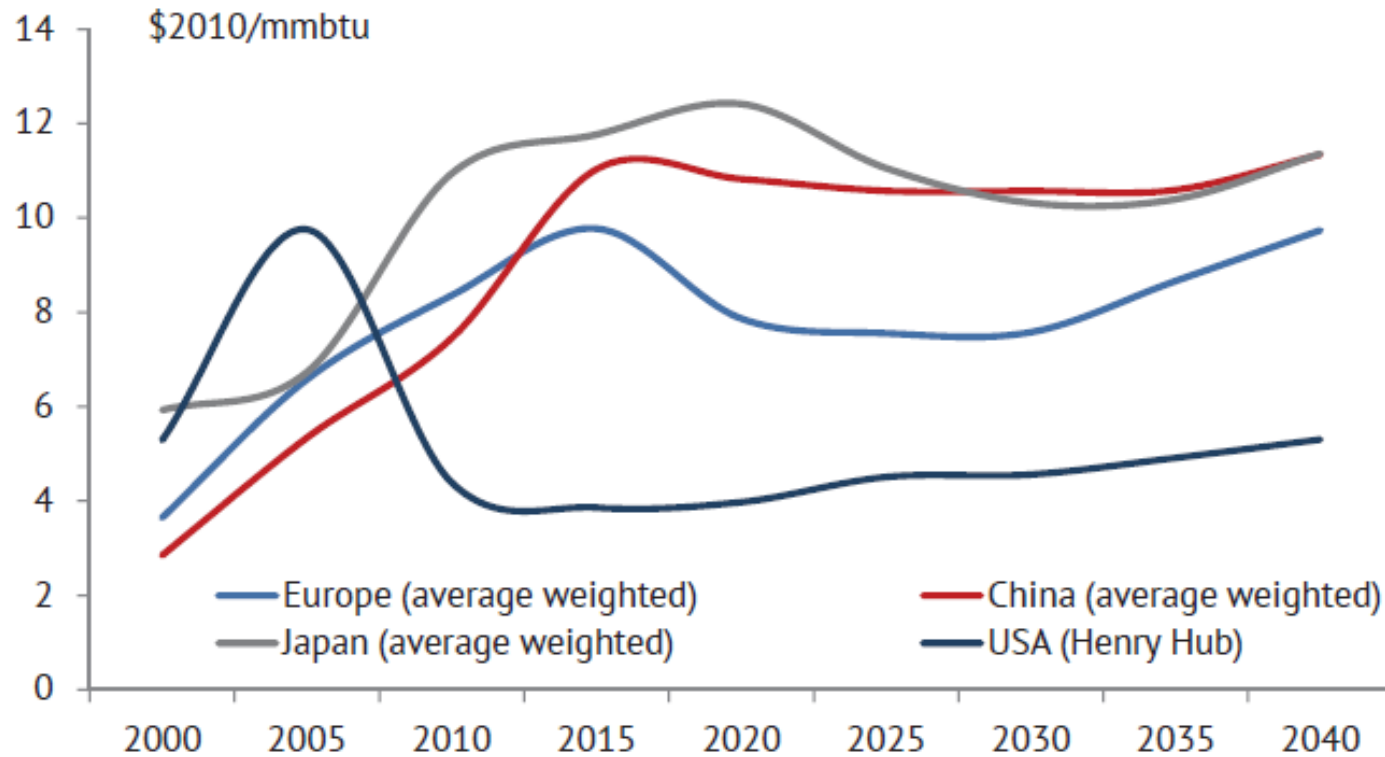


Source: ERI RAS



# Weighted average price of gas

ERI RAS / AC forecast, 2010 - 2040, by regional markets



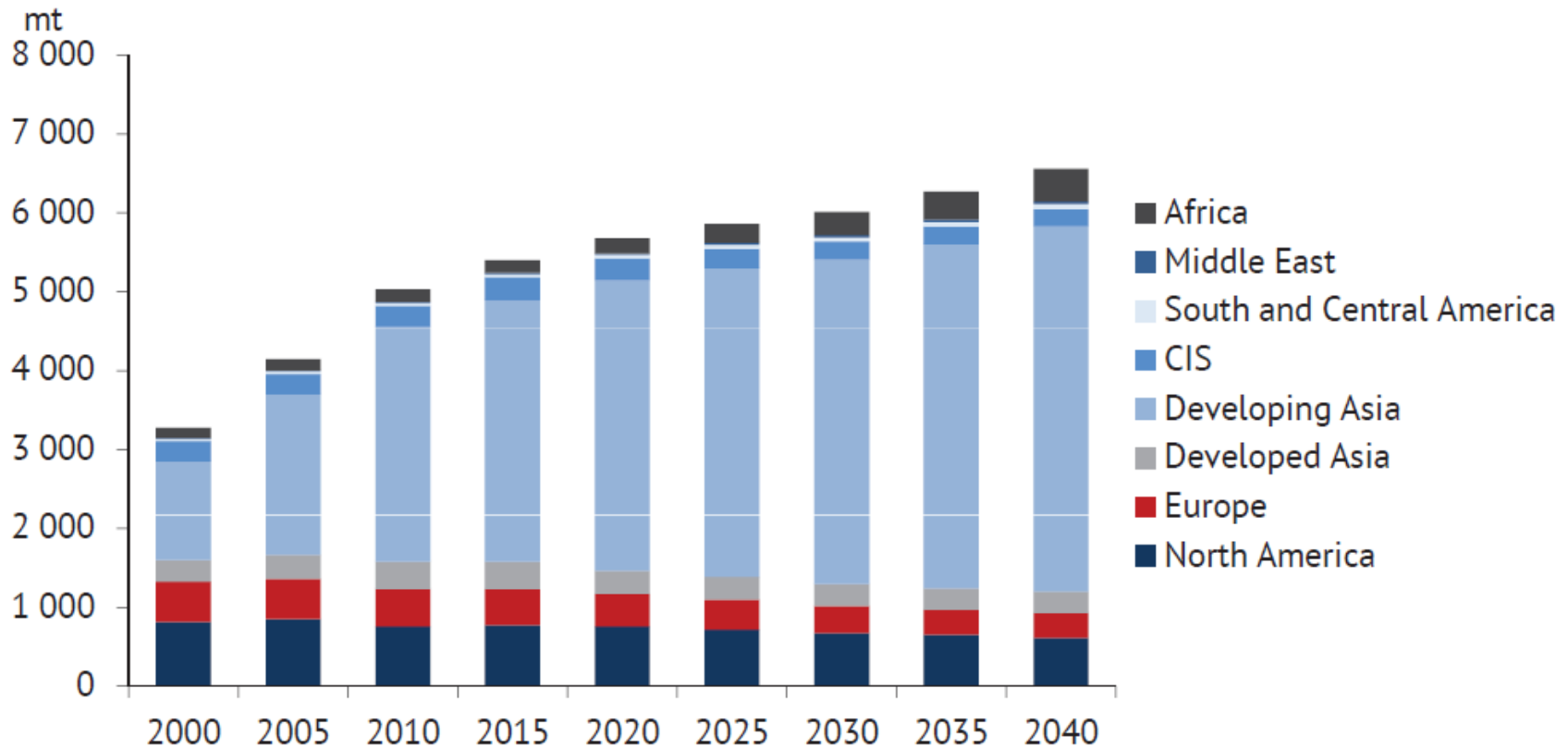
\* Weighted average price between the prices of long-term contracts linked to alternative fuels, and spot prices.

Source: ERI RAS



# Coal consumption

ERI RAS / AC forecast, 2010 - 2040, by region

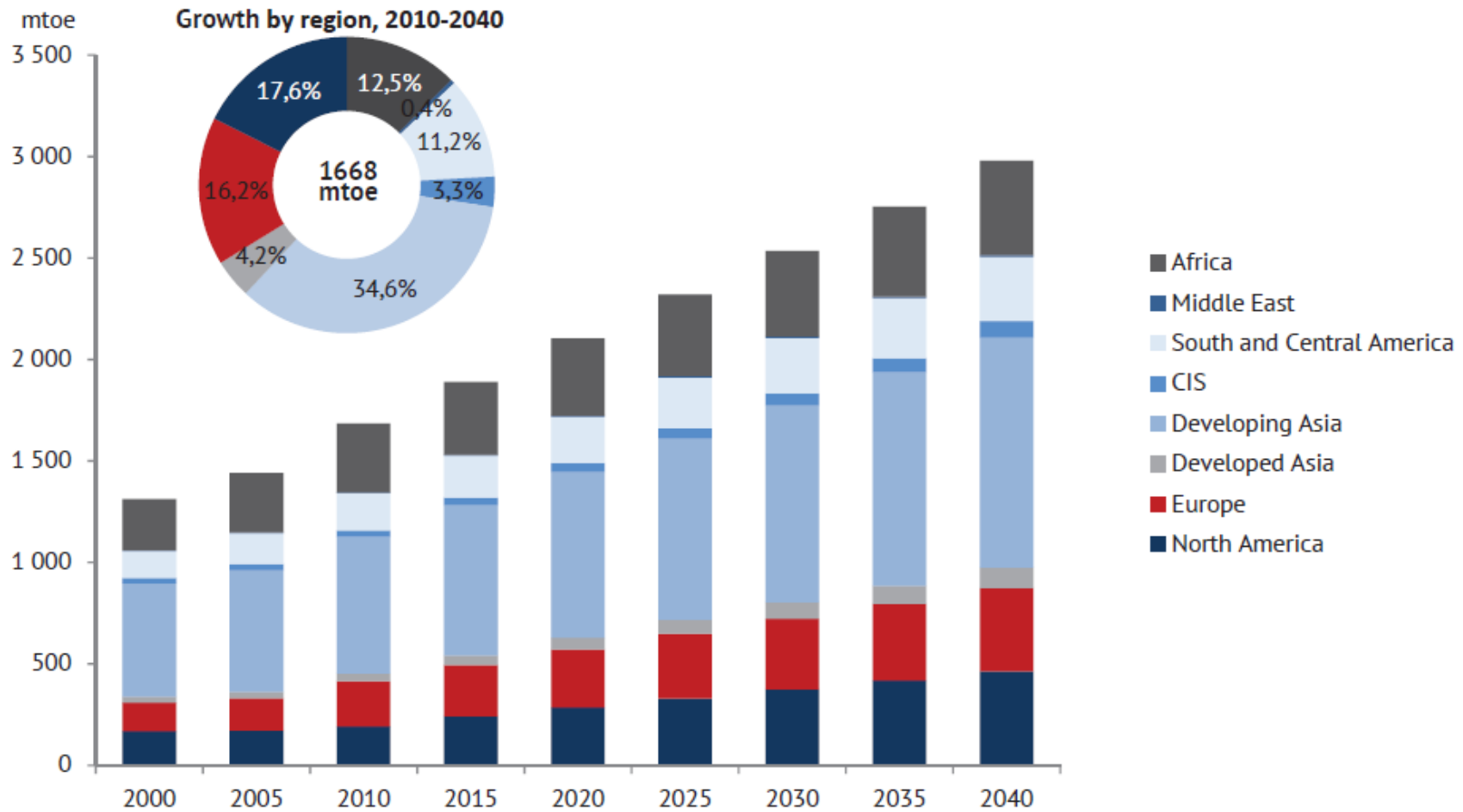


Source: ERI RAS



# RES consumption

## ERI RAS / AC forecast, 2010 - 2040, by region



Source: ERI RAS





# Energy diversification in Europe

- Right now: from Gas to Coal ... and RES
- Global 2040 = 23-27% shares for “4 energies”:  
Oil, Coal, Gas and the Rest of all, incl. RES
- EU Gosplan style decisions - from politics?..
- Politics and Lawyers believe they change World!
- Who takes the investment risks?
- Russian Energy Strategy now - Future 1 tril. cm
- Brussels decisions are for EU spending - not for more risks and costs of suppliers & investors...
- Climate is a crucial problems now, not after a generation of introducing the Glorious policies

