Study on Entry-Exit Regimes in Gas

Part A: Implementation of Entry-Exit Systems

Entry-Exit Regimes in Gas, a project for the European Commission – DG ENER under the Framework Service Contract for Technical Assistance TREN/R1/350-2008 Lot 3. Contract ENER/B2/267-2012/ETU/SI2.628337

In collaboration with COWI Belgium

Groningen – The Netherlands, July 19 - 2013

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DNV KEMA

By order of the European Commission – DG ENERGY

author : BK, MV, PS, AB, DB

reviewed : CH

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approved : CH

KEMA Nederland B.V. Energieweg 17 9743 AN Groningen P.O. Box 2029 9704 CA Groningen The Netherlands
T +31 50 700 9700 F +31 50 700 9858 www.kema.com Registered Arnhem 09080262

FOREWORD

The present report has been prepared by DNV KEMA, in collaboration with COWI Belgium, under the existing COWI Service Framework Contract with DG TREN (ENER and MOVE) covering Technical Assistance Activities (Ref. TREN/R1/350-2008 Lot 3) and in response to the Terms of Reference included under the Specific Contract No ENER/B2/267-2012/ETU/S12.628337.

Readers should note that the report presents the views of the Consultant, which do not necessarily coincide with those of the Commission.

EXECUTIVE SUMMARY

This study has analysed the implementation of entry-exit systems for natural gas in the Member States of the European Union. The focus of the assessment was to identify which choices in the design of the entry-exit system may already have lead or may still lead to barriers for the entrance of new market players and barriers for cross-border trade. Secondly the study assessed the potential for market area integration on the basis of a cost benefit analysis for three different combinations of market areas.

Regulation 715/2009 of the European Parliament and of the Council of 13 July 2009 specifies that transmission system operators should have a de-coupled entry-exit system in place. An entry-exit system is a gas network access model which allows network users to book capacity rights independently at entry and exit points, thereby creating gas transport through zones instead of along contractual paths. The independence of entry and exit capacities is further supported by a virtual trading point where network users who have booked entry or exit capacity can sell or buy gas, respectively. In this set-up natural gas can easily change ownership, facilitating the gas market. Compared to the previously used point-to-point relations this model represents a general improvement providing more flexibility for network users and non-discriminatory access, fostering competition and creating an EU internal gas market for natural gas.

Since the development and formalisation of the abovementioned regulation the implementation of the entry-exit system in the individual EU member states has been on-going. Member States have developed different solutions while implementing the entry-exit systems. There are also countries that have not (yet) implemented an entry-exit system.

Also in this context, late in 2011, the Council of European Energy Regulators (CEER) delivered a target model for a European gas market to the European Commission. This model provides a vision of 2014 and beyond and contains a suite of recommended steps. The Gas Target Model aims at facilitating the creation of a well-functioning EU market, consisting of national or cross-border interconnected entry-exit zones with virtual trading points (so-called “hubs”).

Against this background, the European Commission has initiated the current study. The objective of the study is two-fold:

- Part A of the study provides an assessment of how the current status of implemented entry-exit systems effectively leads to barriers for the entrance of new market players and cross border trade.
- Part B of the study assessed the potential for entry-exit market area integration.

We present the main findings of the study in this summary.

PART A – ENTRY EXIT REGIMES IN GAS

This part of the study is based on a comprehensive assessment of the implementation and characteristics of entry-exit systems for natural gas systems throughout the EU. In order to assess the functioning of the entry-exit systems, the work focussed on four main aspects, namely the basic design features of the entry-exit system, the contractual framework, capacity products and pricing and finally balancing and imbalance settlement. Detailed country factsheets were compiled for the EU Member States. These country factsheets are attached as an appendix to this report. The information compiled in these factsheets is the basis for the analysis in this report. Whilst the detailed analysis and findings are discussed in the main part of the report, the following text summarizes the main observations.

This summary presents the main findings of the study, covering the following issues:

- Firstly, we describe the characteristic of what we called the ‘full’ entry-exit system;

- Secondly, we list a number of key features or best practises which are considered essential or supportive respectively for the establishment of well-functioning entry-exit systems.
- Finally, we present a number of barriers for access and trade which our analysis has revealed.

This summary provides the overall findings. For country specific details the reader is kindly referred to the main body of the report.

Characteristics of the 'full' entry-exit system

Regulation (EC) No. 715/2009 (in particular Recital 19 and Article 13) specifies the fundamental characteristics of an entry-exit system. While the fundamental characteristics of an entry-exit system are defined therein, the systems implemented in the Member States differ from each other however. In order to have a reference point from which the different systems are described and compared, this study has defined a 'full' entry-exit system.

In accordance with the definition used in this report, a 'full' entry-exit system is characterised by the following features:

- **Entry and exit capacities** – Network users can contract entry and exit capacity separately.
- **Free allocability of capacities** – Entry and exit capacities are generally freely allocable. This means that gas brought into the system at any entry point can be made available for off-take at any exit point within the system on a fully independent basis. Each exit point can be supplied from any entry point without any restrictions.
- **Virtual trading point** – A 'full' entry-exit system needs to be equipped with a so-called virtual trading point where gas can be traded independently of its location. The virtual trading point offers the users the possibility to bilaterally transfer title of gas and/or swap imbalances between network users.
- **Distribution level included** – In a 'full' entry-exit system, the distribution level is included in the sense that transmission and distribution network operators take care of capacity and connection related issues at their interconnection points (city gate). Network users do only book exit capacity on the network level where the final exit takes place. Imbalances between injections and withdrawals (taking into account the transactions at the VP) are aggregated across all entry and exit points in a network user's portfolio, regardless of the network level.

We have identified and analysed the present and emerging structure of the entry-exit systems across the EU in detail. Based on our assessment, we highlight factors as well as best practises that we have identified as being essential or supportive, respectively, for facilitating network access, wholesale trading and competition in an entry-exit system.

These essential features can be summarised as follows:

- **Independent booking and use of entry and exit capacities**: In an entry-exit system, network users should be able to book and use entry and exit capacity independently from each other. By moving away from predefined transportation routes, gas that enters the market area can be delivered at any exit point.
- **Existence of a virtual point with unrestricted access**: One of the key characteristics of an entry-exit system is the existence of a virtual point where network users can freely exchange gas. Access to the virtual trading point should be available for all network users and from all entry and exit points, in order to enable network users to optimise and balance their portfolios and to facilitate trading in the wholesale market.

- **Availability of short term capacity products for inter-zonal trading between different entry-exit systems:** Short term capacity products are essential for short-term trading. Using day-ahead and within day capacity products, network users are able to optimise and balance their portfolio, or to react to short-term sourcing and trading opportunities. In addition, short term capacity products also facilitate arbitrage in the market which is beneficial for the development of the market.

In addition to these essential features, our analysis has also identified a number of other design choices and best practices which we believe to be most effective in facilitating network access and trading in an entry-exit system. These design variables are related to licensing/contracting, capacity products and pricing as well as balancing arrangements.

Among others, we have identified the following best practices:

- Harmonised requirements for national licenses and acknowledgement of licenses issued by other countries (e.g. EU trading passport) for providing access to the system,
- Limitation of preconditions for network access to those that are necessary to protect the TSO and network users from risks created by (different types of) network users,
- No (very limited) fees for access to and use of the virtual point,
- Market-based balancing,
- Bundling of cross-border capacities,
- Establishment of organised market places (e.g. gas exchange) connected to the VP,
- Integration of TSO networks and/or multiple market areas into one larger entry-exit systems in those cases where it is technically feasible and where costs outweigh benefits

Barriers for Access and Trade

In many Member States additional components or solutions deviating from the 'full' system have been implemented. These individual particularities are often the result of the local situation, the existing infrastructure and (long term) contracts being in place. Based on the hypothesis of the 'full' entry-exit system, we have identified a limited set of additional or deviating elements which are implemented in the Member States. In addition, our analysis has revealed a number of potential barriers, which may inhibit access to and trade within the national markets, as well as cross-border trade and competition in the European gas market.

We have grouped the observed barriers in three categories which are discussed in the separate sections below:

- **Highly critical barriers** - These issues are real barriers to the entrance of new market players and/or for cross-border trade. These barriers should be avoided wherever possible.
- **Potential barriers** – These design features may lead to sub-optimal market design and should be overcome where practically possible, unless the costs outweigh the benefits.
- **Other** – We list a number of other issues which are more of an administrative nature. These issues might not necessarily be barriers to access and cross-border trade, but they can affect the efficient functioning of the system.

Highly critical barriers

- **Absence of a Virtual Point / Lack of Short-Term Capacity Products for Cross-Border Trading**

In line with our definition of essential features of an entry-exit system above, we consider the absence of a virtual point or short-term capacity products for cross-border trading as highly critical barriers for the development of a well-functioning entry-exit system. Without a virtual point, the system cannot facilitate the key functionality of an entry-exit system, i.e. the free exchange of gas between different network users within the entry-exit system. Similarly, short-term capacity products at cross-border points are important for connecting markets in neighbouring entry-exit systems.

- **Undue Requirements for Access to the Network**

Some Member States seem to impose requirements on licensees and/or network users that go far beyond what is required in other countries. Examples of such additional requirements include proof of ability to secure supplies, a mandatory diversification of the supply portfolio, limiting VP trades to booked entry or exit capacities, or the general compulsory booking of storage and/or LNG capacities. Such requirements may not only act as a barrier for new entrants or smaller players. In addition, they do also not seem to be necessary to protect the TSO or other network users from the risks created by the given party getting access to the entry-exit system.

Once again, we acknowledge that NRA's may decide to set particular rules and requirements to protect local consumers. However, such rules and conditions should be limited to suppliers of corresponding customers but should not universally apply to all users of the network.

- **Exclusion of Certain Network Users from Common Balancing Arrangements**

In most Member States, all network users are subject to the same rules for imbalance settlement. In some cases, however, balancing arrangements effectively provide for a fundamentally different treatment of network users with and without local entry and exit points. Whilst the former are subject to 'common' arrangements for imbalance settlement, i.e. with financial cash-out (and WDOs), imbalance charges for the latter group are determined through a fundamentally different mechanism. Such arrangements may cause significant risks and hence create a serious barrier for affected shippers.

Potential barriers

- **Limitations to Free Allocability of Entry and Exit Capacity**

As explained in chapter 2.2.2, several Member States restrict the independent booking and use of some entry and/or exit capacities. Examples include:

- Capacities that cannot be reached from the VP or other entry and exit points (or v.v.), either in general or under certain circumstances,
- Separation of border-to-border transport from the local entry-exit system.

Such restrictions obviously undermine two of the essential features of a well-functioning entry-exit system. Gas flows that cannot reach the VP will not be able to fully react to short term market signals, which will lead to sub-optimal market results. Moreover, such restrictions will also represent a barrier for network users affected by them. The use of capacities with restrictions of free allocability should thus be minimised as much as reasonably possible.

However, we also acknowledge that available infrastructure may not always be sufficient to satisfy all possible combinations of entry and exit flows, or only at the expense of an excessive reduction of available capacities. In some cases, the use of restricted capacities may therefore represent an acceptable solution and may help to realise the general benefits of an entry-exit system. However, the

use and benefits of such restrictions should be carefully weighed against any resulting negative impacts on the market and/or individual network users.

Access to the VP is a key feature of an entry-exit system. When capacities with limitations to free allocability have to be used, preference should be given to products that provide access to the virtual point at least on an interruptible basis.

- **Separate Balancing on Distribution Level**

Ideally an entry-exit system stretches across network and pressure boundaries. However, in some Member States the distribution level is not part of the overall balancing regime or different rules apply. The separation of the distribution level is considered to be a barrier to new entrants, in particular, on account of larger shippers benefiting from their portfolio and thereby realising savings compared to shippers with smaller portfolios. This is not beneficial for creating a level playing field for the participants on the market. Splitting the demand for balancing gas may also have a negative impact on liquidity and competition on balancing markets. Therefore, it seems preferable to establish a single system-wide balancing system integrating the whole "supply chain" of a shipper from system entry towards exit to a final consumer and allowing the shipper to pool imbalances occurring across this supply chain as well as within his customer portfolio.

- **Differentiation of Tariffs by Consumer Groups**

The use of tariffs which are differentiated for particular consumers groups can be discriminatory and effectively create a barrier to entry. For example, in some Member States tariffs are differentiated based on the maximum capacity of the connection or by the annual consumed volumes. Such tariffs may be discriminatory against smaller network users and could pose a barrier to market entry.

- **Requirement to Have Strictly Balanced Nominations Portfolio**

Prior to the gas day, network users send nominations to the TSO. Based on these nominations, the TSO is informed how the shippers will be using their contracted capacity. Also the change of title via the virtual trading points is organised using nominations. In the matching procedure the TSO's check the nominations. One of the typical requirements in most countries is that the nominations in the portfolio of a network user should be strictly balanced. Imbalanced nominations are rejected. This can be a potential undue barrier for short term trade. If network users were allowed to have imbalanced nominations, the shipper/trader can decide during the gas day where to source the remaining quantities of gas. The balancing regime should be sufficient to incentivise the network user to make that by the end of the gas day demand and supply within the portfolio of the network user are matched. The exposure of the TSO to potential uncovered imbalanced should of course be limited. The maximum nominations imbalance could, for example, be linked to the financial guarantees a network user has in place. In this respect, the risk for the TSO is limited.

- **Fees for Using VP**

In a number of Member States operators of the virtual trading point charge fees for using the virtual trading point. These fees can either be fixed annual charges but also variable charges per kWh traded.

As discussed above, the virtual trading point is an essential feature of an entry-exit system. The network users should have easy access to the virtual point in order to further stimulate the development of the market. Therefore, ideally the costs of operating the virtual trading point are socialized in the transmission tariffs. Conversely, especially a fee per transferred kWh can be a disincentive for network users to exchange gas within the network via the virtual point. Similarly, using a fixed fee may discriminate against smaller players and new entrants.

At the same time, there are also network users who do not book capacity at entry or exit points but who want to trade at the VP (virtual traders). In the absence of any specific fees for using the VP, such parties might therefore be able to participate in the market free of charge. This may be perceived as

unacceptable. However, rather than generally charging a separate fee for access to and use of the VP, it may be more beneficial to simply require a (limited) fee for access to the virtual point from parties that are not otherwise using the entry-exit system.

Other issues

- **Unavailability of Information in English**

Some TSO's and NRA do not provide all relevant information regarding access to and use of the entry-exit system in English. Usually an English version of the website is available. But national network codes, tariff sheets, operational codes and other essential documents are not always available in English. This is considered to be an issue especially for new market entrants who want to assess the regulations in place. Although this issue can be overcome by hiring translation services and local advisors, it will create additional costs for new entrants and may hence inhibit cross-border trade. It therefore seems preferable for TSOs and NRAs to make sufficient information available in English, even if formal regulations and contracts may need to written in the local language.

- **Multiple Virtual Points**

Some Member States have defined multiple virtual points, i.e. in addition to the virtual trading point in the entry-exit system. Examples include:

- Separate virtual trading points for different gas qualities,
- Separate virtual points for aggregating physical entry or exit points, such as storage facilities, LNG terminals or exit to local consumers,
- Differentiation between the VP for title transfer and a separate point for balancing transactions / imbalance settlement.

The presence of multiple virtual trading points can be a barrier to trade since it splits liquidity. However, as long as there are no restrictions to transferring gas between these different points and as long as these (operational) virtual points remain within the same balancing portfolio, i.e. as long as they are aggregated for the purpose of imbalance settlement then we do not consider them a barrier.

PART B – ENTRY-EXIT MARKET AREA INTEGRATION

The second part of the report discusses the potential for integrating two or more entry-exit zones.

Firstly, we have examined the potential of integrating three different combinations of gas markets, namely:

1. Spain and Portugal,
2. Republic of Ireland, Northern Ireland and Great Britain,
3. Hungary and Romania.

For each of these combinations, the costs and benefits associated with a market merger of the respective Member States were assessed. Secondly, we provided a general assessment of measures other than investing in new infrastructure that could be taken in order to enable the formation of a single market. Such instruments may take the form of administrated measures, such as the use of interruptible capacities, capacities with locational restrictions or capacities with limited allocability. However, all of these measures may lead to potential barriers as discussed in the summary of part A above. Alternatively, market integration may also be based on market-based instruments like capacity buy-back, locational trades and flow commitments.

In general, when conducting a cost-benefit analysis, the aim should be to quantify the related costs and benefits as much as reasonably possible, ideally in monetary terms. At the same time, the boundaries of what can and cannot be quantified should be acknowledged. In our approach we have assumed that existing firm capacities should not be reduced after the market area merger. Simultaneously, our analysis has also been based on the requirement that the secure and reliable operation of the network has to be ensured, independent of any future flows that may not be as expected when determining the firm capacities of the network.

We discuss the overall findings of the cost benefit analysis for the three combinations below.

Spain - Portugal

The analysis shows that on a yearly basis there are likely moderate net benefits to be obtained. Furthermore, it is expected that benefits may increase if the Spanish and Portuguese TSOs manage to avoid additional investments whilst enabling market area merger and continuing to ensure reliable gas supplies to end consumers. The costs associated with alternative measures are generally expected to be lower than investing in new infrastructure, but will depend on the measure chosen and have not been quantified in this study.

When interpreting this result, it should be taken into account that the simplified analysis in this study has focused on those costs and benefits only, which could be easily quantified. Also, the chosen modeling approach is likely to underestimate the true benefits as it assumes a perfectly competitive market in both Spain and Portugal, which is arguably not the case at present. Moreover, we have only assessed the potential benefits in a specific market segment in Portugal, whereas possible additional benefits for instance for customers connected to high pressure off-takes have not been considered.

Furthermore, the analysis did only consider the gas sector on its own but not any wider impacts on the national economics, such as the electricity market. The Spanish and Portuguese electricity markets are already integrated and around one third of the electricity produced is generated by gas-fired power plants. As such, any inefficiency present in the gas market may be transferred to the electricity system. For example, high interconnection costs for transporting gas from Spain to Portugal may lead to efficient CCGT's in Portugal moving closer towards the end of the merit order.

Republic of Ireland, Northern Ireland and Great Britain

The report also provides an assessment of the costs and benefits associated with a possible merger of the gas markets of Great Britain, Republic of Ireland and Northern Ireland. Such a merger may lead to significant costs in the short to mid-term, which are mainly related to the possibility of physical reverse flows from the Republic of Ireland and Northern Ireland to Great Britain.

The gas market of Great Britain is generally regarded as the most liquid in Europe with a low market concentration. Hence, any benefits from an increase in competition are expected to primarily occur in the Irish gas market instead of in the GB market. Furthermore, Ireland sources almost all of its gas on the NBP in Great Britain. As such, the Irish market is basically integrated with the GB market already. Although some benefits can theoretically be expected from a merger due to an expected fall in gas prices, it may lead to a potential rise in transmission tariffs of the interconnector system. The latter may result from a different allocation of the interconnector's costs to entry and exit points in a combined system. This issue is principally a cost allocation problem and may therefore be regarded as a side-effect of a market merger.

Overall, it seems uncertain whether a merger of these markets will lead to any tangible benefits. Instead, it may be more beneficial to consider other, less rigorous alternatives for promoting integration of the individual markets.

Hungary and Romania

The assessment of merging the Romanian and Hungarian gas markets shows that the current interconnection capacity is rather limited in relation to the size of both markets. Consequently, large investments may be required to enable a full market merger and, at the same time, offer the same level of reliability of supply to end consumers. However, several ways to reduce the required interconnection capacity have been identified. For example, modifying the existing interconnection to accommodate physical reverse flows could be a first step. Secondly, arranging the possibility to swap gas between Hungary and Romania with the Ukrainian TSO Ukrtransgaz could further reduce the need for interconnection capacity. Finally, the introduction of locational restrictions on the transit section of the Romanian network could be a third option to reduce interconnection capacity and associated investment requirements. Nevertheless, whilst these options may reduce the need for capacity, they would not suffice to completely eliminate it.

The potential benefits that may arise from a market merger between Hungary and Romania could not be quantified at this stage. This mainly has to do with the current situation of the Romanian gas market and its forthcoming deregulation; this process makes it very difficult to estimate any potential benefits. A merger of both markets may thus be regarded as premature at this point, as it is unclear how the Romanian market will evolve during the next few of years as a result of liberalisation and the introduction of the European network codes.

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LIST OF ABBREVIATIONS

DSO	Distribution System Operator
FA	Framework Agreement
IP	Interconnection Point
NRA	National Regulatory Authority
TPA	Third Party Access
TSO	Transmission System Operator
USP	Universal Service Provider
VP	Virtual Point
WDO	Within Day Obligation

LIST OF FIGURES

DEFINITIONS

In the course of carrying out the current study, it has come to our attention that the definitions used by various stakeholders in relation to the market parties, and namely their roles, are ambiguous. In order to avoid confusion while reading this document, below we have provided definitions that will be further used throughout the document.

For the scope of this study we differentiate between the following roles:

Shippers are also commonly referred to as network users because they essentially buy the right to use the transmission network for a certain price and under certain conditions. The services acquired can be entry- and/or exit capacity in the gas transmission network but it can also (just) be access to the virtual point.

Trader is as a party which engages in the buying and selling of natural gas on the wholesale market. We distinguish between financial trading and physical trading. Physical trading generally refers to contracts which specify that the commodity should be physically delivered to the other party; rather than settling the trade financially, which is the case in financial trading. Since physical trading presumes physical delivery, it requires a transportation contract with the TSO, and in this case physical traders additionally need to become shippers.

Supplier, also referred to as retailers, is a party which supplies natural gas to end consumers. A supplier must also act as a shipper, in order to physically deliver the gas to the end consumer.

End consumer is defined as a party which procures natural gas for its own use.

It should be mentioned that market parties often assume more than one role at the same time. For example, suppliers also act as traders, by buying and selling gas on the market, and as shippers, by using the network to deliver their gas to the customers. Moreover, a large end consumer (e.g. electricity production plant) can act as a trader, and/ or as a shipper for own gas- by procuring gas for own consumption (or selling gas when the price is right) and by delivering it to itself.

In order to facilitate a structured discussion of entry-exit systems we furthermore use the following definitions:

An **Entry-Exit System** is a system for third party access to gas transmission networks. In an entry-exit system network users book capacity at entry points and exit points independently. Gas can be injected at the entry points and made available for off take at exit points on a fully independent basis. The gas does not follow a predefined contractual path. The entry-exit system has a virtual trading point where gas can change ownership within the system.

A **Market Area** is a term that in this report is considered a synonym for ‘entry-exit system’.

A **Balancing zone** is a zone within an entry-exit system in which a separate imbalance position for each shipper is determined.

A Virtual Point (VP, also referred to as a Virtual Trading Point) is defined as a notional point which offers network users the possibility to bilaterally transfer title of gas and/or swap imbalances.

A Gas Exchange is an organised market offering the anonymous trade of standardised products. All transactions at the gas exchange are financially settled by (or on behalf of) the exchange operator, which also acts as a central counterparty to all transactions. With regard to network access, the gas exchange principally operates like any other shipper, although there may be special rules regarding nomination procedures. An exchange might be connected to the VP of an entry-exit system or a physical hub.

A Physical Hub is a physical location at the border of one or two entry-exit systems where title transfer service is offered by a dedicated entity (the hub operator). In practise a physical hub is usually

located where transmission pipelines from different networks connect and where gas physically flows through.

1 INTRODUCTION

1.1 Background

In 1998, the Member States of the European Union unanimously adopted Directive 98/30/EC concerning common rules for the internal market in natural gas The overall objective of this directive was to create an open internal market for natural gas in Europe and increasing competition whilst taking due account of security of supply. When one reflects on the meetings held in Madrid from 2002 onwards, the common understanding in EU-bodies is that the entry-exit model is most suitable to serve the objective of a non-discriminatory network access on the transmission level. Discussions over the past years have resulted in the regulation (EC) NO 715/2009 of the European Parliament and of the Council of July 13, 2009 on conditions for access to the natural gas transmission networks and repealing Regulation (EC) No 1775/2005. Regulation (EC) 715/2009 specifies that transmission system operators should have a de-coupled entry/exit system in place.

An entry-exit system allows network users to book capacity rights independently at entry and exit points. This model represents a general improvement providing more flexibility for network users, system transparency and cost reflective network tariffs. The independence of entry and exit capacities is further supported by a virtual trading point where network users who have booked entry or exit capacity can sell or buy gas, respectively. In this set-up natural gas can easily change ownership, facilitating the gas market.

Since the development and formalisation of the abovementioned regulation the implementation of the entry-exit system in the individual EU member states has been on-going. Member States have developed different solutions while implementing the entry-exit systems. There are also countries that have not (yet) implemented an entry-exit system.

Also in this context, late in 2011, the Council of European Energy Regulators (CEER) delivered a target model for a European gas market to the European Commission. This model provides a vision of 2014 and beyond and contains a suite of recommended steps. The Gas Target Model aims at facilitating the creation of a well-functioning EU market, consisting of national or cross-border interconnected entry-exit zones with virtual trading points (so-called “hubs”).

Against this background, the European Commission initiated the current project with a twofold objective:

1. Implementation of entry-exit systems - An analysis and assessment of the implementation and characteristics of existing or planned entry-exit systems for natural gas throughout the European Union.
2. Potential for entry-exit zone mergers - An analysis and assessment (including a cost-benefit assessment) of the potential for development of entry-exit zones in the European Union as a whole and specifically in certain regions in the European Union.

In this report we present our findings on task 1 of the project. In a separate report, we present the findings on task 2 of the project.

1.2 Scope and Structure of the Study

The assessment provides a strategic view on the status of entry-exit systems and their implementation in the EU. More specifically, the key aspect of the analysis is to assess the possibility to trade gas at the virtual trading point, hub and exchanges as well as cross border trade between Member States and to assess how the existing systems influence the liquidity of the wholesale market.

The focus of the assessment is to identify which choices in the design of the entry-exit system may already have lead or may still lead to:

- Barriers for the entrance of new market players.
- Barriers to cross-border trade.

We structured the assessment along the lines of the following topics:

1. Design of the entry-exit system
2. Contractual framework
3. Capacity products and pricing
4. Balancing and imbalance settlement

The focus of the analysis is on the functioning of the entry-exit systems. The access regulation of connected facilities, such as LNG terminals and storage facilities, is not part of the analysis.

The assessment of these topics is provided in the next chapters. The appendix to this report comprises of detailed country factsheets. The information compiled in these factsheets is the basis for the analysis in this report.

2 DESIGN OF THE ENTRY-EXIT SYSTEM

2.1 The 'Full' Entry-Exit System

2.1.1 Defining the 'Full' System

Regulation (EC) No 715/2009 (in particular Recital 19 and Article 13) requires all Member States to establish a so-called entry-exit system, where for every entry point into and for every exit point out of the system network users (i.e. the contractual party of the TSO, the so-called shippers) are able to book entry and exit capacities independently. An entry-exit system has a virtual trading point (VP). The virtual trading point facilitates the trade of gas between network users. The trade can either be a title transfer or an imbalance swap[1].

While the fundamental characteristics of an entry-exit system are thereby defined, the actual application differs between Member States. One of the main objectives of the project at hand was to identify and analyse the state of the entry-exit system implementation in the Member States of the EU and to assess which characteristics, in particular, facilitate or impede the entrance of new market players, access to the virtual trading point, exchanges and cross-border trade. To depict the main characteristics of the various entry-exit systems implemented in the various Member States, we have compiled a schematic representation for each Member State (cf. Member State factsheets in the appendix of this report). This schematic representation summarises the basic access arrangements in a uniform manner. The scheme aims to represent the contractual interfaces in the entry-exit system from the shipper´s view.

[1] The common terminology is to refer to title transfer and this is used in this report, but from a technical perspective it can also be an imbalance swap between network users, although in effect it has the same consequences.

In order to have a reference point from which the different system are described and compared, first a **'full' entry-exit system** was defined. Such a 'full' entry-exit system can be described as follows:

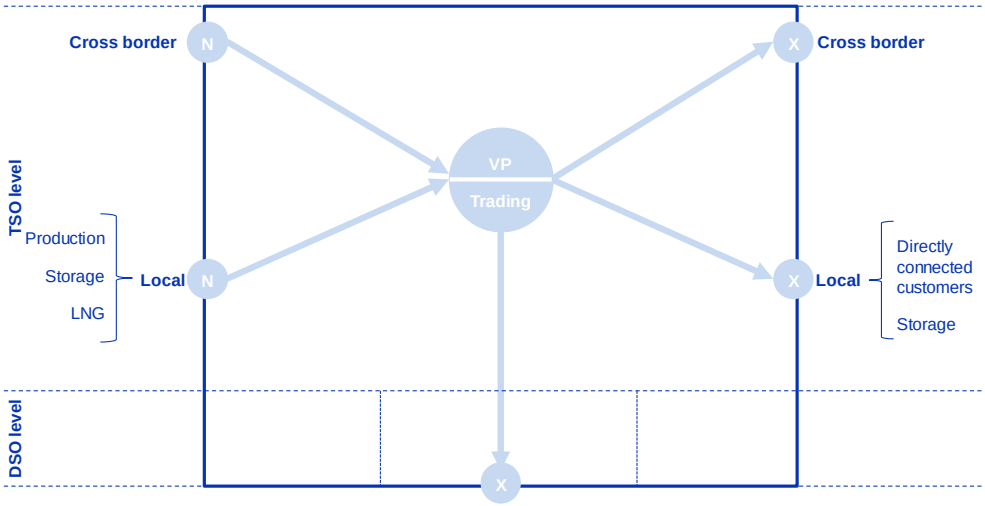


Figure 1: Schematic Representation of a 'Full' Entry-Exit System

As indicated by the blue entry and exit points, network users can contract entry and exit capacity separately in an entry-exit system, i.e. the 'box'. This is the first and foremost requirement set by Regulation (EC) No 715/2009.

Gas is brought into the system either at cross-border entry points (pipeline entry or LNG terminal) or at entry points from domestic production. Gas exits the system either at cross border exits, to directly connected customers at TSO level or at exit points to distribution networks. In addition, most systems have gas storage facilities where system entry and exit is possible. As the traditionally used contract paths (point-to-point model) are abolished, entry and exist capacities are generally defined as freely allocable or de-coupled. For a 'full' entry-exit system that means that gas brought into the system at any entry point can be made available for off-take at any exit point within the system on a fully independent basis. Similarly, this has the effect that each exit point can be considered as being supplied from any entry point without any restrictions. This is indicated with the blue arrows in the scheme.

Furthermore, it is generally understood that a 'full' entry-exit system needs to be equipped with a so-called Virtual Trading Point (VP). Regulation (EC) No 715/2009 requires that gas can be traded independently of its location in the system. The VP fulfils this requirement. A VP offers users the possibility to bilaterally transfer title of gas and/or swap imbalances between network users. The VP is not tied to a physical point within the system and it is accessible without the need to book entry or exit capacities. If there is a VP, network users have free access from every entry and exit point to the virtual point; in the above scheme this is indicated by the light blue arrows which indicate the contractual flow of gas[2]. With the VP, trading is enabled to move away from traditional trade at specified physical locations, traditionally at the flange of a system entry or exit point. Fully flexible access to and from the entry and exit points enables shippers to bring gas into the system (i.e. to every exit point) and to the VP once they have entry capacities. Likewise, a shipper possessing exit capacity would be enabled to supply that exit from every entry point as well as from the VP. Thereby, a shipper could limit its activities to bringing gas into the system and selling at the VP and thus requiring only entry capacities or, alternatively, possessing exit capacities only while sourcing all gas from the VP. In addition, an intermediary trader could be buying and selling gas at the VP without owning any entry or

[2] Please note that the contractual flow is not necessarily equal to the physical flow.

exit capacities at all. It can be concluded that a virtual trading point is essential and intrinsic to an entry-exit system facilitating a functional wholesale market. In section 2.3 we discuss the definition and use of the virtual point in detail.

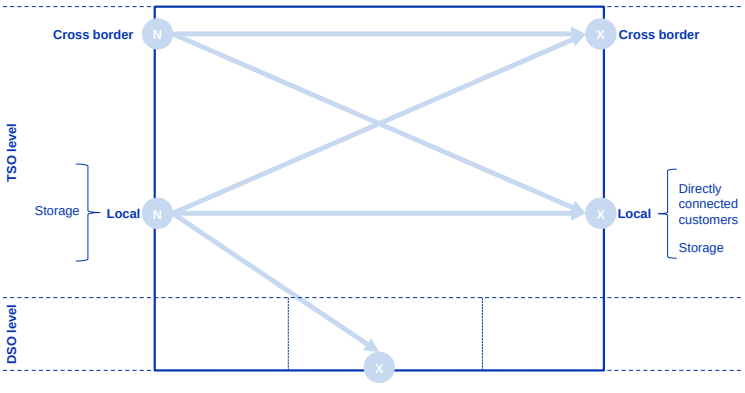
In a 'full' system, the distribution level is fully included into the entry-exit system. That means transmission and distribution network operators take care of capacity and connection related issues at their interconnection points (the so-called city gate), whereas a shipper would book the exit capacity only on the network level where the final exit takes place. Thus, a shipper supplying a customer connected on distribution level would only need to contract exit capacities on this level and still be able to supply this particular customer from any entry point in the system (including the VP) while the required capacity at the city gate would be subject to an agreement between distribution and transmission network operators. In such a system, the distribution level is part of the market area and/or balancing area. Imbalances between injections and withdrawals (taking account of the respective transactions at the VP) would then be summarised for all entry and exit capacities in a shipper's portfolio, regardless of the network level.

2.1.2 Deviations from the 'Full' System

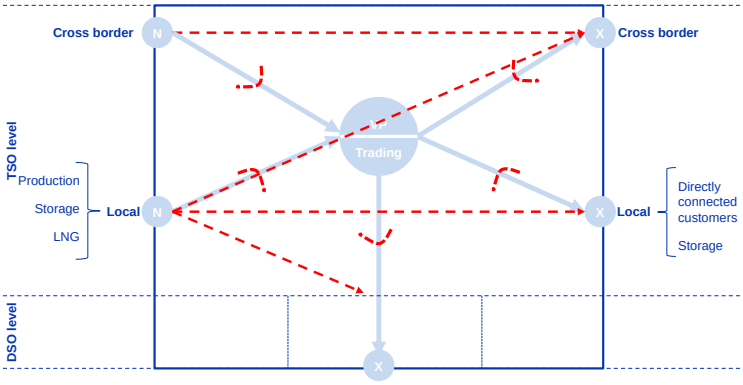
In many Member States additional components or solutions deviating from the 'full' system are implemented. In most cases these individual particularities are the result of the local situation, the historically grown physical infrastructure as well as the historically grown contract "landscape" (i.e. for instance the existence of long-term contracts). In the individual Member States solutions had to be found, for instance to accommodate a larger market area size, significant direct border-to-border ("transit") flows, imposing restrictions on free allocability of capacities, explicit booking at city gates, etc.

Based on our hypothesis of how a 'full' entry-exit system could look like, as described above, we used a standardised set of additional elements in the schematic representations in order to visualise the differences in a consistent, clear and easily comprehensible manner. This is shown in the figure on the next page. Here we briefly describe these particularities. The individual particularities are explained in more detail in the following sections. The schematic representation of the entry-exit systems in all the Member States can be found in the country factsheets attached to this report.

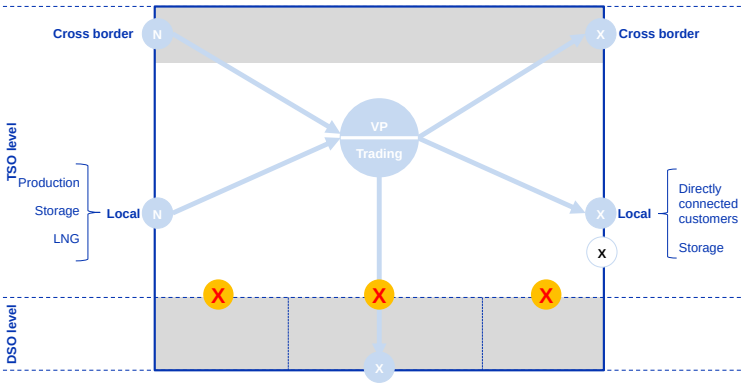
For instance, some Member States may not have a VP yet. For such cases we have then connected all the entry points with all the exit points with blue arrows, indicating that from a shipper's perspective gas can flow from every entry point to every exit point (not suggesting point-to-point relations).



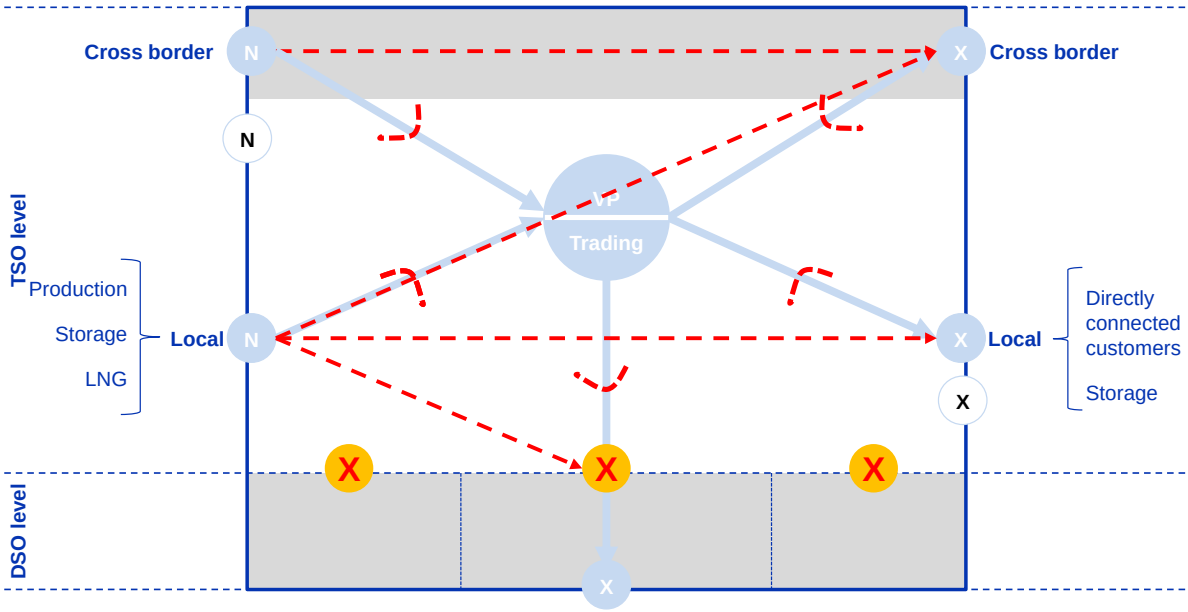
In several systems, (physical) limitations of the existing infrastructure prevent the transmission system operators from offering all capacities as freely allocable. In those systems, a certain share of the capacities may be offered with a mandatory point-to-point relation, i.e. a locational restriction (because other network points just cannot be accessed from every other network point). In addition or as an alternative, general access to the VP and other points may be provided on an interruptible basis only.



Sometimes, the entry-exit system does not fully include the DSO level, requiring additional capacity contracts between the shippers and the network operators at the interconnection points between transmission and distribution ("city gate"), thus creating an additional contractual interface for the shipper. In addition, the distribution network may not be part of the balancing zone and/or even may be a separate balancing zone.



The figure below gives the schematic representation with all the various options depicted. In the figure below we provide a concise legend of the symbols used.



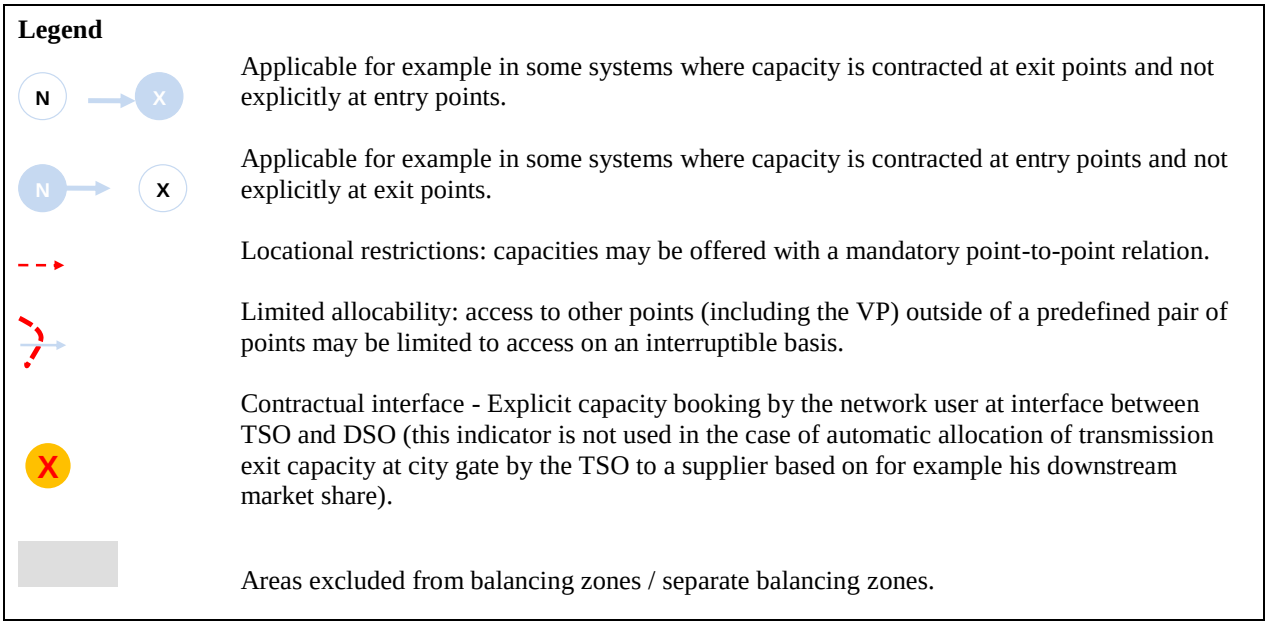


Figure 2: Schematic Representation of Possible Particularities of Entry-Exit Systems Implemented

It should be noted that in various systems a similar design feature may be described using different terminology whereas in other cases identical terminology may be used to describe factually different design features. In our description we aim to provide an understanding of how a system really works and not how it is labelled. The specific variations, including their description and explanation observed in the Member States are provided in each Member State country factsheet in the relevant section.

2.2 Overview of Design Features of Implemented Entry-Exit Systems

The following sections summarise the general status of the implementation of entry-exit systems in the Member States of the European Union, as well as the basic access arrangements established. To this extent we have firstly assessed for each Member State:

- Whether it has implemented an entry-exit model, a Member State is said to have implemented an entry-exit model if a network user has the possibility to book capacity at entry and exit points independently of each other.

Furthermore, for each Member State we have assessed:

- Whether there is a virtual trading point (VP).
- Whether capacity products with limitations of free allocability are used.
- Whether direct border-to-border ("transit") or cross-border flows are integrated in the entry-exit system, or whether there is a separate system for direct border-to-border flows.
- Whether the entry-exit system "ends" at the city gate or the distribution level is included, for capacity booking as well as balancing.

We discuss these aspects in separate subsections below.

2.2.1 Status of Implementation of Entry-Exit Systems

The figure on the next page shows where each of the Member State is in terms of implementing an entry-exit system. We show the level of entry-exit implementation along two major dimensions:

- Firstly, we show whether capacities are restricted in their flexible use in a Member State, meaning either locational restrictions or limited allocability (for parts) of the capacities, i.e. where capacities are either not fully integrated into the entry-exit system or entry-exit capacities are not fully freely allocable, or where this is the implicit result of splitting the national system into several market areas or entry-exit zones.
- Secondly, we show whether a Member State has implemented a VP allowing for flexible title transfer of gas independent of the physical location of the gas.

A rectangular shape indicates that a Member State has implemented an entry-exit system and a circular shape indicates an entry only/ exit only system.[3]

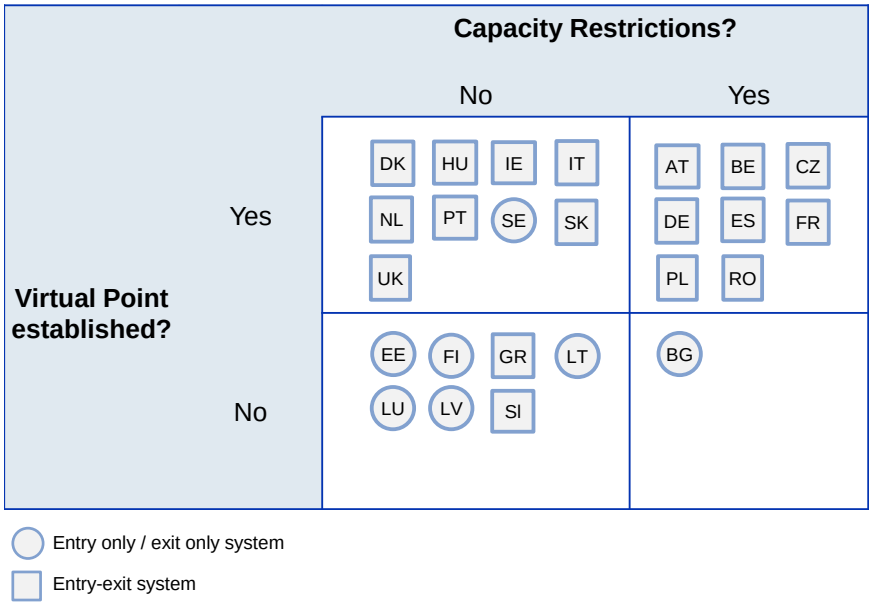


Figure 3: Overview of Status of Implementation of Entry-Exit Systems

The above figure can be interpreted in a way that the systems implemented in those member States in the left upper quadrant are closest to the earlier defined 'full' entry-exit system. This group consists of nine countries. In other Member States either the implementation of the VP is still missing (seven countries) or the capacities cannot be used fully flexibly by shippers (nine countries). Only one Member State, Bulgaria, has neither a VP established nor all marketed capacities without restrictions.

It should be stressed that the entry-exit systems grouped in the left upper quadrant are not necessarily at the same stage of development. The functioning of the entry-exit systems is determined by many aspects (e.g. capacity products, applicable licenses, terms and conditions for access, balancing regime, etc). In order to arrive at a nuanced view of the different entry-exit systems we assess the characteristics of entry-exit systems in the following sections in more detail.

[3] The overview presented in Figure 3 is greatly condensed for the sake of clarity which results in an overview that cannot facilitate all nuances which may be important. These are elaborated on in detail in the individual factsheets.

Without doubt, the lack of an entry-exit system can be described as a serious barrier for market development, trade liquidity and thus competition. However, the emergence of a functioning market also requires other conditions to be met. It is therefore important to note that deploying an entry-exit system will not necessarily create a competitive market by its mere existence. First we take a further look at various forms of directly or implicitly restricted capacities.

2.2.2 Capacity Restrictions

When moving from a point-to-point regime to an entry-exit system, the TSOs have to re-evaluate the technical capacity which is available at the entry and exit points. In an entry-exit system the entry and exit capacities are booked separately by the shippers. The shippers can freely use the booked entry and exit capacities in all combinations. The TSO is not informed anymore how the booked entry and exit capacities will actually be used in relation to each other. Compared to the situation before implementing the entry-exit system, the flow patterns might change in the network. Therefore, the TSO might not be able to continue accommodating pre-existing firm available capacity or previously booked capacity. Limiting the amount of technical capacity would ensure that all offered capacity can be freely used in all combination and under all conditions (free allocability). However, this will not always be a feasible or sensible option as it may mean that some shippers would not get or maintain the required earlier contracted capacities, or that the volume of firm capacities might have to be reduced excessively. Different measures are available to deal with this issue.

The following table provides an overview of some mechanisms that are available for relieving potential congestion. The mechanisms are grouped in administrative measures and market-based instruments. For the market based instruments, we indicate the counter par for the TSO.

Administrated measures come largely free of charge to the TSO, with the exception of for example a reduction in tariffs for interruptible or restricted capacities. Market-based instruments are generally accompanied by remunerating counterparties for the actions taken. Apart from the difference between administrated and market-based measures, the mechanisms can also be grouped by the type of product and/or service to which they are related. Two distinctions can be made: the mechanism is either related to the allocation and use of capacity rights or the mechanism is directly linked to trading gas and/or the nominations submitted by network users on a daily basis.

	Administrated Measures	Market-Based Instruments	
Counterparty	Shippers	Shippers	Infrastructure operators
Capacity	• Interruptible capacities • Locational restrictions • Limited allocability	• Capacity buy-back	
Commodity / Nominations		• Locational trades • Flow commitments	• Re-routing of flows

Source: DNV KEMA

Figure 4: Potential Mechanisms to Relieve Network Congestion

This part of the study focusses on the definition and use of entry-exit systems. Instruments like capacity buy-back, locational trades, flow commitments and re-routing of flows may be used by TSOs to find solutions for congestion, but they do not relate to the definition and use of capacity rights. We therefore do not discuss this further in this part of the report, the reader is kindly referred to part B of this report. Below we focus on interruptible capacities and capacities with restrictions.

The concept of capacity restrictions is closely related to interruptible capacity. In essence, the TSOs do not interrupt capacity, but would redefine the capacity product so that it may only be used under certain circumstances. As such, the network user's use of the conditional capacity product would be restricted beforehand to those situations which would not lead to an interruption. An advantage of this type of capacity could be the clarity it provides to network users concerning the firmness of the product as it delineates it usability in advance. We have identified two types of restrictions, namely capacities with locational restrictions and capacities with limited allocability:

- **Interruptible capacities** - Interruptible capacities are already widely applied in the European gas markets, in order to provide as much capacity to the market as possible whilst maintaining the ability of the TSO to guarantee system integrity. Introducing interruptible capacities would imply degrading currently firm, preferably unsold capacity to interruptible capacity in order to account for those situations in which the network is insufficient and congestion problems occur. In section 4.1.1 we provide a full overview of the capacities offered in the differenet Member States.

- **Locational restrictions** - With locational restrictions, capacities are offered with a mandatory point-to-point relation (which disables for instance access to the VP) within the entry-exit system. However, locational restrictions may be defined less strictly and not relate to a combination of specific points, but to specific parts of the overall market area as well.
- **Limited allocability** - With limited allocability, other points (including the VP) outside of a contractually predefined point-to-point connection are only accessible on an interruptible basis.[4]

In the schematic representation introduced above, restrictions applied on capacities are depicted with the dashed red lines, as shown in the following figure.

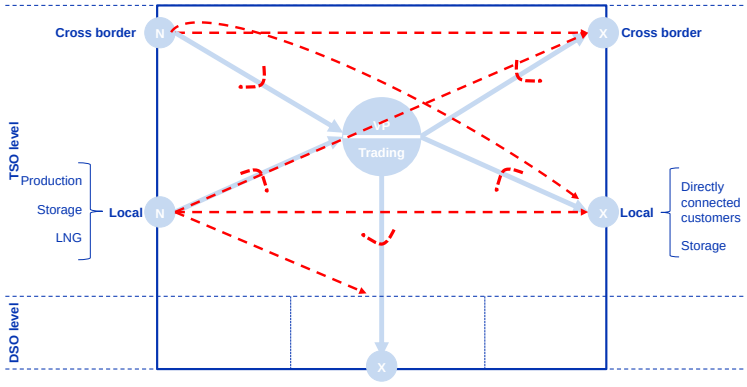


Figure 5: Schematic Representation of Restricted Capacities

We indicate the locational restrictions using a dashed red arrow (- - ▸). The limited allocability is indicated using the curved red lines ⌒, indicating the limited access to other points outside of a predefined pair of points. s is shown in the following figure, the number of Member States using explicitly restricted capacity products is quite limited. It should also be noted that, in these cases, the restricted capacities are only a minor part of the total capacity. That means that the majority of capacities is also freely allocable in these countries.

[4] Interruptibility may be dependent on general system situation or on predefined indicators, such as day of the year, ambient temperature, specific system states, etc. As such, interruptible access to the VP with not freely allocable capacities and interruptible capacities is usually not differentiated.

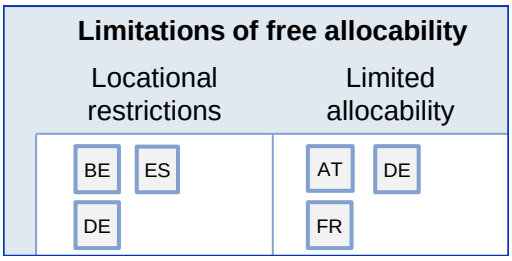


Figure 6: Member States Where Limitations of Free Allocability of Capacities Are Used

Where limitations are applied within the entry-exit system, usually free allocability is only limited in a way that access to the whole system and the VP is provided on an interruptible basis. Only in one case, in Germany, is a point-to-point restriction without interruptible access to the rest of the system still applied. A more detailed discussion of capacities with a restriction of free allocability can be found in chapter 4.1.3.

With regard to the general application of such capacity products, it has to be carefully assessed what the alternative measures are to fully ensure free allocability of entry and exit capacities and what would be the cost of implementing these alternatives. If limitations on free allocability are imposed to achieve a generally larger size of the system or to offer a higher amount of capacities, such limitations may be beneficial from a total welfare perspective compared to the alternative of expanding the infrastructure, limited system size or reducing capacity offered to the market.

However, when assessing the basic features of such mechanisms it seems quite obvious that if used they should be used in the mildest form and to the least extent possible. Therefore, limitations of free allocability which provide at least an interruptible access to the complete system (including the VP) seem to be preferable against imposing direct point-to-point restrictions.

2.2.3 Integration of "Transit" Flows and Separation into Multiple Entry-Exit Systems

From the perspective of capacities with locational restrictions or limitations on allocability, separate capacity systems or even separate physical infrastructures have the same, or at least a very similar, effect, namely they limit a shipper's flexibility to freely access every point within the system, including the VP and thus limits the shipper's choices of how it might balance its gas account.

In short, we distinguish three factors which directly or implicitly could have an impact on free allocability of gas flows within the Member State:

- **Separate transit contracts –** In some Member States, separate transit contracts are still in place, typically in the form of legacy contracts.
- **Separate systems -** Physically and/or commercially separated systems consisting of single transit pipelines, e.g. having a national market area and separate system for a pipeline crossing the market area.
- **Several market areas -** Multiple market areas with individual entry-exit systems, typically geographically demarcated, e.g. North and South (while overlap is possible).

Referring to the schematic representation of entry-exit systems, several aspects which rather have an indirect impact of allocability are shown in the following figure. Separate transit contracts/systems are depicted by a grey bar at the top of the scheme. Furthermore, it shows that within the same Member State more than one entry-exit system can be present.

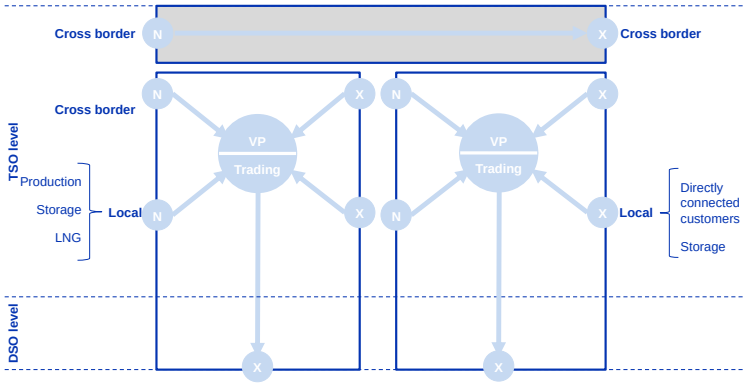


Figure 7: Schematic Representation of Aspects Having Indirectly Restricting Capacities

In the table below we provide an overview of the three ways which may limit free allocability of capacities. Below we discuss these three issues separately.

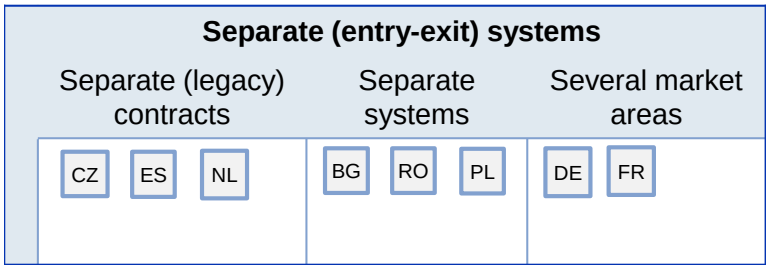


Figure 8: Member States Where Other Factors May Limit Free Allocability of Capacities

The issue of non-integrated transit/cross-border flows refers primarily to new contracts. In the Netherlands, Spain and Czech Republic some legacy transit contracts still exist and have not yet been converted to contracts under the entry-exit regime. However, in the Netherlands and Spain, the contract terms are currently being reviewed and adapted to the entry-exit model under supervision of the national regulatory authorities. In the next section 2.2.5 we provide an overview of the historical development of legacy contracts, their integration into entry-exit systems and the impact of their existence on market development.

With regard to the integration of transit or cross-border flows[5], we can see that the majority of Member States have integrated this as part of the overall entry-exit system[6]. The Polish system uses a separate entry-exit system on the transit system (Yamal pipeline). However, as this entry-exit system covers one large trunk pipeline and has no VP, there is little flexibility for shippers. This means that shippers have no possibility of transferring gas among each other within the system. A shipper using entry capacity into the system will thereby always be required to obtain the respective exit capacity to transport gas further. Trading among shippers is only possible at the flange, i.e. technically speaking- before the system is entered or after it is left. In order to supply gas from the Yamal system to the rest of the Polish system or the Polish VP, exit capacity needs to be explicitly booked on the Yamal system as both systems are not integrated into a joint market area (plus the respective entry capacity into the

[5] As far as this is concerned, in particular the transition to an entry-exit system, this is to be discussed in more detail in chapter 2.2.5.

[6] Poland has implemented two separate entry-exit systems similar to other Member States which also have multiple systems. However, one of the entry-exit systems coincides with the main East-West "transit" system (Yamal pipeline). In this entry-exit system, there is no VP and it is not possible for network users to transfer their gas among each other. In contrast, in the other entry-exit system which predominantly serves the domestic market, a VP has been established.

other Polish transmission system). Bulgaria and Romania have a separate transit system where no TPA is granted and no entry-exit system is applied.

Dedicated "transit" systems, be it as a entry-exit system or still under point-to-point contracts, and similarly legacy contracts, may have several effects on the gas market. In general, gas transported through the system under such contracts or in separate systems is prevented from reaching the local market, or requires additional transaction costs to reach the market[7]. As a result, gas flows (or more precisely the shippers) may not react efficiently to economic signals which may also negatively affect liquidity. The integration of dedicated transit systems into the entry-exit system might not necessarily result immediately in market development and increased competition, in cases where shippers on such systems have firm obligations towards other parties. They still may not react to price signals or take part in markets. Nevertheless, dedicated systems for larger shares of the capacity will surely not be suited to explicitly foster and promote the development of liquid and competitive markets. In those cases where transit systems are separated from the "normal" entry-exit system, either – as is the case in Poland – by setting up a dedicated entry-exit regime, or by maintaining a separate point-to-point system, as applied in Romania and Bulgaria, this would appear to be a barrier to trade. Such systems seem to prevent that gas which is transported on the transit system is entering the national market (or at least to impede the access from the transit system to the national market).

In most cases, the entry-exit system coincides with the national boundaries. In general, it can be stated that any *undue* separation of larger network areas into more than one entry-exit system could be clearly seen as an obstacle to market development, even if the negative effects are limited by a transparent and easy-to-handle capacity allocation at the relevant interconnection points. In some Member States, though, there is more than one entry-exit system within national borders. This is, for example, the case in Germany, France and Poland (the case of Poland is already discussed above together with dedicated transit systems). Such a split into more than one market area could also be seen as a barrier to freely and flexibly using entry-exit capacities.

However, the existence of more than one market area within a Member State may have several reasons. Some Member States justify the implementation of more than one entry-exit system (or market area) with the size of the local system and the existence of physical congestion. In general, it could be argued that there are "natural" limits for the size of an entry-exit system, although this limit can probably not be identified with certainty and will be very much dependent on the particular situation.

For instance, this is the case in France and in Germany, with France having three market areas and Germany having two. In both countries, discussions on how market areas could be integrated further are ongoing. Especially in Germany, a further consolidation to one single market area seems to be unlikely in the near future as the TSOs have assessed that considerable investments would be necessary. It should also be noted that the biggest market area in France, as well as both of the German market areas, are significantly larger than many other entry-exit systems in the EU.

The reasons for the co-existence of more than one entry-exit system (or market area) are diverse and often argued to be determined by a lack of physical interconnection capacities between the systems and merging market areas may require large infrastructure investments. To that end, enlarging the footprint of an entry-exit system may come at additional cost. Thus, this may not be beneficial from a total welfare perspective as it is also assessed for a set of country combinations mentioned in part B of this report which addresses the issues of market area integration.

[7] This, for instance, may be the case in Poland where additional capacities are required to move from one system to another.

2.2.4 Integration of Distribution Level into the Entry-Exit System

As already described, a 'full' entry-exit system will stretch across network and pressure boundaries. However, the degree of integration differs among the Member States. Typically, the transmission and distribution systems are operated by separate network operators. The interconnection point between the transmission level and the distribution level sometimes serves as demarcation point between different capacity booking and balancing systems:

- **Capacity booking -** The main difference among Member States is whether a shipper who wants to transport gas from an entry point somewhere on the transmission level to an exit point somewhere on distribution level has to book capacity at the so-called city gate separately, or if capacity arrangements at this point are handled by the network operators internally.
- **Balancing -** In addition, systems may differ to which extent the distribution level is part of the overall balancing system or if a separate balancing mechanism is applied.

The figure below shows how these features are depicted in the schematic representation of the entry-exit system. The grey bar at the bottom of the scheme indicates if separate imbalance settlement at DSO level takes place. The red 'X' depicts the necessity of a separate capacity booking at the city gate.

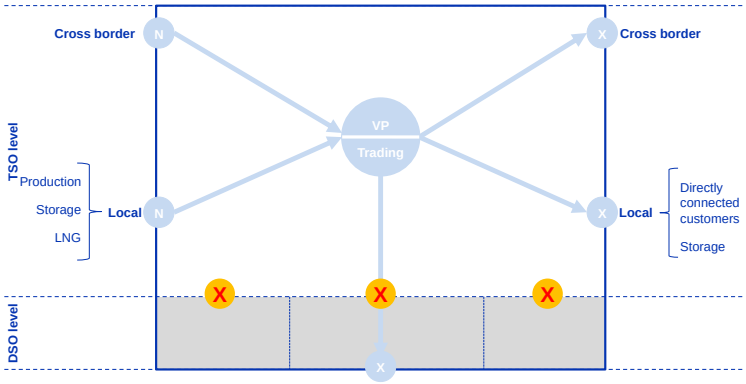
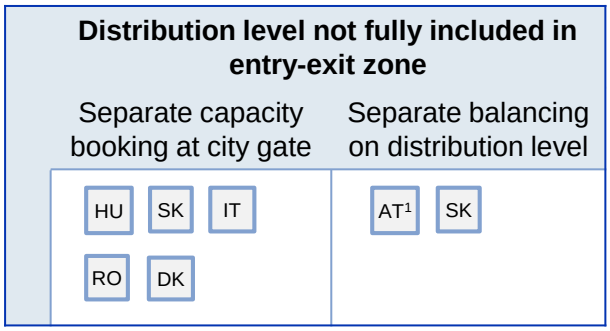


Figure 9: Schematic Representation of the distribution level in the Entry-Exit System

In many Member States no separate capacity bookings are required at the city gate for access to the distribution network. In Austria, for example, the distribution area manager takes care of these capacity bookings at an aggregated level, while in Germany the DSO is responsible for aggregate booking. Slightly differing, in Belgium, similarly to the United Kingdom, the exit capacity to the distribution grid is allocated to network users based on their market share of the retail market. In some other countries, for instance in the Netherlands or in Ireland, shippers are invoiced separately for the city gate capacities by the TSO, whilst the allocation is still implicit based on their share in the market. The main difference in such a system compared to integrating the costs in the distribution exit charges is only whether the transmission exit costs are going through the books of the DSOs or not, which seems to be a very minor issue.



1. We have categorized Austria as having two different balancing systems. However, the separation is not from the perspective of the network users, but rather from the exit points where a shipper ships gas to. This effectively results in two separate balancing systems for shippers with and without physical entry or exit points.

Figure 10: Member States with Distribution Level Not Fully Included in Entry-Exit System

The majority of Member States follow the approach that capacity at "city gates" is subject to agreements between DSOs and TSOs, with costs often rolled into the cost base of the DSO and thus into the distribution charges.

In contrast to this integrated approach, network users have to book capacity separately at each respective city gate point in other Member States. This is the case in Hungary, Romania and Slovakia. In Denmark, shippers need to explicitly book capacity at the domestic exit point. This is a virtualized exit point covering the whole domestic exit zone.

If shippers are required to book capacity at the "city gate" separately, this could mainly result in three negative effects:

- Shippers are required to have an additional contractual interface for booking capacity at the "city-gate". In a case where a shipper transports gas for instance from the border entry to a final consumer on distribution level, he would need (1) entry capacity contract at border entry, (2) exit capacity contract at "city gate", and (3) a contract with the DSO[8] compared to only two contracts if the "city gate" capacity is subject to internal agreements between the respective network operators. The result will be higher transaction costs for the shipper.
- The larger a shipper's portfolio of clients behind a "city gate", the larger the portfolio effect and thereby the realized savings compared to shippers with smaller portfolios. In essence, such a system may put a smaller shipper at a disadvantage. There is a potential discrimination among small traders if the system allows the traders to book separately the exit of the transport system (at the city gate, excluding distribution) using all his portfolio of clients at this specific exit point. The portfolio effect can especially cause problems for small traders when there is no integration of the access to the distribution network in the exit tariffs. This effect is mitigated when the TSO makes an overall capacity booking based on a consumption prognosis model for the downstream market area taking into account the non-simultaneous behaviour of residential demand. Based on this information the TSO can calculate the required capacity and then allocates the total required capacity to suppliers active at the city gate.
- In addition, from a theoretical point of view, said portfolio effect is strongest if all capacity is booked (or otherwise reserved) by the DSO instead of by each shipper individually. Conversely, individual bookings by each shipper may even lead to contractual congestion. If all capacity reservations are fulfilled by providing the necessary infrastructure, separate

[8] I.e. one contract with the DSO, if the DSO operates a postage stamp tariff system.

booking could thus lead to higher need for infrastructure at the "city gate" when booked by each shipper separately. Overall, investment costs for the network would thus be higher.

These considerations show that separate booking of exit capacity at the "city gate" may lead to additional cost, especially for smaller shipper. Nevertheless, we do not consider any of these issues as a fundamental barrier, provided that all shippers are able to book sufficient exit capacities to supply their customers in a given distribution network.

With regard to balancing, there is typically no distinction between balancing on transmission and distribution levels. Of course, in daily network operations, every network operator is responsible for keeping its network balanced. In some cases a DSO might fulfil this responsibility by pressure control or by relying on balancing actions by the TSO. What is meant with a separate balancing on distribution level is whether a shipper is separately responsible towards each of the transmission and distribution network operators to keep its balance or – if not – subject to separate imbalance settlement schemes. In particular when capacity at city gates is not only booked but also nominated by shippers explicitly, imbalances may occur on transmission or distribution level (or both). In such cases a shipper would be liable for imbalances for each of the networks separately. Any benefit for imbalances stemming from a larger portfolio will be limited to the borders of individual network while netting of imbalances over several networks will not be possible, thus resulting in potentially higher costs for a shipper in imbalance settlement. Under optimal conditions, the imbalance of a shipper would only be the difference between allocated entries and exits, regardless of the network level and the distribution network on/in which these imbalances occur.

A separate balancing regime for transmission and distribution is applied in Slovakia where the intake and off take on DSO level are balanced separately from the transmission system. A somewhat different approach is taken in Austria, where the separation is not from the perspective of the network but rather from the exit points where a shipper ships gas to. In fact, the result is nevertheless very close to having a separate balancing system on the distribution level.

Having separate balancing systems for the transmission and distribution level may lead to an increase of balancing costs for a shipper, as it prevents netting the imbalances with each other. This is worsened if a shipper is active in more than one distribution system downstream of the same transmission system. In addition, splitting the demand for balancing gas may have a negative impact on liquidity and competition on balancing markets. Therefore, it seems preferable from a market functioning perspective, to establish a single system-wide balancing system. At the same time we recognize that the relevant TSOs and DSOs may have additional balancing requirements in order to maintain an acceptable distribution of gas in the underlying system. Further details with regards to imbalance settlement are discussed in chapter 5.

2.2.5 Treatment of Legacy and Long Term Contracts

This section provides an overview of the historical development of legacy contracts, their integration into entry-exit regimes and the impact of their existence on market development. It is the aim of the following assessment to describe how, and if at all, legacy transit contracts have been integrated into the entry-exit system across the Member States.

Previously, gas supply in the EU Member States was usually secured by long-term contracts. These contracts are often long-term contracts and bilaterally closed agreements that typically contain a take-or-pay provision (buyer always is obliged to pay for a certain minimum amount of gas, even in case of lower physical off-take) and are generally concluded on the basis of intergovernmental agreements. With the unbundling developments following the second Package, many of those traditional contracts have been decoupled into separate commodity supply and transmission contracts.

With the implementation of entry-exit systems following the Third Package, these legacy transmission contracts, both for direct border-to-border transit transmission as well as for 'domestic' transmission, should be integrated into the new entry-exit systems. In most EU Member States legacy contracts for 'domestic' transmission has been adapted to the new legal provisions. For the time being the conversion of the legacy transit contracts into E/E contracts in line with EU legislation is in some cases still outstanding. In some Member States transit contracts still enjoy different treatment from national transmission contracts. However, if transit is entitled to different (more favourable) treatment compared to national transmission it might result in market distortion. Third party access to transit capacity was recognized as crucial for liquid markets to emerge.[9]

Recently, ACER finished an inquiry into the Member States regarding the compliance of transit contracts with the current EU legal provisions. The inquiry´s main focus is whether transit contracts enjoy different (more favourable) treatment compared to national transmission[10]. In this section an overview of this inquiry is provided with a focus on the access regime and regulatory treatment of the high-pressure transmission lines used for the transfer of natural gas within the EU for the purpose of delivery to another country (transit). It is important to note that, as stated in the report, there is still a lack of sufficient information and transparency as regards gas transit contracts in the EU.

The results of this inquiry are summarised in a graphical way in Figure 11 below. Member States that have no physical ability for transit flow because they have either only import or only export capacity FI, GR, IE[11], LU and SE), Member States that are exempted as long as they are qualified as isolated markets (EE, LT, LV) and Member States that have dedicated transit pipelines (BG, RO, PL) are excluded in this graph.

In the graphical representation and summary of the ACER inquiry the focus remains on two aspects:

- Do transit contracts exist in the Member State?
- If so: is there any difference in treatment of transit compared to national transmission or are there any other legal provisions specific for gas transit?

[9] This was clearly identified in the Energy Sector Inquiry of 2007 (SEC(2006)1724, 10 January 2007, p.89).

[10] ACER-report: Transit Contracts in EU Member States – Final results of the ACER inquiry, 9 April 2013

[11] Although Ireland does not export gas physically to other countries, it is possible to virtually export gas from Ireland to Great Britain through the Moffat Interconnector Point.

In addition to this information, the graph below represents an indication whether the overland transit is exclusively between two EU Member States, or that non-EU countries are (possibly) involved.

	Treatment of legacy transit contracts and border-to-border flows*		
	Full integration	Separate provisions	No integration
Old legacy transit contracts	AT[1] BE CZ[2] DE[5] DK[3] FR[4] NL[8] SK[10] UK	HU[6] IT[7] SI[11]	ES[12]
Border-to-border flows	AT[1] BE CZ[2] DE[5] DK[3] ES[12] FR[4] HU[6] NL[8] PT[9] SK[10] UK	IT[7] SI[11]	

AT[1] No distinction between transit and inland transmission. Legacy transit contracts have been transferred into the E-E system.

CZ[2] From 2011 legacy transit contracts (point-to-point) my be transferred into separate entry and exit capacities subject to the decision of capacity holder to accept the mandatory offer of the TSO to split the point-to-point capacities. According to information provided by ERU in February 2013 all remaining legacy contracts have been transferred into the entry-exit regime in 2012.

DK[3] Cross border flows are integrated into the overall E-E system.

FR[4] Transit flows are under E-E booked capacities, however the duration of the transit contracts towards Spain and Switzerland was maintained and not modified with the implementation of the E-E system.

DE[5] No distinction between transit and inland transmission. Legacy contracts have been transferred into the E-E system.

HU[6] Direct border-to-border transports are integrated into the E-E system. There is only one transit contract realized before market opening (even before Hungary joined the EU) where transit fee is not regulated.

IT[7] Old transit contracts have become standard transmission contracts in line with the European legislation. In case of emergency transit cannot be interrupted.

NL[8] When the Third Package came into force (3 March 2011) three transit contracts were in place. The first transit contract expired in September 2011, the second and the third transit contracts have been adapted.

PT[9] Former transit contract was terminated in 2010. No distinction between transit and inland transmission.

SK[10] No distinction between transit and inland transmission.

SI[11] Although transit is treated within the same Tariff Act and same methodology adopted by the NRA, it is charged on a point-to-point basis, using special tariff coefficients depending on the point-to-point transmission utilization rate versus the utilization rate of an average final customer within the country. No other difference exists in any other aspect.

ES[12] There are two transit contracts signed before liberalisation in place which are subject to different treatment from national contracts in terms of tariffs, CAM and CMP.

EU-borders

non-EU borders

Figure 11: Overview of Transit Contracts in the EU, Based on the ACER Inquiry Of 2012

As shown in Figure 11, the integration of existing contracts in the entry-exit system shows a clear pattern in the Member States:

- **Full integration**: Some Member States were able to integrate the existing contracts into the new system by adjusting the terms and conditions of these contracts in such a way that they match the new regimes' requirements. This means that the direct border-to-border transmission through this Member State is contracted as separate bookings at entry- and exit points, fully in accordance with the entry-exit regime without any different treatment compared to domestic transport, and without any specific provisions. Such adjustments may consist of, for example, adjustment of the booking period according to the new

regimes provision, changes in point(s) of delivery and/or tariff changes. This process may be implemented in combination with or parallel to an unbundling process of the previously vertically integrated company (following the second Package provisions), when there is a 'natural' cause to split the contracts into commodity and transmission contracts.

- **Separate provisions**: A few countries introduced the entry-exit system in a way that transit contracts still have different provisions from the transmission system in terms of tariffs or interruptibility. Some Member States have converted the old point-to-point transit contracts into capacity contracts with restricted allocability that limit access to the virtual trading point by requiring a point-to-point connection in any event, or in case of congestion. This type of capacity product is elaborated in more detail in section 4.1. According to the ACER inquiry, two Member States have reported to have no separate transit contracts, but have indicated to have other legal provisions specific for gas in transit. In Slovenia tariff differentiation is applied through special price coefficients and in Italy transit cannot be interrupted. ACER concludes on these cases: 'The contradiction here is obvious: Such provisions clearly fall under the category of access rules, and will have to be brought in line with EU legislation.'

- **No integration:** In a number of cases, the Member State opted for implementing an entry-exit system for all flows except either all transit flows or only the legacy transmission contracts. In the former case all transit contracts are treated differently from national transmission contracts. In the latter case the existing transit contracts are left (partially) unaffected. This means that the new entry-exit system at the start was limited to capacity that was not tied up in legacy contracts at the moment of implementation and to any new capacity generated since then. With the expiration of the legacy contracts, the capacity can then be accommodated to the new entry-exit regime. The result may, for example, be the (temporary) survival of these old gas transmission contracts that are typically charged on a point-to-point basis, or the legacy contracts are split into entry- and exit contracts but with longer booking periods and/or flexible tolerant booking regimes (and either old or new tariffs to be applied). These conditions are often bilaterally negotiated.

The way in which the Member States integrated the legacy transit contracts can enhance or harm cross-border trade and can represent a potential barrier to the entrance of new market players.

When legacy transmission contracts are actually split into entry and exit contracts with longer booking periods, they factually become long-term bookings within the entry-exit system and do not result in any market distortion.

When legacy transmission contracts are not fully transferred into entry-exit contracts, but deviate from the rules applicable to inland transmission and remain subject to a different treatment from national transmission concerning the applicable tariffs (point to point tariffs) or with regard to other aspects of the entry-exit system, this may form a barrier to market development and to new entrants for two reasons:

- Tariffs for point to point legacy contracts may differ from the entry-exit transmission tariffs. In the case of lower tariffs for the legacy contract transmission, this difference implies a commercial benefit to the incumbents possessing such contracts.

- Gas transports based on point to point legacy contracts would have no access to the virtual trading point, thus isolating gas flows from price signals at spot markets, similar to the use of capacity products with restrictions on free access to the virtual point.

2.3 Definition and Use of Virtual Trading Points in Entry-Exit Systems

The establishment of a virtual trading point is an essential requirement for an entry-exit system to function as it ensures that gas can change ownership[12] independently of its physical location in the system.

We have observed that the design and implementation of the virtual points is not uniform in the Member States. The EU regulations do not provide an official definition of the virtual trading point. Various terms and definitions are in use in the gas industry for a virtual trading point. The terms virtual/notional and point/hub are often used in an interchangeable way. Also the understanding of the purpose and working of a VP may differ among parties.

Basically, we consider the fundamental purpose of a VP to enable the bilateral transfer of gas between portfolios of network users within the entry-exit system for commercial purposes (trading) or to manage their (expected) imbalance position. Depending on the legal framework in each Member State, this transfer may either take the form of a formal title transfer, i.e. where shippers hold gas in the system, or an imbalance swap, i.e. where shippers do not own gas within the system.

Outside the entry-exit system, when entering or leaving the system, ownership of gas can also change at different physical entry or exit points. Usually this is possible at the following physical points in the system:

- Cross border interconnection points ('supply contracts with delivery of gas at the flange'),
- Storage points ('transferring gas in the storage to other storage users'),
- Exit points of directly connected sites ('delivering gas to the consumer'),
- Where applicable, exit points to the distribution network ('delivering gas to/via the distribution company').

But as mentioned before, gas that is within the entry-exit system can usually only change ownership at the virtual point.

Network users make use of the virtual trading point by sending nominations/notifications[13] to the operator of the virtual trading point. The seller and buyer specify a user code (unique identifier of registered network users issued by the operator of the virtual trading point) of the receiving and supplying network user and the volume of gas transferred. The operator of the virtual point then performs a matching by checking if the user codes and volumes specified match. In case of a mismatch between information provided by two counter parties the operator usually takes the smaller amount as a valid value, the so-called 'lesser rule'. In this way volumes of gas are transferred on the specific gas day from one portfolio to the other.

In order to provide insight in the definition and use of virtual points, we provide a structured overview of the virtual points which are observed in the Member States in the next sections. We assess for all relevant Member States the following aspects:

[12] The precise effect of a VP transaction differs across Europe depending on legal circumstances and local contractual provisions. The effect however should be the same in that it either changes the ownership of the gas (where shippers hold gas in the system) or it delivers an imbalance swap (where shippers do not own the gas within the system).

[13] Existing network codes typically use the word nomination. The network code Balancing however uses the word notification because nomination in the legislation might refer to physical flows only. Since this report is based on the existing arrangements in place, we use the word nomination.

- Presence of a VP,
- Functionality of the VP,
- Existence of additional virtual points,
- Existence of trading platforms besides the VP.

Based on the assessment, we discuss potential barriers for the entrance of new market players and barriers for cross border trade. In chapter 3 of this report, we discuss the contractual framework and requirements for accessing the VP in more detail.

In appendix A we provide detailed information on the virtual trading points in the Member States. In that appendix we provide an overview of the functionality of the virtual trading point in the Member States. For each virtual trading point we specify the operator, the requirements for access, the fees, and we specify if there are capacity products in the entry exit system that do not provide access to the virtual point.

2.3.1 Entry-Exit Systems with a Virtual Trading Point

In the next sections we use a simplified schematic representation as shown on the right hand side to illustrate how the virtual trading point, physical hubs, additional trading platforms or (virtual) 'nomination points' are related to the entry-exit system.

Figure 12 indicates which Member States have a virtual trading point.

From this figure it becomes clear that 16 Member States have established a virtual point as part of their entry-exit system. Typically, VPs are established in the more mature and/or larger gas markets like Belgium, France, Germany, Italy, the Netherlands, Poland, Romania and the UK. In addition, some smaller markets such as Denmark and Ireland have established a virtual trading point in their system as well.

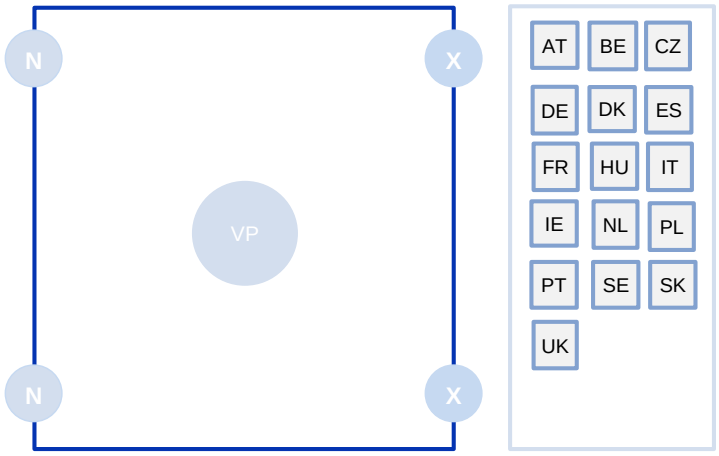


Figure 12: Entry-Exit Systems with a Virtual Trading Point

In contrast, eight of the assessed Member States do not yet have a VP for gas trade implemented (BG, EE, FI, GR, LT, LU, LV, SI). The majority of these are characterised by a less developed gas sector, in the sense that their gas consumption is low and/or gas is supplied or imported by only one large incumbent company. Moreover, physical interconnections with other EU Member States or alternative import means are rather limited, thereby imposing a strong dependency from a single gas source. Often there is only one (main) entry point for gas. This holds for instance for the Baltic states,

Bulgaria, Finland, Luxembourg, Slovenia and Sweden[14]. Among these are also the majority of those Member States that have not yet implemented an entry-exit system[15].

Although some Member States officially introduced some form of a VP, these are effectively not in operation, in the sense that there are no trades or title transfers taking place (yet). For example Romania and Slovakia have only recently (in 2012) established VPs where trade and liquidity still needs to catch up.

The basic function of a virtual point (or for that matter of an entry-exit system) is to facilitate network access and trading. However, it should be pointed out that the existence of a VP does not by itself guarantee the development of a liquid wholesale market. For example, the PSV in Italy was created in 2003, but liquidity has been low for many years now. Other forces are important in the development of the wholesale market as well. Among others, this may be the number of market players and/or producers/importers, the available capacity for flexible gas trading with neighbouring countries, the access to various sources of gas (own production, piped gas, LNG).

In most cases the TSO is the operator of the virtual trading point[16]. Exceptions are Austria, Belgium, the Czech Republic and Germany where dedicated market operators or similar entities take care of the interface, and particularly data communications, to the VP. In Austria CEGH (the former operator of the Baumgarten hub) was appointed as the operator of the virtual point. Similarly in the Czech Republic the company OTE is Czech electricity and gas market operator. Also in Belgium the virtual point is not operated by the TSO but by the company Huberator. In Germany the market area operators NetConnect Germany and GASPOOL administer the virtual trading point.

2.3.2 Fees for use of Virtual Trading Points

In some Member States the network users pay a fee for access to and use of the virtual point. In the figure below we provide an overview of the situation in the different Member States.

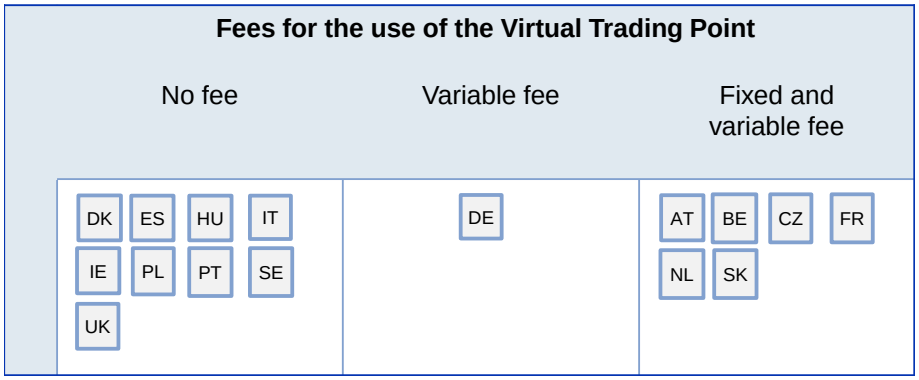


Figure 13: Fees for the Use of Virtual Points in Entry-Exit Systems

[14] Sweden nominally has a VP, but in the past it has shown no activity at all. Swedish gas market actors seem to prefer the Danish VP, as 100% of Swedish gas supply is imported from Denmark and the Swedish TSO is applying a postage-stamp system. According to our understanding, every trading location within a postage stamp system would be considered as a virtual point anyway.

[15] Which is not very surprising as, in many cases, the existence of an entry-exit system would be prerequisite for a functioning VP.

[16] The Network Code Balancing (Gas) requires that the TSO (or its agent) provide the facility to submit trade notifications so that they might be used in the determination of individual shipper imbalances.

In appendix A we specify the fees charged for the different virtual points. Whereas it goes beyond the scope of the current document to discuss the amount and the appropriateness of the fees in various situations, it is worth noting that such fees should be carefully weighed against their impact on the market and transactions at the VP. For traders (especially smaller parties) a price differential is of importance when deciding when and where to trade, and large fees for using the VP could represent a barrier.

Network users should have easy access to the virtual point in order to further stimulate the development of the market. Having a fee per transferred kWh can be a disincentive for network users to exchange gas within the network via the virtual point.

Conversely, it is worth noting that the functionality of a VP, i.e. the processing of trade notifications, is very similar to the process required for the nomination of physical flows by the TSO. Consequently, it seems fair to argue that the incremental costs of processing notifications at the VP are very limited if not negligible. Also with a view of facilitation of the gas market, the costs of operating the virtual trading point should ideally be socialized through transmission tariffs. ´Nevertheless, there are also network users who do not book capacity at entry or exit points but who want to trade at the VP (virtual traders). For those users a (low) fixed fee for access to the virtual point might be applied so that the costs of the TSO for operating the VP are covered.

Furthermore, it should be noted that access to the VP should not be hindered by unnecessary or undue access arrangements. This is elaborated on in more detail in chapter 3.

2.3.3 Virtual Trading Point and a Physical Hub

Next to a virtual trading point there may also be a physical trading hub connected to an entry-exit system. In this report we have defined a hub as a physical location at the border of one or two entry-exit systems where title transfer services are offered by a dedicated entity (the hub operator). In practise, a physical hub is usually located where transmission pipelines from different networks connect and where gas physically flows through.

The Zeebrugge hub in Belgium and the former Baumgarten hub are examples of physical hubs in the European gas market.

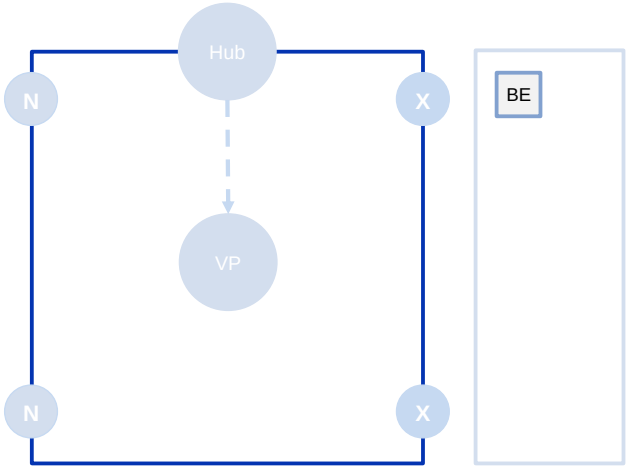


Figure 14: Entry-Exit Systems with a Virtual Trading Point and a Hub

The situation in Austria and Belgium is somewhat comparable. Both countries have an important transit function for gas in Europe and their transit models traditionally differed from their domestic transport models. In contrast to having established VPs early on, both countries have created important physical trading hubs at locations where a large part of the gas is (physically) passing through and where gas can be traded. Belgium introduced a decoupled entry-exit system and a virtual trading hub

(ZTP) in 2012[17], whereas Austria did so at of the beginning of 2013 when CEGH was appointed operator of the Austrian VP. Below we discuss the situation in Belgium and Austria separately.

The Zeebrugge hub in Belgium offers physical trading service as it facilitates the transfer of gas in the Zeebrugge area between Zeebrugge Beach, the LNG terminal, Interconnector Zeebrugge Terminal (IZT) and Gassco's Zeepipe Terminal (ZPT). The so-called Zee Platform Service enables grid users to transfer natural gas between two or more (at the grid user's choice) of these points without explicit capacity reservation and without any capacity limitation. The hub is operated by the company Huberator which is also the operator of the virtual trading points in Belgium (ZTP and ZTPL for local gas market area) in Belgium. Users of the hub do not have direct access to the entry-exit system and the VPs though.

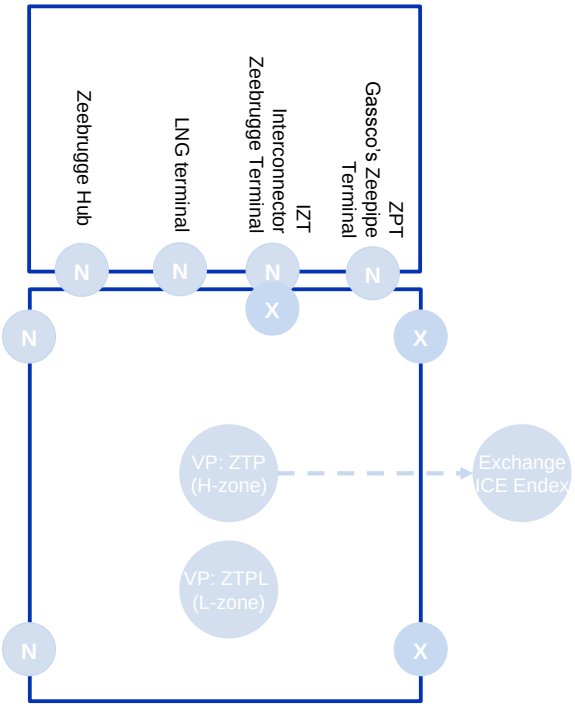


Figure 15: Belgium: Combination of an Entry-Exit System, Virtual Trading Point and a Hub

Where the Zeebrugge hub offers a physical trading service, the virtual point ZTP is responsible for the title transfer service in the entry-exit system. All Zeebrugge Beach customers get access to ZTP trading services without additional fees. The configuration in Belgium is depicted in **Error! Reference source not found.** on he right hand side.

The situation in Austria is somewhat different. The Baumgarten hub in Austria developed into an important physical trading hub. With the launch of the new Austrian Gas Act by January 2013, trading within the Austrian market changed from a flange-based system to an entry-exit system. Trading activities are now centralised at the virtual trading point which is operated by CEGH. During the transition from flange based trading to trading at the virtual point within the entry-exit system some issues were faced in Austria.

Before the introduction of the entry-exit system, gas was traded at the Baumgarten hub operated by CEGH, where gas was supposed to be delivered at the Baumgarten flange. After the introduction of the entry-exit system in 2013, all services offered by CEGH are now linked to the virtual trading point in the Austrian entry-exit system and no longer to the (former) physical hub.

As specified in the Austrian gas law (GWG, §170 – 24) commercial hub services and associated trades based on existing contracts are due to be transferred to the virtual trading point in the market area and all transfers have to be nominated at to operator of the virtual point. Whilst it is still possible to transfer gas at all borders in Austria today, i.e. as long as there is no bundled capacity with a single

[17] However, Belgium maintained the physical trading hub ZEE. It will have to be awaited where this co-existence will develop to.

nomination, all transactions that were concluded and registered at CEGH now have to be nominated at the virtual point.

Some existing multi-year contracts faced the issue that the hub operations now moved from the flange into the entry-exit system. The particularity of these contracts is that they referred to CEGH at Baumgarten (and not to the flange Baumgarten). With the introduction of the entry-exit system the delivery point moved into Austria and both contract partners now have to enter the entry-exit system, something which was not foreseen when the contracts were finalised. Apart from contractual issues and the availability of sufficient entry or exit capacities, this change has also impacted the value of existing transactions since holders of existing contracts may not find themselves exposed to entry or exit charges, which did not apply to transactions at CEGH in the past.

Depending on the overall market situation, the coexistence of several trading places could have a negative impact on the liquidity of trade. In order to effectively evaluate this, the individual situation as well as the historical development have to be taken into account. Belgium for instance currently has a quite strong market attached to the (physical) Zeebrugge hub, which operates in parallel to the VP in the entry-exit system. However, historically, the physical market was already there before the VP was established. The co-existence of both points could split the liquidity; therefore the advantageous way forward could be to move the trade from the physical point to the VP. In particular, if the parallel co-existence is only of a transitory nature then it would appear to be uncritical. Similar developments have occurred in the past, with flange trading being partly moved to the virtual points, as was the case, for example, with Eurohub at the Dutch-German border which seized to operate in 2006 subsequent to the emergence of virtual points in the Netherlands and in Germany.[18]

We explicitly point out that we do not suggest abolishing the co-existence of physical and virtual points per se. However, we do recommend monitoring their development in order to judge whether they could be integrated over time. However, this should be carefully assessed as the integration of a physical point with a VP may also harm liquidity (e.g. if market participants lose trust into the market place).

2.3.4 Role of other trading platforms linked to the VP

Gas Exchanges

The virtual point not only delivers a means to record bilateral transactions between different shippers, it also enables other platforms to serve the market.

Next to OTC trading, shippers can also use a gas exchange for trading. A gas exchange is a trading platform offering anonymous trading, clearing, and financial margining services. At the exchange, market parties (e.g. producers, suppliers, large consumers, brokers, traders) are able to buy or sell gas in the form of standardised products. The exchange operator is the central counterparty to all transactions and ensures

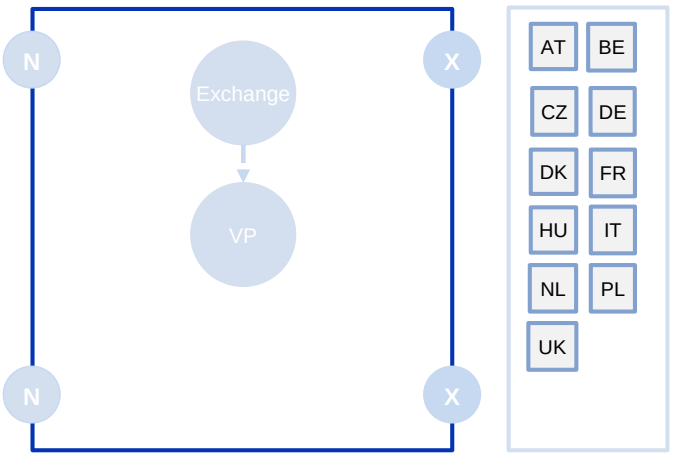


Figure 16: Exchange Connected to a Virtual Trading

[18] Of course this did not foreclose the possibility to trade at the flange bilaterally.

clearing and settlement (physical or financial). A gas exchange may offer spot trading on day-ahead and intra-day markets, forward trading, as well as a variety of (financial) derivatives of physical markets.

Point in an Entry-Exit Systems

Transactions established via the exchange have to be notified to the operator of the VP. As such the exchange utilizes the functionality that defines the VP, namely the ability to administer trade notifications. The gas exchange operator or the clearing house usually does the nominations at the virtual point of the network on behalf of the parties concerned. The amount nominated at the virtual point is based on the balance of all transactions between the gas exchange operator and each party that has been active on the exchange.

Various gas exchanges have been established. The table below provides an overview of gas exchanges providing a platform for spot and futures trading with delivery on European hubs. Contrary to most other exchanges, in Austria both the title transfer market at the virtual trading point and the exchange are operated by CEGH (previously operator of the Baumgarten hub).

	Products	
Exchange	**Spot**	**Futures**
European Energy Exchange EEX (Germany)	NCG Gaspool TTF	NCG Gaspool
Powernext (France)	PEG Nord PEG Sud PEG TIGF	PEG Nord
ICE ENDEX Gas ZTP (Netherlands)	TTF NBP ZTP	TTF
The Intercontinental Exchange ICE (London)	-	NBP TTF
CEGH Gas Exchange (Austria)	CEGH	CEGH
Nord Pool Gas (Denmark)	GTF	-
GME M-GAS (Italy)	PSV	-
OTE / CMBKBK (Czech Republic) *	Czech VP	Czech VP
NFKP (Hungary)**	MGP	-
Central Eastern European Gas Exchange CEEGEX (Hungary)**	MGP	-
Kaasupörssi (Finland)	Finnish E/E Zone	Finnish E/E Zone
PolPX (Poland)	Polish VP	-

** OTE and CMBKBK operate a physical spot and futures market, respectively.*

***Both NFKP and CEEGEX transactions give rise to trade notifications in respect of the virtual trading point MGP (as defined in Hungarian statutes)*

Table 1: Gas Exchanges Offering Spot and/or Futures for European Hubs

A gas exchange is not an intrinsic part of an entry-exit system[19] but it is a market place that makes use of the virtual point in the system for settlement of the trade concluded. However, an exchange is a typical feature of a maturing market, which offers an alternative to bilateral or brokered trades in the OTC market. As such, an exchange will not split liquidity but rather enhance trading options for market parties. It is rather the absence of an exchange which could be seen as a sign that liquidity is still lagging behind. Conversely, it seems to be a natural process that once market dynamics and liquidity reach a certain level, an exchange will emerge.

Balancing Platforms

In a number of Member States the combination of a balancing platform and a virtual point is also observed.

A balancing platform is a facility that enables trading of gas where the TSO is counterparty to each and every trade. It can provide the TSO with means to manage system imbalances, for example by imbalance swaps with shippers so that their change in position might trigger a physical flow change or by sourcing gas flow changes at particular locations or timings at entry-exit points.

Similarly to a gas exchange, a balancing platform utilizes the functionality that defines the VP, namely the ability to administer trade notifications.

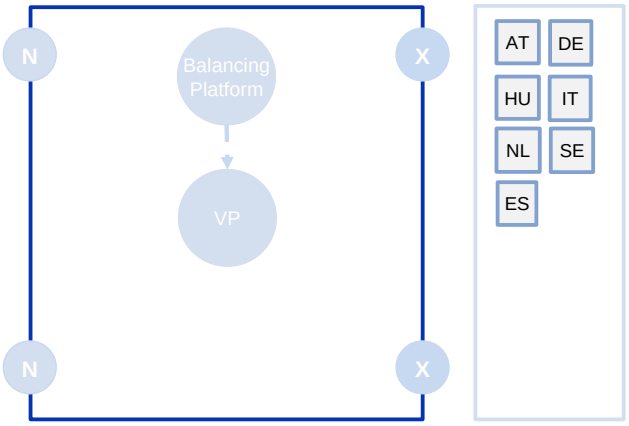


Figure 17: Entry-Exit Systems with a Virtual Trading Point and a Separate Balancing Platform

However, here one has to distinguish between the trading platform, which may be either operated as a general trading platform or platform for balancing only, and the point of delivery which can be independently selected in many cases. For example, for the time being, in the Netherlands a separate balancing platform is operated alongside the virtual trading point TTF and connected exchanges. Similarly, balancing gas is partly procured on a separate platform in Germany, although it usually has to be delivered at the VP.

Similar to the discussion of the coexistence of a (physical) hub and a virtual trading point, a separate market for balancing gas potentially splits liquidity. However, if the balancing platform was established first and trade at the VP is only emerging, it may also help to promote liquidity. In cases where there is no open traded market at all, the balancing platform (with the preferred delivery of balancing gas at the VP) will be a progress compared to (perhaps rather opaque) bilateral contracts of the TSO with balancing gas providers. It should also be noted that, for balancing, specific products are sometimes necessary (e.g. physically specified delivery points), which are not available on the general market.

A separate balancing platform may be beneficial where liquidity in the wholesale market is insufficient to act as a reliable source of balancing gas. However, once liquidity and confidence in the market have increased, the aim should be to procure balancing gas through the general wholesale

[19] Indeed, an exchange can principally also be connected to a physical hub.

market at the VP. The currently proposed NC BAL already foresees that such steps need to be taken once the wholesale market is sufficiently liquid.

2.3.5 More Than One Virtual Trading Point within the Entry-Exit System

There are two Member States that have an entry-exit system with two virtual trading points. This is the case in Belgium and Germany, which have separate systems for high and low calorific gas. The market areas for both gas qualities also have their own virtual point[20].

Also the network in the Netherlands accommodates two gas qualities. Previously the Dutch entry-exit system also had two virtual points. But quality conversion in the Netherlands has been socialised since July 1, 2009. Gas quality does not need to be booked separately upfront.

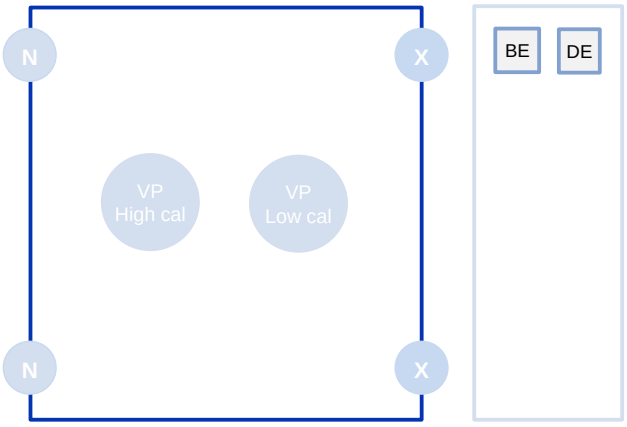


Figure 18: Entry-Exit Systems with More Than One Virtual Trading Point

Since then the Dutch system has had one virtual trading point where gas can be traded irrespective of the gas quality. This development was particularly effective in bringing together more market players and removing entrance barriers especially for new entrants who earlier might have had difficulty in securing gas quality conversion capacity. The actual transport system is still divided into a high and low calorific system.

Previously also France had an L-gas market area next to the dominant H-gas market area. As of April 1, 2013 the PEG Nord High-cal and Low-cal balancing areas were merged.[21] Market players now have access to a single northern PEG balancing zone without any gas quality-related issue. This approach is beneficial for the functioning of the market and the development of liquidity. But of course, physically the two separate networks still exist and the TSO is challenges to manage these separate systems and balance High-cal and Low-cal supply and demand.

[20] The connection of these virtual points to the exchange only applies to the virtual point in the high calorific value market area.

[21] Source: http://www.grtgaz.com/fileadmin/clients/fournisseurs/documents/en/CRE_decision_tariff_december_13th_2012.pdf

2.3.6 Nomination points

A number of Member States have established additional "virtual points" next to the virtual *trading* point. The concept of these points is however different to the function of the virtual trading point discussed elsewhere in this chapter. These points are used to aggregate several physical points at entry or exit to the system and are largely used for the purpose of capacity than for trading or balancing purposes. We therefore label these points as "nomination points".

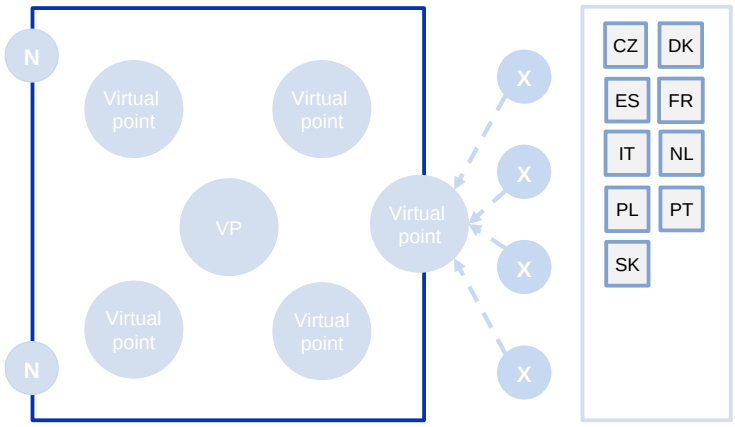


Figure 19: Entry-Exit Systems with a Virtual Exit Point

Examples are:

- Production – In Italy the entry from national production is combined into virtual entry points.
- Cross border – In Portugal and Spain a virtual interconnection point is used as a commercial point where capacity between Spain and Portugal is booked.
- Storage - For example in the Czech Republic, Italy, Spain and France storage capacity of a number of physically separated storage facilities is jointly offered via a virtual storage point.
- Domestic exit zone – For example in Denmark, Italy, Slovakia the exit points in the domestic exit zone are combined administrative virtual point(s). The same approach is used in Slovakia.
- OTC market – Poland has both a virtual point which is connected to the gas exchange and a virtual point that is used for tracking the transactions from the OTC market.

In Spain, title transfers are also spread over multiple (partly physical) points (six LNG points, virtual storage and virtual balancing point). Trading in Spain is thus principally location specific. The situation in Spain involves significant volumes of gas being traded across eight balancing points: the six LNG terminals, the virtual balancing point (AOC) and the virtual storage point. Trades at LNG terminals are assumed to be mainly swaps without any price associated.

These points are typically used to group similar physical points in one virtual point. These points are for the purpose of capacity booking and nominations rather than as a virtual trading point. Overall, we therefore do not necessarily see resulting barriers. One might argue that these points lower the overall administrative burden. Access to these points is included in acquiring access to the entry-exit system. There are no particular additional requirements in place preventing network users from using these points.

A similar but slightly different situation can be observed in Denmark. Next to the virtual trading point the system has a number of nomination points:

- GTF: Gas Transfer Facility for the bilateral transfer of gas from one shipper to the other. The functionality of this point is the same as that of the virtual trading point as defined in this report.

- NPTF: Virtual point supporting the Nord Pool Gas exchange (NPTF). All trades at NPG Exchange are anonymous and cleared by NPG. Gas traded at the NPG Exchange can only be transferred via NPTF.

  The NPTF thus allows for title transfer, but only for a specific party. We therefore label it as a nomination point. The gas transferred is fed into the shipper balancing portfolios and as such the point is explicitly linked to the main virtual trading point.

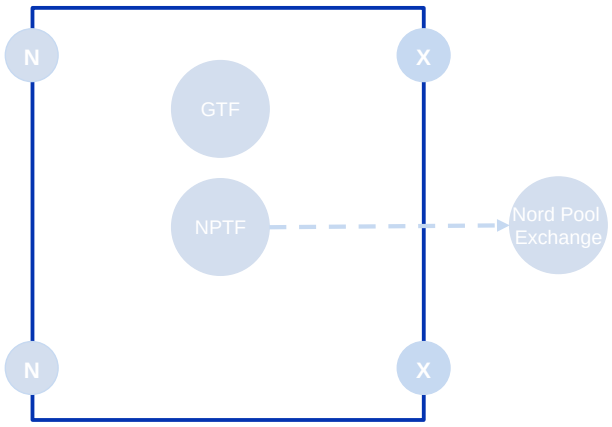


Figure 20: Entry-Exit Systems in Denmark with Multiple Virtual Trading Points

2.4 Recommendations

In the previous sections we have assessed the design features of the implemented entry-exit systems by comparing these systems to the essential features of the 'full' entry-exit system. Based on this assessment, we subsequently provide recommendations on the following design options:

- Design option which may lead to restrictions on free allocability of capacities
  - Applying capacity products with limitations of free allocability
  - The integration of direct border-to-border ("transit") transports
  - Separation of a national system into multiple (entry-exit) systems
  - The integration of the distribution level into the entry-exit zone
- The implementation and design of a virtual trading point
  - The establishment of the virtual trading point
  - Co-existence of other virtual points and physical trading locations

We discuss these recommendations separately below.

Limitations of Free Allocability

A key feature of an entry-exit system is the fact that gas from a commercial perspective be considered to flow freely from any entry point to any exit point, including the virtual point. The free allocability of capacities facilitates the exchange of ownership of gas, facilitating the gas market. Some countries, however, constrain the free allocability in the form of point-to-point capacities or limiting access to other points. Applying these limitations by definition excludes access to the virtual point. These limitations, irrespective of their form, will isolate the corresponding gas flows from the general spot market (at the VP) and hence may reduce competition and therefore distort overall price levels.

In some cases the physical capabilities of the transport infrastructure are insufficient to accommodate all previously booked capacities as freely allocable entry-exit capacities. Some limitations may, therefore, be necessary in order to avoid physical congestion and/or excessive restriction of capacities that can be made available to the market.

It is recommended that, in the case of limited overall capacity (i.e. with the available infrastructure the capacity demand cannot fully be satisfied with freely allocable capacities only), strict point-to-point relations should be avoided as much as possible. Ideally, access on a freely allocable basis should be granted at least on an interruptible basis (sometimes called dynamically allocable). Thereby, the TSO's ability to maintain system stability is ensured, while at the same time capacity demand can be satisfied and capacities are not strictly restricted to a predefined link between entry and exit points.

Integration of "Transit" Flows

As mentioned above, ideally all the gas entering a market area can freely flow to any entry point to any exit point. In some Member States, direct border-to-border flows are not part of the entry-exit system because of the existence of separate (transit) systems. Trading of gas is only possible at the flange at the entry of the exit of the transit route. With transit flows shippers do not have the possibility to transfer gas between one another within the system and gas that is transported through such contracts is therefore unable to reach the local market. Gas transported under such regimes is only limitedly responsive to market price signals or will completely be barred from entering the local market. The use of point-to-point capacities for transit flows is therefore considered as a barrier to trade. At the same time, it could be that gas which is shipped through these transit systems has destination clauses due to which these gas flows may not react to price signals or take part in the market within the entry-exit system.

The abolishment of the separation of cross-border and national gas flows will, in many cases, have a positive impact on cross-border trade. Therefore, it is recommended that dedicated transit systems and legacy transit contracts are fully integrated into the entry-exit system, and only where strictly necessary using capacity products with restrictions of free allocability, as described above.

Integration of Multiple Zones

Where national systems are complex and large, more than one entry-exit system may exist in a Member State, especially if a zone merger were to entail significant investments or severe limitations of free allocability of capacities. The main advantage of such an approach is that with multiple zones, the capacities of the individual zones have less or no restriction of free allocability. The disadvantage of such a split is that in effect the geographic scope is limited for all capacities and not a part of the capacities only. The optimal zone size or number of zones is therefore a subject to trade-off between investment requirements, capacity restrictions and benefits of a merged zone. However, any undue separation into multiple zones will negatively impact market development.

It is therefore recommended that where multiple zones prevail, the possibility to cost-effectively merge the zones (eventually for instance based on commercial instruments such as load flow commitments), should be monitored/assessed in regular intervals.

Integration of Distribution Level

Ideally an entry-exit system stretches across network and pressure boundaries. However, in some Member States the distribution level is not part of the overall balancing regime or different rules apply. The separation of the distribution level is considered to be a barrier to new entrants, in particular, on account of larger shippers benefiting from their portfolio and thereby realising savings compared to shippers with smaller portfolios. This is not beneficial for creating a level playing field for the participants on the market.

In addition, having separate balancing systems for the transmission and distribution level may lead to an increase of balancing costs for a shipper as it prevents netting the imbalances with one another.

This is worsened if a shipper is active in more than one distribution system downstream of the same transmission system. Splitting the demand for balancing gas may also have a negative impact on liquidity and competition on balancing markets. Therefore, it seems preferable to establish a single system-wide balancing system.

It is therefore recommended that the distribution level is fully integrated into the entry-exit system. Forms of automatic allocation and or arrangements between TSO and DSO are an effective instrument towards that end. Also, there should only be a single balancing system integrating the whole "supply chain" of a shipper from system entry towards exit to a final consumer and allowing the shipper to pool imbalances occurring across this supply chain as well as within his customer portfolio.

Establishment of a Virtual Point

The virtual point is a key feature of an entry-exit system. A virtual trading point allows for title transfer of gas regardless of the gas' location within the system, thereby allowing all market parties flexibly to take positions in the gas market and – if the trade is liquid enough – to balance their positions if need be. The absence of a virtual point will limit trade to physical locations.

Traditionally gas trading took place at physical network locations (so-called flange trading at entry or exit points of networks). In some cases, large shares of gas transmitted through the network passes through one or two physical location. At these locations quite liquid physical hubs may emerge. Where this is not the case, gas trade will be split over various specific physical locations negatively impacting market liquidity and the emergence of a spot market.

In addition, the absence of a virtual trading point will complicate it for shippers to flexibly combine entry and exit capacities and to use the virtual point to exchange gas with other shipper. Pure paper trading, i.e. trade without the intention to physically deliver the gas, will be hampered even more.

A virtual trading point should indisputably be part of every entry-exit system. The absence of a virtual trading point is therefore considered a critical barrier to trade. Where this is not (yet) the case, measures should be taken to ensure a virtual trading point is implemented as soon as possible. As a minimum requirement, the TSO (or its agent) should provide a facility where trade notifications are administered and where no other rules should unduly limit access.

It is also worth mentioning that in some Member States a fixed fee for registration at VP is in place and a variable fee for volume of traded energy: such fees should be carefully weighed against their impact on the trade. For market participants (especially smaller parties) such costs are of importance when deciding when and where to trade, and large fees for using the VP could be potentially discouraging. We recommend avoiding separate fees for trading at the VP as another means to promote further market trade and liquidity.

Co-Existence of Virtual and Physical Trading Locations

As has already been mentioned above, in some cases a multiple trading platforms can be observed. These may be a balancing platform procuring balancing gas to be delivered at the virtual trading point as well as at physically specified network locations, an exchange traded market (normally attached to the virtual point) and – sometimes quite liquid – flange trading.

In order to assess the advantages and disadvantages of a certain situation, the level of development needs to be taken into account. As long as there is no virtual point, a liquid market at a physical location is considered to be beneficial for the market development. Indeed, we do not see a need to formally disallow title transfer at existing physical hubs which have already developed substantial liquidity, especially if these are located at the interface between more than two entry-exit zones. Nevertheless, once a virtual trading point has been established, preference should be given to facilitating and promoting title transfer and trading at the VP, and there should be no undue separation of trading between the virtual point and various other physical locations.

3 CONTRACTUAL FRAMEWORK

In this chapter we analyse the contractual framework which enables market participation and access to gas transmission infrastructure in the Member States. In order to provide a comprehensive and a uniform basis for comparison between the licensing regimes and contractual frameworks required in each Member State, standardised factsheets per each country were provided. The factsheets can be found in the appendix of this report. The country factsheets were initially compiled based on the information that is publicly available, mainly provided on the websites of the respective National Regulatory Authorities (NRAs) and Transmission System Operators (TSOs). Additional information was provided through answers from NRA's in a questionnaire concerning licensing.

We provide an overview and analysis of the formal frameworks necessary for the specified market parties to engage into the desired market activity. In doing so, we will focus on the three market roles of supplier, trader and shipper. We start by highlighting the differences between licensing and gas transmission contracts with the TSO as we note that confusion between these different concepts exists. We then investigate such aspects as formats of formal frameworks and the requirements connected to such frameworks. We then analyse all above-described aspects of the market activity frameworks and identify the ones which present a potential barrier for the market parties to access the market or perform their activities in this market. We also elaborate on conclusions and recommendations pointing to those elements which foster an efficient design of the formal frameworks enabling specific market activities.

3.1 Licensing Versus a Gas Transmission Contract with TSO

Market players aspiring to perform different market roles, such as supplying end consumers (suppliers), trading gas (traders) and having gas transported through the network (shippers), typically require some form of formal framework/ relationship before this role can actually be carried out. Such formal frameworks can take two main formats:

- License or some other authorisation, usually provided by a governmental body (e.g. relevant ministry or national regulatory authority);
- Gas transmission contract with the TSO.

It is crucial to make a clear distinction between the two main types of formal frameworks as noted above: license and gas transmission contract, since these frameworks differ in their application and consequences for the market players.

We would like to note that significant discrepancy exists regarding the usage of two concepts of licensing and contracting by the market participants. It is therefore important to distinguish between these formal frameworks for market activity enabling.

Licensing

We define license as an authorisation by a relevant governmental body (e.g. relevant Ministry or a National Regulatory Authority) of a market party (licensee) to engage in or perform an activity on the gas market. A license usually serves a number of purposes:[22]

- It typically presumes a legal presence in at least one Member State, thereby submitting the licensees to effective enforcement of relevant legislation;

[22] 'Wholesale Energy Trading Licenses in the EU', The Brattle Group and Skadden, Arps, Slate, Meagher, & Flom UK LLP, 2010

- It ensures a minimum quality of the licensee's performance, by including a set of requirements the licensee has to comply with in order to obtain the license, and in some cases to also maintain it;

- It can facilitate obtaining the necessary degree of transparency (e.g. by including the desired reporting requirements).

We note that a license as such is not the only format of authorisation by a relevant governmental body. It can also be achieved by such measures as e.g. notification or registration. However, we note that the format or terminology used is in itself of little or no importance while performing the analysis of the frameworks' implications for the market parties. Therefore, throughout the document we will refer to all forms of market activity authorisations which involve the relevant governmental body (be it ministry or NRA) as licenses, irrespective of their actual format.

Contracting with TSO

A network user who wants to acquire access to and capacity in the gas transmission network contracts these services with the transmission system operator. We note that, whereas, for a license the background of such purposes is to protect the end consumers, for a contract they rather serve the aim of ensuring smooth commercial activity (between a TSO and its clients).

In the next section we first discuss the different licensing formats used by regulatory authorities, followed by an overview of the contractual arrangements with TSO's that are in place in the various Member States.

3.2 Form of Licenses and Contracts

3.2.1 Licensing Formats

As previously noted, a license is not the only format which is used by the Member States to formally enable the market parties to become active on the gas market or gas networks. The following formats are identified:

- **Notification/registration**: in this approach parties can become active on the market as suppliers and/ or traders by sending a communication form to the National Regulatory Authority, after which the supplier and/or trader is authorised to engage in activities of supply and/ or trade. In this case, no action is required from the side of the NRA as such- it is the aspirant market parties who perform the action of signing this communication form and sending it to the NRA. This approach is, for example, applied in Spain where parties can become active on the market within one day, by providing a communication form to the NRA. In Portugal the market parties already registered in another EU Member State only have to register with the Ministry of Economics (also no explicit action is required from the Ministry) in order to become supplier or trader on the Portuguese market (new market players have to get a license).

- **License/approval**: in many Member States market parties wishing to engage in supplying natural gas to end consumers should acquire a license from the respective NRAs. In order to obtain (and in some cases maintain) the license, different requirements have to be met. In section 3.3.1 we elaborate upon these requirements. This approach is, for example, used in the Netherlands and Romania.

- **The recognition of the gas transmission contract as the right to supply the end consumers**: in this approach becoming a shipper with a TSO automatically provides the market party with the right to engage into supply and/ or trade as well. In other words, no separate license, notification or registration is required from the market parties wishing to engage in supply to end consumers except the gas transmission contract. This approach is, for example, applied in Sweden where shippers may supply end consumers after either signing a balancing agreement with Balance Responsible Party (BRP) or by becoming BRP themselves.

- **Single license for supply and trade:** in addition to the above-discussed licensing formats, we also note that, whereas, licensing typically applies to suppliers, in some Member States it is also applicable for traders. It should also be noted that in some countries a license for trading is a type of supply license. However, when it is a separate license it is treated as such in the context of this study. For example, this the case in France where a trader license is essentially a type of supply license, classified as supply to non-end consumers (no distinction between physical and financial trading). In the context of this study, it is considered that there are separate licenses for supply and trading in France.

  In practice, there are logical linkages between different types of market activities meaning that it could be argued that mandatory linkages as such do not represent an obstacle for the market parties. The issue is rather in the degree of requirements imposed upon a certain role: For example, in the case of a joint supplier and trader license with common requirements (see section 3.3.1) for suppliers the traders would not experience difficulties. This would seem to be the case in Poland, where there is a single license for both supply and trade (supply is considered as retail trading, trade- as wholesale trading). It appears that Polish domestic traders would not experience significant obstacles due to the joint nature of the license, as the requirements towards suppliers are quite typical (see section 3.3.1).

An overview of the licensing approaches adopted in the Member States of the European Union is provided in Figure 21below:

Role	AT	BE	BG	CZ	DE	DK	EE	ES	FI	FR	GR	HU	IE	IT	LT	LU	LV	NL	PL	PT	RO	SE	SI	SK	UK
Supplier	1		2			4			NA						6	6					6	1			
Trader			NA				NA	5	NA	5							NA				NA		NA		7
Shipper			2				NA		NA						6	6					6				
Contract with TSO					3																				

Comments
1. Being a shipper enables the market parties to engage into supply to end consumers (upon a notification to the NRA in Austria).
2. In Bulgaria the suppliers are obliged to become shippers.
3. In Germany a framework agreement between a supplier and a DSO is required if final consumers on distribution levels are to be supplied.
4. In Denmark a license is only required for Universal Service Providers.
5. Supplier and/ or trader license is required for becoming a shipper.
6. The suppliers license is a prerequisite for a market party to become a shipper in Lithuania and Romania. There is a single license in Luxembourg.
7. Traders which deliver physical gas into the network are required to become shippers.

NA = not applicable (roles are not distinguished in the Member State)

= non-NRA

Figure 21: Overview of Licenses Issued by the NRA's

While it is important to note the differences in licensing formats used in various Member States, these formats only refer to the administrative side of the licensing process, and as such do not provide sufficient information regarding the practical implications for the market parties affected by them. In this regard, the formats of licensing should always be analysed in combination with the requirements associated with them, as they might otherwise be misinterpreted: for example, a notification might have much harder requirements for the market parties to comply with than a license. Such requirements and their degree will be further discussed in more detail in the current document in section 3.3.1.

3.2.2 Gas Transmission Contract Formats

As previously noted, market parties usually become shippers by signing a gas transmission contract with the TSO. The aim behind such contracts is to procure the TSO's services, such as transport capacity, balancing, access to VP, etc. Whether the shipper can procure all the available TSO services and accept the conditions by signing a single contract with the TSO, or whether there are separate contracts per service (or alternatively a combination thereof) varies for the different TSOs. Below we will discuss the types of the contractual framework' formats adopted in the EU Member States:

- **Framework agreement**: The conditions upon which the TSO services can be procured by the shippers are usually established in a document called 'Framework agreement' or FA. In Denmark, for example, market parties become shippers by signing the FA with the TSO and by doing so they gain access to all the services provided by the TSO (capacity, balancing and access to the VP). In other words, Danish shippers only sign one contract for all services: this is a model of one-stop-shop for the shippers.

- **Separate contracts (or a combination thereof) for access to the system and TSO services**: It is often the situation that there are separate contracts which the market parties need to sign in order to procure different TSO services. It could also be the case that some of the contracts do extend to more than one of the services provided by the TSO (e.g. capacity and balancing), whereas the other services have to be procured separately. For example, in Italy the market parties become shippers by signing a transport contract with the TSO (no FA) which also extends to balancing. In order to access the VP the shippers have to sign a separate participation form. In the Netherlands the FA extends to both capacity and balancing, however in order to access the VP shippers have to register separately.

In Figure 22 below we provide an overview of the necessary licenses and different contracts which a market party aspiring to supply the end consumers would necessitate in a given market. The licenses and contracts are considered up until and including supplying an end consumer at DSO level and include the access to VP. It should be noted that the absence of green boxes does not mean that these options do not exist or are not applicable in the respective countries: rather it means that these options are not necessarily required for the market parties in order to engage in the supply to the end consumers.

Requirement	AT	BE	BG	CZ	DE	DK	EE	ES	FI	FR	GR	HU	IE	IT	LT	LU	LV	NL	PL	PT	RO	SE	SI	SK	UK
NRA license	1					3							5			6									
Framework agreement					2											6									8
Capacity contract													5						7						
Balancing contract																									
Virtual point access contract/ registration			NA								4					NA			7	NA	NA		NA		8

1. In Austria being a shipper enables the market parties to engage into supply to end consumers (upon a notification to the NRA).
2. A framework agreement between a supplier and a DSO is required if final consumers on distribution levels are to be supplied.
3. In Denmark a license is only required for Universal Service Providers.
4. TSO is currently in process of developing a VP.
5. In Ireland there is a single license for suppliers and shippers. The framework agreement extends to balancing, and capacity contract covers access to VP. We also note that in Ireland the usage of definitions differs from the ones applied in this document (shippers and suppliers). In this analysis the definitions provided in the current document are used.
6. In Luxembourg there is a single license for suppliers and shippers. Shippers sign a framework agreement, which extends to capacity.
7. In Poland the access to VP is covered by the capacity contract.
8. In UK the framework agreement extends to balancing and VP access.

NA = not applicable (no virtual point in entry-exit system available)

= not included, E-E system is not implemented

Figure 22: Minimum Number of Contracts Required to Supply an End Consumer

As is evident from the figure above, in the majority of Member States a market party necessitates a NRA license in order to supply end consumers. The specific format of such a license is not taken into account in this figure though; this is discussed in more detail in the above section 3.2.1. Moreover, rather few countries offer a one-stop-shop contracting approach for the shippers. Comparably, offering separate contracts for each TSO service is not common, and is rather an exception than a rule (e.g. Hungary). In most countries the contracts referring to the TSO services are combined in some way (e.g. balancing and capacity being covered by the same contract or the framework agreement extending to some services).

Although it may, indeed, be valuable to note the differences in formats of the gas transmission contracts in different Member States, the above overview does not provide sufficient information regarding potential obstacles in accessing the system or the VP for the market parties. In order to address this question the requirements associated with the contractual framework should also be considered (see section 3.3.2).

It should be noted that the format of the transmission contracts as such (that is, when the associated requirements are disregarded) does not significantly impact shippers. Most shippers will require, at the very least, the combination of capacity and balancing services from the TSO and a large share of shippers will also require access to the VP (when present in the TSO's system). In these conditions, the shippers will most often have a contract with the TSO for each of these three services (be it a single contract or a separate one per service, or a combination thereof). However, it is worth noting that the one-stop-shop model is an easier approach from administrative perspective, as shippers only have one contract with the TSO for all services.

3.3 Requirements of Licenses and Contracts

3.3.1 Licensing Requirements

We would like to note that licensing typically applies to suppliers, in view of their obligations towards end consumers. As discussed earlier, one of the aims behind being in possession of a license is the fact

that it ensures a minimum level of quality regarding the licensee's performance. This can be achieved by a set of requirements with which the licensee has to comply in order to obtain the license and, in some cases, to also maintain it. Such requirements differ between Member States and can range from typical to more demanding ones. We identify two different types of requirements: common requirements and additional requirements. Both types of requirements are discussed below.

Common Requirements

In a broader sense, common requirements refer to the ability of the market party being able to perform its duties and are present, in some form (at least partially), in most Member States. Such requirements applicable to the licenses for suppliers could include the following:

- Legal entity (e.g. proof of entry into a Commercial Register, proof that the applicant has not had an equivalent license revoked in the years preceding the application, proof that the applicant has not been convicted of a criminal offence associated with any involvement in economic activities, establishing a branch);

- Operational and technical capabilities (e.g. operational, technical and IT requirements, professional competence of the personnel);

- Financial capabilities (e.g. sufficient creditworthiness and appropriate funds, demonstrating relevant balance sheets and annual statements for the prior 3 years);

- Collateral (e.g. proof that the applicant is able to cover current and future liabilities for at least 5 years, proof that the applicant is able to cover minimum 10% of the expected revenue of the specific universal service area with bank guarantees or parent company guarantee);

- Customer service (e.g. requirements concerning service quality, ability to communicate with the consumers in local language, requirements concerning consumer communication, such as phone and email);

- Reporting (e.g. yearly or upon NRA's request).

We consider the above-described common requirements to be usual business practices, and generally appropriate for the goals of licensing, and therefore are not considered to be a barrier for the market parties in being able to engage in supply.

However, it is worth noting that some of the common requirements, such as the qualifications of the personnel, or the amount of the necessary collateral, could represent a potential difficulty for some market parties in successfully being able to comply, and especially so for the new and small market parties. Moreover, within the above mentioned group of common requirements, the detailed requirements sometimes have particular implications in Member States which could appear cumbersome for some categories of market entrants:

- Local branch office and reporting: for example, specific requirements of establishing a local branch office (required in Bulgaria) or detailed reporting. An example of demanding reporting requirements is France, whereby all shippers have to present their delivery scenarios for different weather conditions to the relevant Ministry (for each category of customers and the use of each category of supply source) e.g. long term contract, storage and spot.

- Distinction between domestic suppliers and importers: it is also noteworthy that some Member States make a distinction between domestic suppliers and importers. This is the case in Romania and Bulgaria, where a separate license is required to import gas.

- Differences between EU and non-EU supplier candidates: for example, in Spain EU aspiring suppliers and/or traders have to send a communication form to the NRA (single form) and will be able to engage in the respective activities within one day. On the other hand, the procedure for non-EU aspirant suppliers and/ or traders takes 4 months, and the government retains a veto possibility for market parties from non-EU countries where there is no TPA reciprocity with Spain. A difference in procedure for granting a license between EU and non-EU applicants is also applied in Bulgaria, Luxembourg and Poland. The above-mentioned differences could result in a lengthier and more complex procedures for international market players wishing to become active on the European market, as well as for the European players wishing to engage in international import and export activities. Although the overall effect is not expected to be drastic, it could potentially have a negative affect on the level playing field in the respective countries.

Additional Requirements

In some Member States the requirements imposed on the market parties in connection to the supply of end customers are more demanding than described above. These are usually additional requirements (to the typical ones): they often have the aim of protecting the end consumers and guaranteeing the security of supply, and refer to the ability of the gas suppliers in meeting their customers' demand under any circumstances.

We have observed the following requirements:

- **Proof of ability in securing gas supplies:** these requirements can take different forms. For example, in Belgium the market parties who want to engage in supply activities have to present proof of their ability in securing gas supplies to the Ministry of Energy. We have also observed additional requirements in Spain where, in spite of demonstrating sufficient supply sources, the market parties engaging in supply to end consumers should ensure the necessary diversification of supplies so that they can meet the supply demands of their consumers at all times.

- **Mandatory diversification of entry capacity bookings:** in France suppliers delivering to more than 5% of the domestic market must book capacity at a minimum of 2 entry points, to more than 10%- at least at 3 entry points. In addition, the applicant has to submit a list of upstream supply contracts to the relevant Ministry (including their duration, suppliers, source countries, contracted volumes, as well as delivery point and entry point for the contracted volumes).

- **Mandatory storage capacity booking:** this is, for example, the case in Poland where there is a difference between suppliers and/ or traders (single license) only active on the domestic market (market party not engaging in import or export, and which only supplies and/or trades gas on the territory of Poland) and suppliers and/ or traders (single license) engaging in activities abroad (import or export, foreign trade). The license for foreign supply and/ or trade is only issued to the market parties when they are already in the possession of a license for domestic supply and trade. In other words, every entity planning to import gas to Poland and then trade it in the Polish market or purchase gas in Poland and then sell it abroad, should begin with applying for domestic supply and a trade license (pre-requisite) and thereafter apply for foreign supply and trade license.[23] Moreover, licenses for foreign supply and trade are issued with regard to the diversification of gas sources and energy security. More

[23] Such linkage does not have consequences for booking the transit capacity, as there are no licenses for transit of gas via the territory of Poland from one country to another i.e. from Germany to Ukraine.

specifically, aspiring market parties should either have their own storage capacity or they should have signed a preliminary agreement for the provision of storage services for mandatory reserves of gas. The companies engaged in cross-border gas trading and gas importing should have gas in storage equal to at least a 30-day average of daily imports. In addition, the storage facility should be able to withdraw this amount within a maximum of 40 days. The amount of gas that needs to be in store is determined by the Polish Energy Authority which is then based on historic data. Amendments to the Reserves Act adopted in 2011 allow these statutory storage reserves to be maintained in storage installations located outside the territory of Poland. Additionally, if the maximum amount of natural gas import over the calendar year does not exceed 100 million cubic meters and the number of the company's customers does not exceed 100,000, exemptions from the obligation to maintain natural gas reserves are possible. Failing to maintain or provide the availability of the mandatory reserves of gas could result in the license being withdrawn for foreign supply and trade.

In Italy one of the license requirements for network users supplying gas to end consumers at both transmission and distribution level is to have appropriate gas volumes modulation capacity as required by his customers, including related storage capacities located in Italy.

The additional requirements described relating to supply could represent a potential barrier to perform this market activity, especially for new and small aspirant entrants. Such a situation might occur for a number of reasons:

- Requirements to demonstrate appropriate/ sufficient gas supplies and the reliability of the supply source could, in practice, largely translate into purchasing natural gas under long term contracts. This could negatively affect spot market trade and liquidity in the respective markets, as well as (potentially) increasing the price for the end consumers if the spot market gas price is lower than that under the long term contracts. Moreover, large and established players usually are in a better position (due to their negotiation weight) compared to new and small players to have long term sourcing contracts.

- Requirements to ensure the necessary diversification of supplies is in practise challenging to fulfil for all market parties. First, large market players are much better suited to ensure the mandatory diversity of supply than smaller parties, due to their large and diversified portfolios. Also, additional questions arise regarding the integration of spot market-procured gas, when the parties usually do not know where the gas comes from. Therefore, this requirement could also have negative consequences for the spot market trade and liquidity.

- Requirements to ensure sufficient storage presume that the holders of the supply license are also shippers, who have a chance of getting access to the storage. However this is not always taken-as-granted: especially in the congested networks and in the networks with scarce storage capacity such requirement could represent a potential market entry obstacle. Moreover, such requirement would benefit the incumbent companies in cases when those are still vertically-integrated, as well as large and established players (in comparison to small and new ones), since such market parties often already have storage capacity in their portfolios. In addition to this, such requirements would significantly increase the costs for the market parties interested in supplying end consumers.

Besides the security of supply insurance, such requirements could also indicate the concerns of the respective Member States about the ability of the market to provide for sufficient supplies on its own.

The requirements placed on the suppliers up until the end consumers, in the respective Member States, aim to guarantee the security of supply and to ensure the supply to the customers on their domestic markets. However, one should also note that these requirements could potentially have a negative

impact upon spot market trade and liquidity, as well as representing a barrier for small and new market parties to engage in end consumers' supply in the respective markets. In such a context, these requirements could represent a trade-off between the security of supply and more competition and liquidity. Therefore, the necessity of such requirements should be carefully assessed and permanently evaluated- at a certain moment the situation on the market might indicate that they are no longer necessary and should be lifted.

3.3.2 Gas Transmission Contracts' Requirements

Similar to the licensing requirements, we also assessed the requirements associated with the gas transmission contracts. These are the requirements that have to be met in order to acquire gas transmission system services (capacity, balancing, access to the virtual point). We also identify two different types of requirements here: common requirements and additional requirements.

Common Requirements

Common requirements to the shippers applied by the TSO are largely similar to the common licensing requirements discussed above (except for supplier-specific requirements, such as the obligation of the supplier of last resort or universal supply, or customer service obligations). Moreover, the TSO usually sets detailed requirements in relation to collateral and IT communication systems, as both have direct implications for the TSO's business. Although these requirements can significantly vary for each TSO, we consider such requirements to be business-as-usual. Therefore, it is our understanding that in most cases they do not represent significant obstacles for those market parties wishing to become shippers. It should be noted, however, that some requirements (e.g. IT communication systems), whereas business-as-usual for large and established market players could be a rather challenging experience for new and small market parties.

Additional Requirements

Similar to the requirements applied by the relevant governmental bodies to suppliers, additional requirements in relation to the gas transmission contracts are also concerned with the security of supply and with the ability of the shippers to perform their duties. For example, in Slovakia the market parties wishing to become shippers have to provide proof that the operators of connected networks will provide for the transportation of gas to the entry point(s) and transport of gas from the exit point(s) of the TSO. Another example is Italy: in this country the market parties wishing to become shippers need to have signed import contract/s for access at entry points interconnected with foreign pipelines or for the other entry exit points to indicate the period of the relevant contracts behind the capacity contracts requests (namely: exportation contract, storage contract, sale contract for redelivery points and purchase contract for national production).Overall, we note that TSOs impose additional requirements less often than the NRAs. However, analogously to the additional requirements related to licensing, the additional requirements related to the contractual framework could potentially have negative consequences both for the spot market trade and liquidity, and for the 'portfolio effect'- they could offer an indirect advantage to large and incumbent market parties in comparison to small and new entrants.

3.4 Access to the Virtual Point

The trades in gas are facilitated by the specific services offered, for instance, by the VP or gas exchanges. As already mentioned above, the existence of and access to a VP are an essential component of an entry exist system.

As discussed in section3.2, there is no single typical formal framework for access to the gas network. Similarly, there are different preconditions and/or ways for market participants to get access to the VP. This is illustrated in Figure 23 below:

Requirement	AT	BE	BG	CZ	DE	DK	EE	ES	FI	FR	GR	HU	IE	IT	LT	LU	LV	NL	PL	PT	RO	SE	SI	SK	UK
NRA license																									
Access to VP integral part of access to network											2														
Separate agreement for access to VP					1									3										5	
Being a shipper											2											4			

1. In order to access the VP a market party needs a balancing contract. The latter is also necessary in order to be active as a shipper (along with the capacity contract), so the shippers automatically get access to the VP.
2. TSO in Greece is currently in process of developing a VP
3. In Italy other parties besides shippers can also access the VP, provided they indicate a so-called compensating party and have this party's acceptance: if the net balance of the transactions is not zero, this value shall be allocated to the compensating party's transmission balance.
4. In Sweden the balance responsible contract also provides access to the VP.
5. In Slovakia the TSO offers title transfer services at both entry and exit point and the virtual trading point. Traders who want to be active at the VP need to conclude a title transfer contract with the TSO. In order to enter into the TT contract, the market parties do not have to be shippers.

= not included, the system does not have a virtual point

Figure 23: License and Contract Needed to Access the VP

As becomes evident from the figure above, a number of variants are possible for the market parties to gain access to the VP:

- **The access to the VP is an integral part of the E/E system:** this is, for example, the case in Denmark where in order to become a shipper one must sign the FA with TSO, and where the FA extends to capacity, balancing and VP. The situation is similar in Sweden, where the market parties become shippers by signing a balancing agreement which extends to capacity and VP access. In addition, in Sweden such a balancing agreement entitles the market parties to supply to end consumers. In such situations, the market parties only need one contract to access the VP.

- **The access to VP comes with certain conditions:** this is, for example, the case in Ireland where access to VP is an integral part of the E/E system access (see above). In this country a shipper may use the VP (e.g. make sell or buy nominations) only when satisfying specific requirements: in the case of receiving a nomination to sell gas, the shipper is to hold a total entry capacity that is at least equal to the quantity nominated to sell on the VP. In the case of receiving a nomination to buy gas, the shipper should hold a total exit capacity that is at least equal to the quantity nominated to buy on the VP.

- **The access to the VP is covered by a separate agreement, only possible for shippers (pre-requisite)**: this is, for example, the case in the Netherlands where market parties interested in VP access have to become shippers first and then separately register with the VP. In such situations, the aspirant VP users would necessitate at least two contracts with the TSO (in case the latter operates the VP as well): a contract regarding becoming a shipper (see section 3.2.2), and a contract regarding access to the VP.

  Such mandatory links between VP access and a contractual framework (via a single authorisation, specific conditions or a pre-requisite, see above) mean that the parties only interested in VP access will also have to become shippers- at least administratively speaking. This implies an additional administrative step for such market parties, however it is not perceived to be a substantial obstacle for the market entry if the requirements associated with becoming a shipper are not over demanding.

- **The access to VP is covered by a separate agreement, only available to suppliers (pre-requisite):** In some Member States (namely in France, Poland and Spain) only market parties in possession of a NRA license can gain access to VP. In France, there is a mandatory link between licensing and contractual relationship with the TSO: either a supplier or a trader license is a pre-requisite for becoming a shipper. VP access in France is covered by the transport contract (which can only be signed by the shippers). In Spain a supplier and/ or trader license is a pre-requisite for signing the transport agreement with the TSO which extends to the VP access.

  The situation in Poland is somewhat different. There is a single license for both supply and trade (supply is considered as retail trading, trade- as wholesale trading). In contrast to France and Spain, there is no mandatory link between the joint license and the contracts with the TSO. However, in practice the market parties have to enter into a contractual relationship with the TSO and become shippers, even if they are only interested in the access to VP as the latter is provided for by the capacity agreement.

  In such cases the market parties interested in VP access have to comply with both the requirements of an NRA license and those imposed by the TSO in relation to the contractual framework. Such a link does not necessarily have to represent an obstacle in itself as many traders in practice would choose to become shippers in any case. However, in a situation when there are additional requirements concerning the license holders (see section 3.3.1), then such a link could become a potential obstacle for small and new market entrants interested in access to VP only.

- **The access to VP is covered by a separate agreement, possible for the parties other than shippers and/ or suppliers (no pre-requisites):** In a minority of countries (e.g. in Slovakia, Italy and Germany) there is a separate contract (or registration) for trading whereby market parties do not have to become shippers in order to gain access to VP. For example, in Slovakia in order to access the VP the aspiring market parties have to sign a so-called 'title transfer (TT) contract' with the TSO. In order to enter into the TT contract, the market parties do not have to be shippers. In Italy the parties other than shippers can also gain access to VP provided they indicate a so-called compensating party and have this party's acceptance. If the net balance of the transactions is not zero then this value is to be allocated to the compensating party's transmission balance. The situation is similar in Germany whereby those parties interested in access to the VP have to conclude a balancing agreement.

  Such an approach that enables the trading activity greatly facilitates the access to VP of the market parties, without imposing disproportionate requirements and administrative burdens on them. Such an approach beneficially affects the spot market and liquidity and has the potential to thereby increase the security of supply and decrease the prices for the domestic market of the relevant country.

3.5 Recommendations

In this section we provide an overview and analysis of the formal frameworks necessary for market parties to be able to successfully engage in the desired market activity, with the overt aim of highlighting those elements which foster an efficient design of the formal frameworks enabling specific market activities.

Transparency and Availability of Information

An observation we make in investigating the formal frameworks is that the usage of terms and definitions shows a significant degree of discrepancy which can sometimes cause confusion. In this context, reaching an EU-wide agreement on the terms and definitions and their consistent application at least by the NRAs and TSOs would be a significant step forward. Another observation is that of the

required information not always being easily available from the respective websites, or only available in the national language of the respective Member States which represents an obstacle in gathering the information for new (foreign) market players. Moreover, in some cases the essential information concerning licensing and/ or contracts with the TSO (such as the procedure, requirements, etc.) is not accessible in a uniform manner (e.g. is split between several websites, documents). We recommend that transparency and accessibility of information be improved by ensuring the availability of essential information (e.g. network codes) in English and by providing a comprehensive overview of the licensing and contractual procedure on the websites of the respective parties (e.g. NRA for license, TSO for transmission contract) in English.

One-Stop-Shop Licensing Approach as a Reduction of Administrative Burden

We would like to note that, while it is important to distinguish the differences in licensing and contractual formats used in various Member States, these formats only refer to the administrative side of the process and as such do not provide sufficient information regarding the practical implications for the market parties affected by them. In this regard, the formats of licensing and contracts should always be analysed in combination with the requirements associated with them, otherwise they do not provide sufficient information regarding the creation of potential obstacles in accessing the system or the VP for the market parties.

Another observation made is the possibility of a one-stop-shop approach to licensing and/ or gas transmission contracts reducing the amount of administrative effort necessary to become active on the market for both the market parties and the relevant authorities. We recommend that a one-stop-shop for licensing and gas transmission contracts is adopted for the market parties, whenever the requirements are comparable. For example, in some cases the common requirements imposed by the TSO towards the shippers are very similar to those imposed by the NRA towards suppliers. In such cases, the potential efficiencies should be realised and one license or contract with the TSO might enable the market activity of the market party (instead of two separate ones with similar requirements).

Moreover, the practice adopted in Portugal regarding registration for the market parties already authorised to supply the end consumers in another country of the EU (versus a license for the new market parties) reduces the market entry barriers for international market players. Adopting the practice of recognising a license from another EU Member State is a recommended development, which would reduce the market entry barriers for European players.

Additional Requirements as a Barrier for Spot Market Trade and Liquidity

While performing an overview of the requirements connected to licensing and contracting we have observed that, alongside the common requirements, additional requirements are imposed in various Member States. Common requirements refer, in a broad sense, to the ability of the market party to perform its duties and are present in some form (at least partially) in most Member States. We consider such requirements to be usual business practices and generally appropriate to the goals of licensing and gas transmission contracts and we therefore do not consider them to be a barrier for the market parties.

In some cases additional requirements are in place: they often have the aim of protecting the end consumers and guaranteeing the security of supply and refer to the ability of the gas suppliers to provide for their customers' demand under all circumstances. The requirements to demonstrate appropriate/ sufficient gas supplies and the reliability of the supply source, as well as ensuring the necessary diversification of supplies are, in practice, challenging to fulfil for all market parties. Large and established players are usually in a better position to comply with both requirements which creates a 'portfolio effect' unfavourable for new and small entrants. Moreover, such requirements could in practice largely translate into purchasing natural gas under long term contracts which could negatively affect spot market trade and liquidity in the respective markets, as well as (potentially) increase the price for the end consumers (if the spot market gas price is lower than that under the long term contracts).

In such contexts, these requirements represent a trade-off between the security of supply and more competition and liquidity. In such cases, the recommendation is to carefully assess the necessity of such requirements and permanently evaluate it- at a certain moment the situation on the market might indicate that they are not necessary anymore, as the market is in state to provide for the security of supply on its own.

Joint and Disproportionate Requirements as a Barrier for Spot Market Trade and Liquidity

In practice, the market players rarely limit themselves to just one role: for example, most suppliers also trade gas and therefore act as traders. Moreover, in some cases assuming more than one market role is necessary in order to successfully perform the market activity: for example, suppliers need to deliver the gas to their customers via the pipelines and therefore they need to become shippers. Thus, we observe practical links between different types of market activities (trading, shipping and supplying) even when such links are not mandatory.

Therefore, in cases when such links are mandatory (i.e. required by the licensing or the contractual framework requirements), they as such do not represent an obstacle for the market parties, as most market parties would assume more than one role in any case, as described above. However, the mandatory links could become an issue in case the degree of requirements imposed upon a certain role is disproportionate to this role. In case of a joint license for supply and trade (an example of mandatory link between supply and trade market role), with additional requirements connected to the security of supply, the requirements would be largely disproportionate for the market parties only engaging in trading activities, as these market parties do not supply the end consumers.

Moreover, whereas the potential negative consequences are considerable, the added value of such mandatory links is not directly obvious. Therefore, the recommendations would be to either split the joint license into two separate ones, with additional requirements on the side of the supplier and not that of a trader, or grant an option to the traders to be exempted from such requirements. These solutions could have a circular positive effect: less demanding requirements for traders could stimulate the liquidity of the market to the extent that the additional requirements for the suppliers are no longer necessary and could be lifted.

Restricted Access to VP as Barrier for Spot Market Trade and Liquidity

We observe that in most Member States being a shipper is a pre-requisite for access to VP. Such mandatory link between VP access and a contract with the TSO means that the parties only interested in access to VP will also have to become shippers- at least administratively speaking. This implies an additional administrative step for such market parties, however it is not perceived as a substantial obstacle for the trading activity if the requirements associated with becoming a shipper are not over demanding.

In some Member States only market parties in possession of an NRA license can gain access to VP. In such cases, the market parties interested in trading activities have to comply both with the requirements of a NRA license and those imposed by the TSO. Such a link does not necessarily have to represent an obstacle in itself as many traders would, in practice, choose to become shippers in any case. However, in a situation when there are additional requirements towards the license holders, such link could become a potential obstacle for small and new market entrants interested in access to VP only.

We are aware of the fact that it is only in a minority of countries that there is a separate contract (or registration) for VP access which means that market parties do not have to become shippers in order to gain access to the VP. Such an approach greatly facilitates the access to VP of the market parties, without imposing disproportionate requirements and administrative burdens on them. Such an approach beneficially affects the spot market and liquidity and has the potential of thereby increasing the security of supply and decreasing the prices for the domestic market of the relevant country. We recommend adopting such an approach as the means of further promoting market trade and liquidity.

4 CAPACITY PRODUCTS AND PRICING

4.1 Design of Capacity Products

The design of capacity products specifies the way in which potential network users can access the network. As recital 19 of Regulation (EC) No. 715/2009 clarifies, in an entry-exit system capacity products are no longer designed to match a contractual transport path from one point to another, but instead they include the right to inject (entry) or withdraw (exit) gas at a specified point within the network. A shipper can then bring several entry and exit contracts together in his portfolio and thus facilitate flexible transport from various entry to various exit locations, as well as trade at the virtual point.

ENTSOG is currently developing network codes setting out the rules for gas market integration and system operation and development, covering subjects such as capacity allocation, network connection and operational security. The Network Code on Capacity Allocation Mechanisms (CAM) sets forth provisions regarding capacity allocation mechanisms. It defines standard capacity products, a standardised capacity allocation mechanism and the description of how cross-border capacity will be allocated. The Framework Guidelines on Tariffs introduces a non-arbitrary and reasoned approach to setting the tariffs for different product durations.

It is the aim of the following analysis to describe the situation within the European Union with regard to the design of capacity products, i.e. which rights are granted to a shipper along with the questions as to how and to which extent certain design features or differences between Member States could hamper cross-border trading and market liquidity.

Capacity products within an entry-exit system can have different distinguishing factors, the most important ones being:

- **Duration:** the first aspect is the duration of the associated contract, i.e. from day-ahead (or even within-day) towards annual and multi-annual contract durations. In addition, the time for which a capacity contract can be concluded in advance needs to be considered as well, i.e. the contract may be annual, but if there is a possibility to have annual contracts for ten years in advance then this can in fact be considered a multi-annual contract.
- **"Firmness"**: The second important feature is the firmness of the product. Basically there are two possibilities: Either a capacity is firm, which means the transport is guaranteed under all normal operational conditions (excluding only, mostly predefined, emergency cases), or it is interruptible which means the TSO endeavours to ensure the transport as long as technically possible, but is entitled to reject a transport nomination (i.e. to interrupt) if the transport would not be feasible.
- **Restricted allocability**: As a third aspect, the potentially limited rights to use capacity flexibly within the entry-exit system needs to be mentioned. Such capacities could have restrictions on free allocability, requiring in fact a point-to-point connection or limit firmness of capacities to certain predefined conditions, e.g. ambient temperature, within normal operation conditions. These restrictions also have an interruptible aspect. While products with restrictions on free allocability (not providing access to all points) are firm, capacity products limiting firmness are interruptible under certain conditions.
- **Bundled products**: In addition, due to the more recent development towards bundled products, the characteristic as to whether entry and exit capacities at a cross-border point are bundled or not, has become an important design feature with a potentially significant impact on market parties.

This section primarily relies on the Country Fact Sheets which have been compiled mainly based on information found on TSOs´ websites.

4.1.1 Duration

In the following figure we outline the products currently offered by the Member States by using the following breakdown: within-day products, products offered day-ahead, monthly products, quarterly products and yearly products. These product categories are also defined in the ENTSOG's NC CAM. In addition to these capacity products, we have also incorporated seasonal capacity products as these are offered by certain TSOs as well and we have included whether backhaul capacity is offered.[24] The results of the assessment compiled for all Member States under consideration are shown in the following figure.

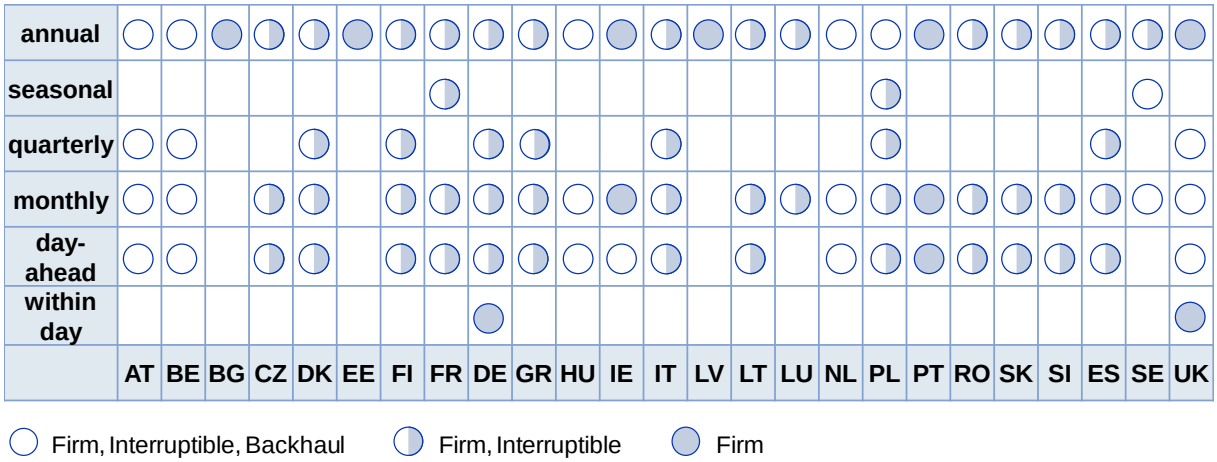


Figure 24: Capacity Products in the Member States

Please note that the above overview is highly condensed and, therefore, does not provide detail on some relevant aspects of capacity products. Hence, the figure only gives a global overview of possible capacity products, some of which only represent a theoretical option and are not necessarily used in practice. Furthermore, the graph does not show whether the relevant capacity products are offered at all network points. Moreover, specifics typically applied at domestic exit points are not shown.

As the above figure shows, the majority of TSOs offer annual, monthly and day-ahead capacity products. In three Member States (BG, EE, LV) shippers can only book annual products as no short-term products are offered by the TSOs. In nine out of the twenty-five assessed Member States, quarterly products are offered and a within-day capacity product is only offered in only one country (UK). Furthermore, in three countries seasonal capacity products are available: France, Poland and Sweden. In Portugal, a weekly product for entry and domestic exit capacity is provided as well.

With regard to annual and multi-annual products, in particular multi-annual products (regardless of whether sold as annual tranches or continuous product) will be primarily attractive for larger or incumbent shippers with a higher ability to predict future capacity needs and to absorb changes in a larger portfolio. However, long-term certainty can also be an important aspect by capacity booking for new entrants, e.g. as a hedge for investment projects. Generally speaking, the availability of capacity products with a duration of only one year (and less) is essential for new entrants (especially for

[24] Backhaul generally means a flow in the opposite direction of the physical gas flow by netting with the original flow. Therefore, backhaul is usually offered on an interruptible basis only as it needs the original flow to take place in the first place.

suppliers and traders) who may be reluctant to commit themselves to a long-term multi-annual contract if they do not have the matching purchase or supply contracts in place as well (and at least if the absence of congestion implies that capacity can most probably not be sold easily in case of non-utilisation).

Short-term (i.e. sub-annual) products will allow shippers to better match their capacity portfolio with their supply and demand profile. This may be particularly relevant for those shippers who want to react to short-term sourcing or trading opportunities. Day-ahead capacity is an important tool for optimising the use of available capacity by facilitating short-term trading and arbitrage, both of which are beneficial to the overall market. Where sufficient physical capacity is available, prices of neighbouring spot markets will converge at least to the level where the difference between the prices is equal to the short-term tariffs. However, regardless of the actual price of the short-term capacity the availability of short-term capacity is firstly important for market functioning and fostering liquid cross-border trade. Indeed, it is important to note that the availability of means for reacting to short-term trading opportunities (availability of free capacity and access to it) may sometimes already be sufficient as potential competition can already have an effect on market players´ behaviour.[25]

The lack of harmonisation of capacity contract durations or of lead times for which capacity product can be contracted by shippers may not lead to any problems for a shipper being active in only one country, but of course this could certainly be a barrier for cross-border trade, e.g. if exit capacities on one side of the border were available on a day-ahead basis and would thus be well suited for market participants to pursue short-term trading opportunities, but only for longer durations for entry on the other side of the border.

However, this aspect will also not be assessed in this report in depth as it has been clearly identified already and is taken care of in the NC CAM.

4.1.2 **Firmness**

Interruptible capacity is an important instrument for mitigating contractual congestion [26] and its absence could result in a serious barrier for market entry in case firm capacity is sold out. As shown in Figure 24, in most countries network users can book the capacity products on both a firm and interruptible basis. Mainly in countries without contractual or physical congestion, TSOs do not provide interruptible capacity products either at all (Bulgaria, Estonia, Latvia and Portugal) or only to a limited extent (e.g. in Ireland the TSO offers solely day-ahead products on interruptible basis). Even in the case of firm capacity not being sold out interruptible capacity could be offered, theoretically. However, this would run the risk of interruption of zero; hence the product should be priced accordingly which implies that no discount would be applied (compared to firm capacity). The current version of the NC CAM also provides only for the need to offer interruptible capacity once firm capacity is sold out.

[25] A market player who may expect competing offers from a neighbouring market, because short-term capacity at the interconnection point is easily available will most certainly take this into account when placing its offer on the spot market.

[26] In particular in combination with transparent publication of data on nominations and flows allowing shippers to evaluate the actual risk of being interrupted.

4.1.3 Restricted Capacities

The third aspect under consideration, mentioned at the beginning of this chapter, is the existence of restricted capacities. In section 2.2.2 we already discussed the background and features of restricted capacities.

As illustrated by Figure 25 below, European TSOs apply three different types of restricted capacities:

- **Separate transit**: In some Member States there is still a distinction between transit and domestic transport, either explicit (because of legacy contracts or pipelines exempted from TPA), or because the systems are split. In those cases, transit contracts are predefined point-to-point contracts with no access to the VP. Such Member States are Bulgaria, Romania and Poland.
- **Old point-to-point transit contracts**: In some Member States, some old point-to-point transit contracts not have been transferred into the entry-exit system implying that these contracts still have a point-to-point nature and do not provide access to the VP. With the expiration of the legacy contracts it can be expected that the capacity will be accommodated to the new entry-exit regime. However, if new point-to-point contracts continue to be concluded, the release of locked capacities by the expiry of old contracts will only represent a transitional solution.
- **Limitations of free allocability:** Some TSOs offer locationally restricted capacities with limited access to the virtual trading point by requiring a point-to-point connection in case of congestion. The free allocability of those products is only granted on an interruptible basis. There is only a small group of Member States which actually deploy locationally restricted capacities, mainly stemming from the integration/translation of old point-to-point contracts into the entry-exit system.
    - Limited capacity products are used in France, in particular at the storage points Atlantique Nord and Atlantique Sud providing limited access to and from the storage depending on ambient temperatures.
    - In Belgium, Fluxys uses so-called 'Operational Capacity Usage Commitments' under which shippers commit themselves to a predefined point-to-point connection in order to mitigate network congestion. In such agreements access to the balancing market and notional trading services is barred.[27]
    - In Austria, these limitedly allocable capacities have been introduced with the integration of the point-to-point transit contracts into the entry-exit system, the reason being that the amount of already sold transport capacities would otherwise be higher than the amount of fully flexible capacity provided by the system.
    - In Germany, the same argument was used and the bulk of those limited capacities seem to stem from the integration of old point-to-point contracts into the entry-exit system as well. There are three different types of products offered by some German TSOs which include restrictions to free allocability: the virtual point or other physical points outside of a predefined point-specific link are (i) not accessible (BZK); (ii) only accessible on interruptible basis (DZK), (iii) subject to certain (temperature) conditions (bFZK). Today, such capacities are only actively marketed by few TSOs, whereas others only have the old existing contracts in their portfolio.

[27] Despite the fact that Fluxys' approach is subsumed under congestion management, the nature of the predefined point-to-point connection implies that it could also be considered as short haul capacities.

- In Spain the capacity products offered by the TSO Enagás do not have locational restrictions in the sense that they have mandatory point-to-point relation. In the case of congestion arising in the network, then the contracted capacity rights can be reduced. The conditions under which capacity can be reduced are specified in the Royal Decree 949/2001. In these situations the contracted capacity at specific points is reduced upon the orders of the technical manager of the gas transmission system. The interruption can only be carried out after the TSO declares the exceptional operating status level 1 or level 2. In general, the notice will be made 24 hours in advance (normal interruption). The period may be shortened if the technical manager of the gas transmission system declares the exceptional operating location level 2 (urgent interruption).

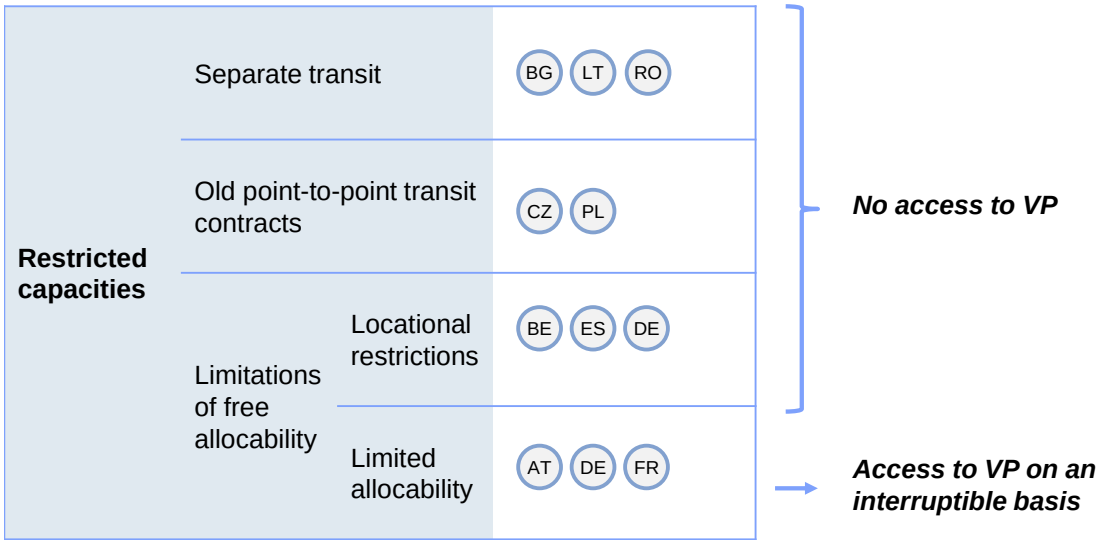


Figure 25: Types of Restricted Capacity Products Offered in the Member States

One could argue that the risk of capacity reduction is lower in smaller networks, networks characterised by generally unidirectional flows, or networks with sufficient physical transport capacity. In those Member States where this is the case the need for restricted capacities is non-existent. Networks opposite to the above listed characteristics may require locational restrictions.

Furthermore, in networks that are supplied from one dominant source, the degrees of freedom in sourcing of gas and the resulting routing of gas flows is limited and the gas flows tend to be rather predictable. As a consequence, restricted capacity is of less relevance and as such not available in those networks. Examples here would be Finland, Lithuania and Estonia.

In the case of restricted capacities being used, gas could potentially be barred from the virtual trading point and other market places, factually isolating these gas flows from short-term price signals. Hence, such gas flows are not subject to short-term price signals, leading to suboptimal market results. However, the effect of restricted capacities is very much dependent on their exact definition. Locationally restricted capacities, allowing network usage only within the point-to-point specification, have an equal effect to legacy point-to-point (transit) contracts and thus they can pose problems for cross-border trading and market liquidity within the European Union. In Austria and, in most cases in Germany, the capacity restrictions are interpreted in a way that they can be flexibly used under normal circumstances. In this case, access to the virtual trading point is generally possible, and only in cases where a transport is technically not possible (because of congestion), any nomination outside of the underlying point-to-point link can be interrupted (same as other interruptible capacities). In the case of the introduction of restricted capacities being driven by real physical constraints and the only alternative to ensure full firmness of the capacities would be a potentially costly network expansion, the usage of such restricted capacities could be seen as economically more efficient. However, it

should be noted that, for example, the availability of short-term backhaul capacities would have a strong potential to mitigate the problem caused by these restricted capacities as gas could then easily "flow back" if and where necessary

Another problem is the fact that a restricted capacity could be ridden with is the potential rebate granted to the shipper. Such a rebate could easily be seen as a way to discriminate in favour of the holder of the restricted capacities. However, if those capacity products are auctioned like all other capacities, the potential for discrimination will disappear.

4.1.4 Bundled Products

At more and more interconnection points, bundled products are increasingly used, at least for a portion of the available capacities and on short-term basis. Examples where bundled capacities are used are for example border points and at market area interconnection points is shown in the table below.

Bundled Products Offered at IPs between Member States	**Bundled Products Offered at Ips between Market Areas within One Member State**
German market areas and Czech Republic, Netherlands, France, Denmark, Poland	German NCG and GPL
Denmark and Belgium	Liaison Nord-Sud and PIR Midi (full bundling)
French PEG Nord and Belgium	
Slovak and Czech Republic	
Austria, Germany and Italy	
Larrau and Birriatou	

In addition, bundling of capacities is planned between Germany and Poland at interconnection point Lasow and between Spain and Portugal at the virtual interconnection point.

Bundling of products requires additional harmonisation of the capacities wrapped into bundles (in terms of duration, firmness, capacity allocation and nomination schedules, etc.) but results in a significantly more simplified access to both the exit and the entry capacity. Furthermore, bundled products may have a positive impact on the liquidity of the virtual trading points by directing trades concluded now at the flange to the virtual trading point. However, as bundling is one of the set requirements of the 'Network Code on Capacity Allocation Mechanisms'[28] (NC CAM) it will not be subject to further assessment.

4.2 Tariff Structures

Under the entry-exit model, capacity contracts for input and withdrawal are separated and independent of one another - there is no linked contract path. Service entitlement is to bring gas into the system (entry capacity) or to remove gas from the system (exit capacity) and such services can be obtained by the same or different network users. The EU Third Package prescribes that tariffs for gas transmission networks must be set separately for every entry and exit point (EC 715/2009, art. 13(1)). This regulation, however, can be implemented under different transmission tariff regimes. As the tariffs set in one country can have an impact on access regimes in adjacent countries, the issues related to the

[28] ENTSOG, Network Code on Capacity Allocation Mechanisms, revised version, CAP291-12, 17 September 2012, Brussels

tariff structure need to be considered in the context of the integration of gas markets across the European Union. In February 2012, the Agency for Cooperation of Energy Regulators (ACER) launched a public consultation on the scope and main policy options for Framework Guidelines on harmonised transmission tariff structures for the European Gas Transmission Network. The major goal is to identify areas for tariff harmonisation and highlight options for their implementation consistently with other framework guidelines and network codes.

In this section we assess the tariff regimes in the Member States by opting for the following characteristics representing different dimensions and not alternatives of tariff regimes:

- **Application of entry and exit charge**: On account of entry-exit system entry and exit capacities being decoupled, it is possible to price either both the entry and exit points or only one of them. The latter is the case in most countries where a postage stamp tariff system is in place.
- **Application of capacity and commodity charge**: In network industries access prices might be set using two different bases: the reserved capacity and the volumes transported. When using the amount of capacity reserved for charging access to the network, one often speaks about the capacity charge (alternatively the term demand charge is used), whereas when the transported volumes serve as the basis for the tariff setting, it is called a commodity charge (or energy charge). Frequently, a combination of both is applied[29].
- **Locational differentiation**: In an entry-exit system, tariff setting can be based on a uniform approach where tariffs for different network points are set equally or based on locational differentiation where the tariffs differ for every entry and exit point or zone[30].
- **Product / customer differentiation**: This next characteristic concerns differentiation in the tariffs applied to network points. For example, different tariffs can be applied to capacity products with different duration (daily, monthly, quarterly, annual). In other cases, tariffs can be dependent on the specific properties of the connected party. Such properties can be, for example, the annual consumption, delivery pressure or gas quality.

The aim of this analysis is not to assess the city gate prices in the Member States. The requirement of explicit capacity booking from shippers at city gate points might have an impact on cross-border trade and market entry, however, this aspect has been assessed in detail in section 2.2.4. The city gate tariffs itself could only result in slightly higher transaction costs for shippers but they do not represent any real additional barrier to market entry and so they do not require any further assessment.

The first aspect of the tariff regime, the application of entry and exit charges is assessed combined with the other three characteristics of the transmission tariff system subsequently in the following subsections.

[29] Alternatively a fixed flat rate can be applied as well, which is independent from the capacity reserved or volumes transported.

[30] We solely distinguish between uniform tariffs and tariffs that differ for each network point or for different zones (both locational). We refrain from an explanation of how these locationally different tariffs are set, e.g. using a marginal cost pricing approach or average cost pricing approach and what, if any, efficiency signals they might provide. Information on the actual calculation approach applied is often not available publicly.

4.2.1 Application of Capacity and Commodity Charge

Figure 13 provides an overview of the different tariff regimes applied in the EU in terms of the application of capacity and commodity charges with the distinction of which network points (entry and/or exit) they are applied to.

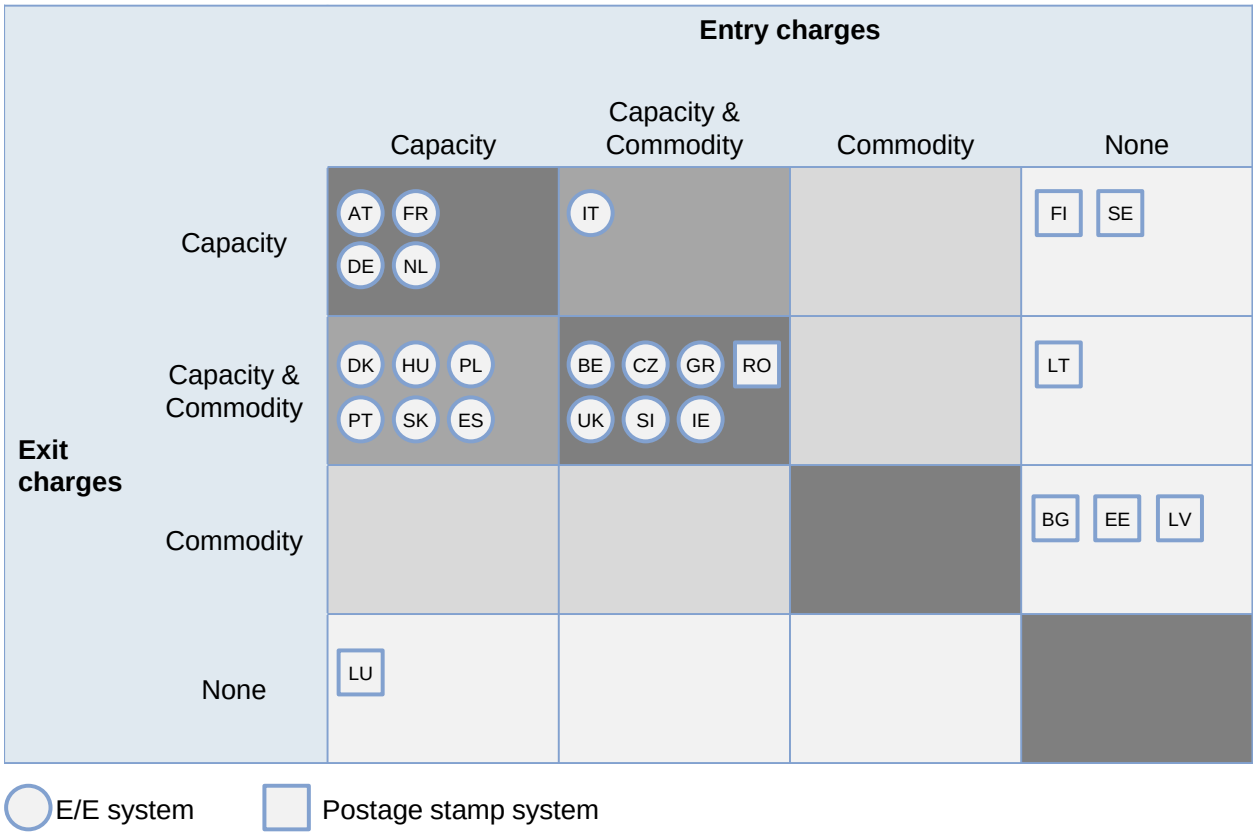


Figure 26: Application of Capacity Charge and Commodity Charge in the Member States

Overall, three main approaches can be distinguished with regard to the tariffication of entry and exit points:

I. **Same tariff structure for entry and exit points:** Some countries (Austria, France, the Netherlands and Germany) price both the entry and exit points and solely apply a capacity charge which implies that the transmission costs of shippers do not depend on the actual volumes transported but only on the contracted capacity. Other Member States apply both a capacity charge and a commodity charge, i.e. a so-called two-part tariff at each network point (i.e. both entry and exit points).

II. **Different tariff structure for entry and exit points:** In most cases, the exit points are priced with a tariff that has a capacity and a commodity component while the entry point is charged by a sole capacity charge (Denmark, Hungary, Poland, Portugal, Slovakia and Spain). Italy is the only Member State that applies a commodity charge at the entry points and capacity charge at all network points.

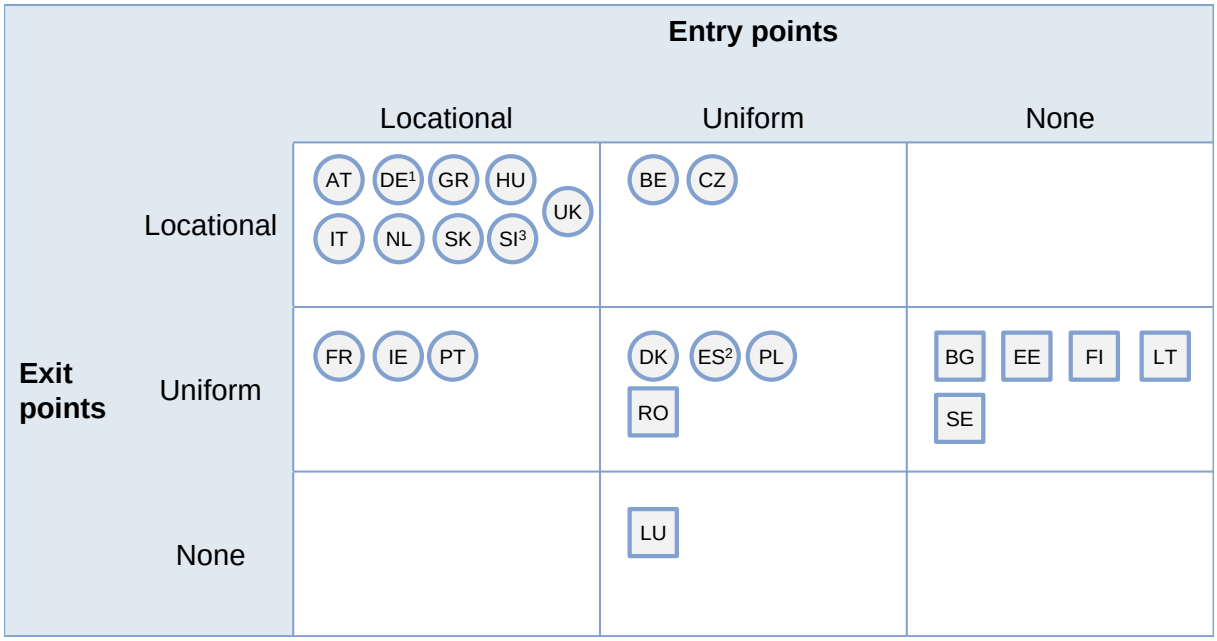
III. **Isolated use of entry or exit tariffs**: The third group of countries prices either the entry points or the exit points, but not both. Most of these countries charge gas flows at only their exit points. The only exception is Luxembourg which applies only capacity tariff for the entry points. Some Member States apply a sole capacity charge (Finland, Sweden, Luxembourg), others a sole commodity charge (Bulgaria, Estonia, Latvia) while only Lithuania prices its exit points by both capacity and commodity charges.

In countries where both capacity and commodity charges are applied, the capacity/commodity split shows a clear pattern (although the actual ratio may differ from country to country): a higher percentage of revenue is recovered by the capacity charge than by the commodity charge. For example, in Greece and Portugal 90 per cent of the revenue stems from the capacity charge; whereas in Lithuania, which has the lowest ratio, capacity sales generate still 70 per cent of the revenue. The observed split between revenues from capacity charge and commodity charge reflects the higher share of fixed costs (capital and fixed operational and maintenance cost) in comparison with variable costs (variable operational and maintenance cost) in gas transmission networks.

Some Member States (BG, EE, LV) only apply a commodity charge. This tariff structure does not reflect the actual cost structure of the TSO, i.e. fix and variable costs are not expressed separately.

4.2.2 Locational Differentiation and Pricing of Entry and Exit Points

Figure 27 groups the Member States based on the tariff setting principles applied at the entry and exit points. The figure does not take any locational differentiation of the commodity charges into account because if a TSO applies a commodity charge then it is often applied uniformly across the network points. In this respect, only Ireland, Portugal and Slovakia differentiate the commodity charge component by network point. Furthermore, a postage stamp by definition implies the use of uniform charges across a given country / market, as shown in the figure below.



DE[1]	No uniform policy has been adopted. Some TSOs apply uniform tariffs for both entry and exit points, whereas other German TSOs have different tariffs for different zones (i.e. locational).
ES[2]	All tariffs are uniform tariffs with the exception of the LNG unloading tariff
SI[3]	Differentiated tariff applies for cross border entry and exit points and a uniform tariff for domestic exit points.

Figure 27: Locational Differentiation of Capacity Charges in EU Member States

As shown in Figure 27 the application of locationally differentiated tariffs is somewhat mixed throughout the Member States. Overall, Member States can be grouped into three categories:

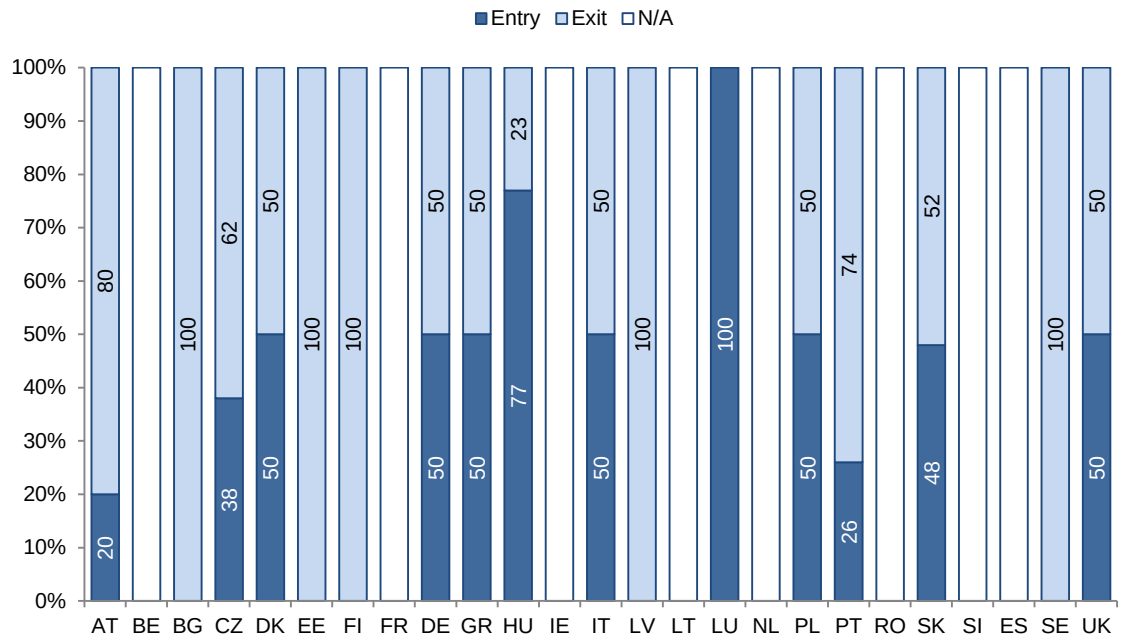
i. **Locational tariffs**: The first group applies different tariffs for each entry and exit point and is the largest group with eight Member States. One obvious reason for differentiating capacity charges would be to attain cost-reflective tariffs. In this case, tariffs are set for the different network points by using various cost allocation schemes such as pipeline length, replacement costs or long-run marginal costs (e.g. UK). However, it is often very difficult to design locational tariffs in a way that they are truly cost reflective.

ii. **Uniform approach (postage stamp tariffs)**: The second group is at the opposite end of the spectrum, compared to the previous group, and apply uniform entry and exit tariffs. In these Member States, the same tariff is applied to all entry and to all exit points; however, the tariff applied to the entry points may differ from the one applied to the exit points.

iii. **Different approaches for entry and exit points**: The third group consists of Member States that apply different tariff setting principles to their entry and exit points. There are a few countries which apply uniform entry tariffs and locationally differentiated exit tariffs, or vice versa. Theoretically, one could argue that these approaches may deviate economically from cost reflectivity. However, practice also shows that it is often very difficult to design location tariffs that truly cost reflective. Uniform charges may foster price stability, simplicity of application and administration among users of the network.

In relation to Figure 27, we have also studied the split of revenue into capacity and energy charges. The explicit prescription of a fixed entry-exit split might influence the cost reflectivity of the eventual tariffs. This target "entry-exit split" is shown in Figure 15. As some Member States do not explicitly adopt a predefined entry-exit split in their tariff calculation methodology, the share of entry and exit charges remain unknown (shown as N/A in the figure)[31].

[31] Please note that for some countries it is not clear whether they have actually adopted an entry-exit explicitly or not. The columns for these countries are also shaded.



IE No explicit split between entry and exit tariffs. However, in a recent decision publsihed by the CER, this will move to a pricing system based on long-run marginal costs. The revenues from entries and exits woul be set at a 50:50 ratio.

Figure 28: Entry-Exit Split Applied

The Framework Guidelines on Tariffs developed by ACER foresees that 50% of the overall revenues expected to be generated at all entry and exit points of the entry-exit zone shall be generated at the entry points.[32] A few Member States have explicitly set the entry-exit split to 50-50: Denmark, Germany, Italy, Poland and the UK. Although in Slovakia no explicit 50-50 target is set, almost 50% (48%) is recovered from entry charges. The choice for explicitly equalising the revenues obtained from the sale of entry capacity and exit capacity can be motivated by aiming for a level-playing field. However, it may be difficult to attain cost-reflective tariffs when determining this split beforehand as, depending on the cost driver chosen, the actual split could be different.

Three countries, Austria, Czech Republic and Portugal, have implemented an entry-exit split which allocates a higher proportion to the transmission exit capacities. The revenues recovered from the sold exit capacities are around three to four times as high as the revenue gained from the entry capacities. This may result in relatively cheap entry capacity which, in turn, might support new entrants and attract new gas flows into the country.

There are only two countries which collect the majority of the revenues from entry charges; in Hungary 77% of the revenue is recovered by entry charges and in Luxembourg this ratio is 100%.

[32] Draft Framework Guidelines on rules regarding harmonised transmission tariff structures for gas, 4 September 2012

4.2.3 Product / Customer Differentiation

Besides locationally differentiating tariffs, TSOs can apply other forms of tariff differentiation. The following principles of tariff differentiation can be observed in the Member States:

i. **Duration of capacity products**: TSOs may apply different tariffs for short-term capacity products (e.g. daily, monthly and quarterly). The tariffs are usually set on the basis of the reference price of annual capacity by using specific adjustment factors. Member States applying adjustment factors for short-term products are Belgium, Denmark, Germany[33], Hungary, Ireland, Lithuania, Luxembourg, Netherlands, Poland, Slovenia and Sweden.

ii. **Due date of capacity products (seasonal factors)**: TSOs might apply seasonal multipliers by the determination of tariffs for short-term capacity products. Thus, capacity products in the winter months can be priced proportionally higher than in the summer months. For example in Spain, monthly capacity products during the winter months are priced at 200% compared to the summer months, implying that according to the TSO the value of the monthly capacity is two times lower in the summer than in the winter.

iii. **Consumer groups**: Several countries have adopted different tariffs for different consumer groups. These consumers are either grouped by the maximum capacity of the connection (e.g. Poland, Slovakia) or by the annually consumed volumes. For example, in Slovakia the tariff paid by the network user is dependent on the amount of capacity contracted and it can be halved if the amount of capacity booked exceeds a certain threshold. While such tariffs obviously aim to encourage large capacity reservations, they may be discriminatory against smaller network users and effectively create a barrier to entry. It is also arguable whether different usage patterns of different customer types result in different transmission costs and that transmission tariffs also need to vary with these patterns. However, this type of differentiation focuses mainly on local consumption and so is beyond the main scope of this study.

iv. **Purpose of gas consumption and gas supply reliability**: Capacity charges can also be differentiated by the purpose of gas consumption (Sweden) and gas supply reliability (e.g. Lithuania). In the first case, the main rationale is that the level and pattern of the customer's consumption is largely determined by the main use which the gas is put to. Therefore, the tariffs are differentiated by the type of user (e.g. household and industrial customer). In the second case, the tariffs assume that some individualisation of costs related to reliability enhancement is possible and, therefore, tariffs are set at different levels for different levels of reliability. Furthermore, tariffs may differ per gas quality (e.g. Poland) and whether the exit point is connected to an underground storage facility (e.g. Poland, Germany). For the latter case, a discount is normally applied to these exit points in order not to charge the storage user twice for the same network point.

v. **Other form of differentiation**: Certain types of tariff differentiation are not related to season, contracted capacity or consumed volume, but to other characteristics of the connection to the end-user. For example, some countries apply a differentiation based on the pressure level of the connection (e.g. Spain and Belgium). Under a cost reflective pricing policy, this means that customers connected at a particular pressure level should not pay for the costs of providing network assets that are at a lower pressure level. In terms of cost allocation, this means, among other things, that ideally only the costs (and the relevant portion of these costs) related to pressure levels at and above the level at which a customer is typically connected should be allocated to the charges paid by that customer.

[33] Some TSOs apply seasonally varying tariffs at storage points.

4.3 Recommendations

In the previous sections we provided an overview of the capacity products that are available to the network users in the different Member States. As already mentioned in the introduction of this chapter, the network code Capacity Allocation Management (CAM) defines standard capacity products and standardised capacity allocation mechanism. The tariff setting is also moving towards a harmonisation with the Framework Guidelines on Tariffs currently being coming in. In the future, the Framework Guideline also has to result in a network code. The implementation of the network codes is mandatory in the Member States. The situation described in this chapter will therefore be subject to considerable change in many cases. We therefore refrain from providing detailed recommendations regarding the current status.

However, we highlight a number of potential barriers which we consider particularly relevant for competition and cross border trade. We discuss the following issues:

- Limitations to free allocability of entry and exit capacity
- Absence of daily capacity products
- Differences in capacity contract durations
- Further potential in offering bundled products

Limitations to free allocability of entry and exit capacity

As described in section 2.4 limitations on free allocability might represent a potential barrier for market access and trade. In addition, restrictions should be reflected in the price of the products. The Prisma auction results have shown that sometimes restricted capacity products are sold before the unrestricted capacity products, indicating that these products are valued by market players. One potential underlying reason for this demand could be the price.

Absence of Daily Capacity Products

For the development of the market it is very important that traders can react to short term price signals for trading and arbitrage. Where sufficient physical capacity is available, prices of neighbouring spot markets will converge at least to the level where the difference between the prices is equal to the short-term tariffs. In order to do so traders need to be able to access the market area. The absence of daily capacity products is therefore a barrier for the functioning of the market and cross-border trade.

Differences in Capacity Contract Durations

The capacity products available in the different Member States vary in terms of duration, firmness and allocability. In this way network users can optimise their capacity portfolio over multiple entry-exit systems. The lack of harmonisation of capacity contract durations or lead times for which capacity products can be contracted by shippers may not lead to any problems for a shipper being active in only one country, but can certainly lead to barriers for cross-border trade. For example, a market participant who wants to pursue short-term trading opportunities might face a mismatch between adjacent systems if for example exit capacities on one side of the border would be available on a day-ahead basis while on the other side of the border only capacities for longer durations are available. The use of incompatible products on both sides of the border results in an increased risk and transaction costs for network users and generally makes it more difficult for new entrants to join the market for cross border trade, impeding the entry of new market players into the domestic market. Ideally, capacity products should thus be fully harmonised.

Differentiation of tariffs by consumer groups

The use of tariffs which are differentiated for particular consumers groups can be discriminatory and effectively create a barrier to entry. For example, in some Member States tariffs are differentiated based on the maximum capacity of the connection or by the annual consumed volumes. Such tariffs may be discriminatory against smaller network users and could pose a barrier to market entry.

Further Potential in Offering Bundled Products

Bundling of products significantly simplifies the access to both exit and the entry capacity. Furthermore, bundled products may have a positive impact on the liquidity of the virtual trading points by directing trades concluded now at the flange to the virtual trading point. In line with the provisions of the Network Code CAM, we therefore believe that the use of bundled products should generally be promoted. An important pre-condition for the successful bundling of capacities is that the capacity products and their terms and conditions are harmonised as much as possible at both sides of the Interconnection Point.

5 IMBALANCE SETTLEMENT

Differences in balancing and imbalance settlement arrangements across several balancing zones in European Union may pose barriers to new market entrants, "*which may have more difficulty balancing their overall sales portfolio than companies already established within a relevant market.*" (Recital 28 of the Regulation (EC) No. 715/2009, "Gas Regulation"). The balancing model and, in particular, the imbalance fees are part of a shipper's (network user) costs for getting access to the network. Unlike network tariffs, imbalance fees per se are not fully predictable. Depending on the consumption profile and characteristics of the end customer that is supplied (different branches of industry, households etc.), the risk of running out of tolerances (if existent) can differ significantly. The costs of imbalances may therefore be far more important for a new entrant to gain access than network tariffs. More specifically Article 21 of the Regulation (EC) No. 715/2009 requires that:

- balancing rules are market based
- TSOs provide proper information on the balancing status of shippers
- imbalance fees are cost reflective, and
- TSOs try to harmonise balancing arrangements to facilitate gas trade.

Following the publication in October 2011 of the Framework Guidelines on Gas Balancing in Transmission Systems by ACER, on 26 October 2012, ENTSOG published the Network Code on Gas Balancing[34] which creates network-related rules on nominations, procedures, rules for imbalance fees and rules for operational balancing between TSOs' systems.

Residual balancing and imbalance settlement are the two sides of a balancing model:

- Whilst residual balancing is the maintenance of the physical system stability during network operation,
- The imbalance settlement is the ex-post commercial process when individual deviations between injection and off take are cleared.

Residual or system balancing is achieved through the interaction between the shippers and the TSO. Whilst shippers should aim to minimise their imbalances and be obliged to take the financial responsibility for any deviations between their inputs and off-takes, the TSO remains the instance that is able to ensure the physical balance of the overall network. These different roles are also clearly specified in the Network Code on Gas Balancing that emphasises "*The shipper shall take primary responsibility to balance their portfolios in order to minimise the need for TSOs to undertake balancing actions*" (Article 4.1). In his role and responsibility to ensure that any deviations between the (aggregate) input and off take of shippers do not cause the system to go beyond its accepted operational limits, the TSO is providing and procuring 'balancing services' to and from the shippers. This mainly covers the purchase and sale of balancing gas by the TSO, in many Member States on a daily basis, but also the advance procurement of operating reserves.

Every system for imbalance settlement is based on a number of key choices related, for instance, to the balancing period, the application of tolerances (possibly differentiated by types of shippers or season, or in relation to the actual system imbalance), within-day obligations, and the pricing of imbalances. The different options are numerous and not mutually exclusive which results in a large number of possible combinations. Moreover, any penalties or potential exceptions for cross-border transports may create further complexity in the potential design of different models.

[34] On 26 October 2012, ENTSOG published the first draft of the Network Code on Gas Balancing, as required by Article 8 (6j) of the Gas Regulation. Following the Opinion of ACER No 01-2013 of 25 January 2013 on the Network Code on Gas Balancing of Transmission Networks, ENTSOG has chosen to re-submit to ACER pursuant to Article 6(8) of Regulation (EC) No 715/2009 an amended Network Code.

In this section we mainly focus on the different models and options related to imbalance settlement; residual balancing will only be assessed to the extent of its impact on imbalance fees. Although the corresponding choices also depend on the physical characteristics of the network and the available sources of flexibility (linepack, production swing, storage, etc.), in accordance with the Gas Regulation and Balancing Network Code, we focus on some major characteristics of balancing systems as follows:

- General scope: balancing zones, application to distribution systems, TSO's or market area manager's responsibility;
- Definition of balancing period and within-day obligations;
- Provision of tolerance levels;
- Procurement of balancing gas by the TSO (non-market based and market-based);
- Imbalance fees (cash-out, incentives and penalties)

5.1 General Scope of Balancing Systems

Typically, each EU Member State consists of one national gas balancing zone. However some Member States have multiple balancing areas. This can have several reasons. Firstly, for geographical reasons (the size of the market area and network interconnectivity), this is the case for France and Germany. Secondly, due to separate systems for different gas qualities as is the case in Belgium. Finally, in some Member States transit infrastructure is not integrated in the overall system and is balanced separately. This is the case in Poland, Romania and Bulgaria where the exclusion of transit infrastructure led to separate balancing areas.

In some Member States, especially those that have multiple TSOs active in a joint market area, the actual management of gas balancing is transferred to a (technical) market area manager or operator, for example:

- Austria: AGCS (Austria Gas Clearing and Settlement) in the eastern control area
- Germany: Gaspool and NetConnect Germany in the respective areas
- Italy: GME

Apart from the number of balancing zones on TSO level, a further important feature of the balancing system is the integration of the DSO level in the overall balancing system. The figure shows in which Member States the DSO level is included in the balancing zone.

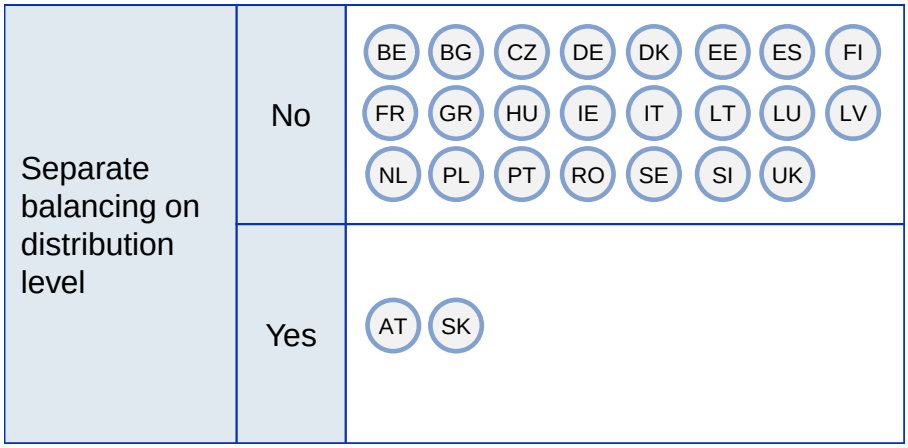


Figure 29: Inclusion of DSO in Balancing Zone

As becomes clear from Figure 17, in the majority of the Member States the DSO level is an integrated part of the balancing system. The quantities delivered at the city gate to the DSOs are taken into account to calculate the imbalance of each shipper in each balancing zone. The only exceptions are Slovakia and Austria. In Slovakia the intake and off-take on DSO level are balanced separately from the transmission system. In Austria there are two different balancing systems as well, however, the separation is not from the perspective of the network but rather from the exit points where a shipper ships gas to. In fact, this results in two separate balancing systems for shippers with and without physical entry or exit points, which system is very close to having separate balancing system on distribution level.

5.2 Balancing Period and Within-Day Obligations

The balancing period is the time interval over which gas injection and gas withdrawal should be balanced by the shipper. It establishes the division of balancing responsibilities between the TSO and shippers. The majority of EU Member States have a daily balancing system in place where imbalances are cashed-out at the end of the (gas) day. The only Member State with a pure hourly balancing system is Finland.

With regard to balancing intervals, it is important to note that there may be differences between the overall balancing interval and requirements for certain behaviour during this interval. For example, various Member States notionally apply a daily balancing interval, although imbalances or deviations from schedules are already determined and penalised on for instance an hourly level. Also Austria, Belgium, Germany and Luxembourg register hourly imbalances, enabling the TSO to impose within-day obligations (WDOs). Although the systems are relying on daily balancing, the additional application of penalties effectively implies that the systems may be more similar to a system with hourly intervals. WDOs aim to incentivise shippers to profile intraday their gas injection (or withdrawal) into (or from) the system and in this way it minimises the interventions required by the TSO. WDOs play an important role in keeping the system within its operational limits by avoiding cross-subsidisation[35]. This is especially relevant in cases where large flows cross the country and an important number of large-scale consumers are connected to the network while at the same time the TSO has limited flexibility means. In these cases, WDOs help to reduce costs of balancing actions by

[35] In case the amount of gas injected (withdrawn) by shippers deviates significantly from the expected volumes it can lead to huge surplus (shortage) in the system requiring the TSO to take expensive balancing actions. The costs associated are recovered by imbalance fees determined based on the imbalances of shippers at the end of the balancing period. i.e spread across all shippers with imbalances.

TSOs. The Balancing Network Code (article 32) allows for system-wide, portfolio and entry-exit point WDOs.

Which Member States apply within-day obligations is shown in Figure 30.

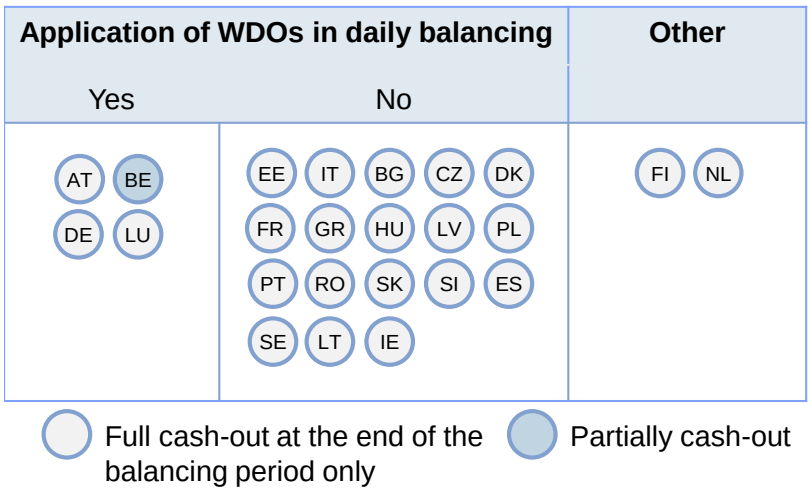


Figure 30: Application of WDO's

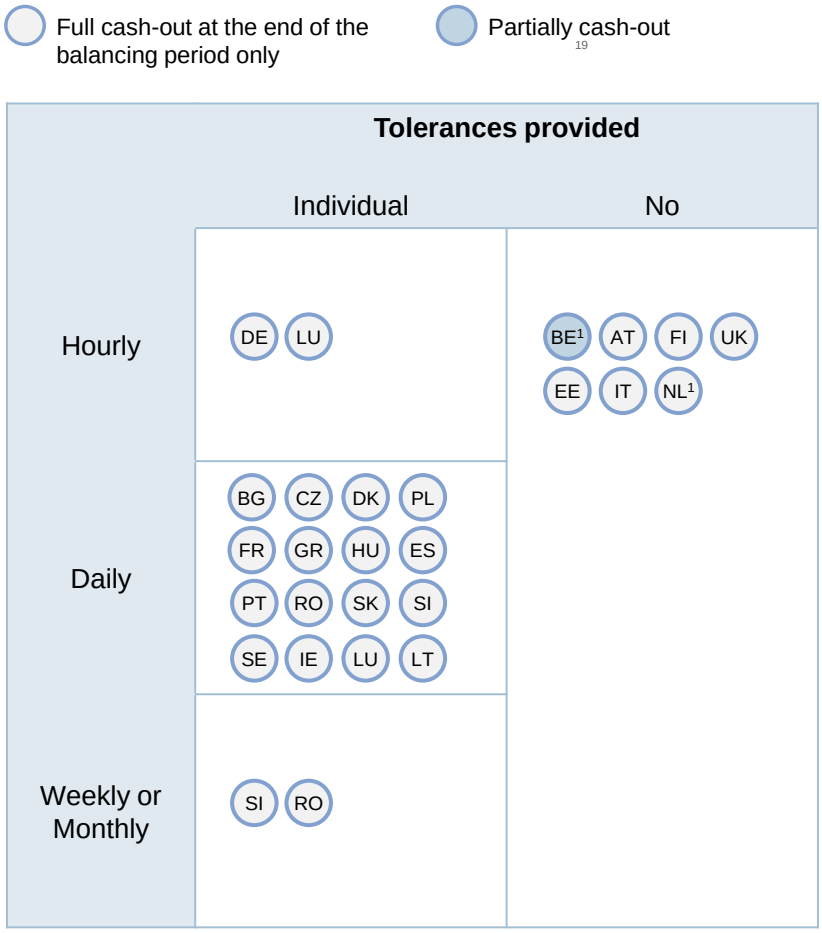
The WDOs applied differ in the way they have been designed. In Germany, on average, a 'structuring fee' of 15% of the imbalance settlement price is charged for deviations from hourly schedules outside the given tolerance margins differentiated by user groups. In Luxembourg the shipper is required to maintain a constant flow schedule during a gas day. The TSO, however, allows a flow variation of 50% of the average amount per hour nominated for a given gas day. These incentives for intraday profiling is relevant for customers with a load profile meter as large deviation in gas intake (and off take) at exit points of – for instance – gas-fired power plants or large industrial gas users can lead to significant surplus (lack) of gas in the system requiring expensive balancing actions from the TSO. Austria applies a similar system where the general balancing period is defined as one day, but customers with a load profile meter and a capacity of more than 50,000 kWh/h are subject to an hourly balancing scheme. Compared to the situation where all network users are subject to the same rules, applying specific restrictions to certain type of network users may potentially pose barriers to the affected network users.

The Netherlands and Finland have a special system. In the Netherlands, a mixture of hourly and cumulative balancing is applied, and the system is based on a continuous balancing. In Finland in case of imbalances the TSO intervenes by increasing the price of the “very short term product” which are the deliveries above pre-booked volumes.

5.3 Provision of Tolerances

The provision of tolerances is an important instrument allowing shippers to reduce their imbalances. A tolerance band permits the shipper some flexibility since there is an assumed balance if the difference between entry and exit gas stays within the pre-defined tolerance bandwidth. Tolerances may reflect the flexibility available through the systems line pack. Tolerances can be granted on daily and hourly basis (for the balancing period or for WDOs) on an individual level, in respect of all the inputs and off-takes of a shipper to and from the system.

Figure 19 summarises the different possibilities of the tolerances provided in the Member States. The application of these tolerances on the imbalance settlement is set out in section 5.5 in the context of imbalance fees and penalties.



[1] System-wide tolerance is provided, meaning the existence of a pre-defined market threshold. The TSO takes imbalance action when the system is going outside this operational band width which can vary on seasonal basis. Generally under normal market behaviour these thresholds won´t be exceeded.

Figure 31: Tolerances Provided

In liquid market based systems, tolerances are less necessary and become more relevant when WDOs are introduced. This is also recognised in the Balancing Network Code (article 49 (v)).

In most Member States an individual tolerance level is applied, ranging basically between 3% and 10% of the contracted capacity. Notable exceptions are Sweden where the tolerance provided is 25% of a winter's day consumption and Ireland which has tolerance levels of 25% to 40% for certain exit points. Apart from the level, tolerances are differentiated in a variety of different ways. Several countries apply multiple tolerance levels for which different 'tiers' of tolerance imply that a different imbalance fee is applied (e.g. an additional mark-up on the gas reference price). In this case, the multiple tolerance levels are set for the same daily balancing period (e.g. Ireland), whereas some Member States have additional tolerance levels related to hourly (e.g. Luxembourg) or cumulative imbalances (e.g. Romania which has a weekly cumulative imbalance and Slovenia where cumulative monthly tolerance levels and imbalances apply). However, tolerance levels may also be set 'dynamically' such as in Greece where tolerance levels are reduced to zero after a five-day sustained shipper's imbalance. Also, for shippers supplying end-customers, tolerances may be different than for pure trading shippers (e.g. in Belgium and France). In Germany, for example, as SLP customers do not occur imbalances by definition, tolerances only apply to metered customers: a 2% tolerance margin on

hourly values applies to metered customers above 300 MWh/h load and a 15% tolerance margin on daily band applies to metered customers below 300 MWh/h load.[36]

Similar to the potential barrier we identified in cases where particular WDOs are applied to specific network users, we also consider applying specific restrictions in the tolerances provided at specific entry or exit points or for specific consumers groups a barrier for the affected network users.

5.4 Procurement of Balancing Gas by the TSO

Figure 32 shows the TSOs' balancing gas procurement actions applied in EU Member States. We distinguish between the following methods of primary procurement of balancing gas:

- **Wholesale**: when using this method a TSO sells and purchases balancing gas in the general wholesale spot market; it may do this on a day-ahead and/or intra-day basis. This approach is also advocated as primary source of balancing gas by the Balancing Network Code (use short term standardised products via a trading platform) as it is expected to reflect the true market value of balancing gas and supposed to improve the overall liquidity of the general wholesale market as well as cost reflectiveness of balancing gas procurement.
- **Balancing market**: in some countries the TSO organises a separate market (or balancing platform) for purchasing and selling balancing gas. This market is frequently organised alongside of the general wholesale market. A balancing market can represent an important instrument if non-standardised products are required, e.g. balancing gas with specified local delivery. The Balancing Network Code (article 49(i)) allows for a balancing platform as a temporary interim regime as long as there is insufficient short term wholesale liquidity.
- **Other options** for TSOs to acquire balancing gas is via open tenders (for several products) or (regulated) ownership of capacities e.g. in LNG or underground storage facilities, or the use of the linepack of the system. The entering into contract for balancing services is provided for in the Balancing Network Code article 13.

It is important to note that in many Member States, where the TSOs mainly procure balancing gas on the wholesale or balancing market, it may have additional means at his disposition to safeguard system stability in case the necessary control gas cannot be obtained from the wholesale or balancing market.

[36] Furthermore, in Denmark shippers can buy more balancing margin from the TSO and they are able to trade the balancing margins among each other.

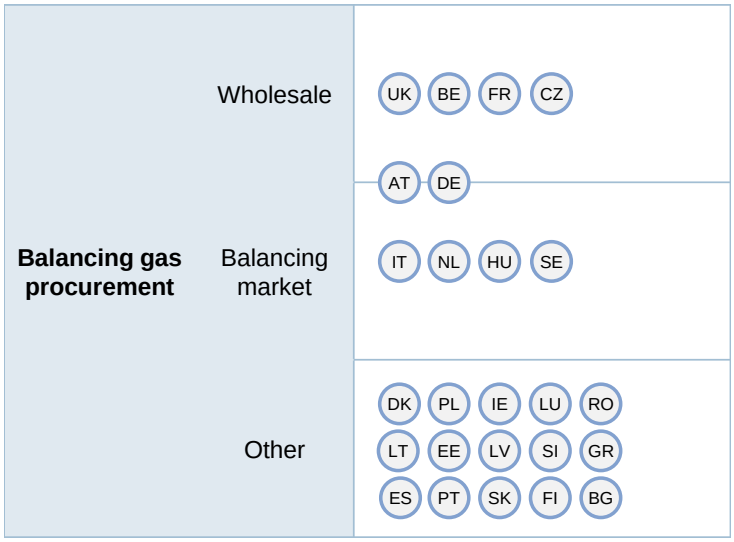


Figure 32: Procurement of Balancing Gas by the TSO

The above figure shows that less than half of the Member States procure balancing gas using the balancing or the wholesale market. The introduction of these instruments has been a trend in recent years induced by the increased liquidity at European spot markets. While some years ago most European TSOs primarily relied on other methods, many TSOs have since diversified their procurement strategy and procure balancing gas on the wholesale or the balancing market. The Balancing Network Code foresees also the priority of wholesale market over balancing market and other ways for the procurement of balancing gas. This principle is for example applied in the merit order in Germany setting out the following order by the procurement of balancing gas: 1) wholesale market within the entry-exit system, 2) wholesale market in adjacent entry-exit systems, 3) balancing platform and 4) other forms. The transition to market-based balancing, either on the wholesale market or the balancing market, facilitates the development of the entry-exit system. Market-based balancing arrangements are a precondition for providing economically efficient incentives for avoiding imbalances and self-balancing by network users.

5.5 Imbalance Fees

The costs occurred through the balancing actions of the TSO to keep the system within its operational limit can be recovered twofold, i.e. gas-in-kind compensation or financial settlement:

- **Gas-in-kind compensation**: in this case, balancing costs are fully or partly socialised over all shippers through normal network charges. In this approach shippers inject or extract the excess or missing gas in order to correct their imbalance. The balancing costs related to use of storage or line pack occurred by the TSO are integrated in the network charges. However, it should be mentioned that this approach is not fully in line with Framework Guideline on Balancing which requires a cash out at the end of the day.
- **Imbalance fees and penalties**: they aim to cover the costs of balancing mechanism from shippers responsible for the system imbalance. ***Financial imbalance settlement*** can be set out by two different components with respect to their purpose which can be combined in various ways as presented in the figures below.
    - *Imbalance fees* aim to partially or fully return the imbalances of the shippers to zero by a mandatory gas trade between the shipper and the system. Shippers are charged for the excess or the missing gas in the system based on a reference price (determined market based, administratively or through indexation) and might include an additional

penalty component which can be further differentiated by the level of imbalance. In return, their imbalance is reduced back to zero- missing (surplus) gas is bought from (sold to) the system. This mechanism is also called cash-out.

- *Penalties* intend to provide incentives for the avoidance of imbalances. To that end imbalance fees may include a penalising component applied either to the whole imbalance of the shipper or only to the part above certain pre-defined tolerance levels. On top of that pure penalties can be used in case of gas-in-kind compensation to an imbalance above a certain tolerance level as well or in relation to WDOs. Penalties can take the form of a multiplier or a mark-up applied on top of the reference price. There is a certain rationale whereby the allocation of balancing costs should be based on a "causer pays principle" as far as possible, implying the application of certain imbalance fees and/or penalties.

The following figure provides an overview of the imbalance settlement mechanisms prevailing in the European Union which can be based on financial settlement or gas-in-kind compensation. As the procurement of balancing determines to some extent the choice of imbalance settlement, this aspect is also included in the figure.

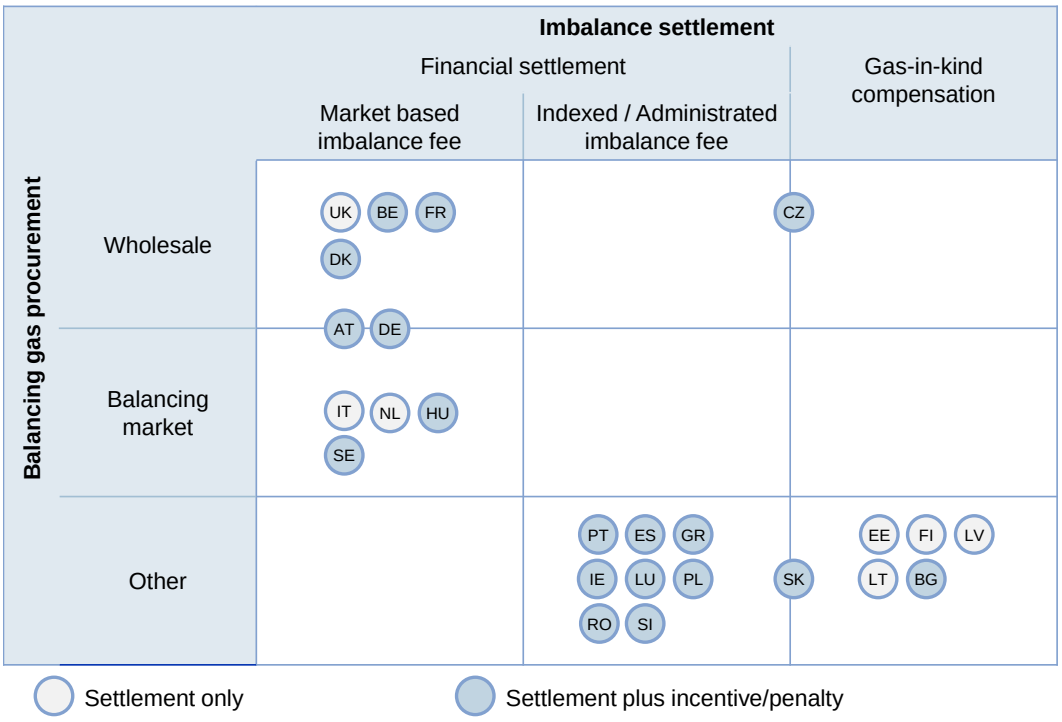


Figure 33: Imbalance Settlement and the Procurement of Balancing Gas[37]

[37] Dots between boxes indicate countries characterised by both options described in the adjacent boxes. Furthermore, it should be noted that the distinction between market-based and indexed imbalance fees is in reality not that unambiguous.

By looking at the correlation between imbalance settlement and the procurement of balancing gas, a clear pattern evolves:

- The gas-in-kind compensation for imbalance settlement is applied in some Member States which have significant line pack and flexibility in the system. For the most part, they do not experience congestion issues under normal operational conditions, as capacity in general is larger than the demand requirements. The shippers are required to feed in or extract additional gas after the gas day in order to restore their balance positions. This kind of imbalance settlement is applied in many Member States without a developed market.
- In Member States where balancing gas is procured on the wholesale or balancing market, a market-based system pricing is typically applied where the imbalance fees are determined by the short-term costs or prices of balancing gas in the market.
- Indexed or administrated imbalance prices are mainly applied in Member States where the TSO does not procure the balancing gas on the wholesale or balancing market (inter alia in some cases due to the non-existence or under-developed nature of these markets) and relies on other, non-market-based balancing actions.

The Balancing Network Code (article 25 (5)) allows for 'small adjustments' in the imbalance fee provided that not exceed 10% of the weighted average price at the virtual point. The majority of the Member States include a form of penalty/incentive in the imbalance settlement with the aim to incentivise shippers to use their own means to balance their portfolio instead of relying on (potentially more expensive) balancing actions by the TSO (shown by the dark blue circles in the figure) and to ensure that the price of balancing gas is not below the wholesale price level. In general, it takes the form of an additional penalising element applied on the top of the reference price in the frame of a financial settlement, however in case of gas-in-kind settlement a pure penalty can additionally also be applied, as it is the case in Bulgaria. The penalty (i.e. penalising element) in the imbalance settlement may be, but not necessarily, linked to the provision of certain tolerance levels. A wide range of different combinations is possible. Figure 34 provides an overview of the different solutions in the Member States.

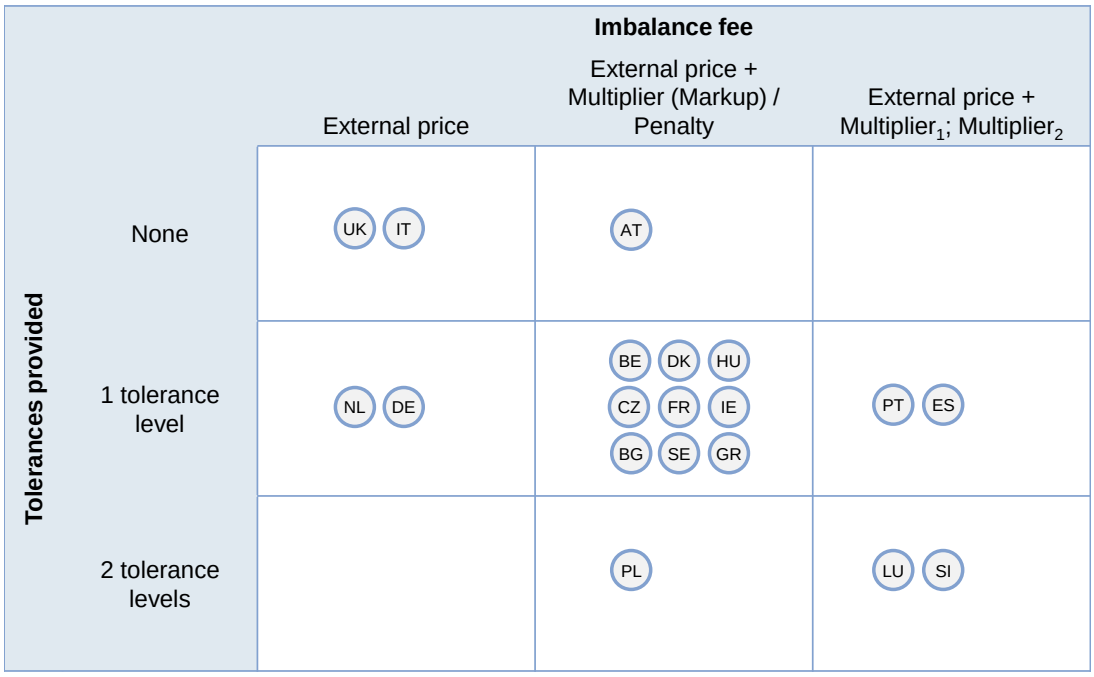


Figure 34: Imbalance Fee and Penalty in the Context of Tolerances Provided[38]

In Member States, where no tolerances are provided in case of any imbalance, shippers face the same imbalance charges regardless of the level of excess (or missing) gas in the system. The TSOs in the UK and Italy charge shippers for imbalances at marked based fees. In Italy they result from the daily auction where shippers and TSO is buying and selling gas. Meanwhile, similar to Germany, Austria multiplies the market based reference price by 1.2 in case of positive and 0.9 in case of negative imbalances.

As has already been described earlier and is clearly shown in the above figure, the majority of the Member States grant some form of tolerance level to the shippers. The actual implication of a tolerance level on the imbalance settlement depends significantly on the associated imbalance fees and penalties. The majority of the Member States incentivises shippers to balance their own portfolio, by including a penalty (i.e. penalising element) for exceeding a pre-defined imbalance level. Denmark, France, Poland, Portugal, and Sweden charge only the imbalances above the granted tolerance level and the imbalances below the tolerance level are rolled over and are to be settled by gas-in-kind compensation. But the Netherlands applies an imbalance fee set at the reference price without any penalising component in case the system is going outside a certain operational band with (i.e. system wide imbalance is above the system wide tolerance level), similarly to Great Britain, Germany and Italy.

In Greece, shippers exceeding the tolerance levels are charged by an additional +/-5% on the imbalance price.

In Hungary, all imbalances are cashed out by the TSO at the reference price (which is the daily volume weighted average price on the Balancing Platform) at the end of the day. Imbalances outside of the tolerance level are charged at a penalising element (a fixed amount per energy unit, HUF/MJ) set by the NRA.

[38] Tolerances on the basis of balancing period is assessed, therefore the tolerances on WDOs in Germany are not indicated in the figure.

A few Member States introduced two tolerance levels and charge the imbalances accordingly. The TSO in Slovenia uses for example specific multipliers for allowed and not allowed imbalances on the reference price. Spain grants only one tolerance level to the shippers, however, applies a multiplier differentiated by the importance of excess (the higher the excess the higher the multiplier). A further differentiation of multipliers can be observed in Portugal where the multipliers differ depending whether the shipper has gas in the system or not.

5.6 Recommendations

Similarly to area of capacity products and pricing, the arrangements balancing and imbalance settlement will be subject to change following the Network Code Balancing (BAL). The draft Network Code on Gas Balancing published by ENTSOG prescribes a harmonised approach to balancing rules in the Member States with the aim of facilitating gas trading across balancing zones towards greater market integration. It foresees the application of market-based mechanisms related to nominations, procedures, rules for imbalance fees and rules for operational balancing between TSOs. As the adaptation of the provisions of the Network Code is obligatory in the gas balancing regimes within the borders of the European Union, we expect that most of the potential barriers identified in this section will be resolved in the near future. We therefore refrain from detailed recommendations regarding the current status.

However, for the sake of completeness we summarize the following issues:

- Differences in balancing services and products
- Separate imbalance settlement at DSO level
- Exclusion of certain network users from common balancing arrangements
- Use of within day obligations
- Absence of market based balancing
- Requirement to have strictly balanced nomination portfolios

Differences in Balancing Services and Products

Member States apply a wide range of balancing services and products. The current degree of diversification and lack of harmonisation results in lower transparency and in a more complicated market entry of new players. The same reasoning applies to the different imbalance settlement approaches which can be observed in the Member States. The harmonization of the balancing regimes will facilitate cross border trade and the further development of the market.

Separate Imbalance Settlement at DSO level

If quantities delivered at the city gate to the DSO level are not an integrated part of the balancing system it means that the imbalances are calculated for each network user twice, i.e. once at TSO level and once at DSO level, and are not reconciled. Shippers being short on one level (DSO or TSO) and long on the other are actually in balance throughout the entire system but would be obliged to pay imbalance fees twice, i.e. on each level separately. If shippers cannot optimize their imbalances on the entire system, those supplying end customers on DSO level run significant higher risks with regards to imbalance settlement. The higher level of risks related to entering the DSO network might represent a barrier for market players entering the end customer market on DSO level and thus impede competition on the retail market.

Exclusion of certain network users from common balancing arrangements

In several Member States,, the balancing regime treats certain network users differently from others. Such differences can for instance take the form of different tolerances on a daily or hourly basis, or the application of different WDOs. Whilst such differences may be justified by the need to facilitate network access for certain customer groups, it is also possible that certain network users are fully excluded from common balancing arrangement. For instance in Austria, the balancing regime distinguishes between network users with and without booked local entry and exit points. Whilst network users with local entry or exit capacity are subject to the general balancing rules and imbalance cash-out, whereas others are not. Especially in the latter case there is a substantial risk of creating intolerable risks for the latter group, in particular if their cross-border nominations are subject to uncertainty.

Use of Within Day Obligations

Within Day Obligations in fact means that even if the basis of the imbalance settlement is one day some or all network users are required to balance their gas flows on for instance an hourly basis but are penalized for deviations. Depending on their design, WDOs impose significant additional obligations on network users and may require significant additional effort and resources to comply with. This may create serious barriers for users that do not have access to the necessary means to fulfill their obligations.

Absence of Market Based Balancing

We acknowledge that the physical characteristics of the network and the flexibility sources available to the TSO as well as the general liquidity in the market influence the balancing systems´ layout. Nevertheless, generally speaking, the lack of market-based mechanisms can impede cross-border trading, regional integration and represent a potential barrier to new market entry. With market based balancing and a functioning wholesale market new entrants have access to balancing means. In the absence of a market based balancing mechanism, new market players can be faced with high and sometimes unpredictable charges. This risk can be considered too high for new market entrants.

Requirement to Have Strictly Balanced Nomination Portfolios

Prior to the gas day, network users send nominations to the TSO. Based on these nominations, the TSO is informed with regard to how the shippers will be using their contracted capacity and which quantities of gas are transferred to another market player via the virtual point. In the matching procedure the TSO's check the nominations. One of the requirements is that the nominations in the portfolio of a network user should be strictly balanced. This can be a potential undue barrier for short term trade. If network users were allowed to have imbalanced nominations, the shipper/trader can decide during the gas day where to source the remaining quantities of gas. The balancing regime should be sufficient to incentivise the network user to make that by the end of the gas day demand and supply within the portfolio of the network user are matched. The exposure of the TSO to potential uncovered imbalanced should of course be limited. The maximum nominations imbalance could for example be linked to the financial guarantees a network user has in place. In this way the risk for the TSO is limited.

6 SYNTHESIS

6.1 Introduction

This chapter provides a synthesis of our findings and conclusions. In the previous chapters, we have assessed the network access models which have been or are currently being implemented in the Member States. For this purpose, we have identified and analysed the present and emerging structure of the entry-exit systems across the EU in detail. This assessment has focused on compliance with key features of a full entry-exit system.

This chapter sets out the main findings and conclusions of this report from two perspectives. The first section highlights factors as well as best practices that we have identified as being essential or supportive, respectively, for the establishment of well-functioning entry-exit systems. In contrast, the second part of this chapter outlines features of existing entry-exit systems which represent potential barriers for access to and trade within the national market and across borders and which may thus impede trade and competition in the European gas market.

Several design features of entry-exit systems have already been addressed by the Network Codes on Capacity Allocation Mechanisms (CAM) and Balancing (BAL). The corresponding aspects, which are covered by these Network Codes, are not further elaborated on in this chapter. In the following section, we therefore focus on issues that are beyond the scope of the Network Codes.

6.2 Key Success Factors of Entry-Exit Systems

Some general requirements for the design of entry-exit systems are set out in regulation (EC) 715/2009. Based on this background, Member States, which have implemented entry-exit systems, have taken a number of different design choices. Although this has sometimes led to different solutions, one are still able to identify some key features that are essential for facilitating network access, wholesale trading and competition in an entry-exit system.

These essential features can be summarised as follows:

- **Independent booking and use of entry and exit capacities**: In an entry-exit system, network users should be able to book and use entry and exit capacity independently from each other. By moving away from predefined transportation routes, gas that enters the market area can be delivered at any exit point.
- **Existence of a virtual point with unrestricted access**: One of the key characteristics of an entry-exit system is the existence of a virtual point where network users can freely exchange gas. Access to the virtual trading point should be available for all network users and from all entry and exit points, in order to enable network users to optimise and balance their portfolios and to facilitate trading in the wholesale market.

- **Availability of short term capacity products for inter-zonal trading between different entry-exit systems:** Short term capacity products are essential for short-term trading. Using day-ahead and within day capacity products, network users are able to optimise and balance their portfolio, or to react to short-term sourcing and trading opportunities. In addition, short term capacity products also facilitate arbitrage in the market which is beneficial for the development of the market.

In addition to these essential features, our analysis has also identified a number of other design choices and best practices which we believe to be most effective in facilitating network access and trading in an entry-exit system. These design variables are related to licensing/contracting, capacity products and pricing as well as balancing arrangements.

Among others, we have identified the following best practices:

- Harmonised requirements for national licenses and acknowledgement of licenses issued by other countries (e.g. EU trading passport) for providing access to the system,
- Limitation of preconditions for network access to those that are necessary to protect the TSO and network users from risks created by (different types of) network users,
- No (very limited) fees for access to and use of the virtual point,
- Market-based balancing,
- Bundling of cross-border capacities,
- Establishment of organised market places (e.g. gas exchange) connected to the VP,
- Integration of TSO networks and/or multiple market areas into larger entry-exit systems in those cases where it is technically feasible and where costs outweigh benefits.

To date, the situation in the European gas market is characterised by a variety of different licensing requirements in different Member States, not only for supply to final consumers but also for access to and use of the network. To facilitate cross-border trading and access to the wholesale gas market, it would be desirable if requirements for national licenses were harmonised, or if the license or any equivalent authorisation of a shipper for access to the network would also be acknowledged in other Member States (i.e. similar to proposal of a common 'EU trading passport'). Nevertheless, we also acknowledge that a direct recognition of foreign licenses may not be possible where the legal framework in a given country requires separate licenses, in order for market participants to become subject to the set of regulatory and market rules, i.e. where these are not universally binding for all network users.

Secondly, our analysis suggests that preconditions for network access should be limited to those that are necessary to protect the TSO and (other) network users from risks created by any party making use of the network, such as the risk of imbalances. Conversely, these requirements should not extend to specific preconditions that are only relevant for certain types of network users or other functions, such as conditions aimed at protecting final consumers against supply-related risks.

Similarly, the functioning of entry-exit systems can be expected to generally benefit from the lack of additional fees for access to and use of the virtual point, i.e. if the corresponding costs were socialised across all network users. Where this may not be possible or desirable, e.g. due to lack of other payments by certain groups of network users (such as virtual shippers that are engaging in paper trading only), any applicable fees should be structured in a way that they do not unduly discriminate against specific types of network users, including smaller market participants.

In line with the Network Code on Balancing (Gas), we support the transition to market-based balancing. Among others, market-based balancing arrangements are a precondition for providing economically efficient incentives for avoiding imbalances and self-balancing by network users, and ideally for supporting the TSO in balancing the network. Similarly, we consider the bundling of cross-border capacities, as foreseen by the Network Code on Capacity Allocation Mechanisms as an

important instrument for facilitate cross-border trading and hence access to the national markets within the European gas market.

In principle, the functioning and liquidity of wholesale gas markets can also be supported by the establishment of organised market places, such as gas exchanges. Where these exist, they should preferably be connected to the VP of the local entry-exit system. However, we emphasise that the establishment of a gas exchange or a similar gas exchange will not itself create a functioning market but requires sufficient competition in and free access to the local market. Similarly, there may be benefits in allowing for the continued operation of liquid physical hubs at the interface between multiple entry-exit systems, although we would generally advocate at least a gradual integration of such markets into the entry-exit system.

This aspect is closely related to the potential benefits of creating larger markets by integrating multiple networks and/or market areas into larger entry-exit systems. Where networks are owned by multiple TSOs, we see benefits in creating larger entry-exit systems with combined marketing and operation of the entry-exit system, for example by appointing a market area manager who provides a single interface towards network users. Similarly, it may be beneficial to combine several smaller entry-exit systems into a larger common market area. However, we would like to emphasise that these benefits will need to be weighed against the principal feasibility and the related costs on a case-by-case basis. In this context, we also refer to the additional analysis under part B of this project.

6.3 Barriers for Access and Trade

In the previous section, we have outlined essential features of as well as best practices for establishing well-functioning entry-exit systems. Simultaneously, our analysis has also revealed a number of potential barriers, which may inhibit access to and trade within the national markets, as well as cross-border trade and competition in the European gas market.

We have grouped the observed barriers in three categories which are discussed in the separate sections below:

- **Highly critical barriers** - These issues are real barriers to the entrance of new market players and/or for cross-border trade. These barriers should be avoided wherever possible.
- **Potential barriers** – These design features may lead to sub-optimal market design and should be overcome where practically possible, unless the costs outweigh the benefits.
- **Other** – We list a number of other issues which are more of an administrative nature. These issues might not necessarily be barriers to access and cross-border trade, but they can affect the efficient functioning of the system.

6.3.1 Highly Critical Barriers

Absence of a Virtual Point / Lack of Short-Term Capacity Products for Cross-Border Trading

In line with our definition of essential features of an entry-exit system above, we consider the absence of a virtual point or short-term capacity products for cross-border trading as highly critical barriers for the development of a well-functioning entry-exit system. Without a virtual point, the system cannot facilitate the key functionality of an entry-exit system, i.e. the free exchange of gas between different network users within the entry-exit system. Similarly, short-term capacity products at cross-border points are important for connecting markets in neighbouring entry-exit systems.

Undue Requirements for Access to the Network

Some Member States seem to impose requirements on licensees and/or network users that go far beyond what is required in other countries. Examples of such additional requirements include proof of ability to secure supplies, a mandatory diversification of the supply portfolio, limiting VP trades to booked entry or exit capacities, or the general compulsory booking of storage and/or LNG capacities. Such requirements may not only act as a barrier for new entrants or smaller players. In addition, they do also not seem to be necessary to protect the TSO or other network users from the risks created by the given party getting access to the entry-exit system.

Once again, we acknowledge that NRA's may decide to set particular rules and requirements to protect local consumers. However, such rules and conditions should be limited to suppliers of corresponding customers but should not universally apply to all users of the network.

Exclusion of Certain Network Users from Common Balancing Arrangements

In most Member States, all network users are subject to the same rules for imbalance settlement. In some cases, however, balancing arrangements effectively provide for a fundamentally different treatment of network users with and without local entry and exit points. Whilst the former are subject to 'common' arrangements for imbalance settlement, i.e. with financial cash-out (and WDOs), imbalance charges for the latter group are determined through a fundamentally different mechanism. Such arrangements may cause significant risks and hence create a serious barrier for affected shippers.

6.3.2 Potential Barriers

Limitations to Free Allocability of Entry and Exit Capacity

As explained in chapter 2.2.2, several Member States restrict the independent booking and use of some entry and/or exit capacities. Examples include:

- Capacities that cannot be reached from the VP or other entry and exit points (or v.v.), either in general or under certain circumstances,
- Separation of border-to-border transport from the local entry-exit system.

Such restrictions obviously undermine two of the essential features of a well-functioning entry-exit system. Gas flows that cannot reach the VP will not be able to fully react to short term market signals, which will lead to sub-optimal market results. Moreover, such restrictions will also represent a barrier for network users affected by them. The use of capacities with restrictions of free allocability should thus be minimised as much as reasonably possible.

However, we also acknowledge that available infrastructure may not always be sufficient to satisfy all possible combinations of entry and exit flows, or only at the expense of an excessive reduction of available capacities. In some cases, the use of restricted capacities may therefore represent an acceptable solution and may help to realise the general benefits of an entry-exit system. However, the use and benefits of such restrictions should be carefully weighed against any resulting negative impacts on the market and/or individual network users.

Access to the VP is a key feature of an entry-exit system. When capacities with limitations to free allocability have to be used, preference should be given to products that provide access to the virtual point at least on an interruptible basis.

Separate Balancing on Distribution Level

Ideally an entry-exit system stretches across network and pressure boundaries. However, in some Member States the distribution level is not part of the overall balancing regime or different rules apply. The separation of the distribution level is considered to be a barrier to new entrants, in particular, on account of larger shippers benefiting from their portfolio and thereby realising savings compared to shippers with smaller portfolios. This is not beneficial for creating a level playing field

for the participants on the market. Splitting the demand for balancing gas may also have a negative impact on liquidity and competition on balancing markets. Therefore, it seems preferable to establish a single system-wide balancing system integrating the whole "supply chain" of a shipper from system entry towards exit to a final consumer and allowing the shipper to pool imbalances occurring across this supply chain as well as within his customer portfolio.

Differentiation of tariffs by consumer groups

The use of tariffs which are differentiated for particular consumers groups can be discriminatory and effectively create a barrier to entry. For example, in some Member States tariffs are differentiated based on the maximum capacity of the connection or by the annual consumed volumes. Such tariffs may be discriminatory against smaller network users and could pose a barrier to market entry.

Requirement to Have Strictly Balanced Nominations Portfolio

Prior to the gas day, network users send nominations to the TSO. Based on these nominations, the TSO is informed how the shippers will be using their contracted capacity. Also the change of title via the virtual trading points is organised using nominations. In the matching procedure the TSO's check the nominations. One of the typical requirements in most countries is that the nominations in the portfolio of a network user should be strictly balanced. Imbalanced nominations are rejected. This can be a potential undue barrier for short term trade. If network users were allowed to have imbalanced nominations, the shipper/trader can decide during the gas day where to source the remaining quantities of gas. The balancing regime should be sufficient to incentivise the network user to make that by the end of the gas day demand and supply within the portfolio of the network user are matched. The exposure of the TSO to potential uncovered imbalanced should of course be limited. The maximum nominations imbalance could, for example, be linked to the financial guarantees a network user has in place. In this respect, the risk for the TSO is limited.

Fees for Using VP

In a number of Member States operators of the virtual trading point charge fees for using the virtual trading point. These fees can either be fixed annual charges but also variable charges per kWh traded.

As discussed above, the virtual trading point is an essential feature of an entry-exit system. The network users should have easy access to the virtual point in order to further stimulate the development of the market. Therefore, ideally the costs of operating the virtual trading point are socialized in the transmission tariffs. Conversely, especially a fee per transferred kWh can be a disincentive for network users to exchange gas within the network via the virtual point. Similarly, using a fixed fee may discriminate against smaller players and new entrants.

At the same time, there are also network users who do not book capacity at entry or exit points but who want to trade at the VP (virtual traders). In the absence of any specific fees for using the VP, such parties might therefore be able to participate in the market free of charge. This may be perceived as unacceptable. However, rather than generally charging a separate fee for access to and use of the VP, it may be more beneficial to simply require a (limited) fee for access to the virtual point from parties that are not otherwise using the entry-exit system.

6.3.3 Other Issues

Unavailability of Information in English

Some TSO's and NRA do not provide all relevant information regarding access to and use of the entry-exit system in English. Usually an English version of the website is available. But national network codes, tariff sheets, operational codes and other essential documents are not always available in English. This is considered to be an issue especially for new market entrants who want to assess the regulations in place. Although this issue can be overcome by hiring translation services and local

advisors, it will create additional costs for new entrants and may hence inhibit cross-border trade. It therefore seems preferable for TSOs and NRAs to make sufficient information available in English, even if formal regulations and contracts may need to written in the local language.

Multiple Virtual Points

Some Member States have defined multiple virtual points, i.e. in addition to the virtual trading point for transfer of title in the entry-exit system. Examples include:

- Separate virtual trading points for different gas qualities,
- Separate virtual trading points for aggregating physical entry or exit points, such as storage facilities, LNG terminals or exit to local consumers,
- Differentiation between the VP for title transfer and a separate point for balancing transactions / imbalance settlement.

The presence of multiple virtual trading points can be a barrier to trade since it splits liquidity. However, as long as there are no restrictions to transferring gas between these different points and as long as these (operational) virtual points remain within the same balancing portfolio, i.e. as long as they are aggregated for the purpose of imbalance settlement then we do not consider them a barrier.

Appendix A - Country factsheets

The country factsheets for the Member States are compiled in a separate document attached to this report.

Appendix B - Characteristics of Virtual Trading Points (VP)

	AT	BE	CZ
Name of VP	CEGH	ZTP	VTP, no reference to a specific name found
Operator	CEGH	Huberator	OTE (Czech electricity and gas market operator)
Requirements for access	Member of Balancing Group	Standard Transmission Agreement with TSO (Fluxys)	Agreement with OTE
Fee	Fixed + Variable	Option: either fixed or variable	Fixed+Variable
Fixed Fee (€ per year)	12,000	15,000	CZK 1,000/month (€ 38.80/month)
Variable fee (€ per traded kWh)	A volume digressive variable Fee 0.020- 0.012- 0.006	Depends on nominated volumes	CZK 2.16/MWh (€ 0.084/ MWh)
Capacity products without access to VP	Dynamically allocable capacity (access to VP on interruptible basis	Wheeling, ZEE Platform Operational Capacity Usage Commitments	Wheeling, shorthaul, capacity coupling service
Other VP's?	No	ZTPL notional trading services for the L Zone, Physical trading hub Zeebrugge Beach	BP (Balancing Point) used exclusively for the balancing of individual shippers, TSO point – virtual entry-exit point for the purchase and sale of gas by the TSO

	DE	DK	ES
Name of VP	GPL and NCG	GTF	AOC
Operator	NetConnectGermany and GasPool	TSO (Energinet.dk)	TSO (Enagás)
Requirements for access	Balancing agreement with market area operator	Shipper Framework Agreement	TPA contract with TSO
Fee	Variable	No fee	No fee
Fixed Fee (€ per year)	Not applicable	Not applicable	Not applicable
Variable fee (€ per traded kWh)	0.11 €ct/MWh at NCG and 0.25 €ct/MWh at GPL	Not applicable	Not applicable
Capacity products without access to VP	Capacities with limited allocability, shorthaul	No	No
Other VP's?	No	Virtual point supporting the Nord Pool Gas exchange (NPTF), Virtual point supporting cross border service Link4Hubs, Balance Transfer Facility (BTF) allows shippers to transfer balance margin, Capacity Transfer Facility (CTF)	Commercial operative Storage (AOC)

	FR	HU	IT
Name of VP	PEG (Nord, Sud, TIGF)	MGP	PSV
Operator	TSO (GRTgaz, TIGF)	TSO (FGSZ)	TSO (Snam Rete Gas)
Requirements for access	Supply license issued by the French Ministry of Ecology and access subscriptions to Title Transfer Points	Agreement for access to the balancing platform	Shippers and regasification companies: need a transport contract with TSO. Other parties: need to indicate a compensating party who will settle possible net balance of transaction.
Fee	Fixed+Variable	No (for NFKP – balancing market, a fixed and variable fee applies)	No
Fixed Fee (€ per year)	6,000 per title transfer point	Not applicable	Not applicable
Variable fee (€ per traded kWh)	0.00001	Not applicable	Not applicable
Capacity products without access to VP	No	Wheeling	No
Other VP's?	No	No	Virtual Entry Points from national production fields, Virtual Entry Points from storage fields (or "hubs") , Off-take Areas are combined virtual points

	IE	NL	PL
Name of VP	IBP	TTF	VTP, no reference to a specific name found
Operator	TSO (Gaslink)	TSO (Gasunie Transport Services)	TSO (Gaz-System)
Requirements for access	A network user may use the IBP to sell/buy gas only when the network user holds a total entry/exit capacity that is at least equal to the quantity nominated to sell on the IBP.	Shipper license (LA) and TTF registration	Network user needs to conclude a 'Transmission Ability Allocation'
Fee	Not applicable	Fixed + Variable	Not applicable
Fixed Fee (€ per year)	Not applicable	15,156	Not applicable
Variable fee (€ per traded kWh)	Not applicable	0.00001475- 0.00000202	Not applicable
Capacity products without access to VP	No	Wheeling Shorthaul	(No VP in transit system)
Other VP's?	No	TTFB, VPPV	Virtual Entry Point from the Gas Exchange, Virtual Entry Point for transactions with the OSP executed in the balancing market, Virtual Entry Point from the distribution area, Virtual Entry Point from the OTC market.

	PT	SE	SK
Name of VP	VTP, no reference to a specific name found	VTP, no reference to a specific name found	No reference to a specific name found
Operator	TSO (REN)	TSO (Swedegas)	TSO (Eustream)
Requirements for access	Framework contract with TSO	balance responsible agreement with the system balance responsible party (which is the TSO)	Title Transfer Contract with TSO
Fee	No	Not applicable	Fixed + Variable
Fixed Fee (€ per year)	Not applicable	Not applicable	6,000
Variable fee (€ per traded kWh)	Not applicable	Not applicable	0.00001
Capacity products without access to VP	No	No	Shorthaul, Wheeling
Other VP's?	Virtual Interconnection Point (VIP) commercial point where capacity Spain and Portugal is offered	No	Domestic point (virtual aggregated interconnection to and from domestic storage and distribution networks

	UK
Name of VP for title transfer	NBP
Operator	National Grid
Requirements for access	Accede to UNC, no shipper license required for pure gas traders
Fee	No fee
Fixed Fee (€ per year)	Not applicable
Variable fee (€ per traded kWh)	Not applicable
Capacity products without access to VP	Not applicable
Other VP's?	No