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Discussion Paper on Energy Regulation: A Bridge to 2025

Gas

6 November 2013

1 Context

The overarching paper, setting out the energy regulation "bridge to 2025", identifies key challenges and possible responses that regulators must consider in the coming years to 2025. Underpinning the overarching paper are three more detailed papers covering specific electricity, gas and consumer issues respectively. The present paper develops our thinking on gas related ideas and considerations. In it we seek to elaborate some of the content and ideas identified in the overarching paper and pose questions where we would appreciate views from stakeholders during the consultation phase.

2 Background

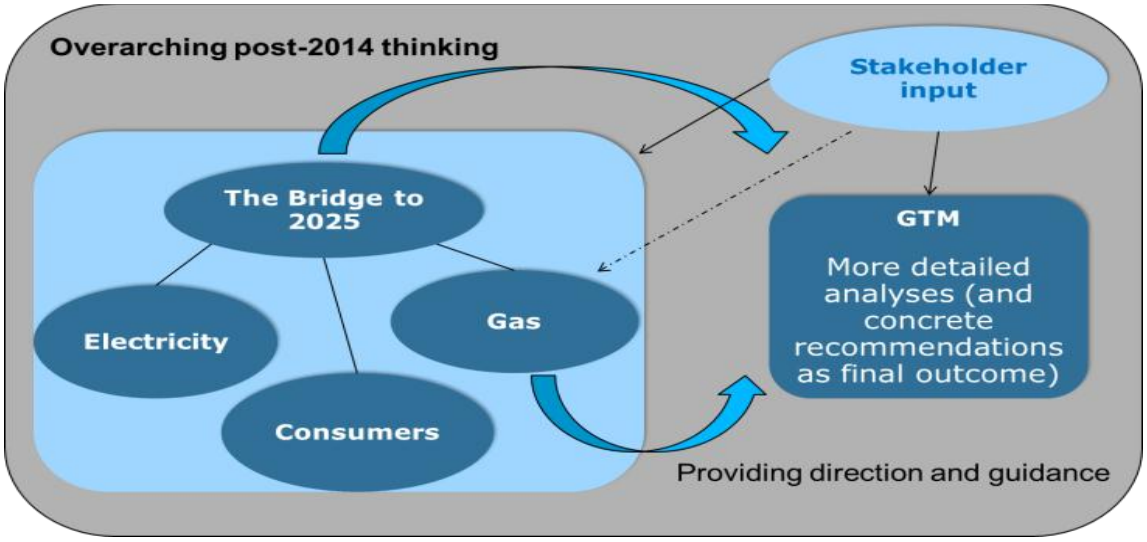
Following the 18th Madrid Forum in 2011, the Council of European Energy Regulators (CEER) developed a vision for the European gas market (the "Gas Target Model", GTM) which had the aim of incorporating in a coherent framework various streams of policy being developed by the European energy regulators and by the European Commission to implement the 3rd Package and achieve a functioning internal market.

The implementation of the 3rd Energy Package with respect to gas markets is proceeding in line with the evolution envisaged in the GTM. It covers, inter alia, the full unbundling of network operators; the establishing of congestion management procedures (CMP); the development of network codes, inter alia, for Capacity Allocation Mechanisms in Gas Transmission Systems (CAM NC), Gas Balancing (Balancing NC), Interoperability and Data Exchange (Interoperability NC) and tariff structure harmonization (Tariff NC) together with several measures directed at final customer protection.

The development of our thinking in the context of the "Bridge to 2025" and of the update of the Gas Target Model are very closely related (see below figure 1). ACER will assess whether and how the gas "target model" would need to be enhanced with the active and regular engagement of stakeholders as reflected in its work programme for 2014.

Both take into account similar considerations. The two processes, which will run in parallel, are therefore closely aligned, so that each can benefit from the other and from the input of stakeholders.

Figure 1: Interrelation between the regulatory "bridge" and the process relating to the Gas Target Model



In this paper we evaluate the options that might be needed in a vision that goes even beyond the current time frame of the GTM and the implementation of the 3rd Energy Package. Its aim would be, as the European Commission stressed at the October 2013 Madrid Forum[1], to ensure that gas can continue to play its role in a competitive energy market and contribute to the climate change objections in general and the energy efficiency targets specifically – in essence to achieve a flexible, adaptable and competitive gas market.

The main concerns that justify further actions beyond the 3rd Package relate to new sector trends, and barriers to competition and the integration of wholesale and retail markets.

This paper is structured as follows:

- Section 3: The Strategic context which describes on the demand and supply side developments in gas markets.

[1] Madrid Forum presentation by Laurent Tourbach, DG ENER, October 2013

- Section 4: Competitive and integrated wholesale markets which addresses challenges that arise in gas wholesale markets. We examine potential barriers to competition that may persist despite the 3rd Package and discuss measures that could alleviate those concerns and foster competition and the integration of wholesale markets.
- Section 5: Contribution to sustainability which addresses the role of gas in moving towards a low-carbon energy system and examines whether the current framework of legislation and regulation can overcome coordination problems between the gas and the electricity sector.

This document addresses in particular the following issues which are of key importance for the gas sector:

- The potential decline of gas demand in the EU in general and in relation to the demand for other primary energy sources;
- The current price situation for natural gas in Europe where gas is too expensive for power generation in many countries;
- The need for enhanced coordination between the electricity and gas sectors;
- The lack of gas market integration.

3 Strategic context

A vision for the future needs to be anchored in the strategic context of the gas sector. A number of strategic themes can be identified which could influence the vision:

(i) Demand side developments:

- An expected slow decline in demand for gas in the heating sector resulting from improving energy efficiency (e.g. insulation) and wider development of electric-heating (heat pumps);
- The demand for gas used in industrial processes relies heavily on the competiveness of gas pricing in the EU compared with other geographies and fuels. Europe is at a serious competitive disadvantage compared to North America and locations on the Arab peninsula;
- The role of gas in power generation is challenged as European gas prices are currently too high (while CO2 prices are too low) to make gas fuelled power generation economically viable. Gas will play an important role in Europe´s move towards a low carbon electricity system only if the clean spark spread is higher than the clean dark spread;
- There are a number of new usages of gas, especially for transportation that could potentially increase demand to offset the shrinking demand in other sectors. However, it is unclear if and when these new uses of gas will become more prominent for the gas market.

(ii) Supply side developments:

- The conventional production of gas in the EU is expected to decline during the next decade; this decline is expected to be slightly faster than demand reduction;
- The EU will continue to depend on substantial and most likely growing gas imports from third countries including Russia;
- Imported volumes of Liquefied Natural Gas (LNG) will rebound in the long run from currently low levels; but fluctuate depending on global LNG prices; and
- Unconventional gas production in the EU has the potential to increase the share of indigenous production provided there is political support for doing so.

(iii) Sustainability:

- Gas, as the lowest carbon-emitting (and cleanest) fossil fuel, will continue to play an important role in the move towards a low-carbon energy system in replacement of coal and/or oil;
- Gas can also contribute to other environmental goals including, as an alternative to coal or oil, the reduction of micro particles and other pollutants;

  Flexible gas-fired power plants are well suited to complement the growth of intermittent generation from solar and wind energy. They have faster ramp up capability (and thus they are well suited for operation within a few hours in order to meet the flexibility needs imposed by a power system characterised by huge RES deployment) are significantly cheaper and faster to build compared to coal or nuclear plants.

A significant challenge could result from developments in demand, where overall demand may well decline. Regarding the expected decline in gas demand for heating, European industries that rely on gas are currently at a massive price disadvantage relative to competitors in the United States (US). Unless European gas prices become more competitive, the output of these industries in Europe and their gas demand may decline significantly. Gas demand in power generation is also uncertain. While gas plants may be important as back-up capacity given intermittent renewable developments, they may run for far fewer hours and burn less gas.

Such potential decline in demand carries with it the danger of triggering a vicious circle. Declining demand would mean that gas infrastructure costs would need to be recovered over a smaller consumption base, leading to higher end-user gas prices and possibly a further reduction in demand. Thus the potential for stranded existing infrastructure must be also examined.

G1. Do stakeholders agree with our view of the gas specific strategic context and in particular with our views on:

- ***Declining demand for gas, and in which sectors such decline is seen;***
- ***Increasing role of imported gas and uncertainty surrounding unconventional gas***

supplies in Europe; and

- ***Increasing role for a flexible gas supply to support growth of renewable electricity generation.***

4 Competitive and integrated wholesale markets

This section discusses competitive concerns in wholesale markets and examines barriers to competition in general; and suggests ways in which market integration might be improved by

- improving the use of existing capacity and increased investments;
- the merging of market zones.

4.1 Remaining competitive concerns and the current lack of liquidity in wholesale markets

In an efficient and competitive gas market, gas flows should follow the direction from low to high prices; transportation costs being the limiting economic factor of fully aligned prices reflected in higher gas prices the further the gas is transported. This rational outcome is not observed in relation to European wholesale prices which are higher in the east and relatively lower in the west, a situation which is counter to the prevailing flow of gas. This situation suggests an important role still played by long-term "take-or-pay" contracts and possible market power issues in eastern markets, keeping prices above competitive levels. Based on imperfect price information that is available, anomalies also appear to occur between Western European countries. In the context of its Gas Target Model (2011), CEER published several criteria that have to be met in order to achieve functioning wholesale markets. A current assessment of these criteria reveals that most indicators point to quite imperfect markets (see below figure 2 CEER criteria for competition). Indeed main market zones are fairly small, predominantly because they are defined nationally. The criterion of adequate liquidity for a market/hub, (defined as a churn rate[2] greater than 8), is not met by most markets, the UK's National Balancing Point (NBP) and the Dutch Title Transfer Facility (TTF) being the only exceptions.

[2] The churn rate represents the ratio between total volumes of trades and the physical volume of gas consumed in the market area/area served by the hub.

Figure 2. CEER GTM Criteria for competition

Measure	CEER criteria	Status quo
Size of Entry-Exit zones	≥ 20 BCM (215 TWh)	Only 6 national markets ≥ 20 bcm demand
Pluralism of sources of supply	≥ 3 significant sources	Importing entities < 3 in Baltic States, FI and SE
Market concentration	HHI < 2000	Problematic in most markets (except for UK and DE)
Liquidity of the market	Churn rates > 8	Only TTF and NBP achieve churn > 8 (ZEE close to 8)

Source: Frontier based on CEER/ACER

Note: A fifth criterion, Residual Supplier Index, has not been assessed as it is associated with a number of difficulties in gas markets (relative to electricity markets where the measure is more common), e.g. accounting for capacity from storages – which contribute significantly to meeting peak demand, but cannot be relied on to be available for a prolonged period of time –, or adjusting for transit flows – their availability to the country they pass would also depend on the supply situation in their destination countries.

In several market areas there is no virtual trading point for gas (e.g. the Baltic States, Finland, Greece, Slovenia)[3]. In other markets, where a virtual trading point only nominally exists, there is still no transparent and liquid wholesale market (e.g. Spain and many Eastern European countries).

Even in markets where liquidity has been increasing in the recent past (e.g. Germany, France, Austria), this trend may not continue. Significant volumes came to the hubs in those areas in the last few years because importing companies had contracted more long-term gas from upstream producers than they could sell to their customer base. 'Take-or-pay' obligations led importers to dispose of those volumes at the hubs, usually at a loss, contributing to a more diverse supply and driving up liquidity. However, there are indications that this excess supply of long-term gas may not persist. Volumes under some contracts have been reduced, upstream producers are increasingly bypassing importers or are vertically integrating with importers. With less long-term gas coming to the hubs, it remains to be seen if liquidity is maintained in the long run – or if this trend increases the competitive concerns arising from upstream concentration (which may historically have been partially mitigated by long-term contracts).

[3] KEMA, 2013, Study on Entry-Exit Systems – Part A, prepared for DG ENER.

Increasing market integration is, therefore, crucial not only for competition but potentially also for sustainable liquidity at hubs. A recent study[4] has shown that the benefits from the market integration already achieved amount each year to € 27 billion. Moving to what is described as "full integration" (in essence a single EU market zone) would yield a further gross € 30 billion annually (not including benefits to security of supply). Improving integration in Western Europe alone would have only economic benefits of € 8 billion per year indicating that the largest economic benefits from further integration would be in Eastern European countries with their less competitive gas wholesale markets. Aspects of integrating markets – to unleash that potential – are discussed in the next three sections.

G2. Are concerns about competition in gas markets and concerns that liquidity at most hubs is insufficient to achieve functioning wholesale markets sufficient to warrant some form of intervention?

G3. Should increased market integration be sought to address issues of non-competitive markets and a lack of liquidity? Are there other more effective measures to be sought in this respect?

4.2 Diversification of supply and improved access to markets

Enhancing competition may require transportation capacity to exceed the minimum required to accommodate the current pattern of gas flows. Without this, it may be difficult for current or new source compete with and displace gas from any other source. Adequate infrastructure to facilitate competition can be achieved by ensuring that existing infrastructure is used efficiently and, where necessary, investing in new import/transport infrastructure.

- **Making use of existing infrastructure** – The development and implementation of the Guidelines on Congestion Management Procedures (CMP) and the Network Code for Capacity Allocation Mechanisms (CAM NC) will increase the efficiency of capacity utilisation. Long-term use-it-or-lose-it (UIOLI), overbooking procedures or firm day-ahead UIOLI, the option to surrender capacity may ensure that capacity is released and efficiently traded in the

[4] Booz & Company, David Newberry, Goran Strbac, Pierre Noel, Leigh Fisher: Benefits of an integrated European Energy Market, 2 June 2013, prepared for DG ENER.

markets. If it is efficient to utilise the capacity, other market participants can purchase it. The CAM NC provides for the sale of interruptible capacity at interconnection points where firm capacity is sold out and lowers transaction costs by bundling capacity on both sides of an interconnector. However:

Such measures are mainly targeted at improving actual utilisation in the short term. New suppliers who want to compete in a market may still find it difficult to secure long-term capacity access into a number of markets; and the efficient use of network capacity requires regulatory arrangements that incentivise optimisation by both market participants and TSOs. The increased efficiency in capacity utilisation theoretically enabled by the CMP and CAM NC might thus need further regulatory arrangements that incentivise TSOs.

Generally, however, the implementation of the CMP Guidelines and the network codes should already significantly increase the efficient use of existing capacities.

- **New infrastructure** – Regulatory regimes do not always provide incentives for the optimal amount of investment based on the costs and benefits of a specific investment, because new infrastructure may have positive external effects, e.g. by enabling (additional) competition into a market, but also by increasing security of supply. In the past these external effects have not generally been taken into account by TSOs making investment decisions. The Energy Infrastructure Package may partly address such concerns in particular in relation to Projects of Common Interest (PCI) but not for the projects which are not PCIs. Therefore regulatory frameworks need to be adapted to recognise externalities associated with some investments and hence encourage optimal and timely development of any new infrastructure that may be needed. To that end ACER has prepared a proposal for amending the CAM NC to ensure that incremental and new capacity is offered in an organized and coordinated way across the EU.

G4. Would efficient use of existing infrastructure and the building of efficient new infrastructure facilitate competition between gas producers?

G5. Can upstream competition be improved with physical infrastructure redundancy or is it an issue of market structure (oligopoly)?

G6. Should regulatory incentives be placed on TSOs to improve the efficient use of existing gas infrastructure?

G7. What are your views on the future investment climate for new gas infrastructure in Europe? What are the major challenges ahead?

G8. Should regulatory frameworks recognise externalities in order to improve investment decision making?

4.3 *Integration of market zones*

A lack of liquidity has been identified as a major concern in EU gas markets. The integration of market zones can contribute to liquidity by increasing the size of the market and, therefore, the potential number of counterparties. A more liquid market may also encourage entry leading to more competition and further improvements in liquidity. Therefore the Gas Target Model (2011) includes possible actions that seek to integrate markets, for example, through creating;

- Cross-border market zones; and/or
- regional trading zones.

However, experience shows that incentives are insufficient for TSOs to merge market zones. Even when justified and technically feasible, merging zones inevitably creates potential risk of internal congestion – which leads to investment requirements or implies congestion management costs – as well as a loss of cross-border revenue. Consequently, given these risks, TSOs are reluctant to integrate market zones, even when the total benefits may well outweigh such costs.

This seems to be the case at least for market zones in Western Europe. A recent study by the Oxford Institute of Energy Studies[5] finds that these hubs can already be considered to be part of the same market (under the assumption that a high correlation (but not convergence) of day-ahead prices is the most important criterion for a common market). Hence, the congestion costs from integrating two or more of those market areas would possibly be low, while the benefits in terms of competition and hub liquidity could be significant. Obviously, the benefits of merging zones with less well established trading hubs, which were not covered in this study, may yield the largest benefits, as the potential competitive gains would probably be higher.

G9. Are cross-border market zones or regional trading zones practical ways to integrate market zones?

G10. Are there other ways one may envisage to enhance the liquidity of European markets?

G11. What actions could be taken to further integrate market zones, given the uncertainty regarding costs and benefits of integrating market zones?

[5] OIES, October 2013, Beatrice Petrovich: „European gas hubs: how strong is prce correlation?“ The study looked at the prices at the hubs NBP, TTF, Zeebrugge, CEGH, NCG, Gaspool and PEG (i.e. at price integration of the respective market zones).

5 Contribution to sustainability

This section discusses the role of gas in moving towards a low carbon energy system; identifies possible coordination problems between the gas and electricity sectors; and proposes possible measures that might resolve or alleviate these problems.

5.1 *Flexibility of gas plants to support RES-generation*

EU power systems with their growing intermittent RES-E generation need flexible sources of back up energy to ensure security of supply. Gas-fired combined cycle and simple cycle plants are well placed to contribute to the provision of this flexible balancing energy as they can rapidly increase (or decrease) their output of electricity. (Ramp rates of coal plant have improved but the higher capital costs of coal plant may make them less attractive for limited utilisation.)

However, the use of gas-fired plant has implications because it may require sudden and unpredictable changes in gas off-take. This issue was not addressed explicitly in the Framework Guidelines or the Network Code on gas balancing, although harmonisation of the balancing rules will be helpful.

In summary, the Balancing Network Code provides for:

- network users to have the primary responsibility to maintain a balance;
- a standardised balancing period of 24 hours with nominations of flows required on D-1;
- re-nomination in hourly cycles from D-1 confirmation time to 3 hours before real time and confirmation (or rejection) within 2 hours from cycle start;
- the right of TSOs to apply (incentivised) “within” day obligations subject to NRA approval; and
- a linepack flexibility service may be offered by TSOs, effectively allowing network users to store gas from one day to the next, if there is surplus capacity on the network.

Gas-fired generators have no way to make re-nominations 2 hours or less before real time. This may limit the flexibility of gas-fired power plants. Indeed changing output at short notice to help manage the effects of intermittent generation, gas-fired power plants may potentially expose themselves to imbalance risk in the gas market.

In order to increase the flexibility of the gas system, the possibilities of demand response should be explored. Industrial users have expressed their interest in developing contractual arrangements with TSO´s to incentivise demand response. Examples from US electricity markets have similarly shown that demand response can deliver very good results in a much tighter market. In addition, taking demand response into account could lead to a reduction of investment needs (by lowering peak demand).

5.2 Reduce exposure of gas plants and improve coordination between sectors

Ways in which coordination between the gas and electricity sectors could be improved by reducing gas-fired generators' exposure to imbalance risk will be analysed (e.g. in the areas of innovation in the capacity products used by system-critical power plants, offer of more short term flexibility products, suitability of within-day capacity products).

Such measures are intended to help gas-fired power plants fulfil their balancing obligations. However, near to real time, it is likely to be desirable for TSOs to play a more active role given that they have a view of the whole network. For this reason, it may be worth considering:

- a more positive role for inter-zonal exchange of gas balance services by gas TSOs in interconnected Member States; and
- exploring the value of electricity TSO to gas TSO coordination at system level after the last re-nomination period.

G12. Does a lack of coordination between intra-day gas and electricity markets expose gas-fired generators to significant imbalance risks?

G13. Does the level of risk exposure create sufficient concern that it could hamper efficient market operation to warrant intervention?

G14. How should coordination of intra-day / balancing gas and electricity markets be improved?

G15. What concrete possibilities for demand response in gas do you envisage?

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