

Gas Markets in the European Union: Testing Resilience

Henry Bartelet and Machiel Mulder†*

Executive summary

1. Background

In the European Union, the energy policy is built upon five closely related pillars: supply security, a fully integrated internal energy market, energy efficiency, emission reduction and research and innovation. In accordance with its ambition that Europe needs to have a secure, affordable and climate-friendly energy system, the European Commission wants to develop the European gas infrastructure in such a way that gas can flow without any technical or regulatory barriers between the regional gas markets. This policy is part of the ‘Energy Union Package’, which is meant to increase the so-called ‘resilience’ of the European gas market. In the context of natural gas, the Commission points to security of supply which should be enhanced through diversification of import routes and increasing the role of storages.

In this paper we analyze the resilience of the European gas markets over the past years. This paper contributes to the literature by providing a better explanation of the term resilience in relation to gas markets. This term, used by the European Commission regarding its energy policy, comes from ecological economics and has not been assessed yet in the literature dealing with energy markets. Unlike most papers, assessing only price responses to shocks, this paper analyzes the market mechanism of adjustment and how the physical balance is restored. This represents a novel point of view and provides a useful analysis for assessment of the European security of supply policy.

2. Method and data

This paper analyzes the five most extreme disturbances since the liberalization of the European gas market in order to assess whether the market proved to be resilient. In order to assess to what extent European gas markets are resilient, we analyze how the market has responded in a number of

* Group Technology and Research, DNV-GL, Høvik, Norway, email: toinebartelet@hotmail.com

† Faculty of Economics and Business, University of Groningen, the Netherlands; Corresponding author: email: machiel.mulder@rug.nl; phone: +31 631035729

unexpected disturbances to the gas system over the past decade. During each of these events, the supply of gas to the market was heavily interrupted (see Table 1).

Table 1 Major disruptions in the European gas market since 2009

Period	Disturbance	Market	Size of disturbance	Weather (actual temperature below normal temperature)	Start date	End date
January 2009	Disruption gas transits Ukraine	NCG (GER)	60% compared to normal import levels	-10 degrees Celsius	January 6	January 20
February 2012	Disruption gas transits Ukraine	NCG (GER)	30% compared to normal import levels	-11 degrees Celsius	February 2	February 7
March 2013	Nyhamna plant outage (Norway)	NBP (UK)	10% compared to normal import levels	-8 degrees Celsius	March 3	Lasted a few days ^{c)}
March 2013	Interconnector outage	NBP (UK)	25% of recent UK demand levels ^{a)}	-4 degrees Celsius	March 22 (0700 GMT)	March 22 (1500 GMT)
December 2017	Baumgarten explosion	PSV (IT)	40% compared to normal import levels ^{b)}	+2 degrees Celsius	December 12	December 13

1. **Note:** The weather variable is an average of the daily average temperatures during the disruption period. For German shocks in Munich, for UK in Southend-On-Sea and for Italy in Barona, Milan. Source:

<https://www.wunderground.com/weather>

2. **Sources:** a) <https://www.platts.com/latest-news/natural-gas/london/wrap-uk-gas-market-spikes-on-interconnector-outage-6282481>; b) <https://www.rt.com/business/413375-russia-gas-europe-lng-dependence/>; c)

<http://www.mondovisione.com/assets/files/Platts-International-Gas-Report-April-8-Edition.pdf>

3. Results and conclusions

Analyzing the market response to the extreme disturbances in the European gas market since 2009, we cannot falsify the hypothesis that the liberalized European gas market is resilient. Even during the extreme disturbances in the recent past, the market has been able to provide an adequate response to restore the supply and demand balance. Following an extreme disturbance, the gas market provided a price signal to reflect the new supply and demand situation (shortage of gas) and following the price signal, market players responded accordingly by sourcing additional sources of gas to the market and by decreasing demand.

We conclude that European policy making for gas markets should focus on strengthening interconnections within the European market and leave the security and diversity of supply issue primarily to the market.