Role of Natural Gas as Instrument of Energy Security in Different Climate Scenarios

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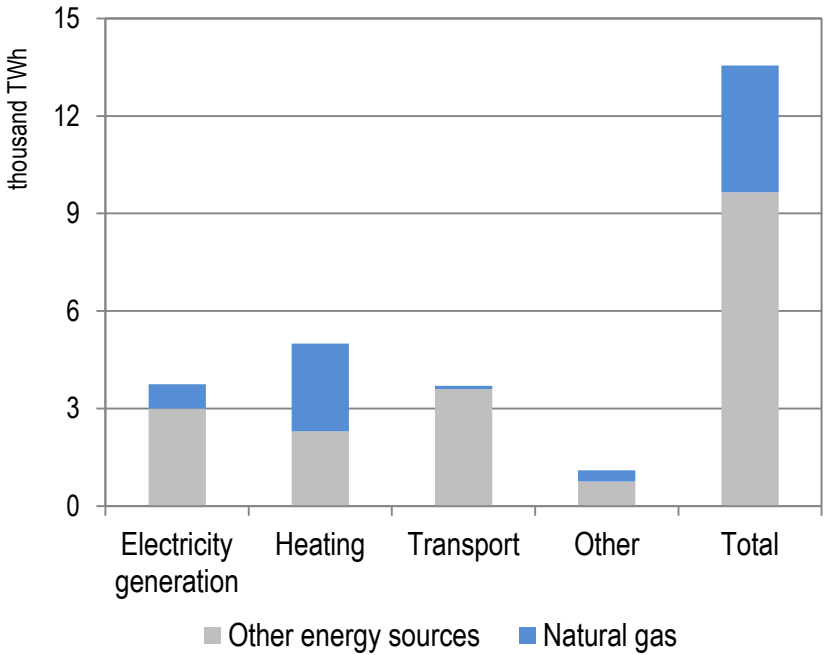
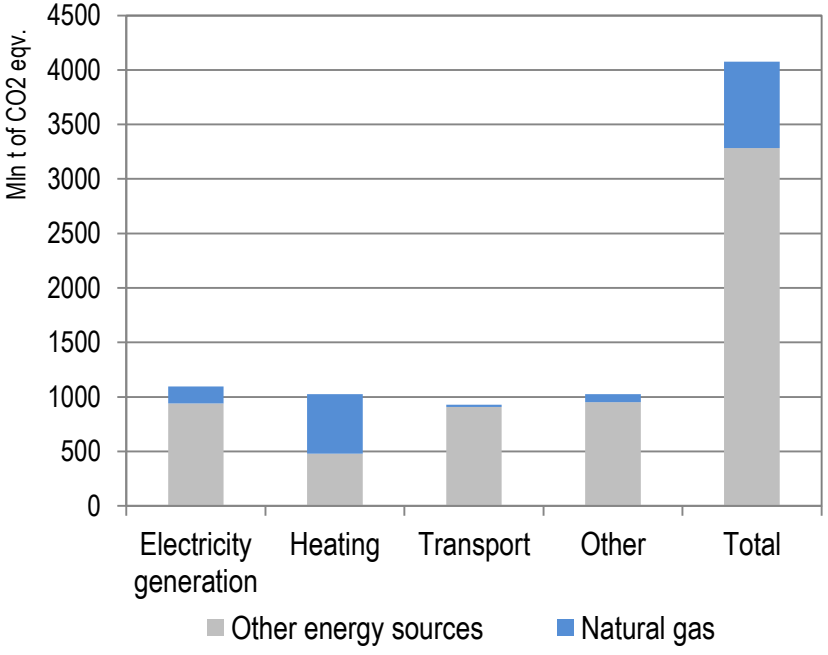
Natural gas is instrument for implementation of climate protection agenda

Primary energy consumption and share of natural gas, 2014



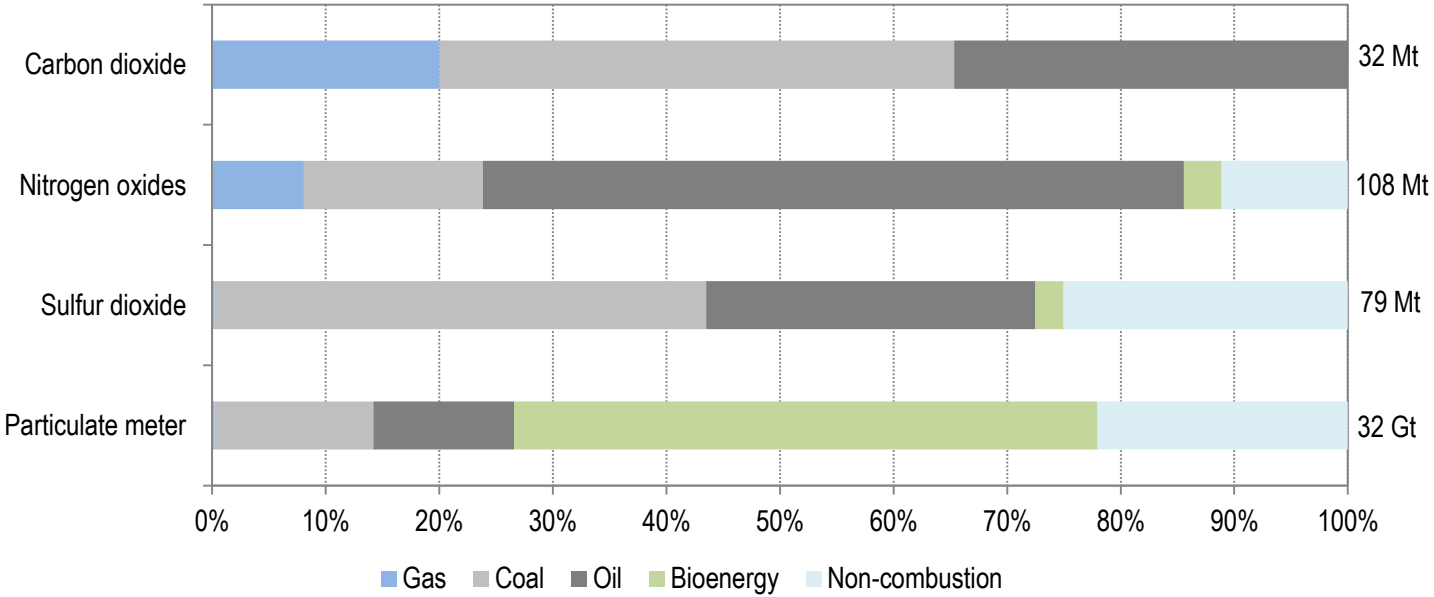
Total CO2 emissions and share of natural gas, 2014



Source: 2016 National Inventory Submissions (Common Reporting Format) for EU, Norway and Switzerland, by Poyry Consulting

Natural gas is instrument for implementation of climate protection agenda

Share of natural gas in total energy-related emissions of air pollutants and CO2



Source: IEA

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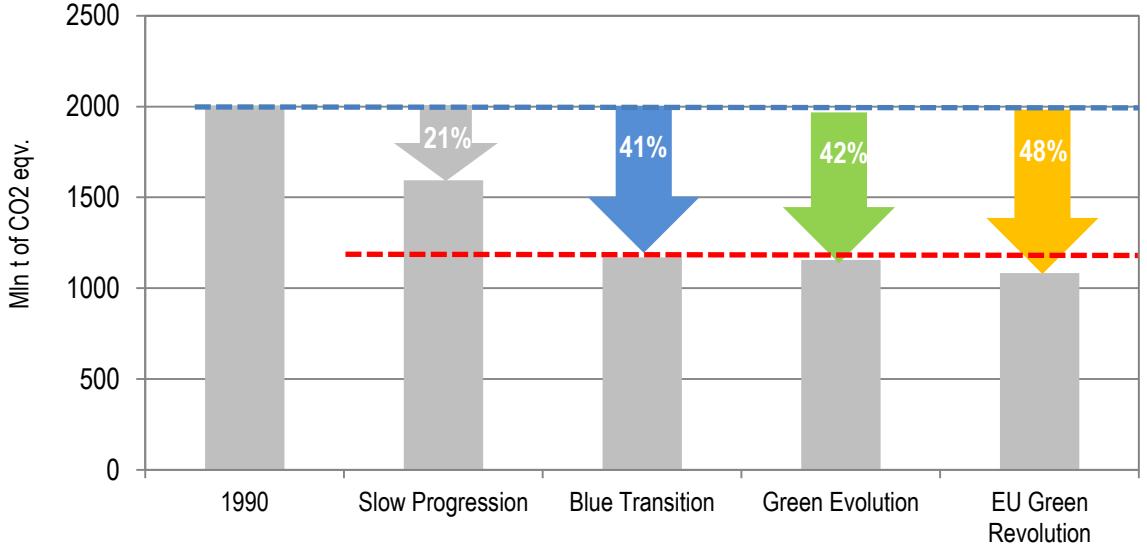
Reduction of CO2 emissions in 2030 in different scenarios



Scenario based on coal-to-gas switch allows

- to reach emissions reduction comparable with those of radical and costly scenarios based on rapid development of renewables;
- makes possible a further usage of existing infrastructure and whereas is more cost efficient.

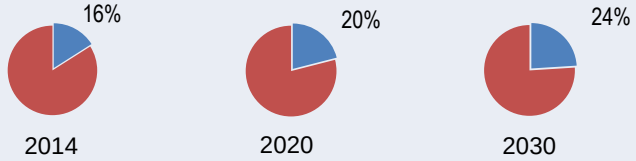
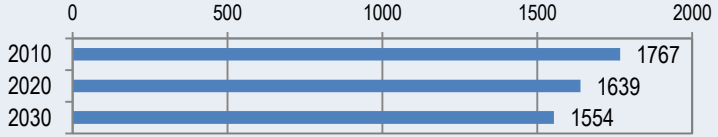
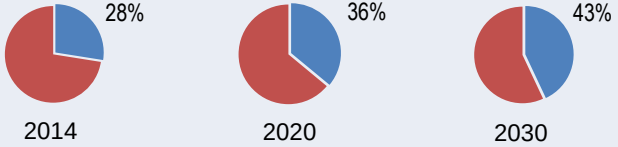
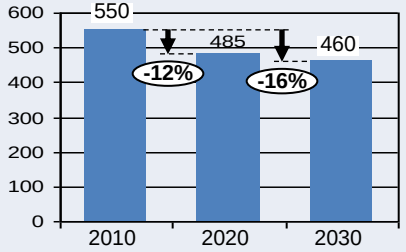
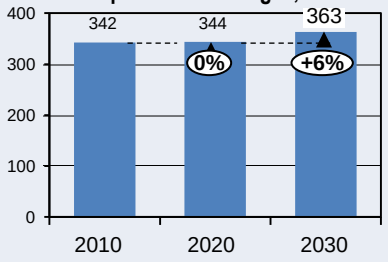
Different scenarios assume different scale of renewables development and different roles of natural gas in future energy balance of Europe:

- *Slow Progression assumes slow deployment of renewables and conservation of current energy balance structure*
- *Blue Transition assumes switch from coal to gas in electricity generation and higher gas consumption in heating sector*
- *Green Evolution assumes a gradual development of renewables and gradual substitution of natural gas consumption*
- *EU Green Revolution assumes a large-scale deployment of renewables in all sectors and radical change of European energy balance*

Source: ENTSOG

EU Climate Policy: possible Gas-exit

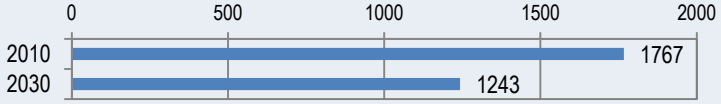
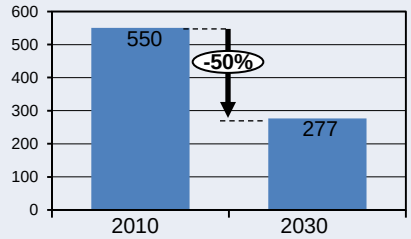
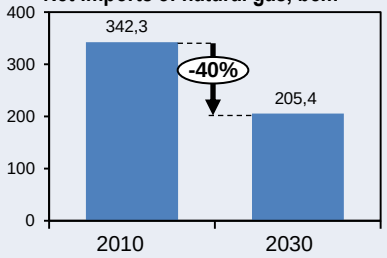
The EU Reference Scenario 2016 is a trend scenario for European energy sector, based on implementation of energy effeciency measures and development of renewables already undertaken by EU member states. According to scenario, the natural gas consumption by 2030 should decline by 90 bcm or 16% compared with figures of 2010.

Document	Targets	Implications for natural gas, EU-28
EU Reference Scenario 2016	Share of renewables in gross final energy consumption EU-28  Primary energy consumption EU-28, mln toe  Share of renewables in electricity generation EU-28 	Primary consumption of natural gas, bcm  Net imports of natural gas, bcm 

Sources: EU Commission, Eurostat, IEA

EU Climate Policy: possible Gas-exit

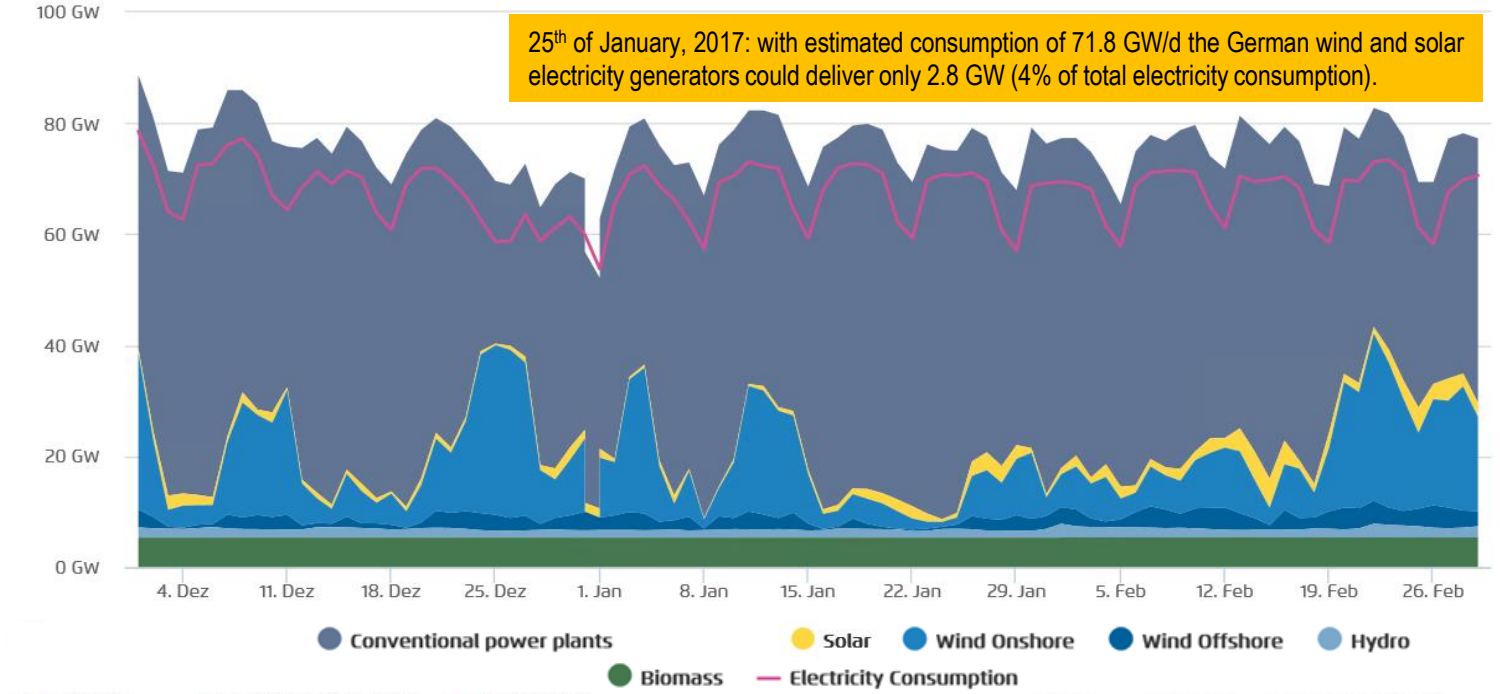
The European Commission might adopt more severe targets for energy policy in order to meet Paris Climate targets. If more severe targets are chosen, the European natural gas consumption by 2030 will decline by 274 bcm or 50% compared with figures of 2010, an net imports of natural gas will drop by 137 bcm or 40%.

Document	Targets	Implications for natural gas
Energy Efficiency and its contribution to energy security and the 2030 Framework for climate and energy policy (EUCO2030)	Share of renewables in gross final energy consumption EU-28  Primary energy consumption EU-28, mln toe  	Primary consumption of natural gas, bcm  Net imports of natural gas, bcm 

Sources: EU Commission, Eurostat, IEA

Short-term risks: intermittency of renewable energy supply

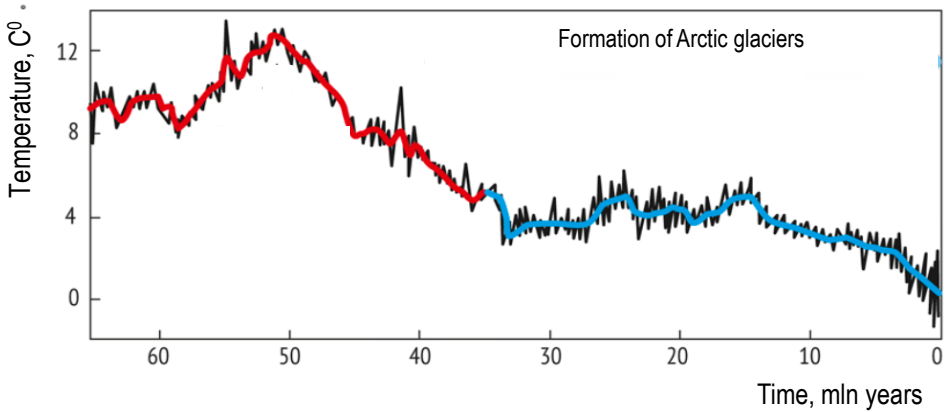
Electricity supply in Germany by generation type, December 2016 - February 2017

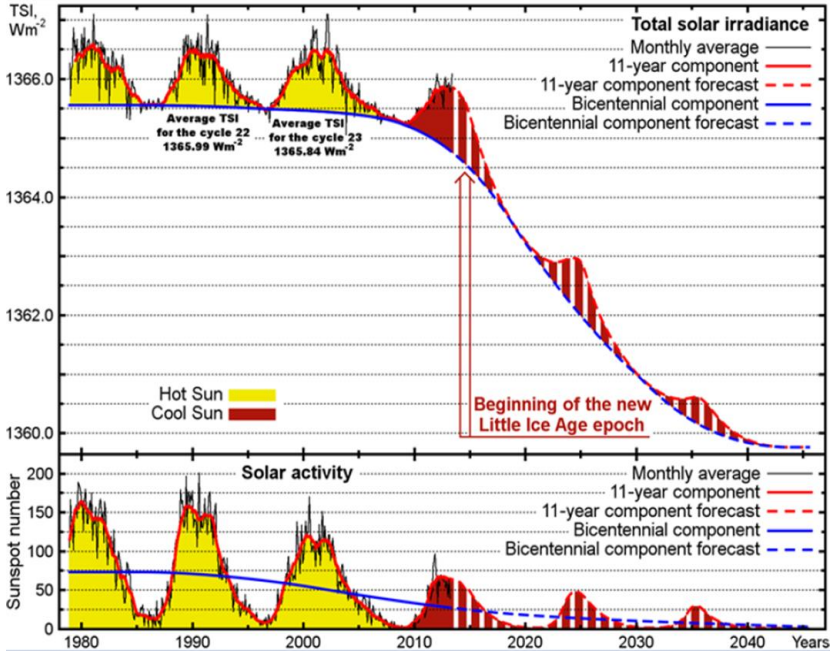


Source: Agora Energiewende

Long-term risks: What will be the climate in 2050?

The climate change is of more fundamental nature and the human impact is not the only factor influencing climate (for instance, solar radiation). There are also estimations that the climate might change in the opposite direction and the world might face the global freezing. So, nobody could tell exactly, what the future climate will be.

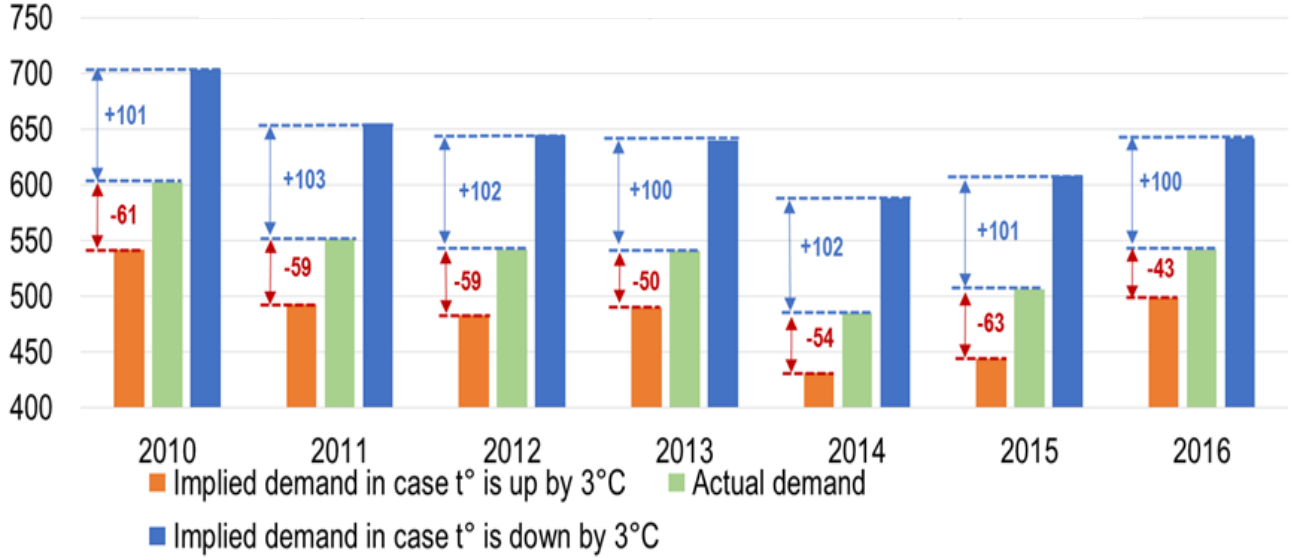




Sources: Abbdusamatov, Golovanov

Elasticity analysis of gas consumption in Europe

European gas demand: elasticity to temperature change, bcm



As elasticity analysis indicates, the consumption of natural gas in case of cooler weather rises higher, as it declines in case of warmer weather. It means Europe might need more gas, if actual weather will deviate significantly from the forecasted one, and flexibility of supplies will play a greater role.

Sources: Gazprom Export

Conclusions

- Natural gas is an effective instrument for implementation of climate protection agenda
- More intensive gas consumption (i.e. due to switch from coal to gas) allows to reach the European climate targets
- Due to elasticity specifics of gas demand, it may rise overproportionally, even if not intended by politics
- While formulating new climate and energy policies, one should consider all possible climate risks
- Development of gas infrastructure could maintain the needed flexibility of supplies and provide Europe with energy even in case extraordinary climate developments