

# GAS MARKETS IN THE EU: TESTING RESILIENCE

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# Background

- The European Union is in process of completing its internal gas market.
- It is generally accepted that gas market liberalization has been rather successful with the exception of a few remaining bottlenecks in interconnector capacity and regulatory discrepancies.
- The European gas market is now able to attract natural gas through its liquid gas hubs

# Research Question

- How resilient is the European liberalized gas market?
- Can the European gas hubs provide security of supply when faced with extreme disturbances?

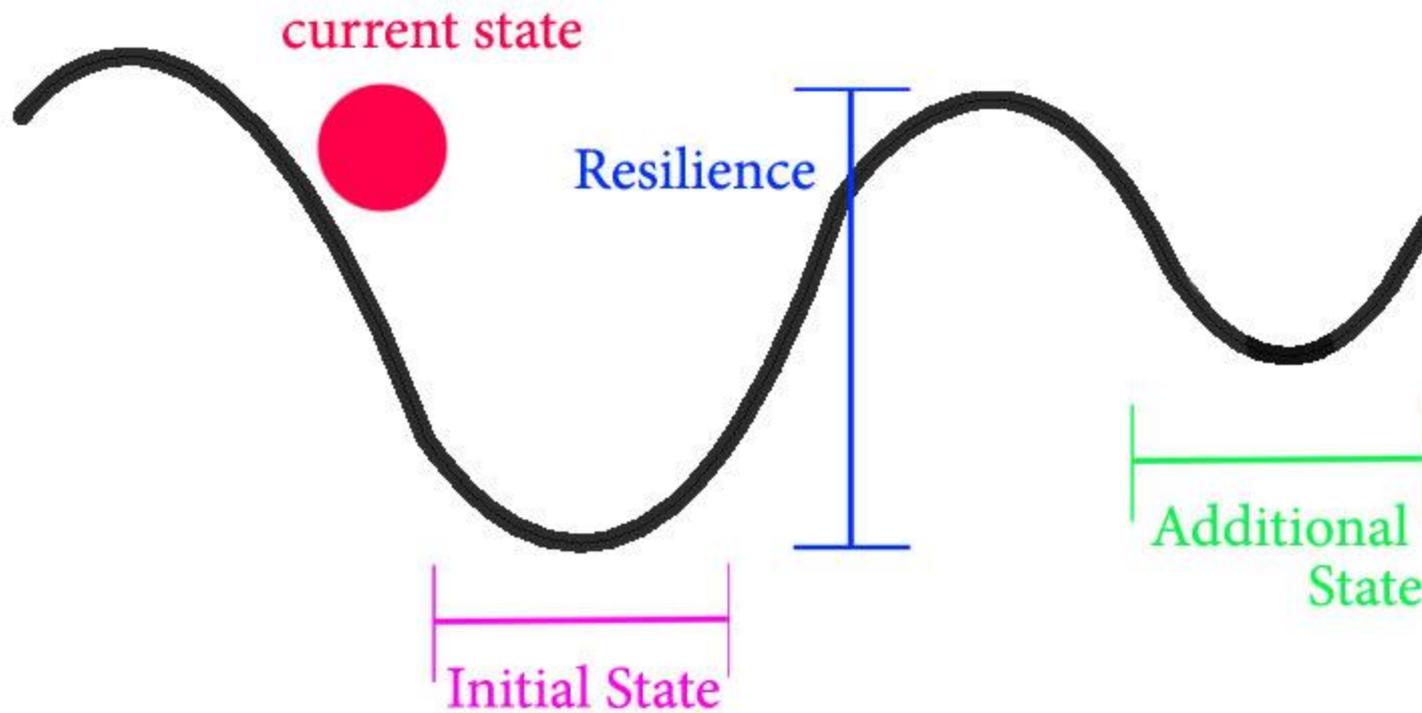
# Liberal gas market

- Price mechanism has the role of balancing (changes in) supply and demand. For this balancing mechanism to work, it is important that the gas price approximates the marginal costs of producing the gas.
- When prices increase above the marginal cost of producing the gas, producers will be triggered to increase their supply
- When a strong disturbance occurs, such as a gas supply crisis, prices will increase as a result of a decreased availability of gas to the market. Market players would immediately respond to this increase in price by delivering gas from other sources to the market and/or by decreasing consumer demand.
- Thus in a perfectly functioning gas market, price signals would trigger the most efficient means for market players to restore their market position.

# Resilience

- For a well-functioning and efficient market to be resilient, it needs to be able to assure security of supply to its customers in times of high stress on the supply/demand balance
- Three kinds of stresses:
  - characteristic disturbances (weather, planned maintenance)
    - High level of predictability
  - large infrequent disturbances (outage of pipeline or supplier)
    - Low level of predictability
  - Unknown shocks (accident at nuclear power plant)
    - No predictability

# Resilience



# Methodology

- Assessing the resilience of the liberalized gas market model to two of the most extreme disturbances
  - February 2012: Extreme cold + Ukraine transit problem
  - March/April 2013: Extreme cold + Outage Nyhamna plant (Norway)
- To test our hypothesis that the liberalized gas market model is resilient, we will test three hypotheses:
  - (H1) = Following an extreme disturbance, the liberalized market price provides a price signal (price peak) to reflect the new supply and demand situation (shortage of gas)
  - (H2) = Following the price signal, market players respond accordingly by sourcing additional sources of gas to the market and by decreasing demand
  - (H3) = Following the adequate response of the market players, no forced terminations of gas supplies are needed to restore the supply/demand balance

# February 2012: Transit problems Ukraine

- The impact was the strongest in the south of Germany, where gas imports from Russia (Waidhaus entry point) were down 30% below normal while natural gas demand soared due to extremely cold temperatures

# February 2012: Market response

- The spike in the spot price (from €27 to €38) in the period 2-7 February 2012 provided a strong signal to source additional volumes of gas to the market
  - The withdrawal of extra gas from gas storage facilities
  - Additional gas supplies were sourced to the German market through its diverse import routes with neighboring countries
  - Those import volumes have been **sold as spot volumes on the German gas hubs** (mostly through the North)
  - German TSO responded by using demand-side response, e.g. restricting supplies to customers with interruptible contracts
- Whereas other European countries, including Italy, Poland and Greece had to declare major supply disruptions under the EU's directive on security of gas supply, the German gas market proved to be resilient during this disruption

# March 2013: Outage Statoil

- Outage at the Nyhamna gas processing plant caused an interruption in gas supply from Norway to the UK of 53 million cubic meters of gas per day (10% of UK's daily supply)
- Large parts of Europe faced an extreme cold spell with 5 to 10 °C below normal temperatures
- The Nyhamna outage and cold spell coincided with the UK's storage facilities being almost empty at the end of the winter period
- Furthermore, on the 22th of March, a failure at the Bacton receiving terminal in the UK led to an interruption in gas supply coming through the Interconnector which connects the UK's market the Zeebrugge market in Belgium

# March 2013: Market response

- Storages continued supplying gas as a response to the Norwegian supply interruption, low temperatures and an increasing NBP price.
- Because of higher prices in Asia, LNG deliveries to Europe remained low during the interruption period. The physical reduction in supply from Norway has mainly been replaced by imports from the continent, through the Interconnector (Belgium) and BBL (the Netherlands).
- The market mechanism played a dominant role in attracting these supplies, because of the **increasing price differential** between the NBP and the continental hubs.
- Interruptible contracts have been used during the interconnector failure to cope with the short-term change in supply

# March 2013: Market response

- At the end of the month (around the 24<sup>th</sup> of March) LNG deliveries from Qatar reached the UK's gas market, thereby further rebalancing both supply and price on the NBP.
- **These additional LNG deliveries from Qatar coincide with the highest price peak on the NBP**
- Thus the prices peaked to the levels that made the NBP attractive to import supplies which are positioned higher within the merit-order.
- NBP market proved to be resilient in the face of the gas crisis in March 2013. Price signals triggered the most cost-efficient responses to become active at each point in time.

# Conclusions

- Looking at the extreme disturbances in the European gas market, **we cannot falsify the hypothesis that the liberalized European gas market is resilient.**
  - Following the extreme disturbance, the liberalized market price provided a price signal (price peak) to reflect the new supply and demand situation (shortage of gas)
  - Following the price signal, market players responded accordingly by sourcing additional sources of gas to the market and by decreasing demand
  - Following the adequate response of the market players, no forced terminations of gas were needed to restore the supply/demand balance
- Market-based responses, employed on a merit order based on their relative cost of supply, provided the most cost-efficient response to disturbances

# Implications for policy makers

- Gas market seems to be able, even in extreme situations, to supply both security and diversity of supply by means of its price mechanism
- **Price peaks are necessary to provide resilience**, although policy makers don't like volatile prices
- Any interventions (such as the proposed collective gas purchasing mechanism) by non-market players can be expected to influence (distort) the functioning and thereby the price mechanism on the gas hubs
- As such they can have the opposite effect which is limiting its resilience.

# Implications for policy makers

- Infrastructure investments and decreasing trading barriers, on the other hand, are not expected to be provided by market players.
- As such, it is recommended for European policy makers to remain focused on the completion of the full European internal gas market, by improving interconnectivity to other regions within the European Union
- A number of bottlenecks still exist resulting in suboptimal integration of markets (ACER, 2015)
- As barriers of entry between markets are removed and interconnectivity is increased, increasing liquidity on the gas hubs will help to provide transparent price signals
- . As such they will have a positive effect on the resilience of the European gas market.

# Application to Russia

- Russian gas market liberalization is a work in progress. The prices for gas of independent producers are already unregulated. The next stage of liberalization is to deregulate the wholesale prices of Gazprom
- A gas exchange has been developed, which now has six gas suppliers or which 2-3 are taking part in trading quite regularly. Over 5,000 companies and end-users can buy gas on the exchange.
- The launch of trades should lead to the appearance of a price indicator that market participants could use after liberalizing gas prices for 2018

# Application to Russia

- **Increasing liquidity on the gas hubs will help to provide transparent price signals**
- Different gas hubs will have to be established in different demand centers within the Russian Federation
- Price signals and price differentials between hubs will provide information on where infrastructural investments should be made
- But: Russia is a much larger country with lower population and demand centers far apart
- Advised to look at the resilience of gas markets specifically from a Russian perspective in the future.



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