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**DRAFT FOR DISCUSSION  
VERSION 5  
Vision for a European Gas Target Model**

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The purpose of this paper is to set out the European energy regulators' vision for the regulatory design of the single European gas market. The objective of an integrated and competitive European gas market that is sustainable, offers choices to customers and promotes security of supply is enshrined in the 3<sup>rd</sup> Energy Package. The European Council confirmed its commitment to this objective and set 2014 as a deadline for its completion; this paper considers both what can be put in place by 2014 and the issues for a longer term vision until 2020. One of the key challenges in creating an integrated market is to set effective rules for facilitating cross-border trading and market integration between Member States. As such, the 3<sup>rd</sup> Package establishes a new regulatory framework for cross-border trade with the creation of an Agency for the Cooperation of Energy Regulators (ACER) and the provision for legally binding European network codes to regulate cross-border aspects. The basis for the development of this paper is the implementation of the 3<sup>rd</sup> Energy Package. With work on the framework guidelines setting the objectives and principles for European network codes progressing, the European regulators at the 18<sup>th</sup> Madrid Forum agreed to bring forward proposals for the design of such a single European gas market, which is known as the European 'Gas Target Model'.

## **1 Context**

The European Union is highly dependent on gas produced outside of its borders – some 64 % of demand in 2009<sup>1</sup> – and transported either via long-distance pipelines or LNG. Energy dependency is going to grow in the future, depending on the ENTSOG Ten Year Network Development Plan 2011 demand scenario considered, to more than 70%<sup>2</sup>. While there are also early developments in exploring shale gas in Europe, it is likely that Europe's import dependency will remain a key feature over the period until 2020. With an obligation for 20% of Europe's energy to come from renewable sources in 2020, many Member States are seeing a significant increase in intermittent sources of generation such as wind. As such, we expect much greater short term fluctuations in gas demand than previously, as we see more gas-fired power stations coming online.

In many European countries, security of supply has been historically met through long-term contractual arrangements (typically 25 years) between gas producers and buyers, which give gas buyers flexibility above an agreed minimum in the volumes of gas that will be delivered within a contract year. These contracts usually include 'take or pay' obligations, meaning that European buyers must 'take or pay for' the minimum agreed volumes of gas. The long-term gas contracts have also been seen as important not only in guaranteeing security of supply but also in underpinning the investment in the long-distance pipelines and in gas production. They have been seen as a key tool for sharing risks between gas suppliers and those investing. The import dependence also means that Member States require additional sources of flexibility to cover fluctuations in demand. In many Member States, storage provides an important source of seasonal and short-term flexibility, with gas being imported in summer to inject into storage to supply peak winter demand.

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<sup>1</sup> Eurostat energy dependence EU-27.

<sup>2</sup> Own calculations based on ENTSOG TYNDP 2011; Shale gas not considered.

Any gas target model will need to provide a regulatory framework that secures supplies in the long, medium and short term, which means making Europe also in the future attractive for gas to be imported and taking account of seasonal and short term fluctuations in gas demand. The idea of the integrated energy market is to promote competition in the European wholesale markets and facilitate new entry to compete against the incumbents in supplying gas. A competitive wholesale market will need to be efficient, thereby delivering gas to where it is most valued whilst providing shippers with the right incentives to secure supplies to European consumers. An efficient market must also provide the signals for investment in both gas production and in gas network infrastructure, including transmission and storage, in order to meet the demands of European gas consumers. There is also a strong need for non-discriminatory and fair arrangements for shippers to access the gas infrastructure in order for competition to develop and for the network to be used efficiently while guaranteeing adequate remuneration for investments.

The European regulatory framework aims to improve efficiency in the use of cross-border capacity and support the development of gas trading at hubs. The European 3<sup>rd</sup> Package, i.e. the Gas Regulation<sup>3</sup>, makes TSO wide entry-exit systems, in which entry capacities can be booked independently from exit capacities, obligatory by September 2011 and abolishes tariffs set on the basis of contract paths<sup>4</sup>. Measures are being pursued to open up network access to new entrants in a bid to foster greater competition. The Gas Directive<sup>5</sup> requires increased unbundling of the ownership and operation of gas networks from gas supply in order to remove potential for discrimination when granting network access. Upon request by the Commission, and in line with the 3-years plan, ACER will develop framework guidelines<sup>6</sup> on e.g. harmonised tariff structures, interoperability, rules trading rules contributing to non-discrimination, effective competition and the efficient functioning of the market. ACER recently consulted on framework guidelines for cross-border network capacity to be auctioned and for cross-border capacity to be 'bundled' to facilitate trading between hubs. The Commission is considering proposals to maximise cross-border capacity and to free-up unused capacity and offer it back to the market. Other measures are designed to promote liquidity in gas traded at hubs. ACER also consulted on framework guidelines to require TSOs to trade at the gas hubs to balance their systems or where these are insufficiently liquid to create 'balancing platforms'<sup>7</sup> as a first step in creating a functioning wholesale gas market. However, in some Member States further steps than the implementation of the envisaged network codes might be necessary.

Trading at Europe's gas wholesale markets or hubs has made progress over the last decade, particularly in North West Europe. However, progress has not been the same in all parts of Europe and also where gas hubs have emerged, liquidity is still regarded by many as insufficient. The British National Balancing Point (NBP) is the most liquid hub with churn ratios of 15 in 2010 but churn ratios at hubs on continental Europe are, although increasing, much lower. With the reduction in gas demand due to the economic downturn in 2009 and the increase in LNG imports available for Europe, we have seen a renegotiation of the oil-indexed prices in the long-term gas contracts in favour of a more 'gas-on-gas pricing'.

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<sup>3</sup> Regulation (EC) 715/2009.

<sup>4</sup> Recital 19 Gas Regulation.

<sup>5</sup> Directive 2009/73/EC.

<sup>6</sup> Article 8(6) Gas Regulation sets full list of areas for framework guidelines; EC will publish soon the coming priorities for network codes.

<sup>7</sup> Balancing platforms are essentially one-sided markets where all trades are with the TSO.

However, more needs to be done for European gas wholesale markets to be sufficiently liquid to send reliable price signals.

### ***Target model: key principles***

The European gas market will consist of interconnected entry-exit zones with virtual hubs. Entry-exit zones should allow shippers to freely trade gas within each entry-exit zone, such that internal physical congestion does not unduly restrict gas trading. Achieving the single gas market requires sufficient interconnection; therefore the regulatory regime should signal where investment is needed and provide TSOs with a predictable framework for recovering their revenues. Once built interconnection capacity needs to be easily accessible to shippers on a non-discriminatory basis at a transparent and fair price. The capacity offered to the market needs to be maximised and contractual congestion should be mitigated, such that capacity hoarding is deterred. Shippers need both long-term and short capacity as gas may be traded both long and short term. Sufficient interconnection that is accessible will promote liquidity in hub-based trading, which in turn will assist with the development of market based balancing. The purpose of the next chapters is to investigate options to foster hub liquidity when necessary.

## **2 Enabling functioning wholesale markets**

Some of the requirements in the Gas Regulation, such as removing contractual paths for transporting gas and creating entry-exit zones, will require changes to the current contractual arrangements for network access in Europe. It raises the question of the number of entry-exit zones and gas hubs envisaged in a single European gas market and whether each Member State creating its own entry-exit zone and gas trading hub will lead to sufficient liquidity in these markets and whether a large number of entry-exit zones will facilitate cross-border trade and market integration. However, there is also a question about how gas will be traded between the hubs within the entry-exit zones. The Gas Target Model considers both of these questions and this paper consults on options both to 'enable' and to 'connect' the entry exit zones as approaches to market integration.

A key reason for considering options to establish enlarged market areas or trading regions is that for some Member States it may be an integral step to creating a functioning wholesale gas market. A functioning wholesale market requires a sufficient presence and low concentration of gas traders active in the wholesale market, availability of gas from diverse sources, multitude of customers (i.e. sufficient demand for gas) as well as a certain level of trade both in terms of the total volume of gas traded compared to the volume of gas consumed (i.e. churn ratios). Despite being extremely complex to define potential quantitative parameters, a 'functioning whole sale market', could be characterised, as a reference, by a Hirschmann-Herfindahl Index below 2000, gas available from at least 3 different sources, as well as gas demand within the zone of at least 20 bcm, which provides a range of gas products, which meet the demands of the market and results in efficient and transparent prices.

<p><b>Question:</b> What are stakeholders views on this definition of a 'functioning wholesale market'?</p>
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The European regulators consider that Member States with low volumes of gas demand and a high level of dependency on a particular source of gas may find it difficult to create a functioning and liquid wholesale market on a national level. But also Member States with sufficient volumes of gas demand and a low level of dependency on a particular source of gas also need to create a framework that enables the emergence of functioning wholesale markets. The establishment of sufficient interconnection capacity and the abolishment of physical congestion is an integral step when creating a functioning wholesale market for these countries. The regulators have identified three broad options for achieving this: (i) creating a trading region, (ii) creating market areas at the national level, which may be appropriate in Member States that are able to meet the criteria of a functioning wholesale market, or (iii) creating cross-border market areas.

The trading region model also creates a common entry-exit zone for transmission and a single virtual point for trading gas between at least two Member States (or parts thereof) but it maintains 'national end-user zones' in different Member States for distribution and balancing of forecasting errors. In any case, the balancing arrangements as set out in the balancing framework guidelines apply also to trading regions as to ensure market based balancing. Where relevant, these arrangements also apply to the 'national end-user zones', especially regarding the balancing period, the gas day and the treatment of forecasting errors. The trading region model could also be applied by Member States which are not able to establish a functioning wholesale market within their borders.

The cross-border market areas option is essentially as the name suggests; it is a single entry-exit zone for transmission and distribution with a single virtual point (i.e. virtual gas hub) where the gas is traded freely, which encompasses at least two Member States (or parts thereof). It would comprise of a single balancing area and there would be a single set of 'market rules', including for balancing relating to the trading and supply of gas in the market area. This approach could be applied by Member States which are not able to establish a functioning wholesale market within their borders.

The main advantage of these options is that by creating a single virtual point for gas trading in a large region should increase the number of gas traders active in the market and thereby enhance liquidity. It would also reduce the number of entry-exit points and cross-border points within Europe at which shippers would need to book capacity, which may facilitate cross-border trade. However, allowing for gas to be traded freely in a trading zone would mean that TSOs would have to manage any network constraints within the zone, which is likely to increase the balancing actions that are undertaken and impose costs ultimately to be borne by European consumers. It would be important to ensure that TSOs are incentivised to maximise cross-border capacity and that balancing actions do not lead to a reduction in the network capacity offered to market participants. This approach would also reduce the total number of interconnection points which shippers have to book, which may lead to the need of setting some kind of inter TSO payment mechanism. As such, these options may be preferable between countries where sufficient interconnection exists and physical congestion is not likely to become an issue. The creation of a cross-border market area will require a significant degree of harmonisation of market rules on TSO and DSO level and close cooperation of TSOs to operate them. The trading region model may require less harmonisation since it envisages the balancing and distribution of gas to take place within the 'national end-user' zones and as such, it is seen as a first step towards the full merging of market areas. However, the trading region is not a model for individual Member States to adopt.

**Recommendation:** [to be added]

**Question:** What are stakeholders' views on this recommendation?

### 3 Connecting functioning wholesale markets

As such, the single European gas market will comprise of several entry-exit zones and gas hubs, i.e. functioning wholesale markets. The issue is how best to 'connect' or to manage the gas trade between them. The key aspects are how shippers access capacity, the capacity is used efficiently and the regulatory framework provides signals for investment in cross-border network infrastructure and for long-term trading of gas, which is likely to remain a key feature. Currently cross-border capacity is not being used efficiently. There is a problem with 'contractual congestion' at many interconnection points whereby cross-border capacity is fully booked but often is unused. This unused capacity is not being made available to other market participants, who may wish to use it to trade between neighbouring markets.

The European regulators developed the framework guideline on capacity allocation mechanisms, the key elements of which are auctions as standard capacity allocation mechanism and a small set of standardised bundled products (instead of selling entry/exit capacity products per interconnection point separately) which aim at facilitating cross-border trade. ENTSOG is developing proposals for a network code based on that framework guideline. The main issue that remains to be solved is ensuring that the volume of capacity made available at cross-border points is maximised and that unused capacity is not 'hoarded' but is released back to the market and therefore used efficiently. The Commission has consulted on options for congestion management (CMP) aim at freeing up capacity by:

- providing for regulators to implement 'overbooking' arrangements, which incentivise TSOs to offer additional capacity on a financially firm basis; and
- requiring TSOs to operate a 'firm use-it-or-lose (UIOLI) arrangement, whereby after shippers have nominated their gas flows day-ahead, a volume of their unused capacity is removed and put into the day-ahead auction for others in the market to access. A Long Term firm UIOLI mechanism, whereby shippers 'lose' unused capacity over a longer period of time is also proposed.

The regulators consider that it is important that the network codes are adopted and implemented as soon as possible but at the latest by 2014. These measures are an important step in providing new entrants with non-discriminatory and fair access to network capacity, which is a pre-requisite to increasing liquidity in gas trading.

#### **Short term capacity allocation**

Assuming that arrangements to free-up unused capacity and to set aside a proportion of capacity for short term trading (the framework guidelines envisage 10%) the question arises as to how this capacity should be allocated. The European regulators proposal in the framework guidelines on capacity allocation recommends that cross-border capacity is auctioned explicitly but the European network codes should not preclude implicit capacity allocation. Explicit auctions are more efficient than current first-come-first-served arrangements but require shippers to coordinate buying network capacity with gas in order to trade across borders, which may be challenging in short timescales. Therefore, a platform (whether it is operated by TSOs or third parties such as exchanges or hub operators)

whereby shippers can submit bids and offers for cross-border gas trades and cross-border capacity is implicitly allocated to these trades may be a more efficient alternative.

Under implicit allocation, market participants submit bids and offers onto a 'market coupling' platform to buy and sell gas between two (or more) entry-exit zones. The platform collates all bids and offers into a single "bid-offer ladder"; the TSOs provide detail on the available interconnection capacity between the entry-exit zones. The platforms submit this information into a "coupling algorithm" that accepts the bids, which have the greatest price spread between the price buyers are willing to pay and the sellers are willing to accept. This results in the most efficient programme of gas flow for the available capacity between the two entry-exit zones.

There have been concerns raised as to whether this approach is suitable for gas given the possibility to fully change nominations during the gas day; and which will increase if gas is a substitute to intermittent sources of renewable generation. As such, it may be preferable for the 'implicit capacity allocations' to be repeated several times during the gas day to facilitate shippers and traders 'within-day' gas trading rather than on a purely 'day-ahead' basis. The procedure can also encompass two or more entry-exit zones so the 'coupling' could be operated between several entry-exit zones. Clearly, it will require technical work for a platform to be established; it may be that it can build on existing hubs, balancing platforms or exchanges and for an algorithm that matches capacity against gas trades to be developed.

The main benefits of an implicit capacity allocation are that it optimises flows and capacity usage on cross border connections and increases liquidity in gas trading. By matching capacity against the trades with the greatest value, the platform ensures that gas flows to where it is valued most whilst taking account of network constraints. Essentially, it allows for the cross-border trades between the two markets to be optimised, such that there is greater price convergence when there is sufficient physical interconnection capacity between the two markets but for prices to diverge when the interconnection is insufficient. As such, it is a 'dynamic' approach to integrating gas markets and ensures that the available capacity is efficiently used. As parties will be trading via a platform for cross-border trades, implicit capacity allocation concentrates gas trades, which has a positive impact on market liquidity. DG TREN concluded that 'market coupling initiatives (e.g. Trilateral Market Coupling Initiative) [have] increased liquidity and price signals in the European power market'<sup>8</sup>. As such, the European regulators consider that there are benefits in exploring a gas 'coupling mechanism', particularly where congestion (either contractual or physical) exists.

**Recommendation:** [to be added]

**Question:** What are stakeholders' views on this recommendation?

#### **4 Ensuring secure supply and economic investment**

There is a question about whether this approach suffices as the longer term vision beyond 2014 for a single European gas market or whether further efficiencies can be achieved. European regulators consider that removing (implicit) destination clauses and contractual paths, introducing auctions and standardised capacity products, which are appropriately coordinated at interconnection points, will provide a solid basis for long-term bookings;

<sup>8</sup> K. Rademaekers et al. 'Review and analysis of EU wholesale energy markets: historical and current data analysis of EU wholesale electricity, gas and CO2 markets. 9 December 2008, page7.

these arrangements should promote the development of competitive wholesale gas markets. While the proposal has been suggested by GEODE for a longer term vision whereby there is no booking of long-term capacity to transport gas between hubs in Europe, we do not consider that a substantive case for such a reform has been made. The main outstanding question is the regulatory framework for the provision of new capacity. The framework guideline does not directly apply to new capacity (apart from capacity which remains unsold after it has been initially offered via an open season procedure) it is recommended that the processes for determining any 'incremental' or (new) capacity are consistent with the provisions of the framework guidelines.

The arrangements for the provision of new network capacity are important. It is possible that in a well-functioning – hub-based – future European market physical congestion may arise in locations not currently congested. Furthermore, there is a requirement to enable reverse flows at all interconnection from Security of Supply Regulation, which may in some cases be an investment supported by market demand so it is important to get the regulatory framework correct. One approach that has been proposed by market participants is for a regular 'bidding' process for testing shippers' commitment to book new interconnection capacity. TSOs would define the relevant costs of a potential investment at a cross-border point. Shippers would submit bids to the TSOs to buy 'new capacity' on a firm basis<sup>9</sup> at this cross-border point, before the investment was made. If the bids received by the TSOs to pre-book the new capacity cover a pre-determined percentage of the overall investment costs, the investment would be approved. The rules for this process need to be known upfront by all market participants.

This proposal would require close-co-operation between the relevant regulators at the cross-border point to agree on the design of this 'market test'. Regulators would need to agree the 'percentage' of investment costs to be covered by shipper commitment. If the percentage is 100%, shippers will have to 'pre-book' all of the available capacity before the investment is approved. Equally, if the percentage is set very low, then it means with very little pre-booking, the investment will be approved, which heightens the risk that once built the capacity is unused (or stranded) and therefore, inefficient. Regulators would need to agree on the frequency of carrying out this 'market test' taking into account the resources devoted to such procedures and the feedback received from stakeholders. Furthermore, regulators need to agree on a case-by-case basis on the percentage of investment cost for which an upfront shipper commitment is needed. Some market participants are in favour of an annual process whereas others suggest that every two years may suffice. The market demand tests could be organised by the current regulated TSOs but also other investors, which may attract additional finance into investments in cross-border capacity. Other investors could be selected on the basis of a tender in case a TSO declares that it can/will not invest in an otherwise economic investment project. The scope of the tender would be to build and finance the pipeline (or other asset). However, the 'market test' may not suffice for investments deemed necessary by Competent Authorities under the Security of Supply Regulation<sup>10</sup> but for which there is insufficient shipper commitment. In such cases additional funding will have to be paid by the beneficiaries of the investment.

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<sup>9</sup> In other words they would commit to buying the capacity before the investment is made. If the investment is made, they'd be liable to paying the price for the capacity. Equally, if the investment is not subsequently made, they would not pay and would be reimbursed if they had.

<sup>10</sup> Regulation (EC) 994/2010.

**Questions:**

What are your views on the need for explicit long-term capacity allocations?

How should economic viable projects for investment in cross-border capacity be determined?

What are your views on the proposed 'shipper commitment' test as a mechanism to determine economic viable projects?

If in favour, how often and by whom should such a test be conducted?

***Pricing of transmission capacity***

The regulatory framework for tariffs is important in sending signals for a sound regulatory regime, which promotes investment in cross-border interconnection capacity. For TSOs to invest in cross-border capacity there needs to be a predictable regulatory framework for determining allowed revenues and setting out how those revenues can be recovered. TSOs revenues are recovered via tariffs imposed on users of the transmission networks. The introduction of auctions (whether implicit or explicit) may alter the way in which tariffs are set but does not need to put TSO revenues at risk. The key question for cross-border investment is how much of the revenues from these investments is recovered from nationally and how much from cross-border revenues.

One approach is for regulators at cross-border points to jointly set a reserve price, which would set a minimum charge that would be paid to underpin the recovery of the costs associated with providing the capacity. The level at which a reserve price is set is not only important for recovering costs but can impact on cross-border trade if not cost-reflective as it could lead to the pancaking of charges for gas crossing several entry-exit zones (i.e. where costs pile up). The European regulators consider that a reserve price would be an appropriate approach for long-term capacity. In their work on tariffs, the regulators are considering the options for setting reserve prices that are transparent, cost reflective, non-discriminatory and promote investments.

The main debate is whether a reserve price should be charged on day-ahead or intraday capacity. Some argue that if a reserve price is not charged on short term capacity, shippers will seek to book more of their capacity short term, which will further exacerbate the potential for TSOs to under-recover revenues and in turn damage longer term investment signals. And that charging a 'reserve price' on short term (day-ahead or intraday capacity bookings) is important in not discriminating between shippers booking on long-term and a short term basis. If TSOs anticipate that they cannot recover parts of an investment via short term bookings, the tariffs for longer term bookings will be set to recover the whole investment costs, which make long-term bookings more expensive. However, others argue that the operational costs associated with short term bookings are much lower or even negative (as the pipeline is operating anyway and there are certain efficiencies in using additional capacity that would otherwise go unused). A reserve price on short term capacity would create a barrier to cross-border trade. The pricing of cross-border transmission capacity along with the issues about how TSOs recover their investments in transmission capacity and promoting cross-border investment will be considered as part of ACER's work on tariffs and in the Commission's proposals on the Infrastructure Package.

**Questions**

What are your views on the pricing of cross-border transmission capacity?



### **Renewable Integration and view beyond 2014**

There are several developments and trends that have the potential to have a significant impact on the European gas market beyond 2014. The EU's environmental policy goals as defined by the 20-20-20 targets, for instance, impact on the role of gas in the energy mix. Although natural gas is a fossil fuel emitting carbon emission when being burned, combined cycle gas turbine power plants are projected to play an increasing role in power generation. The role of nuclear power as an alternative non carbon emitting power source is uncertain, at least in several European countries.

Two other developments are worth mentioning as well. First, due to more renewable power, which is highly volatile and unpredictable in terms of power production, the need for a method to store power is increased. As part of the Commission's task force for smart grids, the concept of converting power produced by renewables into hydrogen or even further into synthetically methane is described as a "highly promising possibility of storing power". Secondly, the boom in shale gas production in the United States triggered exploration in Europe as well. The potential role of unconventional and in particular shale gas in Europe is yet to be explored.

European Energy Regulators take account of current developments and their duty to promote a competitive, secure and environmentally sustainable internal market<sup>11</sup>. European Regulators expect in the coming years an increasing interrelation between electricity and gas markets. New technological developments are expected to enable further integration of electricity and gas networks into a whole European energy system. This might lead to a need for a more integrated network planning model. Integration of renewables in the electricity markets may create different demand patterns of natural gas due to more flexible usage of gas fired power plants. With renewables on the rise, the main challenge is to level out fluctuating electricity supplies with the demand patterns. This may be – next to demand side measures - efficiently approached by using the largest "buffer" / storage potential of the gas infrastructure. Furthermore it is necessary to ensure efficient access and connection of gas fired power plants to the gas grid. With respect to market rules this includes an efficient access to capacity by congestion management measures and the establishment of a functioning short term capacity and liquid trading market. Also under this perspective it is crucial to bring CAM and CMP proposals forward.

#### **Questions**

Do you think that the elements of the target model provide a good framework for the integration of renewable energy?

Are there elements missing in the target model that are necessary for the integration of renewable energy on a European level, maybe with a view beyond 2014?

<sup>11</sup> Cf. Article 40 (1) Gas Directive.