16 July 2015
16GSE078

GSE position paper

On the role of gas storage in ensuring electricity security of supply in the perspective of a Blueprint for Capacity Remuneration Mechanisms

Who is GSE

Gas Storage Europe (GSE) represents the interests of 32 Storage System Operators with around 110 storage sites in 16 countries in Europe, representing approximately 84 bcm, i.e. 87% of EU technical storage capacity. GSE is one column of Gas Infrastructure Europe (GIE), the European association of the Transmission, Storage and LNG terminal Operators.

GSE is committed to improving the regulatory and investment framework for storage activities in order to help its members to continue providing secure, efficient and valuable storage services to the market.

Abstract

Many Member States are implementing Capacity Remuneration Mechanisms ("CRM") in order to enable the market to deliver sufficient electricity capacity adequacy in the coming years. Considering that these uncoordinated public interventions could distort the market, the European Commission ("EC") will propose a new European electricity market design on the 15th of July 2015 – which will likely contain a blueprint for CRM – and legislation on security of supply for electricity in 2016.

GSE would like to take the opportunity of this legislative agenda to welcome the EC initiatives and to stress the significant role played by gas storage in electricity security of supply by providing physical gas flexibility to gas-fired power plants. In order to enable gas storage to play its role, GSE proposes to improve the Regulation 994/2010, which will be revised at the end of the year, by (1) enabling Member States to better protect gas-fired power plants which are essential to security of supply in electricity provided they are physically backed by firm capacity and (2) introducing a new criteria in the supply standards such as the "physical availability of the supply source" to be fulfilled by each individual market player to supply the group of its protected customers.

Background

In the recent years, load levels of gas-fired power plants have been radically reduced due to a combination of European policies such as the development of renewable energy sources and an inefficient European Trading System (ETS). The global context of economic crisis and low coal prices (shale gas revolution in the USA) have further added to the pressure of plant revenues.

This situation, amplified by low power prices and spreads[1], has impacted the revenues of gas-fired power plants all over Europe: thermal plants are struggling to be profitable and some plant operators consider retirement or mothballing. IHS CERA estimates that up to 110 GW of gas plants are not recovering fixed costs and are at risk of closing in Europe[2]. As a consequence, security of supply is potentially at risk if nothing is done to restore profitability of assets as they are necessary "back up[3]" and "ramp up/down[4]" to intermittent and unforeseeable RES.

In response to this concern, many Member States[5] are implementing CRM of various forms in order to enable the market to deliver sufficient capacity adequacy in the coming years. Three types of capacity remuneration mechanism can be identified: capacity payments[6], capacity market[7] and strategic reserve[8]. Capacity mechanisms will affect power plant revenues both directly and indirectly: directly as part of the fixed costs will be covered by the capacity remuneration and indirectly because CRM will affect wholesale power markets dynamics and could have distorting effects on power prices and flows across Member States.

Therefore, since a couple of years, CRM are on the top of the EC's agenda: in its Communication *"Delivering the internal electricity market and making the most of public intervention[9]"* (2013), the EC recognized that Member States may need to support a CRM. In its "*Environmental and energy state aid guidelines*[10]" (2014), it considered again that, due to significant differences in the designs of CRM, a national approach may be necessary to answer market insufficiencies but it warned about the risk of fragmentation of the EU market due to uncoordinated public interventions[11]. Considering that many Member States have inadequate security of supply frameworks in place[12], the EC recently announced, in its Communication on the Energy Union[13], that it would propose legislation on

[1] Clean spark spread will remain generally negative through 2017 and beyond. *"Gas fired power plants on life support"* IHS CERA, November 2012.
[2] "Keeping Europe's lights on: design and impact of capacity mechanisms" IHS CERA, 2013.
[3] Back up is the capacity to substitute at any time (temporary) unavailable RES and conventional production.
[4] Ramp up/down is the capacity to follow the short term variation of the load curve.

[5] Belgium relies on strategic reserves since 2014 . Spain uses capacity payments. France has chosen a capacity obligation system which will be fully implemented in 2017. UK has put into place a capacity auction mechanism in 2014. Italy will organize its first capacity auctions by the end of 2015. Germany has no CRM but is currently carrying a public consultation on the necessity of CRM.

[6] A fixed amount, set by a central body, is paid to generators for available capacity.

[7] There are two types of capacity market:

- capacity obligation: decentralized; suppliers are required to contract a certain level of capacity from generators at a price agreed between the parties, and to pay a fine if this capacity is not sufficient.
- capacity auctions: centralized; the total required capacity is set (several years) in advance of supply and procured through an auction by an independent body.

[8] An independent body determines the amount of capacity to be set aside to achieve the desired degree of adequacy and dispatches it whenever due.

[9] COM (2013) 7243 http://ec.europa.eu/energy/sites/ener/files/documents/com_2013_public_intervention_en.pdf
[10] http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52014XC0628(01)&from=EN

[11] The Commission defined criteria in order to assess the compatibility of CRM with the state aid guidelines.
[12] The Commission intends to establish a range of acceptable risk levels for supply interruptions, and an objective, EU-wide, fact-based security of supply assessment addressing the situation in Member States. This will take into account cross-border flows, variable renewable production, demand response and storage possibilities. Capacity mechanisms should only be developed to address security of supply if a regional system adequacy assessment points to such a need, taking into account the potential for energy efficiency and demand-side response.
[13] http://ec.europa.eu/priorities/energy-union/docs/energyunion_en.pdf

security of supply for electricity in 2016 and a new European electricity market design in 2015, which will be followed by legislative proposals in 2016[14].

GSE would like to take the opportunity of this legislative agenda to welcome the EC initiatives about security of electricity supply and to stress the significant role gas storage has to play in it. Indeed, a gas-fired power plant without a guaranteed access to gas cannot contribute to the security of power supply. Therefore, CRM will not be successful if the supply of gas is not secured. An issue that gas storage can easily resolve.

Role of gas storage in electricity security of supply

Security of supply can be defined as the ability of the electricity system to provide electricity to end-users with a specified level of continuity and quality in a sustainable manner. This concept is based on two pillars:

- Generation adequacy which is the availability of sufficient capacity in the electricity systems at all times, including at peak load periods (long term concept).
- Operational flexibility which means maintaining sufficient system flexibility to balance the electricity system, in response to sudden demand variations (short term).

Indeed, in a system with a high share of intermittent RES, generation adequacy is not only about capacity margin, it must also be able to adapt production/consumption within a given timeframe. The needs for flexibility are specific to a certain power system: these needs will vary with the generation mix, the load pattern, the nature of RES, and interconnections to neighbouring countries.

This flexibility in electricity market is to be met by flexibility in the gas market: from the supply-side, gas-fired power plants are the most suited for providing a back-up for variable renewable generation as they are able to start-up and ramp-up rapidly. But this ability to start-up and ramp-up rapidly requires a huge increase in gas demand[15] which implies an access to gas supply at the very instant the demand for electricity occurs[16].

Storage facilities[17], given their ability to inject gas quickly onto a transmission system, have an important role to play in providing this physical gas flexibility.

However, certain conditions have to be met in order to enable storage to play its role.

[14] An investigation on European CRM and their compliance with the *"Guidelines on State aid for environmental protection and energy 2014-2020"* was also launched on the 1st April 2015.

[15] In case of an extreme case of wind speed reduction in the GB transmission system in 2020, CCGT would need to increase their gas demand by an equivalent of 90 m cubic meters/day – **1 TWh per day** – over a 14 hour period between 20:00 and 10:00 the following day (source: National Grid, quoted in *"Flexible gas market for variable renewable generation"* Eurelectric, May 2014).

[16] Access to liquid gas markets will also be vital for gas-fired generation.

[17] This also applies to LNG stored in tank at LNG facilities.

Necessary conditions to enable gas storage to play a key role in electricity flexibility

Gas-fired power plants can choose between a variety of competing flexibility tools, such as storage, spot purchases, LNG cargos, long-term supply contract flexibility or interruptible contracts, which differ in terms of price, the nature of the service and availability.

Among these tools, storage presents the advantage of a physical asset located close to demand areas[18]; such benefits are limited when the market sources of flexibility are via hubs and long-term contracts ...However, market players prefer to source gas on spot market as it is more economically attractive and they might anticipate that the worst situation will never materialize.

The problem is that, if gas-fired power plants do not have access to gas supply at the very instant the demand for electricity occurs, European electricity security of supply would be at risk.

In order to prevent such a situation, GSE strongly believes that policies should recognize that storage has become a necessary backbone of Europe's electricity security of supply and also recognize the "insurance" value of storage.

More specifically, this recognition could imply the following improvement of Regulation 994/2010 :

- Enabling Member States to better protect gas-fired power plants which are essential to security of supply in electricity, provided they are physically backed by firm capacity.
- Introducing a new criteria in the supply standards such as *"physical availability of the supply sources"* to be fulfilled by each individual market player to supply the group of his protected customers.

***

[18] Storage can deliver gas to meet demand even if cross-border transmission capacity is saturated or unavailable.