

Natural Gas Survival Strategy: Is Carbon Tax a Solution?

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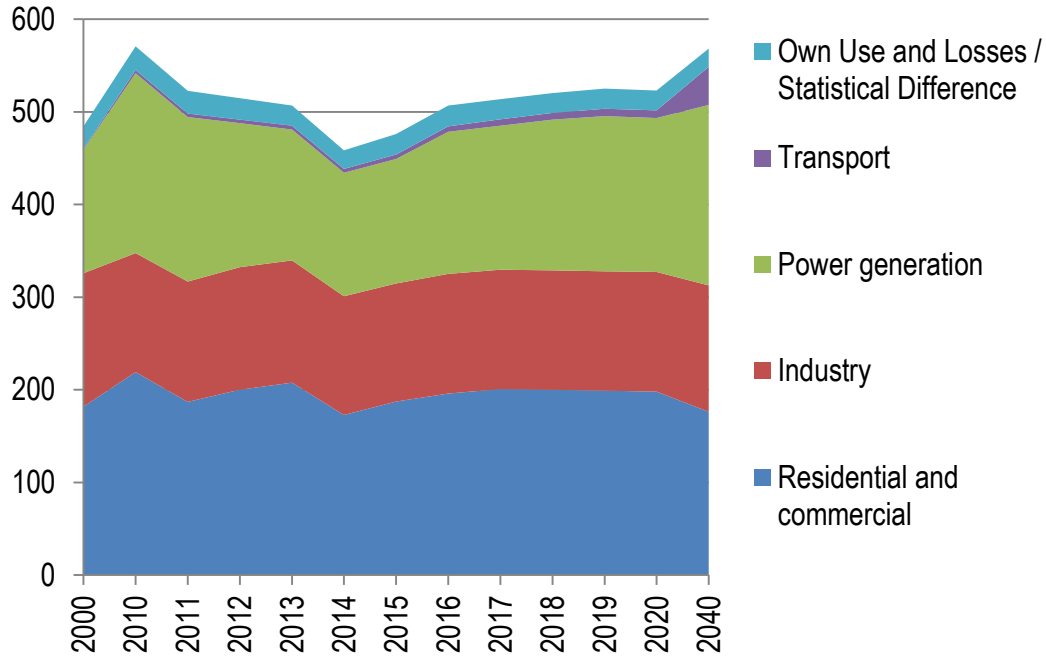
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1. Natural gas should stay in the EU energy mix until the efficient electricity storage devices are developed
2. Competition with RES and coal represents threats for natural gas persistence in the European energy mix
3. Coal's threat to natural gas is overly exaggerated, as coal will leave the scene on its own due to the proclaimed exit plans
4. Additional tax on CO₂ emissions is a bad idea that worsens the already existent energy market distortions and undermines natural gas's role as back-up for RES

*Views expressed in this presentation are the author's sole responsibility and do not necessarily represent that of Gazprom Export

Gas Offers Optimal Back-up for RES up to 2050 at Least But its Future Remains Uncertain

Natural gas demand in Europe by sector, bcm

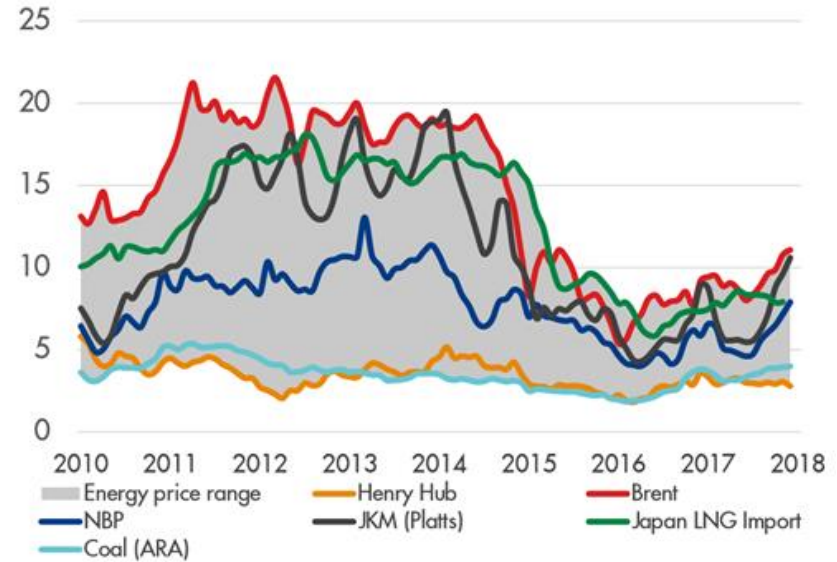
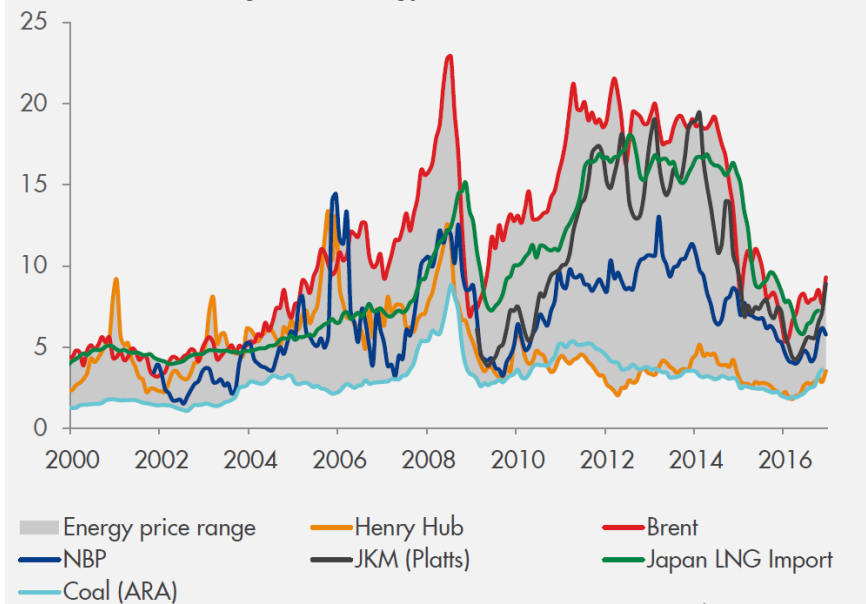


- According to IHS base-case long-term outlook for Europe, demand for gas in power generation could be 200 bcm by 2040, what is plus 41 bcm or 27% more compared to 2016.
- In the absence of appropriate technology for electric power storage, gas offers an optimal solution as backup for the intermittent sources of energy. Without this backup energy system gets destabilized.
- Survival of natural gas in the EU energy mix remain under question under the current economic conditions due to the threats coming from RES and coal.

Source: IHS Markit

Historically Coal Sets a Floor for Gas Prices on the Energy Equivalent Basis and is a Strong Competitor to it

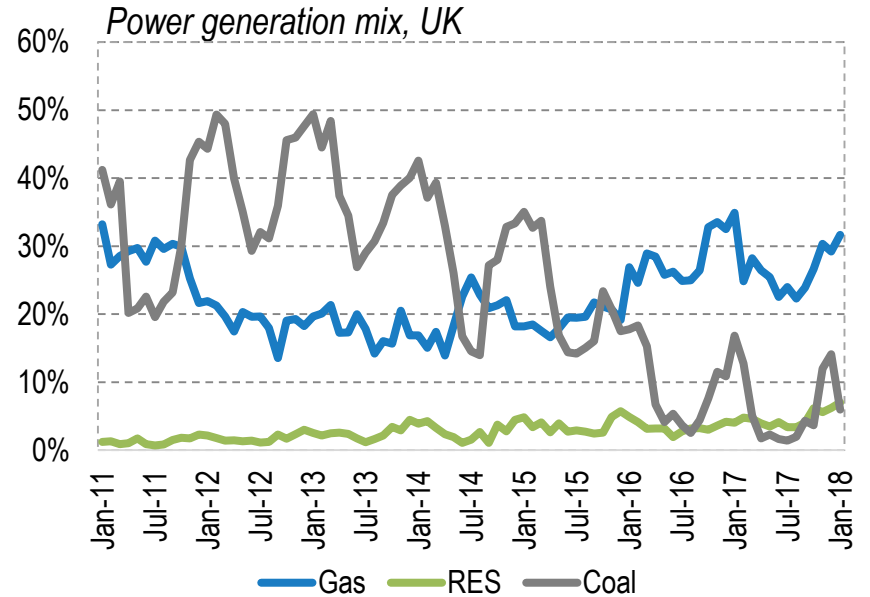
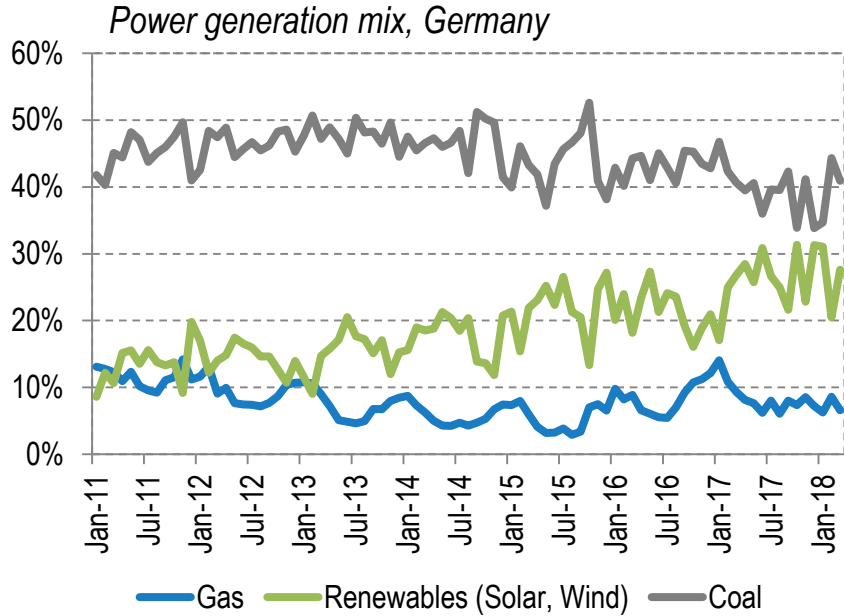
Prices for regional energy resources, \$/mmbtu



Global natural gas prices irrespective of their regional differences firmly sit within a price envelop set up by oil (ceiling) and coal (floor). It is nearly impossible for natural gas to outcompete coal unless gas is provided with special preferences

Source: Shell

Success Story of UK Gas Resulting from Carbon Tax Introduction has Limited Magnitude because of Low RES Penetration in the Kingdom



Natural gas nearly completely replaced coal in the UK energy mix. Success story of UK gas could hardly be replicated in the other parts of Europe especially in countries with a high weight of RES, like Germany

Source: based on Bloomberg, Argus Direct and Department of Energy & Climate Change of the UK data for major producers

Coal-exit campaign in Europe announcements

France

Sweden

Austria,
Ireland,
Italy,
UK

Finland

Denmark,
Netherlands,
Portugal

2021

2022

2025

2029

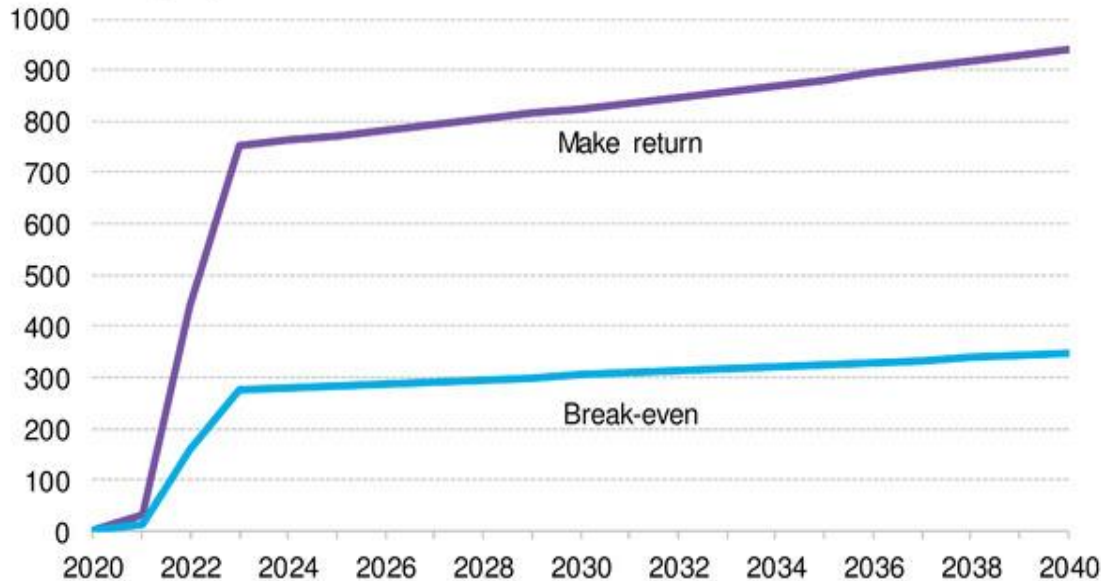
2030

Source: Beyond Coal

Although it is Vitally Important for RES to Keep Natural Gas in the EU Energy Mix, RES Leave no Chance for it to Survive

Total money missing per year for CCGTs in Germany to break even or make a return

million euros per year, nominal



- Subsidies and preferential offtake for RES fundamentally distort the EU energy market
- Power market revenue for natural gas plants is insufficient for capital recovery and making a return because of the low hours of their utilization
- Carbon tax is an additional handicap for gas
- The best option for energy market redesign is to adjust merit order and place gas in baseload by taking into consideration full costs of power generation.

Source: BNEF

Thank you for your attention!