



**Gas Balancing Rules on
European Gas Transmission Networks**

Draft Pilot Framework Guideline

- Initial Impact Assessment -

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PART I – PROBLEM IDENTIFICATION AND POLICY OBJECTIVES

1. Purpose of the document

The 3rd Package¹ aims to develop a well functioning internal gas market for the EU. One reason for creating such a market is to allow consumers improved choice in their gas suppliers, with national incumbents facing increased competition (in terms of price or service levels) from new entrants. The European Commission's Energy Sector Inquiry (the 'Sector Inquiry')² showed that competition had been slow to develop, that vertically integrated incumbents (controlling gas production, gas imports, supply to end-consumers and ownership and operation of gas transmission networks) remained dominant in national markets, and that insufficient market integration and cross-border trade had developed. It found that balancing markets often favour incumbents and create obstacles for new entrants; and that the small size of balancing zones leads to increased costs and protects the market power of incumbents.

The 3rd Package contains a range of measures to improve competition and promote new entry in European gas markets; this includes the unbundling of the ownership and operation of gas transmission networks from gas supply in order to provide new entrants and other market participants with fair access to those networks. It also provides for legally binding network codes to ensure that there is effective and transparent access to the gas transmission networks and barriers to cross-border trade are removed. ERGEG has already consulted on a pilot Framework Guideline³ for capacity allocation. However, for effective competition to develop, not only do new market entrants need access to transmission networks and sources of gas, they also need balancing rules that facilitate this and remove the barriers to multiple parties supplying and shipping gas across gas transmission systems. The 3rd Package recognises this and requires a network code on gas balancing to be established.

The Agency for Cooperation of Energy Regulators (ACER) has an important role in producing framework guidelines (FGs), which will set out the objectives of the network codes. The Commission has requested that in the interim period until March 2011, when ACER will become operational, ERGEG bring forward draft FGs. At the January 2010 Madrid Forum, it was agreed that ERGEG would produce a draft pilot framework guideline on gas balancing.

The purpose of this consultation document is to present ERGEG's initial proposal for a draft FG on gas balancing, and to set out our views on the options of such a proposal through our Initial Impact Assessment (IIA). We would welcome responses to this consultation by 28 October 2010.

¹ Including Directive 2009/73/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in natural gas and repealing Directive 2003/55/EC.

² European Commission, DG Competition (10 January 2007), DG Competition Report on Energy Sector Enquiry, SEC(2006) 1724.

³ ERGEG (10 December 2009), Capacity Allocation on European Gas Transmission Networks, Pilot Framework Guideline, Ref: E09-GNM-10.05.

2. Problem identification

For operational security reasons, pressures of gas in transmission systems need to be kept within a certain range. Fluctuations in pressure occur when the level of gas in the system varies. As such, it is important that the volume of gas exiting the gas transmission system equals the volume of gas being put into the transmission system. Gas within the system (known as 'linepack') can be used to adjust imbalances between the two to some extent. The operational range available in each system differs from system to system and is determined by the linepack and/or the storage available to the system. Where the same party is responsible for inputting gas (whether from national sources of production or through contracts with other countries), off-taking gas from the system (to supply consumers) and operating the transmission system, the responsibility for balancing the transmission system can sit wholly with that party. However, where there are multiple network users inputting and off-taking gas from the transmission system at different entry and exit points, balancing becomes more complex. The question then arises how best to design a balancing regime suitable in the presence of multiple network users.

Balancing issues need to be considered in the context of the integration of gas markets across the EU. The scope of the framework guideline is defined by issues of cross-border nature. Given the importance of gas flows across borders for European gas markets, and given that sources of flexibility may come from across borders, the major characteristics of national balancing regimes will often be of cross-border relevance.

The role of network users and the TSO in balancing

In most Member States, the Transmission System Operator (TSO) has overall responsibility for system security and hence for ensuring that the transmission system is balanced. However, since unbundled TSOs will be increasingly separate from the network users trading gas (and therefore from inputting and off-taking gas from the system), it is important that network users have the ability and the incentive to balance their own gas inputs and off-takes (or in other words balance their portfolios) to the extent possible. Since the precise off-take will usually not be known in advance there is a risk that imbalances occur over the whole portfolio of all network users within one balancing zone. The more network users are able to 'balance' their own inputs and off-takes the less gas the TSO has to buy (when the system is short and too little gas is being inputted) or sell (when the system is long and too much gas is being inputted) on behalf of the network users (residual balancing). There may still be actions that the TSO needs to take in response to constraints at particular points in the system, which occur even if network users' inputs and off-takes are in balance. However, the principle remains that the need for TSOs to take balancing actions should reduce if shippers are able to balance their portfolio efficiently.

The different kinds of balancing activities are listed below:

- **Portfolio Balancing:** the actions undertaken by network users in order to help ensure that their off-takes from a system match their inputs onto the same system over the duration of the relevant balancing period.
- **TSO Balancing:** the actions undertaken by the TSO to ensure that the system stays within its accepted operational limits. These actions can be a result of differences between the aggregate inputs and off-takes of network users but may be unrelated to network users being out of balance individually or on aggregate.

- **Local balancing:** the actions undertaken by the TSOs addressing imbalances at particular locations within the system.

Network users need access to relevant information, flexible gas and network capacity

Most Member States incentivise network users to balance their portfolios by imposing charges on them for contributing to imbalances in the inputs and off-takes in the gas transmission system ('imbalance charges'). Network users' exposure to imbalance charges varies depending on the national balancing rules. In some Member States network users have tolerances within which they can vary their input and outputs up to a certain range. In other Member States some network users are expected to balance their portfolio against a pre-determined standard-load profile for non-metered customers, which means that intraday changes in demand are balanced by TSOs. Whereas in other Member States network users must by the end of the balancing period react to any intraday changes in demand. However, regardless of the extent to which or how network users must balance their portfolios network users can only effectively balance their own inputs to and off-takes from the transmission system, and thereby reduce their exposure to such imbalance charges, if they have timely information on their inputs and off-takes, access to flexible sources of gas and to network and/or storage and LNG capacity.

In many Member States, network users do not have regular information on their inputs and their off-takes and are unaware of whether their portfolio is in balance. Storage and LNG imports are the main sources of flexible gas; and vertically integrated incumbents own the majority of gas storage to which other network users (in particular, new entrants) will have limited or no access. Without the necessary information and access to flexible sources of gas, it is difficult for new entrants in particular to balance their inputs and off-takes, which means that they face greater exposure to 'imbalance charges' than incumbents. The issue of access to storage will be addressed in ERGEG's revised GGPs on capacity allocation of storage. Access to network capacity (including interconnector capacity) at the day-ahead or within-day stages is also required for network users to trade out any imbalances in their portfolios. Consequently, some flexibility to access gas infrastructures is required as well. This is addressed in the capacity allocation pilot framework guideline.

Balancing zones and market fragmentation

Currently, there are a number of balancing zones across Europe, including within individual Member States. There are a number of reasons for the current shape and size of these balancing zones, including technical ones such as lack of physical interconnection between zones or gas quality differences (such as between low calorific and high calorific gas). Different zones might also be the result of different TSOs operating the network in different areas. As a result the European gas market is highly fragmented with different balancing arrangements applying in neighbouring markets.

These differences relate not only to how TSOs procure gas and how imbalance charges are calculated but also to rules such as the balancing period applied; many Member States apply a daily balancing period but in some, shorter-timeframes are used (such as hourly) to calculate imbalances. Such differences often result from differences in physical capabilities. This may create arbitrage opportunities for network users between markets, and flows of gas from daily into hourly markets (and back to daily at the end of the day) in order to avoid imbalance charges. Such flows may be inefficient if they do not reflect the differences in the value of flexible gas in the neighbouring market. They may then distort cross-border trade or pose challenges for balancing within neighbouring markets. Furthermore, even where daily balancing is used, there may be different start times of the gas day, which can enable arbitrage between different markets and may hamper cross-border trade between daily-balancing regimes. Fragmented markets also lead to fragmented network user portfolios which again result in potentially higher balancing costs for network users. It also means a fragmented way of operating networks which may result in a sub-optimal use of available resources (i.e. linepack and other sources of flexible gas).

Therefore, a key challenge is how to move from the current fragmented European gas market to a single European gas market and which rules need to be harmonised in order to achieve this, establishing the action plan including cross-border cooperation and a list of priorities.

Calculation of imbalance charges

Approaches to calculating imbalance charges vary widely across Europe and can present a barrier to entry into the gas wholesale market. As explained in the report⁴ by KEMA commissioned by the European Commission (the 'KEMA report'), in many Member States the imbalance charge is not related to the cost of the TSO procuring or selling gas. Instead the charge is either a fixed fee, which is determined in advance, or is indexed to an external reference price in a commodity market. As such, if the reference price differs from the cost to the TSO of buying or selling balancing gas network users' imbalance charges may be unduly favourable or penal. Therefore, one of the problems is that imbalance charges do not always provide the appropriate incentives on network users to balance, or are not related to the cost of procuring balancing gas.

TSO procurement of balancing services

The method by which TSOs procure gas to balance the system is relevant to how imbalance charges are calculated, for the overall balancing costs and it can influence gas market liquidity.

⁴ KEMA Report, Study on Methodologies for Gas Transmission Network Tariffs and Gas Balancing fees in Europe, Tender No: TREN/C2/240-241-2008, Submitted to: the European Commission, Directorate-General Energy and Transport, December 2009. (http://ec.europa.eu/energy/gas_electricity/studies/gas_en.htm)

The KEMA report notes that “non-market based methods continue to represent the main or often even exclusive form of procurement in most countries”. In many Member States, TSOs rely on regulated or bilaterally negotiated long-term contracts with storage operators or gas companies in other countries for flexible gas. This may be because in some countries the sources of flexible gas are limited and they rely on neighbouring countries to provide this. Where gas is procured via long-term contractual arrangements, it is difficult for the (daily) imbalance charge to reflect the actual cost to the TSO in procuring or selling gas on that day; this leads to the need for imbalance charges to be indexed to gas prices in other markets. This will depend upon the pricing of gas in the contract, which may be flat or reflect some of the variations in seasonal gas. However, it is unlikely to reflect daily fluctuations in gas and therefore, not be as cost reflective. Additionally, the lack of effective markets for TSOs’ procurement or selling of balancing gas can exclude traders from the opportunity to participate in gas balancing markets.

Barriers to cross-border trade

Some approaches to TSOs procuring or selling gas (and differences between approaches) can also inhibit the trading of flexible gas between national markets. For example, if the majority of capacity (in storage, LNG imports or pipelines) is reserved by TSOs, this often means that this capacity is not available to network users, which can contribute to low levels of liquidity in the wholesale gas markets. This acts as a potential barrier to new entrants and also as a barrier to cross-border trade between gas markets. Even if network users had better access to short-term capacity between markets (which ERGEG addresses in a separate consultation), the lack of liquidity in gas wholesale markets will impede cross-border trade. The KEMA report also notes that even where market-based methods are used, the focus is on medium-term products (1 month to 1 year) and there is limited use of daily or intraday products. A further problem is that, even where market-based methods are being used, the lack of consistency across borders in the products being traded may also inhibit cross-border trade. Therefore another issue is how cross-border balancing arrangements can facilitate trade between neighbouring markets.

Differences in nomination procedures pose further challenges to network users. Part of the solution may be to harmonise this aspect of the balancing regime. In this regard it is important to consider the interactions with the Pilot Framework Guidelines on Capacity Allocation Mechanisms⁵ in order to ensure that work related to nomination procedures is not duplicated or inconsistent.

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http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_FWG/Gas/Capacity%20Allocation%20Management

3. Requirements of the Gas Regulation (715/2009)

The concept of framework guidelines

Article 6 of the Gas Regulation (715/2009)⁶ sets out the Commission's power to request the Agency for the Cooperation of Energy Regulators (ACER) to submit to it a non-binding framework guideline setting out clear and objective principles, in accordance with Article 8(7), for the development of network codes relating to the areas identified in the priority list, such as gas balancing. The network code on gas balancing according to Article 8 (6 j) shall cover balancing rules including:

- Network related rules on nomination procedure
- Rules for imbalance charges
- Rules for operational balancing between TSOs

EREGG has received the request to draft a pilot framework guideline on gas balancing rules on 6 August 2010. We have formally consulted the European Network of Gas Transmission System Operators (ENTSO-G) and the other relevant stakeholders in regard to the framework guideline in an open and transparent manner. The Commission shall then request ENTSO-G to submit a network code which is in line with the framework guideline to the ACER. ACER shall then provide a reasoned opinion to ENTSO-G on the network code. ENTSO-G may amend the network code in the light of the opinion of ACER and re-submit it to ACER. Once ACER is satisfied that the network code is in line with the relevant framework guideline, ACER shall submit the network code to the Commission and may recommend that it be adopted within a reasonable time period. The Commission shall provide reasons in the event that it does not adopt that network code.

Each framework guideline shall contribute to non-discrimination, effective competition and the efficient functioning of the market.

Article 21 of the Gas Regulation 715/2009 sets out various high level requirements in relation to gas balancing, namely for balancing rules, imbalance charges, information provision and harmonisation. The requirements are:

- for **balancing rules** to be **fair, non-discriminatory and transparent**; based on 'objective criteria'; reflective of 'genuine system needs' taking into account the resources available to the TSO, and '**market-based**'.
- for **imbalance charges** to be **cost-reflective 'to the extent possible'**, whilst providing **appropriate incentives** on network users to balance their input and off-take of gas. Imbalance charges must also avoid cross-subsidisation between network users, and not hamper new market entry.

⁶ Regulation (EC) No 715/2009 of the European Parliament and of the Council of 13 July 2009 on conditions for access to the natural gas transmission networks and repealing Regulation (EC) No 1775/2005 ('the Gas Regulation').

- for TSOs to provide sufficient, well-timed and reliable on-line based **information** on the balancing status of network users, in order to enable the latter to take timely corrective action.
- For Member States to ensure that TSOs endeavour to **'harmonise'** balancing regimes and 'streamline' structures and levels of balancing charges in order to facilitate cross-border trade.

Article 13 of the Gas Regulation 715/2009, on tariffs for access to networks, says that where differences in tariff structures or balancing mechanisms would hamper cross-border trade between different transmission systems, TSOs must 'actively pursue **convergence**' of tariff structures and charging principles 'including in relation to balancing'.

Annex 1 of the Gas Regulation 715/2009 furthermore includes a number of obligations on the TSO to publish information required for gas balancing.

These requirements apply largely to national balancing systems; however, we consider they apply similarly to the pilot framework guideline for gas balancing rules. Given the inter linkages, we intend for the scope of the pilot framework guideline to cover both national balancing systems as well as cross-border balancing (i.e. arrangements that involve the sharing of flexibility or other balancing tools between adjoining systems and countries).

4. Policy Objectives for the gas balancing pilot framework guideline

In this section, we propose two key policy objectives for the gas balancing pilot framework guideline, after considering the requirements for gas balancing in the Gas Regulation 715/2009 and the problems identified in section 2. One important consideration here is that the development of European gas balancing rules needs to be seen in the wider context of creating a well functioning single European gas market; it cannot be looked at in isolation.

4.1. Proposed policy objectives for gas balancing

The two policy objectives we propose are as follows:

- **Objective one: Move towards greater integration of EU energy markets.**
- **Objective two: Move towards market-based balancing regimes.**

Why move towards greater integration of EU energy markets?

In a European single market, we would expect gas to be traded such that where there is sufficient cross-border capacity, wholesale gas market prices would converge. In other words, network users would trade such that gas would flow from low priced areas to high priced areas until prices converge to the extent that there is sufficient cross-border interconnector capacity available, thus maximising overall social welfare. European gas markets are currently highly fragmented not only along national borders but also within Member States⁷. In some of the smaller balancing zones, it will be difficult to develop sufficient liquidity⁸ in the gas wholesale market without market integration.

Currently, balancing rules differ widely across Europe and in many cases are not adapted to multiple market players competing in the wholesale gas market or to facilitating cross-border trade. There are currently inefficient distortions caused by highly fragmented balancing regimes which will allow for example network users to exploit arbitrage opportunities which do not necessarily reflect the differences in the price of flexible gas between neighbouring balancing zones. Therefore, greater harmonisation of balancing rules may reduce distortions to trade, inefficient arbitrage opportunities and the resulting cross-subsidies. A further effect may be that new entry is encouraged. A key question is to what extent harmonisation of balancing rules will be necessary to integrate markets and facilitate cross-border cooperation. In Chapter 12 we consider the options for cross-border cooperation, as a preparation for merging balancing zones to create cross-border balancing zones, facilitating network user trading with neighbouring balancing zones and TSOs procuring flexible gas from neighbouring markets.

What is market based balancing and why implement it?

In a competitive market, both network users, (i.e. market participants or shippers) and TSOs have a role in balancing the transmission network. The Gas Regulation 715/2009 states that balancing rules should be market-based, which we consider has two implications:

- The market (i.e. market participants) is primarily responsible for balancing and TSOs only need to take residual balancing actions; and
- Trading of gas to balance the system (by market participants or TSOs) is done through market-based procedures.

⁷ There are a number of reasons for the relatively large number of gas balancing zones within the EU at present. These include technical reasons such as lack of physical interconnection or gas quality differences; and historical reasons, for example some balancing zones may have come about as a result of legacy arrangements whereby an incumbent TSO previously controlled a particular area.

⁸ Liquidity means the ability for any party to quickly buy or sell gas without causing a significant change in its price and without incurring significant transaction costs.

As highlighted above, for market participants to be primarily responsible for balancing, they need to be able to trade out any imbalances in a liquid wholesale gas market. A wholesale gas market has multiple sellers and buyers trading gas; the level of liquidity is determined by both the amount of gas and the number of times the gas is traded. Gas trading reveals the true economic value of flexible gas, which in turn sends signals for cross-border trade and to the need for investment in additional sources of flexibility. A liquid wholesale market gives both network users and TSOs the confidence that they will have access to the products needed to balance the transmission system. Therefore, market-based balancing is easiest to implement in developed markets which already have a certain level of liquidity.

Market based balancing rules can also help to promote competition in emerging gas markets. For example, if TSOs use market-based procedures (such as balancing platforms where market participants place bids and offers for flexible gas for the TSO to enter into daily trades) the TSO is more likely to only procure what it needs; this may facilitate the release of flexible gas onto the wholesale market for network users to access and use to balance their portfolios. It also allows for a transparent and cost reflective price to emerge for the TSO's balancing actions. This in turn removes a barrier to new entrants, which is important to promoting competition and reducing the market power of existing incumbents. Although a market-based balancing regime can help to develop competition, it does not in itself lead to the development of liquid gas wholesale markets because balancing gas is a small percentage of the total gas transported or traded in liquid markets. For the development of competition, other changes are also needed, such as freeing up access to infrastructure, especially storage and network capacity, and facilitating new market entry by ensuring that balancing rules are non-discriminatory.

However, it is also important to note that the Gas Regulation 715/2009 states that balancing rules shall reflect the genuine system needs and should take into account the resources available to the TSO. There are significant variations in the amount of flexible gas available in different Member States. Some rely on a single source or on neighbouring sources and are still dominated by a single incumbent network user. These Member States have a long way to go before their wholesale commodity markets could be considered fully liquid and competitive and for some there may be a question as to whether competitive markets ever develop. There are also significant differences in the amounts of gas needed to balance the various systems; some systems have large amounts of line-pack available whereas others do not. Finally, not all Member States have set up fully de-coupled entry/exit systems yet, with separate arrangements for contracting at entry and exit points, although this will be required by the 3rd Package. Therefore, it will be important not to ignore these differences and to develop a framework guideline which can be implemented across Europe.

4.2. A target model and interim steps

As a general point, we consider that this pilot framework guideline should establish principles and objectives for the development of the European network codes. They have to ensure a level of flexibility which on the one hand facilitates the development of less liquid wholesale gas markets but on the other hand does not impede further progress in more developed markets. Market development and integration is a gradual process. Inevitably, balancing rules cannot provide for harmonisation in one step.

This is why we have opted for the approach of developing a target model and allowing for interim steps to achieve this target. In part II we outline later in this document policy proposals aimed at eliminating the problems identified. We outline a target model which we believe will ensure the key policy objectives of market based balancing and greater integration of EU markets. Both interim steps and a target model have been proposed.

The target model

Key principles

- Market participants take primary responsibility for matching their inputs into the system against off-takes from the system;
- TSO's role is residual balancing activities;
- TSOs procure the gas they require for balancing through the wholesale gas market on an equal footing with system users;
- TSOs provide network users necessary information within the balancing period;
- Network users can effectively access short term liquid gas markets to take intraday actions;
- Daily balancing with end of day cash out;
- Cost reflective imbalance charges - market participants that contribute to the system imbalance should pay for the balancing actions taken by the TSO;
- Cross-border cooperation should be developed as a step towards the merging of balancing zones, where appropriate, and proposals for cross-border TSO balancing and cross-border portfolio balancing.

We would welcome comments on whether the scope of the target model and the level of detail in the draft pilot framework guideline are appropriate. For example, the draft does not currently address nomination procedures which the network code will have to cover according to the Regulation 715/2009.

5. Pilot Framework guideline proposal on scope, definitions, purpose, policy objectives and compliance

1. SCOPE

1.1. The purpose of this pilot framework guideline is to develop EU-wide principles for a network code for gas balancing, as required in Article 8.6 of the Gas Regulation 715/2009.

1.2. This pilot framework guideline for gas balancing applies to balancing regimes for transmission systems within EU borders. It deals amongst other things with the harmonisation of such balancing regimes, both between Member States and within Member States, insofar as such harmonisation is necessary in order to facilitate gas trade and support the development of competition within the EU as per the requirements of the Gas Directive 2009/73/EC and the Gas Regulation 715/2009.

1.3. This pilot framework guideline also applies to arrangements for cross-border balancing, which is the exchange or trade of flexible gas between neighbouring balancing zones and the netting of network users' imbalances across adjacent balancing zones in order to support the development of competition and to facilitate market integration.

1.4. For the avoidance of doubt, the methodologies establishing the terms and conditions for the provision of gas balancing services that regulatory authorities shall fix or approve under the provisions of Article 41.6.(b) of Gas Directive 2009/73/EC shall be consistent with the network code for gas balancing.

2. DEFINITIONS

2.1. For the purpose of this pilot framework guideline, the following definitions apply:

In these definitions, all references to the Transmission System Operator (TSO) refer to the entity responsible for keeping the system in balance. Where this is a party different from the TSO, references to TSOs in this document relate to that party.

'Balancing period' means the period within which the off-take of an amount of natural gas, expressed in units of energy, must be offset by every network user by means of the injection of the same amount of natural gas into the transmission system in accordance with the transportation contract or the network code (as defined in Article 2(10) of Gas Regulation 715/2009).

'Balancing platform' is a trading platform on which flexible gas is bought and sold, balancing services are procured and the TSO is party to every trade.

'Balancing regime' means the rules and agreements that apply to portfolio and TSO balancing, including the procurement of balancing services and imbalance charges.

'Balancing services' means additional services (i.e. additional to the buying and selling of flexible gas) that a TSO may buy in order for the system to remain within safe operational limits, for example the ability to inject gas into storage.

'Balancing zone' is defined by an entry-exit system for which the specific balancing regime is applicable. One market area can comprise several balancing zones.

'Cross-border balancing zone' is a balancing zone which consists of (parts of) more than one Member State.

'Cross-border balancing' means both the exchange or trade of flexible gas between neighbouring balancing zones in order to facilitate market integration and the arrangements between network users to trade out their imbalances across two adjacent balancing zones.

‘Flexible gas’ means gas required to meet short term fluctuations in demand by customers, e.g. provided by storage, LNG supplies or production. It also contributes to overall system security by responding to unexpected system outages.

‘Imbalance’ is when individual network users’ injections to the system differ from their off-takes or where aggregate inputs to the system differ from aggregate off-takes from the system in a balancing period. This may result in either individual network users and/or the TSO buying or selling gas (or the TSO buying balancing services) in order to offset the imbalance. Inputs and off-takes to and from the transmission system can take the form of either physical gas at a specific point or gas exchanged at a virtual point in the market.

‘Imbalance charge’ means the charge applied by a TSO to network users (or payment received by a network user) for financial settlement of the differences between their inputs to and off-takes from the gas transmission system.

‘Linepack’ means the storage of gas by compression in gas transmission and distribution systems, but not including facilities reserved for TSOs carrying out their functions (as defined in Article 2 (15) of Gas Directive 2009/73/EC).

‘Local balancing’ means the actions undertaken by the TSOs addressing imbalances at particular locations within the system.

‘Long-term flexible gas products’ are gas traded before the day-ahead stage, i.e. include weekly, monthly, annual or multi-annual durations.

‘Network user’ is a party that uses the transmission system to transport gas from one location to another.

‘Portfolio balancing’ means the actions undertaken by network users in order to help ensure that their off-takes from a system match their inputs onto the same system over the duration of the relevant balancing period.

‘Short-term flexible gas products’ are gas traded intraday or day-ahead.

‘Transmission system’ (or ‘system’) means a high pressure transmission network consisting of terminals, compressor stations, pipeline systems and off-take points within a Member State.

‘TSO balancing’ means the actions undertaken by the TSO to ensure that the system stays within its accepted operational limits. These actions can be a result of differences between the aggregate inputs and off-takes of network users but may be unrelated to network users being out of balance individually or on aggregate.

‘Wholesale market’ is a physical or virtual point at which network users trade gas with each other either bilaterally, or via an exchange. The TSO can also trade in this market for balancing purposes. A range of products can be traded including: financial/ virtual, physical (where the gas is required to be delivered at a certain point) and temporal (where the gas is required to be delivered during a certain period).

3. PURPOSE & POLICY OBJECTIVES

3.1. The purpose of this pilot framework guideline is to set out clear and objective principles for the development of a network code on gas balancing as required by Article 6(2) of the Gas Regulation 715/2009⁹.

3.2. The over-arching objective of the network code is to encourage and facilitate gas trade across systems and support the development of competition within the EU, both between Member States and within each Member State, and thereby move towards greater market integration.

3.3. The specific objective for the network code on gas balancing is to create balancing rules including network-related rules on nominations procedures, rules for imbalance charges and rules for operational balancing between TSOs’ systems as required by Article 8(6)(i) of the Gas Regulation 715/2009.

3.4. The network code shall also have regard to the requirements in Article 21 of the Gas Regulation 715/2009 namely balancing rules that are fair, non-discriminatory, based on objective criteria and are market-based while reflecting the resources available to the TSO.

3.5. To this end, Article 21 of the Gas Regulation 715/2009 requires TSOs to:

- provide sufficient, well-timed and reliable information on the balancing status of users to enable network users to balance (Article 21.2);**
- apply imbalance charges that are cost-reflective to the extent possible, whilst providing appropriate incentives on network users to balance their inputs and off takes of gas (Article 21.3); and**
- endeavour to harmonise and streamline balancing structures and imbalance charges in order to facilitate gas trade (Article 21.4).**

3.6. Given the different stages of development of competition and liquidity in the gas markets across Europe, this pilot framework guideline defines interim steps towards achieving a common target model. The network code shall define balancing rules that are consistent with the target model but that allow for TSOs, upon NRA approval, to implement interim steps, where this may be appropriate.

⁹ The requirement for the network code is set out in Article 8, the requirement for the framework guideline in Article 6 of the Gas Regulation 715/2009/

3.7. ACER and the NRAs shall monitor that TSOs develop the network code in accordance with this pilot framework guideline.

3.8. The network code shall require ENTSO-G to regularly review the progress towards implementing the target model.

10. COMPLIANCE

10.1. Once the network code is adopted, TSOs shall comply with the target model or the interim steps defined in the framework guidelines within 12 months. This includes the adaptation of existing contracts and, where relevant, national network codes. TSOs shall comply with the target model unless the NRA confirms that market conditions do not allow this.

6. Overview of remainder of this document

The second part of this document considers the main balancing rules and sets out policy options for moving towards market-based balancing and an integrated European approach. It also analyses the impact of each of these options and makes a recommendation on proposals for a European gas balancing framework guideline.

Chapter 7 considers the role of network users and TSOs.

Chapter 8 considers TSO obligations on information provision.

Chapter 9 considers balancing periods.

Chapter 10 considers the TSO buying and selling of flexible gas & procurement of balancing services.

Chapter 11 considers the imbalance charges for system users.

Chapter 12 considers TSO cross border cooperation.

PART II - PROPOSED PILOT FRAMEWORK GUIDELINE AND INITIAL IMPACT ASSESSMENT

7. Role of network users and TSOs

7.1. Introduction

As set out in Part I, market-based balancing is where network users are primarily responsible for balancing and the need for the TSO to take balancing actions is reduced as much as possible. This section considers what 'network user and TSO' balancing should mean in practice and the extent to which it can be harmonised.

7.2. What are the issues?

As explained in Part I, the aim of incentivising market participants to balance their portfolios is to reduce the need for the TSO to undertake balancing actions (i.e. the buying or selling of gas to balance the system). Of course, this does not mean that the TSO will no longer need to undertake any balancing actions. There may be actions that the TSO needs to take in response to constraints at particular points in the system, which occur even if network users' inputs and off-takes are collectively in balance. The TSO will retain ultimate responsibility for ensuring that the system is in balance. However, in competitive markets with multiple network users it may be more efficient to incentivise market participants to do as much of the balancing as possible. As market participants are subject to competitive pressures, they are likely to be more efficient and economic in trading gas.

TSOs can rely more on market participants to balance their portfolios if certain pre-conditions are met. These pre-conditions include a liquid gas market and market participants having regular intra-balancing period information on both their inputs and off-takes and being incentivised through imbalance charges to trade. If imbalance charges reflect whether network users contribute to or alleviate system imbalances, network users will seek to trade to help balance the system rather than just to balance their portfolios (imbalance charges are discussed in Chapter 11). With the regular information, network users will monitor their portfolios, the overall position of the system and the price in the gas wholesale market and will seek to take balancing actions when it is most economic to do so.

However, where market participants do not have sufficient information on their inputs and off-takes or access to flexible gas and network capacity then market participants are less able to collectively balance the system. In the absence of liquid gas markets, the question arises what can be done to facilitate the task of balancing for new entrants or to provide new entrants with access to flexible gas. Most market participants prefer a daily balancing period over an hourly one as it allows new entrants more time to balance their portfolios. In some Member States, TSOs provide tolerances, ranges within which market participants (particularly new entrants) can maintain an imbalance without paying imbalance charges. There are also measures to allow market participants to pool their imbalances in order to avoid imbalance charges. Another approach would be to allow market participants with non-daily-metered customers to balance their portfolios against portfolios pre-defined at the day-ahead stage. TSOs will be responsible for managing any discrepancies between the profile and actual off-takes during the gas day. While these measures may facilitate new entry into the market, they may lead to the TSO taking more rather than less balancing actions.

Therefore, it is a real challenge to reduce the balancing actions undertaken by the TSO while wholesale gas markets are still developing. One approach used in some Member States is for the TSO to sell flexible gas, including linepack, to market participants, which will allow network users a more active role in gas balancing when gas markets are still developing (in other Member States this is given away for free). However, it is important that the introduction of a linepack product is consistent with the other objectives set out in the framework guideline.

However, there is still a risk, in a daily balancing period that network users will wait to the end of the day to balance their portfolios unless there is a significantly developed gas market (and imbalance charging regime), which sends appropriate price signals. For smaller gas transmission systems with low levels of line-pack, it may not be possible for the TSO to undertake such significant balancing actions to manage the system during the gas day. As such, in a number of Member States, obligations are imposed on customers (particularly those with large off-takes) to require them to keep their portfolios in balance during the gas day (otherwise a penalty is applied). While this incentivises market participants to balance, in the absence of liquid markets it may present a barrier to new entry.

7.3. What are the policy options?

Option 1 - Network user balancing without ‘within-day constraints’

Description of policy option

As described above, under this option, market participants would be expected to balance their portfolios by the end of the balancing period. TSOs would not impose any additional obligations on market participants.

Assessment against criteria

- **Facilitating competition and integration:** the fewer obligations imposed on market participants, the more the balancing regime is likely to be attractive to new market entrants, which stimulates competition in the gas market. Although the balancing regime cannot in itself create competitive markets, a regime that relies on incentives rather than obligations for market participants is likely to be more attractive.
- **Transparency and non-discrimination-** certain information is required for market participants to be able to assist in balancing the system (this is discussed in Chapter 8). In principle, it is non-discriminatory although it places all market participants on an equal footing although the impact of larger customers deviating from expected off-takes make have a greater impact on the TSO's ability to keep the system within operational limits, which may not be appropriate in some small systems with lower levels of linepack.
- **Feasibility-** as explained above, this option is easiest to implement in systems with sufficient levels of linepack or storage for TSOs to manage deviations. But also where a liquid gas market exists and an imbalance charging regime, which incentivises network users to take balancing actions.

Option 2 -Network user balancing with within-day constraints

Description of policy option

Under this option, market participants would be faced with obligations to keep their portfolios in balance or within a certain range during the gas day. One option would be for such within-day constraints only to apply to customers with large off-takes or inputs. Alternatively, they could be applied evenly to all network users.

Assessment against criteria

- **Facilitating competition and integration-** this option may be perceived as a barrier to new entry into the gas market, particularly where failure to meet the obligations results in additional imbalance charges (see discussion of imbalance charges in Chapter 9). Where there is a liquid intraday gas market, intraday constraints may be efficient as network users will be incentivised to balance their positions, which should reduce the role for the TSO. The impact on small new entrants may be limited if the within-day constraints were only applied to large deviations.
- **Transparency and non-discrimination-** again subject to the relevant information being provided, which is discussed in Chapter 6, this option could be transparent. In terms of discrimination, the obligations may be placed on certain types of customers (such as customers with large off-takes). Depending on the physical characteristics of the system, this may be justified and it would carry the benefit that large customers may be better able to balance their portfolios throughout the balancing period than small customers (for example domestic customers). A further justification for only imposing within-day constraints on those network users with large off-takes or large injections would be that the risk for large network users to abuse the system is greater than it is for small network users.

- **Feasibility-** this option will require greater information provisions and require more operational costs by market participants.

Option 3 - TSOs providing ‘tools’ to facilitate network user balancing

Description of policy option

Under this option, the TSO would provide the network user with additional flexibility tools to balance their portfolios.

Where sufficient flexibility is embedded in the transmission system but held by TSOs, one issue is whether TSOs should release that flexibility. This option is commonly known as access to linepack and represents a way for TSOs to enable system users to better manage their gas positions. Network users will rather rely on storage and LNG imports in order to balance their inputs and off-takes. Incumbent network users might be better able to balance their positions than new entrant network users without access to physical flexibility tools.

As explained above, one measure could be to permit network users a range within which they must maintain their portfolio in balance, known as a tolerance. These could be provided for free or the TSO could give network users the option to purchase different levels of tolerances. Another measure could be for TSOs to sell flexible gas, either linepack and/or additional sources of flexible gas (such as gas in storage), which the TSO may have reserved available to market participants. In most Member States (with the exception of Belgium) market participants cannot purchase linepack - this is a tool for the TSO to use in balancing the system. In some countries, the TSOs also have contracts to allow them guaranteed access to storage for keeping the system within its operational balance. The principle is that the TSO would act as an intermediary in freeing up sources of flexible gas, which may stimulate trade with market participants. In other Member States capacity to store flexible gas (at storage facilities or LNG terminals) is concentrated in the hands incumbent market participants rather than in the hands of the TSO. Therefore, it may be that the rules for accessing storage capacity need to be considered, which is part of ERGEG's work on revising the GGPs for storage and is not considered in this pilot framework guideline.

Assessment against criteria

- **Facilitating competition and integration-** the purpose of this option is to facilitate new entry into the European gas markets. Tolerances may have benefits in markets where new entrant network users have limited means to balance their portfolios. The main benefit is that they remove potential barriers created by separate (and potentially unpredictable) imbalance charges, which may be a useful measure in the absence of liquid markets. However, free tolerances do not provide network users with incentives to balance their positions and do not contribute therefore to the development of liquid short-term gas markets. This type of measure places emphasis on the TSOs taking balancing actions by opting network users out from balancing their positions and spread the costs across system users and onto end-consumers. In this respect, TSOs selling flexible gas may actually provide greater benefits to the development of competitive markets since it provides network users the means to balance their portfolios and targets the costs on network users with an imbalance, which will better stimulate trade. By selling either flexible gas or linepack, it may create a value for these balancing services, which may be useful in setting a cost reflective imbalance charge, as discussed in Chapter 11.
- **Transparency and non-discrimination** - as long as the provisions for using these services are published, these options are transparent. There is a question about to whom they should apply since new entrants generally have more need for flexibility tools to balance their portfolios than incumbent network users.
- **Feasibility** - tolerances are used in a number of Member States to facilitate market entry, where market participants have no access to flexible gas. For TSOs to sell flexible gas, a platform would need to be created to facilitate trade. At the moment, such a system is only used in Belgium, which may mean that further assessment is required to understand the costs and benefits. In some Member States, there may be a preference for linepack not to be offered where due the physical characteristics of the network this would compromise the ability of TSOs to manage transmission systems safely.

7.4. Recommendation

We recommend that the target model is for market participants to balance their portfolio so as to reduce the balancing actions required by the TSO as much as possible. The TSO will retain responsibility for balancing the overall system but the objective is to reduce the TSO's role as much as possible. This may be best achieved through a liquid gas market, sufficient information for market participants and imbalance charges, which provide network users with appropriate incentives to balance their portfolio.

However, additional obligations on network users may be needed in gas systems with lower levels of linepack, where if network users (particularly those with significant off-takes) swing their off-takes this will put the system outside of its safe operational limits. In such instances, intraday obligations may be needed, but it is important that these do not deter new entry, so any charges should be consistent with the principles for imbalance charges set out in Chapter 11.

Where intraday restrictions effectively impose an intraday imbalance charge on network users, then this may have some of the features of an intra-daily balancing period. We consider balancing periods in Chapter 9. Also, if Member States have different ‘intraday’ restrictions this may act as a barrier to the creation of a harmonised balancing period across Europe. Therefore, we seek views on whether intraday restrictions can be removed in all systems or whether they need to be harmonised.

Since access to flexible gas is necessary for network users to be able to balance their portfolios, it may be appropriate in markets without liquid gas markets to introduce measures to free up network users’ access to flexible gas. The type of measure will depend upon the characteristics of the individual market. For example, in Member States where the TSO has significant reserves of flexible gas in storage, it may be deemed appropriate for the TSO to release this to market participants. However, in other Member States, TSOs may not hold much flexible gas and that alternative measures outside the scope of this pilot framework guideline are needed to free up access to gas storage capacity. The level of linepack in gas systems varies across Europe; some gas systems have significant amounts while others have low levels. Therefore, it should be for each NRA to decide what may be appropriate for their gas system. We would welcome views on whether, in the target model, tolerances should be used and whether flexible gas and/or linepack should be sold by the TSO.

7.5. Pilot framework guideline proposal

5. NETWORK USERS AND TSO ROLES & RESPONSIBILITIES

5.1. The European network code for gas balancing shall provide for network users to balance their portfolios by matching their inputs into and off-takes from each system during the relevant balancing period. The TSOs shall develop network codes that share the responsibilities of balancing between the TSOs and network users, in accordance with the target model and interim steps below. The aim is to provide, as much as possible, for network users to collectively balance their portfolios so as to minimise the need for TSOs’ balancing actions.

5.2. The network code shall provide for TSOs to be responsible for ensuring that any remaining deviations between the (aggregate) inputs and off-takes of network users do not cause the system to go beyond its accepted operational limits.

5.3. The network code shall require each TSO to consider the impact of their balancing rules on the development of trade with adjoining transmission systems. TSOs shall coordinate balancing activities with other TSOs where this is needed in order to ensure compliance with the general principles in this section (or in order to keep all systems within safe operational limits).

5.4. The network code shall provide for TSOs to allocate linepack to network users if approved by the relevant NRA. TSOs shall allocate the linepack to network users on a transparent and non-discriminatory basis. Where linepack is sold, it shall be offered at a cost reflective price. The price may also be determined through competitive mechanisms. The decision by the relevant NRA to allocate linepack will be based on objective criteria, including the physical characteristics of the networks and whether the provision is consistent with the target model for the balancing period.

5.(A). TARGET MODEL

5.5. Network users through their portfolio balancing activities shall take primary responsibility for matching their inputs into a system against customer off-takes from the system during the relevant balancing period. The principle is to reduce the TSO's role in balancing activities as much as possible.

5.6. Network users shall have access to a liquid short-term wholesale gas market or to sources of flexible gas (including the associated infrastructure) to trade in order to be in a position to balance their portfolios. TSOs shall not impose barriers to development of liquid short term markets in the development of their balancing rules.

5.(B). INTERIM STEPS

5.7. In the absence of a liquid short-term wholesale gas market or information being updated during the balancing period, or in order to facilitate new entry (including, for example, into the market for non-daily metered customers), imbalance charges may be based on a forecast off take profile (provided by the TSO) and proportionate to deviations between network users' inputs and forecasted off-take profiles day-ahead.

5.8. Groups of network users may be entitled to aggregate their inputs and off-takes within a balancing zone, after the end of the relevant balancing period.

5.9. TSOs may provide network users with tolerance levels that shall reflect genuine system flexibility and user needs and address in particular the needs of small users and new entrants. These tolerances may be free. The level of tolerances allocated to each network user shall be designed so as to not create discrimination, in particular towards network users with smaller gas portfolios.

8. TSO obligations on information provision

8.1. Introduction

As highlighted in Part I, timely information to network users on their balancing position is critical to achieving market based balancing and greater EU market integration. Both system and network user input and off-take information needs to be made available in a clear, timely manner and on the same timescale to all system users to enable them to take necessary actions to correct their imbalances. It is also important that network users are aware of actions by the TSO in buying and selling of gas from network users, other TSOs and storage providers. Regular information may (depending on the design of imbalance charges) also be required on the overall status of the system. Consistency across Europe is also required in how information is published to prevent information barriers hindering cross-border trade.

8.2. What are the issues?

Limited ability of network users to assess their imbalance risks: For market based balancing to develop, it is essential to ensure that sufficient information is provided to all market participants on the level of imbalance within the relevant pipeline system so as to assist network users in assessing the potential imbalance charges that they might incur. If network users do not have timely information, the risks of imbalance are higher because they are not enabled to take the necessary action to reduce the imbalance within the balancing period. Consequently network users could face higher imbalance charges and the TSO could be forced to take more balancing actions. This drives up costs.

Risks of discrimination: a lack of transparency also causes inefficiencies through asymmetric information. This is because some network users, perhaps due to their market or historical position, will have better information than others. This creates an uneven playing field and barrier to entry distorting competition.

8.3. Information obligations under Gas Regulation 715/2009

The Gas Regulation 715/2009 (and its recently amended Annex 1 on transparency¹⁰) contains certain requirements regarding gas balancing. In particular, it sets out obligations on TSOs to:

- provide sufficient, well timed and reliable on-line information on the balancing status of network users free of charge. This information shall reflect the level of information available to the TSO and the settlement period for which imbalance charges are calculated – under Article 21(2);

¹⁰

http://ec.europa.eu/energy/gas_electricity/doc/gas_committee/2010_05_31_draft_commission_decision_regulation_2009_0715.pdf

- make public ex-ante and ex-post supply and demand information, based on nominations forecasts and realised flows in and out of the system. The level of detail of the information that is made public shall reflect the information available to the TSO – under Article 18(6);
- publish measures taken as well as costs incurred and revenue generated to balance the system – under Article 18(6);
- publish rules on balancing and methodology for the calculation of imbalance charges - under Annex 1: 3.1.2(g);
- if applicable, publish the flexibility and tolerance levels included in transport and other services without separate charge, as well as any flexibility offered in addition to this and the corresponding charges – under Annex 1: 3.1.2 (h);
- provide to each network user, for each balancing period, its specific preliminary imbalance volumes and cost data per individual network user, at the latest one month after the end of the balancing period. Final data of customers supplied according to standardised load profiles may be provided up to 14 months later. In so far as such information is provided by a third party, TSOs shall be exempted from this provision. The provision of this information shall respect confidentiality of commercially sensitive information – under Annex 1: 3.4 (3);
- where flexibility services, other than tolerances, are offered for third party access, publish daily forecasts on a day-ahead basis of the maximum amount of flexibility, the booked level of flexibility and the availability of flexibility for the market for the next gas day. The TSO shall also publish ex-post information on the aggregate utilisation of every flexibility service at the end of each gas day. If the national regulatory authority is satisfied that such information could give room to potential abuse by network users, it may decide to exempt the TSO from this obligation (Annex 1: 3.4 (4));
- publish per balancing zone the amount of gas in the transmission system at the start of each gas day and the forecast of the amount of gas in the system at the end of each gas day. The forecast amount of gas for the end of the gas day shall be updated hourly throughout the gas day. If imbalance charges are calculated on an hourly basis, the TSO shall publish the amount of gas in the transmission system on an hourly basis. Alternatively, TSOs shall publish, per balancing zone, the aggregate imbalance position of all users at the start of each balancing period and the forecast of the aggregated imbalance position of all users at the end of each gas day. If the national regulatory authority believes that such information could give room to potential abuse by network users, it may decide to exempt the TSO from this obligation (Annex 1: 3.4.(5)).

The requirements to provide supply and demand forecasts as well as historic (or ex-post) information on actual flows allows network users to understand their position (in terms of inputs and off-takes to and from the system) as compared to the overall position of the system. This information is particularly important where imbalance charges vary to reflect either the amount of imbalance or the direction of the imbalance. For example, in two priced systems there is a distinction between positive imbalances (i.e. where a network user is inputting more gas than it off-takes when the system overall is short of gas or vice versa) and a negative imbalance (where a network user inputs less gas than it off-takes and the system overall is short of gas). However, the information is still valuable for network users (regardless of the balancing arrangements) in being able to see whether spare capacity (i.e. unused capacity) is likely to be available, which is useful for access to networks.

It is also important that network users have information on how imbalance charges are calculated. Network users need to understand to what extent imbalance charges are paid by those that cause the imbalance or are part of transmission tariffs and whether the tariff varies according to the amount of imbalance or direction. This is important for network users to be able to measure the potential impact of imbalance charges and to provide them with the incentives to balance. Network users also need information on the price of gas in the wholesale market (which we recognise will only emerge as liquidity develops) in order to understand the costs of trading to balance their positions. (However, the latter information would not need to be provided by the TSO).

While the enhanced obligations on TSO outlined in the Gas Regulation 715/2009 are welcome, they are high level and in part potentially subject to exemptions from the NRA. For example what does “well timed and reliable information” as outlined in Article 21(2) of the Gas Regulation 715/2009 mean in practice? Furthermore the provisions outlined in Annex 1, 3.4(5) may not be sufficient to achieve the target model. To achieve the target model, network users will need within day information with regular updates of their own input and off-takes which must be compatible with nomination and re-nomination times. Therefore it may be necessary through the network code to provide more detail on providing these obligations in practice to ensure a consistent approach across the Member States. We would welcome views on whether the framework guideline should introduce requirements regarding TSOs’ information provision in addition to existing legislation.

8.4. Pilot framework guideline proposal

4. TSO INFORMATION PROVISION OBLIGATIONS

4.1. Aggregate network user input and off-take information needs to be made available by the TSO in a clear, timely manner and on the same timescale to all network users in order for them to be able to take necessary actions to correct their imbalances. Network user specific (but market sensitive) information should be made available to the relevant network user in a similar manner.

4.2. It is also important that network users are aware of actions by the TSO in buying, selling of gas from network users or other TSOs. Regular information is also required on the overall status of the system. Consistency across Europe is also required in how information is published to prevent information barriers hindering cross border trade.

4.3. The network code shall require TSOs to set out the detailed information needed to comply with the provisions outlined in the target model below.

4.(A). TARGET MODEL

4.4. TSOs shall provide, free of charge, to each network user the available information regarding its inputs on to the system and off takes from the system at appropriate intervals during the balancing period in order for network users to be able to balance their portfolios.

4.5. In accordance with Chapter 3 of Annex 1 to Regulation (EC) No 715/2009 (on conditions for access to the natural gas transmission network) TSOs shall publish, per balancing zone, the amount of gas in the transmission system at the start of each gas day and the forecast of the amount of gas in the transmission system at the end of each gas day. The forecast amount of gas for the end of the gas day shall be updated on an hourly basis throughout the gas day. If imbalance charges are calculated on an hourly basis, the transmission system operator shall publish the amount of gas in the transmission system on an hourly basis. Alternatively, transmission system operators shall publish, per balancing zone, the aggregate imbalance position of all users at the start of each balancing period and the forecast of the aggregated imbalance position of all users at the end of each gas day. If the national regulatory authority is satisfied that such information could give room to potential abuse by network users, it may decide to exempt the transmission system operator from this obligation.

9. Balancing periods

9.1. Introduction

The balancing period is the period in which network users must balance their portfolios. At the end of the balancing period, network users will face imbalance charges if their portfolio is not in balance and their balancing position will be neutralised. This section focuses on whether, and if so how, balancing periods should be harmonised across Europe.

9.2. What are the issues?

In the majority of Member States there is a daily balancing system in place. Other countries have hourly systems (Austria) whilst in others a monthly (Czech Republic, Greece) or even an “evergreen” balancing account is used (Portugal, Romania). However, sometimes there are differences between the notional and the effective balancing interval, for example, where a daily balancing interval applies but imbalances are also determined and charged on an hourly basis. Different balancing periods may also apply to different types of users within one system (for example, where specific profile requirements apply in relation to CCGT power stations).

The difference in balancing periods creates arbitrage opportunities for network users between zones, as gas flows go from daily into hourly markets in order to avoid imbalance charges, which may distort gas balancing in daily zones if the balancing costs are not correctly allocated. Similarly, where daily balancing is used in two adjacent systems the differences between the start of the gas day hamper gas trading across these systems, as daily products differ. Flows caused by inefficient arbitrage opportunities may distort cross-border trade or pose challenges for balancing. Furthermore, where nominations are taken as a basis to calculate network user imbalances, the different nomination lead times between neighbouring balancing areas, or between different categories of systems users in one and the same area, may restrict the opportunities for network users to balance their own portfolios by trading gas with other network users in one or more balancing areas.

The length of balancing period often relates to the physical characteristics of the balancing zone. For example, in smaller balancing zones with lower levels of linepack or other flexible sources, hourly balancing or hourly constraints, particularly for customers with large off-takes (such as power stations), are often used to ensure that network users keep their flows within manageable ranges, which reduces the balancing actions required by the TSO. Network users have expressed a preference for daily balancing periods without hourly constraints as it provides them with more time and opportunity to balance their portfolios and avoid imbalance charges. If network users trade to balance their portfolios this will help develop liquidity in the gas wholesale markets. However the question is whether TSOs are able to rely on the market to balance systems within the gas day or whether more balancing actions will be needed by TSOs if daily balancing periods are implemented.

There is an interaction between the increased use of renewable sources of electricity and gas markets. Many of the renewable sources of electricity, such as wind power, are intermittent. Gas powered CCGT plants are often used to compensate for this intermittency. As a result, these gas fired power plants require gas on a profile that may not be flat or aligned with gas supplies. As the use of renewable sources of electricity increases, this may create new challenges for future gas balancing regimes.

9.3. What are the policy options?

We consider three options for imbalance settlement periods: an hourly system; a daily system (with a single gas day for all of Europe) and a cumulative system. Below, we describe each option in turn and then assess it against the common criteria.

A further point of discussion is whether or not balancing periods need to be harmonised. This discussion is included in the summary of analysis of policy options section.

Option 1 – Hourly system

Description of policy option

Under this option, every TSO would be required to adopt a system for the settlement of imbalances on an hourly basis. Imbalances could also be settled less frequently than hourly but on an intraday basis. This may be the result of intraday restrictions where these restrictions mean that network users pay imbalance charges if they do not comply with the restrictions. We referred to this in Chapter 7.

Assessment against criteria

- **Facilitating competition and integration.** Hourly balancing would incentivise network users to balance their positions closer to real time, which may reduce the need for TSOs to take residual balancing actions. Where a liquid intraday gas market exists hourly balancing may be an efficient provision. However in the absence of liquid wholesale gas markets, hourly balancing may create significant barriers to entry to the market. Many new entrants without access to flexible gas and/or flexibility services offered by the TSO to match the hourly balancing period would not be able to efficiently manage their risk exposure. Small market participants would also not have the capacity to deal with the frequency of data required for network users to correct their imbalances on an hourly basis.
- **Transparency and non-discrimination.** Market participants require access, within the hour, to appropriate information to be able to manage their portfolios on an hourly basis. Hourly balancing information is currently not made available to network users and the wider market in many parts of Europe. Until this can be provided, hourly balancing would result in a sub-optimal arrangement from a transparency perspective. Hourly balancing may also lead to discrimination towards new entrants and small participants where these do not have effective access to hourly flexibility, including the ability to compensate overall imbalances that bigger participants have because of their holding of large supply portfolios.

- **Feasibility.** The implementation of hourly balancing across Europe will vary depending on the Member State's current balancing period. Clearly, for Member States which already operate hourly balancing periods the changes would be insignificant. However, for systems moving from daily to hourly balancing it would require significant changes, including to metering, collection of data and to IT systems to introduce hourly nominations. Traded markets are daily based partly because upstream production contracts are daily based, and as such changing production flows to a higher frequency could impact on efficiency and safety and potentially increase costs.
- **Transitional costs:** Those balancing zones that are moving from a non-hourly balancing regime to an hourly one may incur significant implementation costs. Systems of TSOs and network users would need to be updated to cope with significantly larger amounts of information. In addition, data would need to be provided to allow network users to react to signals provided by the hourly imbalance charges, which potentially means more frequent than hourly updates. It is likely that the balancing information systems would need to be rebuilt.
- **Direct operational costs:** Compared to a daily balancing regime, the direct operational cost for network users may be increased significantly with the introduction of hourly balancing regimes. In a non-hourly balancing regime, it is not necessary for all network users to monitor their positions at every hour of the day. Many network users may be able to deal with their position in the balancing mechanism during normal working hours. In an hourly balancing regime, network users have to monitor their balancing position at every hour throughout the day. This means that some network users, which currently only trade during normal office hours, may be required to introduce operations at every hour of the day.

Option 2 – Daily system

Description of policy option

Under this option, every TSO would be required to adopt a system for the settlement of imbalances on a 24-hour basis. At the moment the timings of the gas day vary across Europe, which means that the timing of the settlement of imbalances would differ. The EASEE-gas standard is for the gas day to run from 6am-6pm but this may vary where the countries are in different time zones. In some of the Eastern European Member States the gas day is from 8am-8pm, in Spain it is from midnight to midnight¹¹. Therefore, this option will include the requirement for TSOs to agree on a common gas day (opening and closing simultaneously across different gas systems) across Europe.

¹¹ Spain is in process of legally implementing EASEE-gas day at the borders, currently EASEE-gas day is being applied by TSOs under OBAs

As discussed in Chapter 7, an interim step may be for network users to be required to balance against their inputs and off-takes for the relevant day or against a predicted profile for the relevant day. In either case, it is important for network users to have access to flexible gas and the corresponding capacity on a daily basis in order to balance their portfolios by the end of the gas day. Where network users need to balance against the off-takes, which are updated during the gas day, they need additional access to flexible sources of gas in order to deal with situations where actual off-takes deviate from expected off-takes.

Assessment against criteria

- **Facilitating competition and integration.** Longer balancing periods present a number of benefits for the development of competition in gas markets. The implementation of a 24-hour balancing system would give more opportunities for network users to trade or net off their imbalances during the gas day, either individually (fluctuations within a network user's portfolio) or against each other (through the gas market), therefore stimulating new entry and market liquidity. Over the course of a longer balancing period imbalance positions are more easily managed. Network users can correct their balancing status during the balancing period. If, for instance, they become aware as the day progresses that their forecasts for that day were inaccurate, they can adjust the volume of gas entering the system. A 24-hour period would also give more time for available sources of flexibility to be used (daily sources of flexibility are more common than hourly ones). The transaction effort for the network users is kept to a minimum.
- **Transparency and non-discrimination.** For daily balancing network users would still need relevant information to be provided regularly. In principle, daily balancing is non-discriminatory but can leave the TSOs to undertake more balancing actions within the gas day and target lead to less targeted imbalance charges on those network user that cause the imbalances than in hourly balancing regimes (where the originators of imbalances can be more easily targeted through imbalance charging). However, this can to a certain extent be alleviated if imbalance charges reflect the value of the linepack since network users would be paying for the linepack TSOs used to balance the system during the balancing period.
- **Feasibility.** A common 24 hour balancing period may raise system operational risks in smaller systems and in systems with low levels of linepack or other sources of flexible gas, particularly in relation to customers with potentially significant swings in gas off-takes (i.e. electricity power stations). Smaller balancing zones may need to apply hourly constraints to ensure that the system pressure operates within the appropriate range.
- In terms of introducing a common gas day across Europe, this will require network users in some Member States to nominate and settle their imbalances at different times in comparison to the current situation. In terms of impact, a relevant consideration may be where the timing means an early start, whether this adversely impacts on smaller network users without a 24-hour trading team. Another consideration is whether the changes to contractual arrangements and direct costs incurred by network users (IT systems, revised supply contracts) are significant, which we would expect ENTSO-G to consider in their impact assessment.

- **Transitional costs:** For those changing from an hourly system to a daily system there could be an impact on costs, as IT systems would need to change to allow for daily nominations, potentially at different times if required by the harmonised gas day as opposed to hourly nominations.
- **Direct operational costs:** Compared to shorter balancing periods, operational costs for network users would be lower in a daily balancing regime. Network users would only need to balance towards the end of the gas day, rather than operating in the balancing market at every hour. Compared to longer balancing periods, a daily balancing regime may result in additional direct costs to network users.

Option 3 – Cumulative system

Description of policy option

This model does not define the length of balancing periods, but defines these balancing periods according to the actions taken by the TSO. Under this option no imbalance charges are incurred unless the TSO takes an action. This means that, as long as the system is moving within a defined range, no imbalance charges are incurred. Only when the system's position moves beyond that range and the TSO therefore needs to take an action to restore system balance network users are charged imbalance charges according to their positions at that point in time. A model similar to this is being introduced in the Netherlands.

Assessment against criteria

- **Facilitating competition and integration.** Where market participants have access to liquid markets and have sufficiently regular information on the balance of their portfolios and on the level of imbalance in the overall system (in order to be able to assess whether imbalance charges are likely to occur), this system would promote trading and competition among market participants. If sufficient information were published and made available to market participants in neighbouring balancing zones, then it could also stimulate cross-border trade. The duration of the balancing period will vary, at times of low demand it may be very long (several days) but at other times when the system is tight it may be very short (several times within day). Therefore, in the absence of liquid markets or network users having access to flexibility, when the system is tight this arrangement could present the same problems to network users (particularly new entrants) as an hourly arrangement.
- **Transparency and non-discrimination.** Provided that the relevant information was made available then it would be sufficiently transparent. Depending on how the imbalance charge was designed then it would also be non-discriminatory. One aspect of a cumulative balancing regime is that the same portfolio imbalance may or may not require the network user to pay an imbalance charge, depending on whether the system faces an imbalance or not. This may be efficient in terms of encouraging network users to balance their portfolios when this is needed but we may need to consider whether it avoids particular network users being able to free-ride) i.e. being out of balance but avoiding imbalance charges).

- **Feasibility.** As with other balancing periods, this arrangement will require regular (including within day) information provision. It may also require more complex arrangements for the calculation of imbalance charges to ensure that they are fairly targeted. This may be more complex than an arrangement whereby all market participants must balance their portfolios at a specific point in time.
- **Transitional direct costs:** As is the case with other balancing periods, the main costs will be for IT systems.
- **Direct operational costs:** A comparison of direct operational costs incurred through this option with direct operational costs incurred through other options depends on system conditions. Where a system is tight and the occurrence of imbalance charges is frequent, operational costs to network users would be significant compared to all other options. If, on the other hand, the occurrence of imbalance charges is infrequent due to a relatively larger system, direct costs incurred through this option would be lower compared to the other options outlined in this section. This is because there may only be a very limited requirement for network users to be subjected to imbalance charges.

9.4. Recommendation

There is trade-off between a longer balancing period, which is more attractive to market participants (particularly new entrants) and a short balancing period, which allows the TSO to ensure that flows within the day are maintained within the required range. A longer balancing period (daily or longer) allows market participants more time to access flexible sources of gas or to trade out any imbalances in their portfolios and reduces their transaction costs. This is particularly important for new entrants in markets with low levels of flexibility, where an hourly regime is considered a significant risk. The key issue is whether there is sufficient market liquidity or access to flexible gas and network capacity for market participants to balance their positions in whatever the balancing period defined (if markets are liquid enough an hourly regime would not present such a barrier). While balancing rules cannot in themselves develop liquid markets as other factors, such as ensuring that flexible sources of gas are released to the market and not retained by incumbents, play a significant part, a daily balancing regime may lower the barriers to new entry. This may stimulate trade and thereby increase liquidity in developing markets, which is why we recommend this as the target model.

However, in small networks with low levels of line-pack or other sources of flexible gas, TSOs are likely to perceive that a daily balancing period (or longer balancing periods) is creating a risk to maintaining the system within safe operational ranges. Some concerns have been raised that unless network users have appropriate incentives through the imbalance charge arrangements to flow flat and react intraday to unexpected changes in off-take, then daily balancing periods will result in TSOs having to take more balancing actions during the gas day. Also if TSOs do not have access to sufficient flexible gas during the gas day to manage these imbalances, this will lead to TSOs reserving in advance fall-back sources of flexible gas, which may further limit the flexible gas available to the market and reduce liquidity. As such, it may be necessary to permit within-day constraints (through some kind of obligation on market participants) before moving to a daily balancing period without hourly constraints.

An alternative could be to oblige network users to announce flow programs and restrict re-nomination within-day to minimum lead-times or certain percentages. In this model, the TSO would take responsibility for balancing during the balancing period. This would increase rather than reduce the TSO's balancing actions and reduce network users' role during the balancing period. The TSO taking responsibility for intraday profiling balancing may be more efficient because the TSO may be better placed to profile the overall network portfolio. However, it may be less efficient if the TSO has to undertake a large amount of balancing actions which intraday trading by network users could avoid.

Cumulative periods are an alternative to fixed balancing periods. They focus more on the overall balance of the system and may be more efficient in that they do not require individual market participants to balance their positions unless overall the system is out of balance. In some respects, this focus is more efficient than a fixed period approach. However, only imposing imbalance charges when the system moves beyond a defined range may be more complex than a fixed balancing period and may pose particular challenges for new entrants or small businesses. Also, in developing markets a fixed balancing period may stimulate more daily and within-day (cross-border) trading than a cumulative regime.

In terms of whether the balancing regimes should be harmonised, we consider that removing the differences in balancing periods will facilitate market integration. From a network user's perspective, if balancing periods are harmonised it will facilitate the managing of portfolios and cross-border trade. Having a common balancing period may also be important if TSO cross-border balancing is to be introduced, whereby TSOs act as intermediaries to facilitate cross-border trade of flexible gas (see Chapter 12). For this reason, we recommend that in the network code ENTSO-G does introduce a common balancing period, including common start and end times and that any deviations from this are exceptions, and subject to approval by the relevant regulator.

9.5. Pilot framework guideline proposal

6. BALANCING PERIODS

6.1. The balancing period reflects the time interval at the end of which network users are subject to imbalance charges for any deviations accumulated over the duration of this interval, between their inputs into and off-takes from the system. In other words, after the balancing period network users will be billed for any imbalance charges and the imbalance of their portfolios shall be set to zero. For the avoidance of doubt, being financially settled after this interval does not preclude network users from engaging in portfolio balancing activities during the interval. This also does not preclude network users from ex-post trading after the balancing period, where this is provided for in national balancing rules as provided for in 5.8.

6.2. ENTSO-G shall develop a gas balancing network code that harmonises the balancing period in accordance with the target model. It shall consult on the cost/ benefit impacts of harmonising the balancing period. This will require a common starting time and ending time of a common gas day. ENTSO-G will also consult on the costs and benefits of implementing the target model.

6.(A). TARGET MODEL

6.3. The balancing period determined for a transmission system shall be characterised by a daily interval, at the end of which network users are cashed out for any deviations, as accumulated over the course of the preceding 24 hours, between their inputs and off-takes from the system.

6.4. TSOs may, subject to public consultation and approval by the relevant NRA, implement within-day restrictions on network users, where this is necessary to manage the system. This may apply to customers with large inputs or off-takes (or particular injection profiles). Where such restrictions apply, TSOs may impose on network users an imbalance charge for imbalances in accordance with [section 7 of this pilot framework guideline]. These restrictions shall not act as a barrier to new network users entering the market or to the development of competitive markets.

6.(B). INTERIM STEP

6.5 As an interim step, the balancing period in a particular balancing zone can be any period other than daily, subject to approval by the relevant NRA. This should be reflective of the current and potential future physical characteristics of the relevant system and the connected resources of flexible gas.

10. TSO buying and selling of flexible gas & balancing services

10.1. Introduction

Where network users fail to balance, TSOs will need to ensure that the collective inputs and off-takes are in balance to ensure that the system remains in balance. This section considers specifically the methods that TSOs use to buy and sell balancing gas and to procure balancing services; and the impact that these methods have on the development of competition and cross border trade. It also considers the different products associated with the procurement of balancing services including their time horizon, location, and how products of different durations may inhibit (or facilitate) national and cross border gas trade.

10.2. What are the issues?

As set out in the problem identification section, the method by which TSOs procure balancing services has an impact on the cost of balancing which should be reflected in the imbalance charges. Some methods may make it more difficult for imbalance charges to be cost-reflective than others. Depending on what method is used, it may also result in lower levels of liquidity in emerging gas wholesale markets. We expand on these issues briefly below. TSO cooperation regarding the exchange of balancing services across borders is an issue that should also be looked at in this context. This is addressed in Chapter 12.

Impact on imbalance charges

The methods by which TSOs procure gas to balance the system differ significantly across Europe, which may render it difficult to establish a similar approach to cost reflective imbalance charges in all Member States as required by the current Gas Regulation. According to the KEMA report, TSOs procure gas via 'market-based' mechanisms (e.g. through balancing platforms) only in a small number of countries. In many Member States, TSOs rely (or even depend) instead on regulated or bilaterally negotiated long-term contracts for balancing services with storage operators or gas companies in other countries. Where gas is procured via long-term contractual arrangements, it is difficult for the (daily) imbalance charge to reflect the actual cost to the TSO in procuring gas on that day; which may then lead to imbalance charges being indexed to gas prices in other markets.

The KEMA report also noted that balancing products are often of a medium or long-term nature (e.g. 1 month to 1 year's duration or longer) and there is limited use of daily or intraday products. This is because in some Member States, TSOs reserve flexibility in advance through monthly or annual contracts. If a product is procured on a daily basis, this will be more reflective of actual costs than if it is procured on a monthly or annual basis. Furthermore it will be easier to achieve a common market for wholesale and balancing gas if the products relevant for TSOs and the products relevant for network users refer to a similar time-frame. However, it is also the case that TSOs need access to flexible gas and therefore may need access to some long-term products (i.e. greater than day-ahead). The extent to which TSOs rely on long-term products may also depend upon whether the TSO has access to sufficiently liquid markets or balancing platforms.

Impact on liquidity & cross-border trade

The methods by which TSOs procure balancing services across Europe can impact on market liquidity within national markets even though the volume of balancing gas accounts for a small part of the transported amount. For example, if a TSO reserves the majority of flexible sources (and associated capacity such as storage and LNG capacity) for its own use in balancing this gas is not available for network users, which will reduce liquidity in the wholesale gas market and the ability for network users to balance their portfolios over the relevant balancing period. Where TSOs procure all of their gas in advance (on long term contracts, annual or monthly basis) they may reserve more gas and capacity than they actually need, which in turn may reduce the amount of flexible gas and capacity that would be otherwise offered to the market. We would welcome stakeholders' views on whether it is appropriate to use market-based procurement methods as set out in this chapter to procure such storage or LNG capacity.

A lack of consistency across borders between the products being traded may also inhibit cross-border trade.

Impact on TSO cooperation

The integration of smaller balancing zones presents an opportunity to increase liquidity in European gas markets and supports greater efficiency of balancing services procurement. We discuss these issues further in Chapter 12 on TSO cooperation.

Specific products for TSOs

The TSO is likely to require some balancing services which network users would not typically purchase. For example, some of the balancing actions TSOs take are in response to constraints in the network at particular locations. In order to balance the system, the TSO will need to procure balancing services at a particular entry point of the system. In many Member States the cost of these balancing services are often spread across all network users. Due to the system constraints, there will be fewer sellers able to provide this type of balancing service, known as local balancing. We would therefore welcome stakeholders' feedback on whether market-based procurement methods are appropriate for TSO specific products, such as the provision of locational flexibility. (Locational imbalance charges could be used to incentivise gas flows in particular points across the system but this is not an issue that we consider in this pilot framework guideline).

10.3. What are the policy options?

We consider four different policy options for procurement methods: wholesale market procurement; a separate balancing market (or platform); tenders for balancing gas; and negotiated contracts. Below, we describe each option in turn and then assess it against the common criteria.

Option 1 – Procurement through the gas wholesale market

Description of policy option

One option is for TSOs to buy and sell gas and procure balancing services in the same short-term wholesale gas market where network users would trade gas between themselves. This wholesale gas market could operate on a day ahead and/or a within day basis; and this would be reflected in the nature of the products being bought and sold on this market.

In some Member States, the TSO already buys and sells gas on the same wholesale market as network users. For example, in Great Britain the TSO buys and sells gas on the same intraday market¹² as network users; and this represents the only means for the TSO to purchase balancing gas. In other Member States, TSO participation in the wholesale gas market for balancing purposes is complementary to other methods of procuring balancing services, such as balancing platforms or tenders¹³.

For the wholesale market option, TSOs and regulators will need to be sufficiently confident that the TSO can meet all of its residual balancing requirements through a liquid and competitive wholesale market and thereby ensure system integrity.

¹² Known as the 'OCM', or On-the-day Commodity Market.

¹³ The KEMA report (page 37) provides an overview.

Assessment against criteria

Assessing this policy option against each of the relevant assessment criteria in turn:

- **Transparency and non-discrimination.** This criterion can be met, as long as the rules for short-term wholesale gas markets have been designed accordingly. The market rules will need to have certain features in order for the market to operate efficiently for all parties, and to avoid discrimination by the TSO in favour of particular buyers or sellers. For example, they may need to be anonymously cleared, screen based exchanges, with pricing information published in real time. Intraday markets may work best when run by independent operators. Other specifications may be able to meet this criterion too.
- **Facilitating competition and integration.** While TSO trading on the wholesale market cannot itself create liquidity it contributes to increased market liquidity. Market liquidity will then be higher and less dispersed than if the TSO acts in a separate market or through dedicated procurement processes. This in turn reduces barriers to new entry and encourages cross-border trade. It would be possible for traders in other markets to participate more easily assuming the short-term wholesale market is transparent and non-discriminatory; again, this could increase liquidity. The existence of deeper, more liquid markets also makes it possible to have more robust prices indices for gas, which is a pre-condition for efficient cross border trade and further integration of the European single market. It would allow for daily imbalance charges to reflect more easily the actual costs to the TSOs in procuring gas on the day. On days where the TSO does not require balancing services, the price index of this wholesale market could serve as the basis for calculating imbalance charges.
- **Feasibility.** This option requires the pre-existence of a liquid short term gas market where multiple parties have the ability to trade gas with each other. Liquid short term gas markets (both intraday and day ahead) would take time to develop where they do not yet exist. One key barrier that could hamper this development is the lack of access to flexible sources of gas and the associated capacity, for example if such flexible gas remains concentrated in the hands of a few (incumbent-affiliated) network users or is directly contracted to the TSO. It may not therefore be possible to implement this option in the short term in balancing zones where there is limited diversity in flexibility and congested capacity in the interconnection to adjacent balancing zones, but it may be possible in the long term. However, in other parts where liquid short-term gas markets already exist (or may soon exist), it could be retained as the preferred policy option even in the short term. This option can also be used for the procurement of local balancing services.
- **Direct operational costs.** Some direct operational costs to TSOs and those network users that provide balancing services are incurred, because balancing services would be traded throughout the day. The operational process of trading is likely to involve less effort in some of the other options.

Option 2 – Procurement through a stand-alone balancing market (or platform)

Description of policy option

A second option would be for TSOs to buy and sell gas and to procure balancing services on a balancing market or platform that is kept separate from any short-term wholesale market. The purpose of this balancing market would be for the TSO to buy and sell gas and procure balancing services for daily balancing purposes, on a day-ahead and/or intraday basis. This option would most likely take the form of a balancing platform which enables the TSO to buy and sell balancing gas from third parties through a system of bids and offers. The products on this platform would be day-ahead or intraday.

In some Member States, including France, Austria, Hungary and parts of Germany, TSOs hold auctions to buy and sell gas in a separate balancing market on a daily basis. This is open on a day-ahead basis; and the pay-as-bid principle is used to remunerate providers of balancing services. These auctions are an example of balancing platforms. The gas market initially relies on a separate balancing platform where the TSO can buy and sell balancing gas; as the market matures and becomes more liquid over a number of years, this platform can be abolished.

A balancing platform could exist alongside other means of procuring balancing gas. In practice, when moving to market-based balancing rules countries may face a choice of whether to adopt a balancing platform where there is not sufficient market liquidity, or whether to move directly to TSO procurement in the wholesale gas market (Option 1).

Assessment against criteria

- **Transparency and non-discrimination.** In principle, a balancing platform can meet this criterion. There should be no restrictions on who is able to sell gas and offer balancing services on the platform. In particular, it is important that there are no restrictions on owners of flexibility being able to offer this on the platform.
- **Facilitating competition and integration.** Under this option, the TSO would effectively act as a market-maker in the absence of a liquid short-term wholesale gas market. This would enable third parties with ownership or access to flexible gas to participate on the platform, including parties from neighbouring markets. It would also allow for a clear measure of the daily gas balancing costs of TSOs to emerge; and hence for daily imbalance charges to reflect more easily the costs that TSOs incur in procuring balancing gas on a daily basis.

However, a separate balancing platform could reduce the amount of gas sold in the wholesale gas market (where both exist alongside each other); and hence reduce liquidity in the latter. Not only would trades be separate, but network users with access to flexible sources of gas might have a preference for trading on the balancing platform to better hedge their imbalance risks. Reduced liquidity on the wholesale market could hamper the wider development of competition. However, there may be a temporary need for the two to coexist alongside each other.

- **Feasibility.** This option could be implemented, at least in Member States where sufficient sources and providers of flexible gas are available. Where a liquid daily gas market does not exist, a balancing platform may help to reassure TSOs that they will be able to procure balancing services at competitive prices. However, where access to flexible sources of gas is limited or concentrated in the hands of a few companies, it may not provide sufficient reassurance to TSOs that they will have access to balancing services through the platform (unless there is a market maker obliged to provide this gas); or that service offers will be priced competitively. Also, there may not be an economic rationale for setting up a balancing platform if, for example, there is only one supplier of flexibility; or if because of system characteristics (e.g. an abundance of linepack within a certain system) the TSO need not procure balancing gas frequently or in significant quantities.
- **Direct operational costs.** TSOs would incur IT costs in setting up such a platform which may entail the design of new information systems. In addition, running these information systems may incur a regular cost to TSOs.

Option 3 – Procurement through periodic tenders

Description of policy option

A third option is for TSOs to procure balancing services through periodic tenders, reserving flexibility in advance which they can then draw on as required for system or residual balancing purposes. In principle, the products tendered for can be of any duration, as best suited to meet the requirements of the TSO, for example annual, monthly, weekly, or even daily (although in this case the tender becomes like a daily balancing platform); the TSO will typically use these products not for their full duration but only for a part of it. For example, the TSO may draw on an annual product on certain days only. TSO may require different kinds of products depending on whether they require the gas for local balancing or residual ('non-local') balancing purposes.

Tenders for balancing services are used in a number of Member States, such as Belgium, France, Ireland and the Netherlands. In some Member States, they are the single method of procurement, whereas in others they feature alongside other methods.

Tenders could potentially be regarded as a market-based mechanism (albeit to a lesser extent than procurement through the wholesale market or balancing platforms), when TSOs use them to competitively procure balancing services from multiple providers. One key difference between tenders and balancing platforms is that in a tender competition occurs on a one-off periodic basis, whereas balancing platforms create an ongoing competitive process for the procurement of balancing gas on a daily basis. Another is that the TSO decides in advance on the acceptance of offers. Tender contracts will usually define conditions for the provision of flexibility services over a month, a year, or longer periods of time. In contrast, balancing platforms tend to be used for the purchase of short term balancing gas (day-ahead or intraday).

Assessment against criteria

Assessing this policy option against each of the relevant assessment criteria in turn:

- **Transparency and non-discrimination.** Tenders can be transparent and non-discriminatory assuming they are correctly designed and open to all parties. Timely and sufficient information would need to be provided to market participants engaging in the tendering process. In practice however, because of their one-off periodic nature, tenders may be less transparent and non-discriminatory than for example balancing platforms or gas wholesale markets; the TSO can change how it conducts the process from one tender to the next.
- **Facilitating competition and integration.** Tenders may provide fewer opportunities for market participants to compete for the provision of balancing services than procurement through balancing platforms or the wholesale market will. Competition may be compromised if the TSO contracts for more flexibility than is needed, reducing flexible gas for market participants. In addition, because of their bespoke nature tenders usually vary significantly between TSOs, which makes flexibility services more difficult to exchange across gas systems and reduces the opportunities for the integration of gas balancing across borders. Finally, depending on how they are designed, tenders may create barriers for new entrants to the market. This could be the case where the duration of the tender contract is too long or the amount of flexibility required (minimum tender lots) is too high for new entrants to be able to compete in the tender.
- **Feasibility.** The implementation of tendering for balancing services is unlikely to present major obstacles in most Member States. Tenders are already being used in several markets and the tendering process is not onerous.
- **Direct operational costs.** This option does not require specific investment in information systems. There would be administrative costs associated with the organisation of tenders; however the running costs, both to TSOs and to network users, are likely to be low compared to other options.

Option 4 – Procurement through long term contracts (or direct access to flexibility)

Description of policy option

TSOs may enter into direct bilateral contracts with individual market participants, providing them guaranteed access to balancing gas or other sources of flexibility, for example storage or flexibility provided by Distribution System Operators (DSOs). The KEMA report established this as a non-market based method for procuring balancing services, alongside other proprietary approaches, such as ownership rights or mandatory contracts.

Assessment against criteria

Assessing this policy option against each of the relevant assessment criteria in turn:

- **Transparency and non-discrimination** Negotiated contracts lack transparency in most of their elements. The ways of ensuring non-discrimination through negotiated contracts are limited.
- **Facilitating competition and integration.** Negotiated contracts do not allow for market parties to compete for the provision of the services that TSOs require. Moreover, the ability of new entrants to participate in a market hinges on the possibility of accessing balancing services on a competitive basis. A negotiated approach therefore creates barriers to competition and cross-border trade in European gas markets.
- **Feasibility.** Negotiated contracts are easier to implement than market-based instruments for procuring balancing services.
- **Direct operational costs.** This option is likely to incur the lowest direct costs both to network users and to TSOs. However, striking direct long term contracts may require some resource, for example legal, which may not be required under standardised processes in some of the other options.

10.4. Recommendation

TSO trading on the wholesale market to balance the system is the option that is the most market based. It provides for a transparent and cost-reflective price for the TSOs balancing actions, which is important when setting imbalance charges. Also where the TSO trades on the same market as network users, it does not compromise wholesale gas market liquidity, making this the most suitable option to facilitate competition and integration. However, given that in many Member States liquidity in the gas wholesale market is limited, it may be useful for TSOs to establish balancing platforms to buy or sell gas and other services to balance the system. A balancing platform, which is essentially a one-sided market as the TSO is always the counterparty to a trade, is also a market-based mechanism. It also allows for a transparent and cost reflective market price to emerge for the TSOs balancing actions. It is important that there are no restrictions on which parties can make bids to take and offers to provide flexible gas on the platform as otherwise this will reduce liquidity and discriminate against market participants. The only disadvantage is that it may reduce the flexible gas available to network users in the wholesale gas market and thereby reduce market liquidity. Therefore, in the long run, we recommend that TSOs set out a plan to integrate the balancing platform and the wholesale gas market as the latter develops to a sufficient degree of competition and liquidity. Also to avoid the risks of diminished liquidity we recommend that balancing platforms and short term gas markets (as the case may be) be used for the procurement of the majority of the TSO balancing needs.

However, where there are limited sources of flexible gas available, it may not be efficient to introduce a balancing platform or possible for the TSO to trade on a daily or within day basis to balance the system. The TSO may need to rely more on longer-term contracts (i.e. monthly, annually or longer) for its balancing needs. However, as explained in Chapter 11, it is still important for the calculation of cost reflective imbalance charges that the prices and terms and conditions in these contracts are transparent and that TSOs engage in open and transparent tendering processes. It is also important that TSOs reservation of flexible gas does not impede the development of the market. Therefore we recommend that the feasibility of releasing flexible gas back to the market, where possible should be evaluated and consulted upon by TSOs. In exceptional circumstances, where TSOs rely on a single source of flexible gas, it may be appropriate for the TSO to enter into a direct bilateral contract but the terms and conditions of this contract must be published and approved by the relevant NRA.

As highlighted elsewhere in the document, even where network users balance their portfolios, TSOs will still need to undertake balancing actions to manage constraints at particular locations on the system. To meet these needs, TSOs require physical gas or perhaps other balancing services to be provided at particular locations on the system or at particular times. TSOs need to be sure that physical gas will be delivered. In many Member States, TSOs reserve flexible gas or access to storage (and/or LNG) to meet these needs. However, physical or temporal gas products could be traded by TSOs on the wholesale market or balancing platforms. It may be argued that some long-term reservation of flexible gas or capacity is needed to ensure that TSOs are able to fulfil their balancing responsibilities. The key challenge is ensuring that the TSOs do not reserve flexible gas and/or storage or LNG capacity such that it impedes network users' access to these services. We welcome your views on whether TSOs should be permitted to reserve flexible gas and/or storage and LNG capacity within this context.

10.5. Pilot framework guideline proposal

8. BUYING AND SELLING OF FLEXIBLE GAS AND BALANCING SERVICES BY TSOs

8.1. In order for TSOs to ensure that the system is kept within safe operational limits, they need to be able to buy and sell gas and may also need to be able to buy balancing services.

8.2. The network codes shall require TSOs' procurement and sale of gas to be market-based. As such, TSOs should use the wholesale gas market or market-based mechanisms (such as balancing platforms) to procure gas in a transparent and non-discriminatory way.

8.3. The network codes shall require TSOs to procure flexible gas and related balancing services in a way that helps minimise the cost of balancing the system. For the procurement of flexible gas, they shall accept the lowest priced offers or highest priced bids (in other words to trade as close to the market price as possible). TSOs shall be cost neutral in relation to their balancing activities but NRAs may incentivise TSOs to procure efficiently by allowing them to retain a certain amount of revenue if balancing costs are minimised to a certain level, or require them to bear some of the costs if these are above a certain amount.

8.(A). TARGET MODEL

8.4. TSOs shall procure the gas they need to ensure gas transmission systems are in balance through buying and selling gas in the wholesale gas market on an equal footing with network users.

8.5. As such, a necessary pre-requisite is that the wholesale market offers sufficient liquidity for the relevant balancing zones.

8.6. Where the wholesale market is insufficiently liquid, balancing platforms shall be used for the procurement of the TSO's gas balancing needs. Balancing platforms may also be used when there is a liquid wholesale market, subject to approval by the NRA. When using balancing platforms TSOs shall buy and sell flexible gas transparently and on a non-discriminatory basis through a system of bids and offers in a balancing platform. Any network user shall be able to participate in the platform on an anonymous basis.

8.7. TSOs shall buy or sell short-term flexible gas products on the wholesale market or on the balancing platform (as the case may be), such as day-ahead and/or within day gas products. ENTSO-G shall define these products and related balancing services in the gas balancing network code, following consultation with stakeholders.

8. (B). INTERIM STEPS

8.8. Where a wholesale market is insufficiently liquid, the network codes shall provide for TSOs to procure a certain share of their flexible gas on the wholesale market or on a balancing platform. This shall be without prejudice to the application of the provisions in 8.9 and 8.10 below. TSOs shall specify the share in their national balancing rules, which shall be appropriate to the resources of flexible gas available.

8.9. Where there are not sufficient parties that can provide balancing gas through wholesale gas markets or balancing platforms competitive tendering processes may be used to procure long term flexible gas products. In this case, the tendering processes should be conducted on a transparent and non-discriminatory basis.

8.10. Exceptionally, where a Member State relies on one source of flexible gas, the TSO may enter into a bilateral contract with the provider of the flexible gas. The price of this contract should be cost-based. The price and the terms and conditions of this contract should be published and approved by the relevant NRA.

8.11. Where long term contracts for the procurement of flexible gas are already in place, the network codes shall provide for TSOs to release back to the market any surplus gas which is not required for its balancing purposes in any given balancing period, in order that network users have access to greater volumes of flexible gas. In order to finalise the network codes, ENTSO-G shall consult on the rules for procedure for the release of flexible gas.

11. Imbalance charges

11.1. Introduction

If network users fail to balance their portfolios, they will pay or receive ‘imbalance charges’ (a network user may receive rather than make a payment where the TSO has sold excess gas on its behalf). There is a wide variety of approaches to setting these charges across Europe. This section considers whether imbalance charges can be harmonised and how this may be achieved.

11.2. What are the issues?

Imbalance charges can present barriers to new entry

The Gas Regulation 715/2009 requires imbalance charges to be cost-reflective to the extent possible whilst providing appropriate incentives on network users to balance their inputs and off-takes of gas. In many Member States the imbalance charge is not based on the costs to the TSO in procuring additional gas (or selling excess gas) to balance the system. The imbalance charge is either calculated in advance based on charge/methodology fixed by the regulator or varies but is indexed to a reference price in a neighbouring market(s). Where the imbalance charge deviates from market prices to the network user’s detriment, this may act as a ‘penalty’, which deters new entry by market participants. Equally, if there is a lack of transparency about how the imbalance charge is calculated and market participants are unclear about the level of charges that may apply, this will also act as a barrier to new entry. A lack of new entry limits the development of competition in the market and further entrenches the market power of incumbent network users that have access to flexible gas and are better equipped to avoid an imbalance charge. Also, if the imbalance charge differs significantly from the costs incurred by the TSO, the TSO may recover more than the actual costs it incurred unless this additional revenue is passed back to consumers by the regulator and the TSO’s position is neutralised (i.e. it doesn’t make or lose money from balancing the system). If the TSO were to financially benefit (or lose) from taking balancing action, this may distort its incentives in encouraging and providing market participants with the means to balance. Therefore, imbalance charges which are based on the costs of TSOs balancing the system are important to the development of competitive and well functioning gas markets.

Imbalance charges may not incentivise market participants to balance

The Gas Regulation 715/2009 also requires imbalance charges to provide network users with the appropriate incentives to balance their gas inputs and off-takes. This is an important element towards achieving the goal of more of the balancing being done by market participants and less by TSOs.

If incurring the imbalance charge is less costly to network users than addressing their imbalances, this will not incentivise network users to balance their portfolios. Also it is important that charges are designed to target those that have contributed towards the system’s imbalance. If the costs of imbalance are shared across all network users this will also deter individual market participants from seeking to balance their portfolio.

Furthermore, imbalance charges can differentiate between market participants whose imbalance contributes to the overall system imbalance and one whose imbalance ‘helps’ the system. This is called a dual pricing mechanism. This incentivises network users not only to balance their portfolios but to help balance the system, which should help to reduce the need for the TSO to take balancing actions. For example, a market participant who is short of gas when the system is short of gas overall (or equally has a long position by injecting too much gas compared to off-takes when the system is long) is contributing to the system imbalance. Conversely a market participant who is short of gas when the system overall is long is helping to reduce the overall imbalance (or vice versa). In some Member States the imbalance charges benefit the market participants that help the system and place the costs on those that contributed towards the imbalance.

This raises the question about what is meant by a ‘benefit’. For example, it would suggest that the network user is paid for excess gas that it puts into the system when the system is short. However, there is a question as to whether the network user should be paid the market price or whether the charge should be lower in order to create an incentive for network users to balance their portfolios. However, incentivising shippers to help balance the system overall will help to reduce the need for the TSO to undertake balancing actions. It requires network users to have information during the balancing period about the system imbalances. We welcome your views on whether the costs of this outweigh the benefits.

In some Member States, the same charge is placed on all market participants with an imbalance. Under this approach, TSOs may have to undertake more balancing action as network users will have an incentive to balance their portfolios regardless of the system imbalance. Network users will have less need for information on the system imbalance, which may reduce the costs for TSOs. This approach may be more appropriate if the target model is for the TSO to be responsible for intraday balancing. Therefore, the type of imbalance charge and how it is targeted on those contributing to the system imbalance is an important aspect of the target model. It places the incentives on market participants to balance and defines the role of network users and TSOs in balancing.

Harmonisation of imbalance charges

A further issue is how to harmonise imbalance charges across Europe. Some imbalance charges are more cost reflective than others and some provide network users with more targeted incentives to balance their portfolios than others. However, some types of TSO procurement more easily provide for cost-reflectivity than others. For example, where a TSO procures balancing gas on the wholesale market or on a balancing platform, the cost of its balancing actions is transparent and straightforward for market participants to calculate. However, if the TSO procures most of its balancing gas via long term contracts, then an imbalance charge will need to be determined based either on the contract price or the price in the wholesale market (if one that is sufficiently liquid exists), which is why other reference prices may be used. Equally, in developing markets there may be a trade off between imbalance rules that are reasonably simple (i.e. a single imbalance charge) as long as they do not deter new entry and more complex rules (i.e. differentiated imbalance charges depending on whether the market participant contributes to or helps to reduce the imbalance) which may be more appropriate in more developed markets. Therefore, the implementation of cost-reflective imbalance charges, which give market participants appropriate incentives, is intrinsically linked to the development of market mechanisms for the procurement of balancing services.

While, it may not be possible to completely harmonise imbalance charges across Europe, and the Gas Regulation 715/2009 refers to imbalance charges being cost reflective to the extent possible, it is important that we define an agreed target model. As with all cross-border trade, where different approaches to charging exist there is a risk that differences would lead market participants to export their imbalance to the country that is least expensive for them. In practice this would depend on a number of factors, such as the existence of functioning markets or the availability of transport capacity needed for such types of arbitrage to take place. Shifting imbalances from one system to another could be beneficial if this is in response to system and market needs, but it could also be detrimental if it was conducted against the overall advantage of the whole system.

11.3. What are the policy options?

We consider three policy options for imbalance charges:

Option 1- Charges based on efficiently incurred TSO procurement costs on market-based mechanisms

The principle is that the imbalance charge is based on the marginal¹⁴ or the average price incurred by the TSO procuring gas either in the wholesale market or via a separate balancing platform for daily products. Either approach can be used but the marginal price will provide network users with a greater incentive to balance their portfolios (since this charge will be less favourable to the network user than the average price). The imbalance charge could also be differentiated to reflect whether the market participant has contributed to the system imbalance or whether the market participant helped to reduce the overall system imbalance.

¹⁴ For each balancing period when the TSO has taken an action, the marginal prices are the highest price the TSO has paid for procuring a unit of balancing gas and the lowest price the TSO has received for selling a unit of surplus gas during that balancing period.

One issue is how to calculate the imbalance charge for market participants with imbalances when the TSO has not needed to procure (or sell) gas on the wholesale market or balancing platform. In this case, there will not be a price paid by the TSO on the wholesale market or the balancing platform, yet the imbalance charge must reflect the cost borne by the TSO. One approach may be not to charge market participants imbalance charges but to only charge market participants when the TSO has had to take balancing actions on the market. This approach may incentivise shippers to balance according to the level of imbalance in the system rather than their individual portfolios. This may be perceived as efficient and reduces the need for the TSO to take balancing actions but may also create free riders.

However, even if TSOs do not need to take balancing actions, in some systems TSOs use linepack to balance the system, as such it may be appropriate to charge market participants for imbalances even when the system is overall balanced. TSOs could place a price on linepack, which may allow for a cost-reflective charge for such balancing actions to be derived. However, in most Member States, linepack is not sold to market participants and no value is currently placed on this.

Where no balancing action is required by the TSO, the imbalance charge could also be based on the price on the wholesale gas market or in the absence of a sufficiently liquid market, an average of the price on the balancing platform over a recent period of time. While this may not be reflective of the actual costs incurred by the TSO, it would be based on the costs that the TSO may face if it were to have undertaken balancing actions. The imbalance charge would need to be as cost-reflective as possible but in order to incentivise market participants to balance their portfolios, a small uplift may be needed. It is important that this uplift is not penal and does not deter new entry. It may be argued that uplifts reduce the cost reflectivity of the imbalance charge and therefore, should not be used. However, if network users are simply charged the market price it would not incentivise them to balance their portfolios. Therefore, there is a balance between cost-reflectivity and incentivising network users to balance. We welcome your views on the issues of the approach for imbalance charges when TSOs have not undertaken balancing actions.

Based on the above considerations, our assessment if it were to be applied as a common approach across the EU is as follows:

- **Facilitating competition and integration.** This option would help to reduce barriers that new entrants (who tend to be more exposed than incumbents to imbalance charges) may face if imbalance charges are ‘penal’ and dissociated with the actual costs faced by TSOs in balancing the system. As explained above, new entry stimulates competition and reduces the market power of existing incumbents. It is important to ensure that the imbalance charges, which are imposed on market participants when no balancing action is taken by TSOs, are as cost reflective as possible.
- This option would also facilitate the trading of balancing gas between different gas systems cross-border based on cost-reflective prices, leading towards further integration of national markets.

This option would provide network users with incentives to balance their own positions, which will also contribute to the development of liquidity in wholesale gas markets. As with balancing procurement options, the more market based the approach to imbalance charges, the bigger the benefits will be to the integration of European markets.

- **Transparency and non-discrimination.** Cost reflective charges limit the scope for discriminating between network users who have access to flexible sources of gas and those who do not. Charges based on the market price are fairly transparent and market participants will be able to calculate them. It is important that the calculation of the imbalance charges, which are imposed on market participants when no balancing actions are taken by TSOs, is as transparent as possible.
- **Feasibility.** The necessary pre-requisite for this option is that TSOs use the wholesale market or a balancing platform to balance the system. If so, using the reference price from these markets is in principle a straightforward option to implement. The feasibility of implementing market-based balancing for TSOs is considered in Chapter 10 above.
- **Direct operational costs.** Some ongoing direct operational costs may be incurred by TSOs as they need to translate the costs they incur through balancing actions into imbalance charges. However, these costs are likely to be insignificant compared to the potential benefits appropriate imbalance charges may deliver.

Option 2- Charges based on an administered price

Where TSOs rely on long-term contracts for the procurement of balancing gas (via transparent tenders) or regulated contracts, the imbalance charges may also still be based on the costs incurred by the TSO. However, depending on the contract, it may be more complicated to derive a price for actual value of the gas used by the TSO to balance the system on a particular day. The imbalance charge may be the same for a period of time (fixed in advance) or fluctuate within a range. In order to encourage market participants to balance their portfolios, it may be deemed necessary to add an uplift to the contract price (otherwise market participants may face similar costs whether they balance their portfolios or not). However, the same points as highlighted above, arise in respect to uplifts. The challenge is to ensure that the uplift provides appropriate incentives on market participants without penalising new entrants. It would be possible to calculate a differentiated imbalance charge that reflects whether market participants contributed to or helped to reduce overall system imbalances. However, in the absence of liquid markets, the imbalance charges will be based on an administered price.

- **Facilitating competition and integration.** This option may be deficient where the administered price does not reflect to network users the true cost they are creating by being out of balance. As with the “charge based on a cost proxy”, administered prices may not result in appropriate incentives for network users. For example, where the imbalance charge is significantly higher than the cost of gas (which in Europe is often based on oil indexed contracts) network users will be encouraged to balance their portfolios but if they fail, they may face unduly high imbalance charges depending on how the part of the charge that is over the gas cost has been defined; this can also act as a barrier to new entry. Where the imbalance charge differs from the cost of gas in oil-indexed contracts, network users may have no incentive to balance their portfolio, and may therefore leave it to the TSO to sell them gas (or buy it from them) in its role as a residual balancer.
- **Transparency and non-discrimination.** In principle this mechanism is transparent and non-discriminatory. However, if the charge contains a penalty element it may have a discriminatory effect on new-entrant network users.
- **Feasibility.** This charge will require a more complex methodology to be used by TSOs. It will require more scrutiny by the regulator to assess the effects of the charge on market participants and the development of the market. There is more scope for it to deviate from actual costs so will also require a greater degree of monitoring and regulatory overview. The costs of this option depend on the actual charge used. However, it may be easier to implement than the other options.

Option 3 - Charges based on a cost proxy

An alternative option for setting up imbalance charges could be by using proxies such as references to baskets of prices in different wholesale gas markets - either single prices or combinations of them. This would allow the imbalance charge to reflect the variation of market prices in Europe; it may also render the need for uplifts to the imbalance charge (which avoids the risk of penalising new entrants) and may provide for more targeted incentives for market participants to balance their portfolios. This option could be implemented using a single imbalance charge or a differentiated imbalance charge that reflects whether market participants contribute to or help to reduce the overall system imbalance.

Our view of this option against the relevant assessment criteria is the following:

- **Facilitating competition and integration.** The difficulty with reference prices from other markets is that they will deviate from the true cost of procuring gas and may not result in appropriate incentives for network users. For example, where the imbalance charge leaves network users significantly worse off than procuring their own gas (which in Europe is often based on oil indexed contracts) network users will be encouraged to balance their portfolios but if they fail will face unduly high (or unduly low) imbalance charges; this can act as a barrier to new entry. Where the imbalance charge leaves network users better off than procuring gas in oil-indexed contracts, network users will have no incentive to balance their portfolio, and will therefore leave it to the TSO to sell them gas (or buy it from them) in its role as a residual balancer.

- **Transparency and non-discrimination.** In principle this mechanism is transparent and non-discriminatory. However, if the charge contains a penalty element it may have a discriminatory effect on new-entrant network users.
- **Feasibility.** In principle this is relatively straightforward to implement.
- **Direct operational costs.** This option for imbalance charges is unlikely to incur significant direct costs to the TSO or network users.

11.4. Recommendation

Some approaches to imbalance charges are more cost reflective than others. Where the imbalance charge is based on the price in the wholesale gas market or on the balancing platform products that the TSO has paid for procuring flexible gas, this is the most cost reflective option. It is also the option most likely to incentivise network users to trade in order to balance their portfolios, since the market price will be transparent and they will have an incentive to procure gas more economically than the marginal price paid by the TSO. The first question is whether an imbalance charge should be levied where the TSO has not undertaken balancing actions and if so on what this charge should be based. If the imbalance charge is based on the wholesale market price without an uplift, it may not incentivise network users to balance their portfolios. However, an uplift reduces the cost-reflectivity of the imbalance charge.

The second issue is whether an imbalance charge should differentiate between market participants who have contributed to the system imbalance and those who have helped to reduce the system imbalance. It may encourage market participants to collectively balance, reducing the need for the TSO to take balancing action. Under this approach network users will need information on the system imbalance which may have advantages and disadvantages. The advantages include that it will allow network users to have information to allow them to respond to imbalances in the system. However, there are some concerns that network users would use this information to exploit their market power, raising gas prices for the TSO. NRAs would need powers to mitigate such abuses. It is for this reason that we have left the target model open at this stage on this issue. We welcome your views on whether the imbalance charges should be harmonised and your views on this issue. Where the TSO does undertake balancing actions, we recommend that the target model is for imbalance charges to be based on the marginal price to the TSOs in procuring (or selling) gas on the wholesale market or the balancing platform. We recommend that any imbalance charge imposed on market participants when the TSO has not taken any balancing actions on the market (or the balancing platform) are as cost reflective as possible.

However, these principles may not be feasible where gas is not procured on a short-term basis through wholesale markets or on a balancing platform and requires that conditions are met to allow network users to be able to procure their own balancing gas. We recognise that in the interim period an administered price for imbalance charges may be needed that is based on the price in long-term contracts or on a proxy for the market price, such as an average price of the wholesale market price in neighbouring balancing zones or on some other the basis. The challenge with these options is that the imbalance charge will need to ensure that it provides the appropriate incentives and does not deter new entry. NRAs will need to regularly review the imbalance charge. Where the imbalance price is independent from the cost incurred on the market to balance, it may not provide market participants with effective incentives to balance their portfolios. For example, if the imbalances charge deviates from the cost that a network user actually incurs in procuring balancing gas (e.g. the market price or the long-term contract price), market participants might be acting rationally if they chose to pay imbalance charges rather than balancing their portfolios.

However, even where the interim steps are being applied, it is important that the calculation of the imbalance charge is transparent and is targeted on those that cause the imbalance, so we recommend that this charge is separated from other network charges.

11.5. Pilot framework guideline proposal

7. IMBALANCE CHARGES

7.1. The network codes shall require TSOs to publish transparent methodologies for the calculation of imbalance charges. TSOs shall provide network users regular and detailed information on how any imbalance charges they incurred were calculated.

7.2. The network codes shall require TSOs to charge separately imbalance charges from other transmission charges. Imbalance charges shall be reflective of the costs incurred by the TSO in buying gas and balancing services (or the revenues received by the TSO in selling gas) to the extent this is possible. Imbalance charges shall be levied on the network users that contributed to the imbalances. Only costs incurred by TSOs undertaking balancing activities that are not directly attributable to a network user causing imbalances may be shared across all network users. Imbalance charges shall be targeted on the network users contributing to the imbalance and therefore shall not include other charges.

7.3. The network codes shall require TSOs to have in place imbalance charges that provide appropriate incentives on network users to balance their portfolios, without deterring new market entry or impeding the development of competitive markets.

7.4. The purpose of such incentives is to ensure that network users are incentivised to undertake portfolio balancing activities and potentially avoid incurring imbalance charges, which minimises the need for the TSO to undertake balancing activities

7.5. The network code shall require TSOs to have in place imbalance charges that are consistent with the target model or the interim steps.

7.(A). TARGET MODEL

7.6. Where TSOs use either the wholesale market or a balancing platform to buy balancing gas, the imbalance charges shall be based on the marginal price paid by the TSO. Where TSOs use the wholesale market or a balancing platform to sell balancing gas, the imbalance charge shall be based on the marginal price paid to the TSO. The principle is that this will provide network users with economic incentives to balance their portfolios.

7.7. Such imbalance charges when applied to individual network users may reflect whether the network user's imbalance contributes to the overall imbalance on the system or helps to reduce the overall system imbalance. The principle would be that the imbalance charges of network users that contribute to the system imbalance should reflect the balancing actions taken by the TSO in accordance with 7.6. above. The imbalance charge of network users whose imbalance helps to reduce the system imbalance would be based on the price in the wholesale market. The imbalance charge may also include a small uplift in order to incentivise the network users to balance their portfolios. This uplift shall not deter market entry or impede the development of competitive markets.

7.8. Where no balancing action is taken by the TSO, the imbalance charge shall be based on the price on the wholesale market. It may include a small uplift in order to incentivise the network users to balance their portfolios. This uplift shall not deter market entry or impede the development of competitive markets.

7.(B). INTERIM STEPS

7.9. Where there is no liquid wholesale gas market or balancing platform for the TSO to procure balancing gas, the imbalance charge may be based on a proxy. This proxy may be based on the prices in different wholesale gas markets. The imbalance charge may include a small uplift in order to incentivise the network users to balance their portfolios.

7.10. This charge should not deter new market entry and must be approved by the relevant NRA. It should still provide an incentive for the network user to balance its portfolio.

12. Cross-border cooperation

12.1. Introduction

In this section, we consider the options for cross-border cooperation in order to integrate European gas markets. The section considers whether, and if so, how balancing zones should be merged. It also considers options for cross-border balancing between neighbouring balancing zones as an alternative to mergers. This can reduce physical balancing costs and help network users to reduce imbalance costs by enlarging their portfolios.

12.2. What are the issues?

As highlighted in Part I, in a single European gas market, we would expect gas to be traded such that wholesale gas market prices would converge, subject to there being sufficient cross-border interconnector capacity. European gas markets are currently highly fragmented into a number of balancing zones, many of which have no or low levels of trading or market liquidity. While gas does transit Europe, the level of trading within some parts of Europe, particularly on a short-term and cross-border basis, is limited. There is a question about whether merging balancing zones or introducing measures to enhance cross-border trade through cross-border balancing better links markets and supports new market entry.

Merging balancing zones to create fewer balancing zones would require agreement not only on a common set of balancing rules but in network tariffs and capacity allocation arrangements. In this pilot framework guideline, we focus on the aspects relating to the balancing rules. As explained above, the differences in the TSO procurement of balancing gas and in the calculation of imbalance charges are partly a result of the differences in the diversity of sources of flexibility and the development of liquidity in gas wholesale markets. Therefore, it may be challenging to reach a sufficient level of harmonisation of market rules between neighbouring Member States in order to fully merge balancing zones.

However, if the providers of flexible gas are limited in smaller balancing zones, there may be little value in introducing measures for the TSO to procure gas for residual balancing via wholesale markets or auction platforms. In such a case, the integration of gas balancing zones is needed to promote greater liquidity in European markets and market-based balancing. In order to achieve market integration, it may not be sufficient to agree on harmonised rules for gas balancing but some form of cross-border cooperation may also be required. Furthermore, given the variation in balancing rules (and market design more generally) the different physical realities of gas systems promoting cross-border balancing may be a step towards market integration. Therefore, in addition to considering the merging of balancing zones to create a small number of cross-border balancing zones, this section also considers options for cross-border portfolio balancing (whereby one network user is able to net his imbalances in neighbouring markets) and TSO-led cross-border balancing (whereby TSOs act as intermediaries to trade flexible gas within the gas day). It may be that these options are not mutually exclusive and that they can all be pursued in parallel.

12.3. What are the policy options?

Option 1 – Full merging of cross-border balancing zones

Description of policy option

Certain balancing zones would be fully merged into a single balancing zone with one entry-exit regime with common balancing rules. The principle would be that the boundaries of balancing zones would reflect the physical realities of the gas transmission network rather than the political boundaries of Member States or legacy arrangements within Member States (i.e. where a particular TSO has historically managed a particular network). Therefore, the size of these zones will vary where physical network constraints or indeed differences in gas quality may dictate a smaller market zone than in other parts of Europe. One TSO could be appointed the system operator for the whole zone or an agreement could be reached in how balancing is shared among the TSOs. This may lead to the creation of “cross-border zones”, where more than one Member State's balancing zones (or parts of Member States) are merged.

If balancing zones are to be merged, it would need to be considered which of the current balancing zones should be merged and whether this should be developed through the agreement of NRAs, TSO and network users on common rules or whether we expect zones to ‘converge overtime as markets develop. It is hard to envisage how many balancing zones there would be in a European single market. The following considerations are relevant:

- Taken to one extreme, the EU gas market could have only **one EU-wide balancing zone**. This would have the benefit of reducing operational complexity for network users and would facilitate cross-border trade since we would expect more liquidity to develop in a larger zone. However, the bigger the balancing zone the greater the number of localised constraints that will need to be managed within it and the more balancing tools will be required by the TSO to ensure system integrity. Therefore, one question is whether a single European market should mean one balancing zone or whether several balancing zones would persist within a single European market, and if so what the optimal size of these balancing zones is.
- Another, more **national** approach would be to aim for one balancing zone per Member State (or where there is more than one, for this to reflect at most differences in gas quality). While this is indeed a policy¹⁵ being pursued in some larger Member States, it may not be optimal at the European level, for smaller Member States or for balancing zones within Member States that perhaps could usefully merge across borders.

¹⁵ France and Germany have had policies to reduce the number of balancing zones.

- A third approach may be to consider the long-term vision to be **regional** markets for residual balancing gas ideally integrated into regional gas wholesale markets. Deciding top-down on the size of these regional markets and of the balancing zones within them may be complex, since for example the size may need to vary depending on the physical grid characteristics and market environment. However, it may be that some smaller balancing zones merge to form one balancing zone, particularly where there are smaller zones with limited liquidity.

Assessment against criteria

The key issue is feasibility and whether this model can be achieved in the short-term or whether it is necessary to implement interim steps, set out in the options below before seeking full integration.

- **Transparency and non-discrimination.** In principle this measure would meet this criterion assuming that the common rules were appropriate.
- **Facilitating competition and integration.** In principle this measure would meet this criterion if the common rules establish a market-based mechanism.
- **Feasibility.** This option would require agreement between Member States, NRAs, TSOs and market participants on the integration of particular balancing zones. Further work would need to be undertaken to agree which zones to merge and to understand the physical realities of the various networks. If interconnector capacity is limited this would be a significant barrier to merging balancing zones. A further challenge would be agreeing how system operation would be managed and whether one TSO in the zone would be appointed as the main system operator (this situation exists in some countries, such as Spain). Agreeing common balancing rules between all of the relevant players would be a significant undertaking and given the current diversity in balancing rules may be difficult. If there was already greater harmonisation of balancing rules, this may facilitate these discussions. While moving to this option may currently seem particularly challenging, mergers between TSOs in neighbouring zones (such as between Gasunie Netherlands and Gasunie Deutschland) may create some opportunities for an establishment of cross-border balancing zones.
- **Direct operational costs.** This option would incur large implementation costs to TSOs. A large amount of legal obstacles may need to be addressed to merge balancing zones. The ongoing costs may be reduced for network users, because they would need to maintain fewer interfaces with TSOs. However, liaison between TSOs in one balancing zone may incur additional direct operational costs.

Option 2 – Shipper-led cross-border portfolio balancing

Description of policy option

Instead of requiring all of the balancing rules to be harmonised, neighbouring markets could develop arrangements to allow for network users to trade between neighbouring markets in order to settle their imbalances. The main focus for harmonisation would be the calculation of imbalance charges and the balancing periods.

2 a) Cross-border netting:

TSOs in adjacent balancing zones would allow network users to net their imbalances between neighbouring markets through virtual bilateral trades. At each imbalance settlement period, the network user's imbalance would be calculated separately in each of the zones. The basic principle could be that a network user can offset its imbalance in one zone with its position in the other zone. For example, a positive imbalance (assuming that the system overall is short of gas and the network user is long) in zone A offsets a negative imbalance (i.e. where the system is also short but the network user is also short) in zone B. The network user would then pay imbalance charges to settle any remaining negative imbalance in zone B or conversely benefit if his excess input in zone A exceeded his negative imbalance in zone B. When one system is short but the other is long, the calculation is more complex, but the same principle of offsetting a situation where the network user 'helped the system' against one where he contributed to the 'imbalance'. An alternative approach may be to simply split any imbalance charges payable between the two systems rather than allowing complete offsetting. At the extreme, under this option shippers could use the same balancing account in adjacent balancing zones. Such arrangements are already in place in Germany.

2 b) Cross-border pooling:

Netting, as described above, could be taken a step further where two or more network users in different zones are allowed to net off their imbalances jointly. In this option, network user one in zone A could net his imbalance with network user B (and perhaps more network users) in zone B. Again, if the system conditions differ in the two zones, the calculation will become more complex, but the principle will remain that a network user can offset a position in which he contributed to an imbalance in one zone with another network user's position which helped balance the system in a different zone. A direct transaction may or may not occur between the network users involved to reflect that, in the absence of the pooling arrangement, one network user may have had to pay imbalance charges whereas the other may have received a payment for its contributions to balancing the system.

Assessment against criteria

The key issues are whether the netting and pooling of imbalances would promote new market entry and what needs to be harmonised for this mechanism to work.

- **Transparency and non-discrimination.** In principle this mechanism can be applied in a non-discriminatory and transparent manner. Information on how the imbalances will be determined, how imbalances can be netted with neighbouring zones, and real-time updates on the network user's imbalance position in each zone would need to be available in order for the network user to decide how to trade his portfolio. Pooling will create bilateral virtual trades between network users in neighbouring zones, which may be less transparent than trades via spot markets but are consistent with over the counter trading.
- **Facilitating competition and integration.** Netting of imbalances may reduce new entrant network users' exposure to imbalances charges particularly in smaller balancing zones, if they are able to compensate imbalances in one zone with their position in a neighbouring zone. It would increase cross-border trade and where there is sufficient interconnector capacity may lead to greater price convergence. Decoupling network users' trading in imbalances in their portfolios from physical gas flows may increase competition and trading and help to overcome the limitations in the availability of interconnection capacity for short-term trade. While this may assist network users, it may result in the TSO having to take more residual balancing actions, particularly in smaller zones. There may be a risk that cross-border pooling delivers greater benefits to those network users that have established contacts with other network users in adjacent balancing zones (which may not be the case for new entrants).
- **Feasibility.** TSOs would need to operate a harmonised balancing period and imbalance charges would need to be harmonised so as not to distort trade. For example, if in zone A, a fixed administrative imbalance charge with a 'penalty' was applied to any network users out of balance but the imbalance charges in zone B were based on the price of gas on the wholesale market, which varied depending on whether the network user had a positive or negative imbalance, network users may want to avoid the more punitive charges in zone A, which may distort network users balancing their portfolios in zone B. More network users would also have an incentive to trade where differentiated imbalance charges, which reflect whether a shipper has contributed to or helped reduce the system imbalance, applied in both markets. In single imbalance charge regimes only network users with an imbalance would be incentivised to trade. Furthermore, as explained in Chapter 9 a pre-condition for the harmonisation of the calculation of imbalance charges is the use of a market-based mechanism for the procurement of balancing gas. Therefore, TSOs may also need a common approach to procuring balancing services, which is considered in the options below.
- **Direct operational costs.** The introduction of shipper-led cross-border balancing is likely to require additional information systems. This will incur an implementation cost mainly to TSOs, but possibly also to network users. We have no indication that this option would result in significant ongoing operational costs.

Option 3 – Cross-border TSO balancing

Description of policy option

An alternative approach is to require the TSOs to act as intermediaries in the trade of flexible gas cross-borders. Based on bids and offers for flexible gas in their own market, TSOs could exchange information on prices in their markets and then use available interconnector capacity to trade flexible gas. There are different designs for this policy option.

3 (a) Operational Balancing Accounts

This concept builds on the operational balancing accounts, which are used at a number of interconnection points to allow TSOs to manage the fluctuations in cross-border gas flows, which may occur as a result of differences in gas qualities or steering differences. "Operational Balancing Account" means an account in which the differences between the measured and the matched and confirmed gas quantities are documented and put on account. With an OBA, TSOs agree operating and balancing agreements with adjacent TSOs to ensure that all network users will be allocated quantities equivalent to their confirmed nominations. The difference between the measured quantity and the total sum of confirmed nominations will be shown on an imbalance account by the system operators involved. The TSOs settle these minor steering differences in gas flows between them. This ensures that where there are minor differences in gas quantities, network users do not need to balance their position at each interconnection point.

Beyond the purpose of enabling operational balancing between adjacent TSOs, OBAs can also be used by adjacent TSOs to jointly optimise the linepack in their systems. Generally, some fluctuations between injections into and withdrawals from the network can be offset by the TSOs using the storage capability (linepack) of their networks, without recourse to system balancing energy. This proportion can be increased further if there is reciprocal support among the TSOs. Notably, they can store gas from adjacent TSOs in their linepack or make gas from their linepack temporarily available to adjacent TSOs. For such operations it makes sense for the TSOs to conclude mutual agreements detailing the procedures and their area of application.

Assessment against criteria

The key issue with this mechanism is to what extent cross-border exchange of flexible gas would help to reduce the need for the provision of balancing gas and if this benefit can outweigh the potential deficit of restricting each TSO's own flexibility and what needs to be harmonised for this measure to be introduced.

- **Transparency and non-discrimination.** OBAs are agreements between two or more TSOs and there is a risk that these are non-transparent and may benefit some network users more than others. However, this could be mitigated where the NRA has the ability to enforce a minimum level of transparency.

- **Facilitating competition and integration.** TSOs have used OBAs successfully and they appear to facilitate cross-border trades because they provide a useful tool for managing gas flows at interconnection points. However, as they are not generally used for the exchange of significant amounts of flexible gas, there may be a limit to how much they can contribute to supporting competition by making physical balancing more efficient.

Feasibility. This approach is widely used in Europe and could be implemented at most interconnection points. However, it is less of a tool to promote physical cross border balancing and more to assist in managing gas flows across Europe.

Option 3 (b) Cross-border trading of balancing gas

Description of policy option

The mutual exchange of linepack envisaged by OBAs could be extended to allow for trade via the TSOs in flexible gas at certain points within the gas day. At agreed times in the day, neighbouring TSOs exchange bids for and offers for flexible gas in their markets. The TSO would be acting as an intermediary (or a market-maker) for those with flexible gas to trade with the TSO in the neighbouring market, who would use the gas to balance its system when the gas from the neighbouring market is more economic. To ensure that flexible gas is efficiently allocated between the two markets, the bids and offers for the flexible gas should be cost-based and derived using a market-based mechanism (i.e. the wholesale market or a balancing platform). It would also allow network users with access to flexibility in one zone to trade out the imbalance in their portfolio in the neighbouring zone and could be taken into account when calculating imbalances. If there are limits on the volume of flexible gas to be exchanged or in the availability of cross-border interconnector capacity between the balancing zones this will limit cross-border trade. This type of cross-border balancing has been introduced at some interconnection points in the European electricity markets.

Assessment against criteria

The key issue with this mechanism is whether cross-border exchange of flexible gas would promote cross-border trade.

- **Transparency and non-discrimination.** If the bids and offers for the exchange of balancing gas are published and there is no restriction on those offering flexible sources of gas, this measure meets this criterion. However, if under this option TSOs make non-transparent bilateral agreements for longer-term access to particular sources of gas then this option would not be transparent, non-discriminatory or facilitate competition.

- **Facilitating competition and integration.** It facilitates the integration of European gas markets as it would ensure that sources of flexible gas within Europe are efficiently distributed and traded as long as it does not limit or restrict access to cross-border capacity by network users. Assuming that the bids and offers exchanged between TSOs are derived from market-based mechanisms (either integrated into the wholesale gas market or on a balancing platform) this measure would promote competition and increase liquidity. However, it would potentially increase the role of the TSO as an intermediary in cross-border trade of balancing gas. It may be that this is a first step towards greater liquidity in short-term cross-border trade but that in the longer-term trade in flexible gas should take place between network users and between network users and TSOs in different zones, without the TSOs acting as a market-maker.
- **Feasibility.** This approach has been used in electricity markets but requires considerable TSO cooperation to establish. TSOs would need to agree a certain time or number of times within the gas day at which cross-border trading can occur and establish joint IT systems to exchange the necessary information. It may be possible for imbalances within the neighbouring markets to be settled at different timescales (e.g. hourly or daily basis) within the zones. In this case, the TSOs may need to trade a range of the products (i.e. daily and hourly). However, for network users to derive the benefits of using it to trade their portfolios it would be better for these to be harmonised.
- It would also require harmonisation between neighbouring balancing zones in the methods and products for TSO procurement of balancing gas as well as the obligations on network users or storage operators to keep certain levels of gas in storage for security of supply reasons. If these obligations are not harmonised it may distort the trade in flexible gas between neighbouring balancing zones. These distortions could be overcome by agreeing the volumes of flexible gas to be traded in cross-border balancing. However, if the levels of flexible gas to be traded are restricted then this will reduce the effectiveness of this measure in ensuring an efficient use of flexible gas. In practice the cross-border flows between zones may be restricted by the availability of interconnector capacity for short-term trade. Nonetheless, the introduction of cross-border trading of balancing services is likely to be more effective when both zones operate a market-based mechanism for the procurement of gas and have common rules on storage requirements.
- **Direct operational costs.** This option may require the introduction of significant information systems which would result in potentially significant implementation costs. There would also be ongoing direct operational costs on TSOs and network users to run this system.

Option 3 (c) – Regional platforms for procurement of balancing gas

Description of policy option

Another option would be for several TSOs to establish a shared regional platform within one regional zone, which traded short-term products for balancing. This platform could either be integrated into the wholesale gas market or be operated as a separate balancing market. The platform could encompass some or all of the Member States in each of the current Regional Initiatives. As the size of the regions varies it may be appropriate for some regions for the platform to include all balancing zones but for other regions it may be better for the platform to be developed on a sub-regional basis. The principle would be for the sources of flexibility in the defined region to be made available on an equal basis to all of the TSOs and network users to be able to bid and offer. This builds on bilateral cross-border balancing by allowing for more sources of flexibility to be traded. In principle, this would further increase the efficient use of flexible sources of gas within the region. If the platform was integrated with the wholesale gas market, it would also allow network users to use it in order to trade short-term gas in order to balance their portfolios. As highlighted Chapter 8, a separate platform creating a separate balancing market may be a useful measure to create a market but longer-term if not integrated with the wholesale gas market can reduce liquidity in trade between network users. A key precondition of this mechanism would be for sufficient short-term interconnector capacity to be available. The benefit and feasibility might be limited by the transport speed of gas.

Assessment against criteria

Many of the issues are similar to those for cross-border balancing and would require similar aspects of the balancing rules.

- **Transparency and non-discrimination.** This measure would meet this criterion since by definition it would require a transparent platform for the procurement and trading of short-term balancing products.
- **Facilitating competition and integration.** Since this measure combines both a market-based mechanism and cross-border it meets this criterion.
- **Feasibility.** This measure would raise some of the same issues as for cross-border balancing (set out above).
- While differences in imbalance periods could be accommodated on the platform by ensuring that a range of short-term products were made available for TSOs and network users, it would facilitate trade if the balancing periods were harmonised. For example, if there were a number of TSOs and network users procuring daily balancing products, this may reduce the liquidity in products for those operating an hourly balancing regime.

- For a regional platform to work, the main challenge is the availability of sufficient cross-border interconnector short-term capacity, which is likely to be a significant obstacle over the next few years until the rules on allocation of capacity are able to take effect. If this obstacle could be overcome TSOs would also need to agree on standardised balancing products on the platform, which were suitable for all balancing zones. In some regions, where there are lower levels of flexible sources of gas, there may be a need for a certain amount of long-term products. Given that this option involves a larger number of participants (TSOs, network users and NRAs) and more harmonisation than cross-border balancing, it is likely that setting up such a platform will be more complex. However, unlike cross-border balancing, each balancing zone would not need to set up its own market-based mechanism for the procurement of balancing gas. This would be particularly advantageous for smaller zones, where flexible gas and liquidity in trade is likely to be limited. However, the same issues would arise with regard to storage requirements. To avoid asymmetries arising from cross-border trade, it would be necessary that these requirements were harmonised across the region.
- **Direct operational costs.** This is likely to incur low direct operational costs to both network users and TSOs. TSOs would share the cost of running the platform and network users may reduce their cost when they can trade their positions on one regional platform rather than having to interact with more interfaces.

12.4. Recommendations

Some form of cross-border cooperation would be beneficial to encourage market integration in Europe. However, neither cross-border balancing zones nor significant levels of cross-border cooperation have yet been implemented in Europe. Therefore, we consider it important that further work is done by TSOs to develop proposals for cross-border balancing first and to analyse the costs and benefits of such proposals.

For smaller balancing zones, there may be considerable efficiency in merging balancing zones together to create cross-border balancing zones. This is particularly the case in zones with low levels of market liquidity, which makes introducing market-based balancing rules difficult. However, merging balancing zones will require NRAs, TSOs and market participants to agree on common balancing rules and potentially also wider market design rules. This may be best rolled out on a regional basis when there is sufficient harmonisation or convergence in balancing rules for parties to be able to reach agreement on common rules. Therefore, we recommend that TSOs consult on the options for merging balancing zones within the regions when these conditions are met.

Cross-border balancing arrangements may be a useful step in ensuring a more efficient allocation of flexible gas and encouraging more cross-border trade. These options require TSOs to focus on harmonising different aspects of their balancing rules or devising a common arrangement for cross-border cooperation purposes. Cross-border portfolio balancing allows network users to pool their imbalances between neighbouring markets through bilateral virtual trades, which may help to increase market liquidity. Physical cross-border balancing allows TSOs to access flexible gas from neighbouring markets, where it is more economical. It may be possible to introduce both of these options. Therefore, we recommend that ENTSO-G consults on proposals for both types of cross-border balancing.

12.5. Pilot framework guideline proposal

9. CROSS-BORDER COOPERATION

9.1. If the balancing arrangements of adjacent balancing zones are sufficiently harmonised the network code shall require relevant TSOs to cooperate in order to merge balancing zones and create a cross-border balancing zone wherever this is technically feasible and economically reasonable.

9.2. For that purpose relevant TSOs shall consult on the design of the cross-border balancing zone, including an impact assessment of the expected costs and benefits and on the timeline for completion. The proposal shall be subject to approval by the relevant NRAs.

9.3. The European network code shall require ENTSO-G to regularly review the progress of harmonisation of rules in adjacent balancing zones in order to identify possible mergers of balancing zones and thereby, the creation of cross-border balancing zones. The review will also consider whether there are additional measures needed to harmonise rules, which may facilitate the achievement of cross-border balancing zones.

9.4. The network code shall include proposals for cross-border balancing rules. Cross-border balancing may be an interim step, which enhances cross-border trade in the absence of sufficient harmonisation to create cross-border balancing zones. The proposals shall establish:

- shipper-led cross-border portfolio balancing, which would allow network users to net their imbalances between cross-border neighbouring balancing zones; this shall be without prejudice to a fair allocation of balancing costs among network users of interconnected balancing zones; and

- cross-border TSO balancing, which would allow TSOs to act as intermediaries to facilitate access to flexible gas in neighbouring markets.

9.5. The cross-border balancing arrangements in the network code shall be based on the results of a public consultation, which shall include a cost/benefit impact assessment of the options for cross-border balancing.

9.6. ENTSO-G shall share the results of its consultation with ACER and the NRAs.

9.7. The network code shall also require TSOs to implement Operational Balancing Accounts (OBAs) with adjacent TSOs to address steering differences. This shall eliminate the balancing risk for network users purely transporting gas through one or more balancing zones to another balancing zone.

9.8. These requirements shall not prevent TSOs in any of the gas regions (as defined in the European regional initiatives) from bringing forward or consulting on proposals to merge balancing zones or for cross-border balancing in the meantime.

ANNEXES

Annex 1: List of abbreviations

Abbreviation	Definition
ACER	Agency for the Cooperation of Energy Regulators
DSO	Distribution System Operator
ENTSO-G	European Network of Gas Transmission System Operators
EREG	European Regulators Group for Electricity and Gas
FG	framework guideline
GGPGB	Guidelines for Good Practice for Gas Balancing
IIA	Initial Impact Assessment
IP	Interconnection Point
OBA	Operational Balancing Account
OCM	On the day Commodity Market
TSO	Transmission System Operator

Annex 2: Glossary

Term	Definition
Liquidity	The ability for any party to quickly buy or sell gas without causing a significant change in its price and without incurring significant transaction costs.