Study about models for integration of the Spanish and Portuguese gas markets in a common Iberian Natural Gas Market

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Public Consultation Document

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Study about models for integration of the Spanish and Portuguese gas markets in a common Iberian Natural Gas Hub

Executive summary

The aim of this document is to analyze possible models for the integration of the gas wholesale markets of Spain and Portugal, including the feasibility for the development of a common Iberian Gas Hub.

The proposed Iberian gas hub is expected to introduce a fairer price reference for the gas traded on the Iberian market. In combination with sufficient capacity of interconnections with France, this should contribute to integrate the Iberian gas markets with those in Central Europe and to improve LNG access for Central European countries.

In order to assess the feasibility for the development of a gas hub, the study analyzes different aspects of the current gas market situation in Spain and Portugal, including the volume of gas consumption, imports and the level of concurrence and prices in the gas market, as the most important factors.

The study covers three different models of market integration: "Market Area Model", "Trading Region Model" and "Market with Implicit Capacity Allocation", and its possible application to the Iberian gas market, comparing the advantages and disadvantages for each model.

- In the **Market Area Model**, the adjacent transmission networks that are situated in the same geographical area and well interconnected are forged into a single entry/exit system.
    - The market area includes all gas transmission systems of participating countries (one single market area).
    - The market area enables a single wholesale market with a single virtual point.
    - The market region has a single balancing system (with a single balancing entity and balancing rules).

  The implementation of the market area model may be considered better within a single jurisdiction (i.e. within a member state), because creating a cross-border market area that span more than one member state requires substantial legal and regulatory alignment between the participating countries.

  Thus, this model can be considered as a long term objective for the Iberian gas market, as is not possible to develop a fully common regulatory framework for Spain and Portugal in the short term.

- In the **Trading Region Model**, the adjacent transmission networks that are situated in the same geographical area and that are well interconnected are forged into a single entry/exit system.

  The main difference is that the Trading Region has two end-user balancing zones. Each national end user balancing zone includes all end users of a member state, and the balancing in each end user zone is performed according to the respective national rules (unbalances are managed by the National balancing entities).

  The creation of a cross-border market area for Spain and Portugal requires a minimum level of harmonization of key aspects of allocation and balancing is highly desirable, in order to not create distortion and different treatments among the two markets.

  Developing the detailed rules of functioning of this model can be complex but the harmonization efforts may be higher for the Market Area Model.

- **Wholesale market with implicit allocation of capacity**

  In this model, gas trade and allocation capacity are assigned simultaneously via a gas exchange (or a gas trading platform).

  An implicit allocation mechanism will allocate cross-border capacity on the basis of the bids and offers to buy and sell gas on a functioning gas exchange on either side of the border. Thus, capacity allocation (and gas flow) will follow the market signals.

  This model can be applied also with limited interconnection capacity inside the Iberian gas system (the markets will decouple when the interconnection capacity is fully used).

  The implicit allocation mechanism can co-exists with explicit auctions that allow traders to buy cross-border capacity in advance, as regulated in the CAM Network Code.

  The implicit allocation model does not require a high level on harmonization of national legislations, so the implementation can be faster.

  The implicit allocation may promote market liquidity on the Iberian gas market and can represent a first step for market integration. The introduction of this model would give a new approach to the development of a wholesale gas market, providing price transparency as well as benefits to the retail market, being a preliminary step for further integration through the trading region model or the gas market area model.

1. Introduction

Liquid and efficient wholesale markets, in combination with effective mechanisms for accessing networks, promote competition and provide fairer price formation at all levels of the production chain.

The development of gas hubs is being promoted by the European Commission as a tool for the integration of European gas systems. However, the process of the successful implementing gas hubs is long and complex and not without risks.

The political goals of the European Union, which call for the establishment of an Internal Energy Market, have been analysed for developing the Gas Target Model by the Council of European Energy Regulators (CEER).

Following the 18th Madrid Forum in 2011, CEER developed a vision for the European gas market, the "*Gas Target Model*", which had the aim of incorporating in a coherent framework various streams of policy being developed by the European energy regulators and by the European Commission to implement the 3rd Package and achieve a functioning EU internal gas market, consisting of national or cross-border interconnected entry-exit zones with virtual trading points (so-called "hubs"). This document included the following principles:

1. Every European final customer shall be easily accessible from a functioning wholesale gas market in order to be able to benefit from those markets.

2. The creation of a meaningful and reliable price for gas and the alignment of short-term and mid-term wholesale gas prices between wholesale markets shall be fostered as much as the existing transport capacities allow for.

3. The establishment of secure supply patterns from gas sources (indigenous production, EU imports, LNG) to every functioning wholesale market shall be enabled.

4. Economic reasonable investments in infrastructure need to be done in order to improve the effectiveness of the Internal Gas Market. Investments for security of supply purposes may need separate considerations.

5. Environmentally sustainable internal market and integration of renewable resources.

Without a liquid wholesale gas market, small players may have difficulties in entering retail markets because gas supplies would not be sourced at an efficient scale, and they cannot balance its positions cost-effectively.

The analysis of the development of different gas hubs in Europe, taking into account as a reference the Henry Hub, in the United States, and the National

Balancing Point, in the UK, has noted the importance of the liberalization of the gas sector in the birth of hubs. It has also emphasized the transformation potential that have successful hubs in the national gas markets, to the extent that they can completely transform the mechanisms that fix gas prices, facilitating the evolution from a price linked with oil (throughout long term oil indexed supply contracts) to a spot gas price based on the gas market itself, following gas offer and demand.

ACER in its overarching paper, setting out the energy regulation "*Bridge to 2025*", identifies key challenges and possible responses that regulators must consider in the coming years to 2025. ACER will assess in 2014 whether and how the gas target model needs to be enhanced, with the active and regular engagement of stakeholders. It is important to ensure that gas can continue to play its role in a competitive energy market and contribute to the climate change objectives in general – in essence to achieve a flexible, adaptable and competitive gas market.

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

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

ACER believes that market integration might be improved by: (i) ensuring that existing infrastructure is used efficiently and, where necessary, investing in new import/transport infrastructure; (ii) the merging of market zones. The development and implementation of the Guidelines on Congestion Management Procedures (CMP) and the Network Code for Capacity Allocation Mechanisms (CAM NC) will increase the efficiency of capacity utilisation.

A recent study prepared for DG ENER[1] has shown that several of the EU27 countries are already enjoying the benefits of market integration, which have already achieved an amount of €27 billion per year. According to this study greater integration of the gas market will likely produce important economic benefits from price effects and from increased security of supply. Under a scenario in which the current situation of oversupply continues, moving to what

[1] Booz & Company, David Newberry, Goran Strbac, Pierre Noel, Leigh Fisher: Benefits of an integrated European Energy Market, July 2013.

is described as "full integration" (in essence a single EU market zone) could facilitate a maximum benefit from price effects – price of gas and price of flexibility – of up to €30 billion per year for the EU27 (not including benefits to security of supply).

However, for market integration to occur, sufficient available connecting infrastructure between markets is necessary, in combination with the supporting regulatory and political conditions to foster trade.

Another study[2] was recently prepared by KEMA for DG ENER, where it is analysed the implementation of entry-exit systems for natural gas in the Member States of the European Union and it is made an assessment on potential merger of market zones.

KEMA considers that independently of the design choice for implementing entry-exit systems, the following key features are necessary:

- Independent booking of entry and exit points. Network users should be able to book and use entry and exit capacity independently from each other, not having to follow contractual predefined paths.
- Existence of a virtual point available for all network users and from all entry and exit points.
- Availability of short term capacity products between different entry-exit systems enabling network users to optimise and balance their portfolio, or to react to short-term sourcing and trading opportunities.

It also points out what it considers to be the 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;

[2] KEMA, Study on Entry-Exit Regimes in Gas, July 2013.

- 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.

KEMA study provides an assessment on the potential for entry-exit market area integration in 3 regions: i) Portugal and Spain, ii) Ireland, Northern Ireland and Great Britain and, iii) Hungary and Romania.

Regarding the merger of the Portuguese and Spanish markets the analysis shows that on a yearly basis there are likely moderate net benefits to be obtained, because prices charged to consumers do not seem to be excessively high but rather low. KEMA has only assessed the potential benefits in a specific market segment in Portugal (industrial consumers), whereas possible additional benefits for instance for customers connected to high pressure off-takes have not been considered. Furthermore, it is expected that benefits may increase if the Spanish and Portuguese TSOs coordinately optimize the use of the infrastructure to avoid additional investments.

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. 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, where one third of the electricity produced is generated by gas-fired power plants. As such, any change in the gas market may alter the merit order in the electricity sector.

Some experiences of market integration are presented on Annex I.

2. European context

The European Union is highly dependent on gas produced outside of its borders, representing about 65% of the internal gas demand.

The current arrangements for gas trading are mainly on a long-term contractual basis with producers outside of the EU (oil-indexed with take or pay clauses) rather than on wholesale gas markets in the EU (following demand and supply).

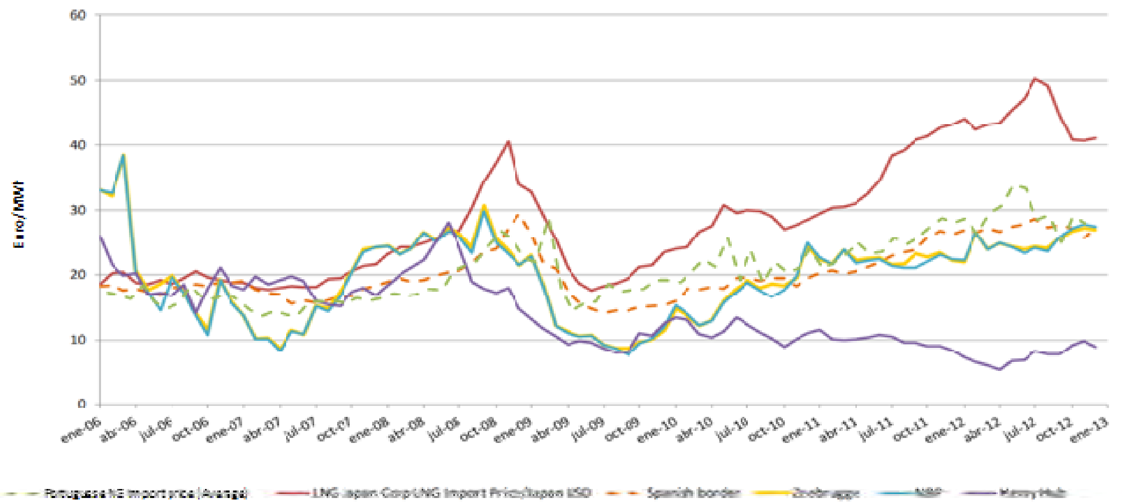


Figure 1. International gas price evolution since 2006 in EUR/MWh

Trading at gas markets has made progress over the last decade, particularly in North West Europe. However, progress has not been the same all over Europe and where gas hubs have emerged, liquidity is still regarded by many as insufficient.

The 20-20-20 obligations lead in many Member States to a significant increase in renewable energies, and in particular on wind generation. As a result, we can expect much greater within-day fluctuations in gas demand than previously.

The year of 2012 represented the lowest natural gas consumption of the last ten years in European Union. EU natural gas consumption totalled 4,910 TWh in 2012, representing a decrease of 4.1% compared to 2011, influenced by the effects of the economic downturn, the increase of the use of coal for power generation and the rise of renewable energy production.

Regarding LNG imports, after continuous growth in LNG imports since the beginning of 2009, the LNG imports began falling in the second quarter of 2011.

The volume of total traded gas on European gas hubs in 2012 was 20,135 TWh. The UK NBP is the largest hub in Europe, with more than half of the volume traded (13,765 TWh) and the Netherlands the second one, with 1,818 TWh, followed to a lesser extent for NCG (Germany) and Zeebrugge (Belgium).

Relative to 2011, volumes of gas traded on EU hubs increased by 11%. Continental hubs (excluding the UK's NBP) experienced an overall increase of 9%, which is considerably below the 27% registered in 2011, and less than the 48% average yearly increase in traded volumes registered between 2005 and 2009.

In the rest of Europe, other hubs still lack significant liquidity. Aggregating pools of liquidity by merging cross border zones and virtual hubs may be a solution

With regard to price developments hubs throughout 2012, the main event was the sudden and unexpected fall where low temperatures were recorded in early

February 2012 in Europe which led to a sharp and significant natural gas demand, which in turn put pressure on gas supplies. As a result, prices of wholesale hub increased significantly, providing signals to gas flows.

The major North Western European (NWE) hubs quoted during in 2012 almost in parallel. The price spreads between couples of adjacent hubs were usually below transportation cost differentials - given the fact that capacity is usually contracted long term and that short run marginal transmission costs are close to zero.

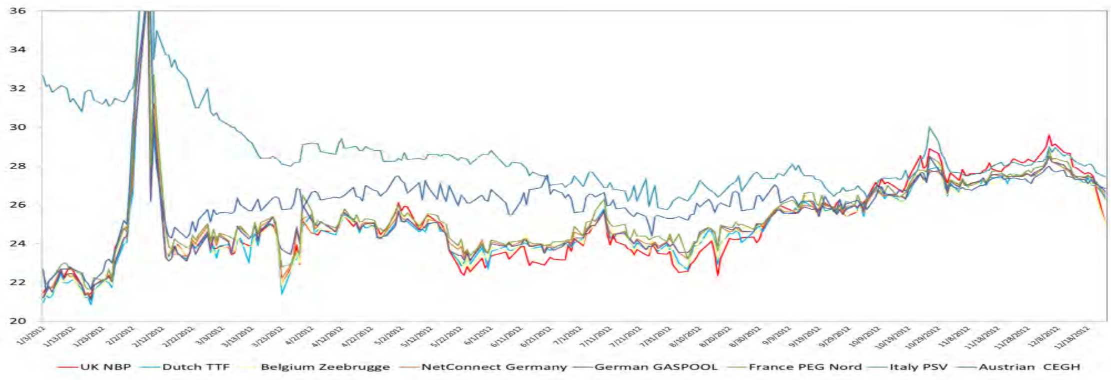


Figure 2. Evolution of day ahead gas price in main European gas hubs since 2006 in EUR/MWh

Overall EU hub price spreads on a day-ahead basis were drastically reduced, mainly due to PSV and CEGH prices moving closer to other EU spot markets. The main reason behind this alignment was the auctioning of new capacity on the Austrian-Italian border. Other reasons were the new policy on storage capacity allocation in Italy and the recent transformation of CEGH (Baumgarten) into a virtual trading hub.

Another EU price formation impacting element is the premium at which East Asian LNG markets (Japan, South Korea, and China) trade above both European and North American prices. East Asian markets can currently sustain price levels which greatly exceed landed gas costs to the Pacific Rim and, for this reason, they trigger the diversion of LNG cargoes away from Europe and sometimes give rise to LNG reloading and reshipment from technically equipped European terminals. As a result, LNG imports into Europe have fallen by 26% in comparison to 2011. This has produced an effect on hub price formation and an appreciable upward pressure on EU wholesale prices.

3. Description of Market Models and application to the Iberian Gas Market

The Iberian Wholesale Gas markets suffer from a lack of liquidity and transparency hindering the efficient allocation of resources, risk hedging and new entries.

The conclusion paper of the CEER Vision on a Gas Target Model have made a call on each NRA to publish a review of its market liquidity and market integration by 31 December 2012 and to explore whether additional measures are needed to improve the functioning of the wholesale market. These reports shall be conducted in cooperation with adjacent NRAs to explore whether there is mutual benefit in joint actions. Such actions could include mandatory release programmes whereby those with significant market power are obliged to sell their gas on wholesale markets, improving the efficiency of interconnector flows or changing the shape of entry-exit zones. This could be done through merging them or by creating trading regions which create a common entry-exit zone for transmission and a single virtual point for trading gas between at least two Member States (or parts thereof) but maintain “national end-user zones” in different Member States for distribution and balancing actions.

Whilst considering merging zones or setting up trading regions one must carefully weigh costs and benefits and consider their distribution between the relevant zones. A cost benefit analysis shall be carried out to assess the economic viability of any proposed measures. The respective Member States, NRAs and TSOs shall implement the identified measures in the framework of the Gas Regional Initiatives by September 2014.

How to enable functioning wholesale markets according with the Gas Target Model?

Different pictures all over Europe call for different approaches which are not mutually exclusive

a. If a country **is capable** of establishing a functioning market itself the establishment of one zone (or two, based on C/B analysis) within this country is important (e.g. GB, Germany, France, Spain).

Is generally agreed that the development of a functioning wholesale markets require a sufficient presence and low concentration of players active in the wholesale market, availability of gas from diverse sources, multitude of customers (i.e. sufficient demand for gas) as well as a certain level of trade in terms of the total volume of gas traded compared to the volume of gas consumed (i.e. churn ratios).

The gas target model mentions, as indication, a set of parameters: a Herfindahl-Index (HHI) below 2000, gas being available from at least 3 different sources, a total gas demand within the entry-exit zone of at least 20 bcm and high churn rate and Residual Supply Index.

Figure 3. Main conditions to develop a functioning gas hub in Spain and Portugal.

Spain complies with most of the liquidity parameters to develop a liquid Hub, which would even become higher if considered at regional level with Portugal. Portugal has no structural conditions to create a stand-alone wholesale gas market

b. If a country **is not capable** of establishing a functioning market itself (e.g. due to lack of liquidity or size), the gas target model suggest different possible solutions:

- **Access to a larger, already functioning market**
- **Cross-border market** areas (full merger)
- **Trading Regions** – a single cross-border zone for wholesale markets with congestion-free interconnection to national end-user zones.
- **Implicit allocation** - market participants submit bids and offers onto the platform to buy and sell gas on two (or more) entry-exit zones.

Possible models to study for the Iberian Market

The study covers three different models of market integration: "Market Area Model", "Trading Region Model" and "Market with Implicit Capacity Allocation", and its possible application to the Iberian market, comparing the advantages and disadvantages for each model. A fourth alternative would be to establish two different stand-alone wholesale markets (no Iberian market integration).

1. **The Market Area Model** (full integration). In the market area model, the transmission and distribution networks situated in the same geographical area and well interconnected are forged into a single entry/exit system.
2. **The Trading Region Model** (full integration, except national balancing)
3. **The Implicit Allocation Model** (One single Iberian wholesale platform, with implicit allocation of capacity)

3.1. The Market Area Model

The present description of the market area model follows the proposal by Jean-Michel Glachant of the MECO-S model[3].

The market area model consists in transmission networks that are merged into a single entry/exit system. The market area model can be implemented within a member state or cross-border between states. In this model, the virtual point of the market would be the main point of the wholesale gas market.

Depending on the degree of interconnection of the existing pipelines, maintaining this commercial overlay causes cost (e.g. for constructing improved interconnection and for procuring flow commitments or system energy). The larger an entry/exit network becomes, the higher this cost usually gets.

On the other hand, the creation of large entry/exit zones is a precondition for the creation of functioning markets.

This dilemma is solved best by designing entry/exit zones as large as is required in order to enable a functioning market, but to avoid the extra cost attached to going beyond that size.

3.1.1. Detailed description of the model

In the market area model, the transmission networks that are situated in the same geographical area and that are well interconnected are forged into a single entry/exit system.

- The market area includes all gas transmission systems of participating countries (one single market area)
- The market area enables a single wholesale market with a single virtual point.
- The market area has a single balancing system (single balancing entity and balancing rules).

[3] The MECO-S model is also presented in *Building competitive gas markets in the EU*, by Jean-Michel Glachant, Michelle Hallack and Miguel Vazquez, published by Edward Elgar, 2013.

The market area model does not prejudice any choice of unbundling model.

1. One market area.

The network access to the market area is organized as an integrated entry/exit network spanning all participating countries.

Within the market area, national borders are irrelevant for shippers, and respective interconnection points need not be booked by shippers anymore.

The main implications of the market area model for the Iberian Market would be:

- Transport tariff between Spain and Portugal are removed
- International border points between Spain and Portugal are not booked by shippers.
- Need to develop a cost allocation methodology to assign the induced loss of tariff income.
- Entry-exit transmission tariffs should be determined with a common methodology and in a coherent way, so that price signals for each entry and exit point are effective and economically sound.
- SoS rules should be harmonized (e.g. obligations about import portfolio diversification, UGS mandatory reserves, load shedding under system constrain…)
- Data interchange between the two TSO since the all infrastructure is managed like one.
- Single booking and nomination point of contact
- Merged or harmonized TPA contract for infrastructure usage by shippers

2. A Single virtual point in the market area, as the virtual point of trading gas for all the gas entering and outgoing in the market area and the possibility of carry out changes of ownership. Regarding changes of ownership the single virtual point of the market area is the only place admitted for shippers to carry out it with the exception of flange trading at EU import points and storage facilities.

3. A Single balancing system consists in a:

- Single balancing entity (or several, but acting like one) and a single set of balancing rules encompassing the whole market area, some examples are: nomination, balancing period, prices for balancing energy, tolerances, rights and obligations of shippers regarding the management of their balancing accounts.
- Single set of rules for allocation and settlement, including rules for measure or estimate the customer consumption, and the exchange of

gas with other markets and storage. All DSO have to send the allocation data to the single balancing entity, so that balancing accounts can be settled.

The following graph visualizes one scenario where a member state implements a (one) national market area and a second scenario where two adjoining Member States implement a cross-border market area.

Currently, Spain and Portugal gas markets can be considered as two separate National markets, although they may not fully comply with the features mentioned before.

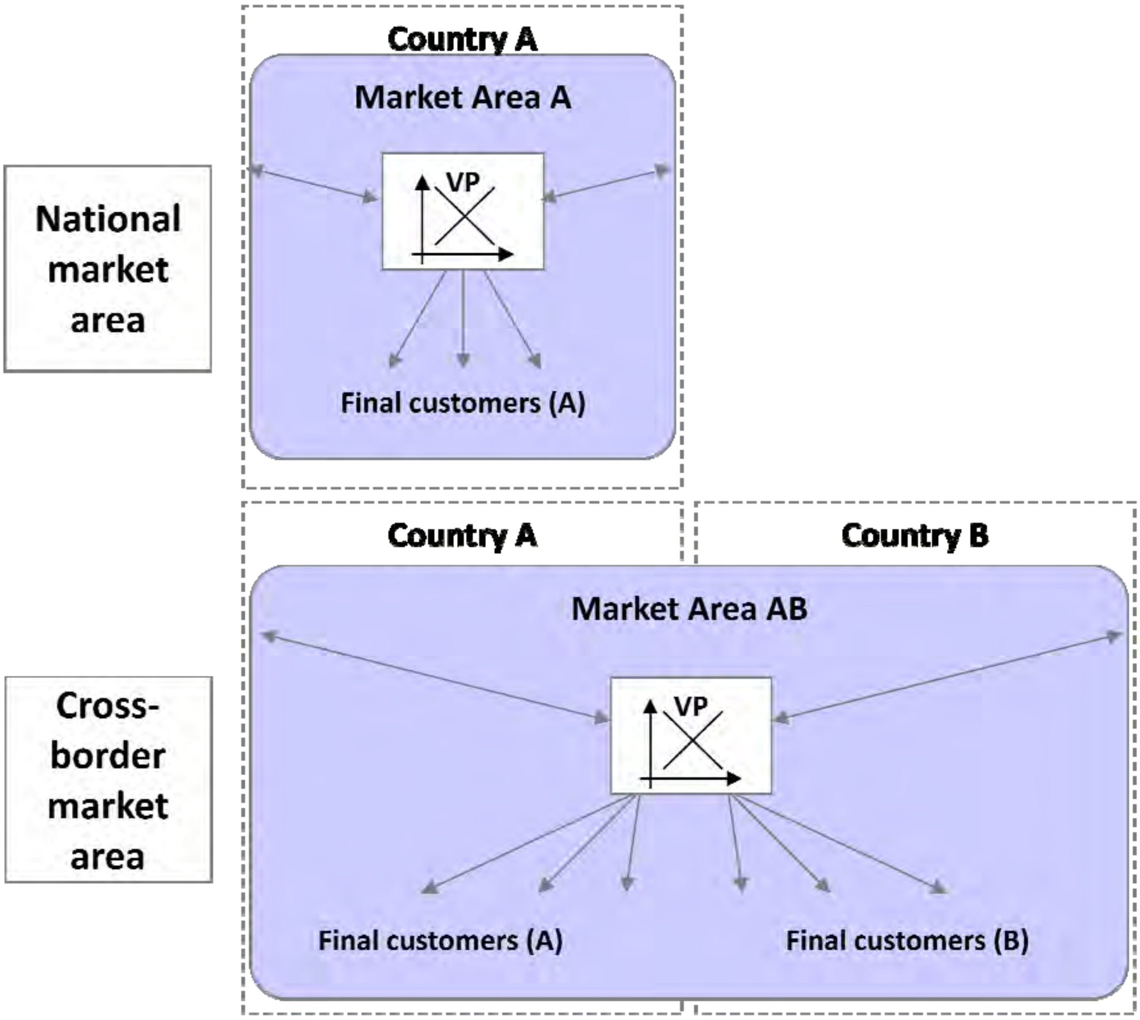


Illustration 1 Market Area Model

Virtual point of the market area serving as the sole marketplace of the market area

↔ Entry or exit contract

→ Exit contract

3.1.2. Application to the Iberian Gas Market. Advantages and drawbacks of the Market Area Model

The Market Area Model will allow the creation of an Iberian Gas Hub and would imply the higher degree of integration of the Iberian gas market.

The main implications of the market area model are:

- Transport tariffs between Spain and Portugal are removed
- International border points between Spain and Portugal are not booked nor nominated by shippers
- Need to develop a cost allocation methodology to assign the induced loss of tariff income.
- Entry-exit transmission tariffs methodology should be coherent
- Need to harmonize security of supply rules (e.g. import portfolio obligations, gas mandatory reserves)
- Implement a single booking and nomination point of contact for shippers.

This market area model is quite demanding in terms of regulatory harmonization and institutional coordination:

- The model assumes the absence of gas transport limitations between Spain and Portugal.
- Its implementation requires full harmonization of regulatory rules (in particular all balancing rules) and the creation of a single balancing entity.
- It requires extensive work and time streamlining the legal and regulatory alignments and reviewing, and also a high level of political agreement.
- It needs a clear definition of regulatory and government oversight over integrated market operators or system operators.

The implementation of the market area model may be considered better (or easier to implement) within a single jurisdiction (i.e. within a member state), because creating a cross-border market areas that span over more than one member state requires substantial legal and regulatory alignment between the participating countries.

Therefore the market area model might be considered the model of choice for larger Member States, where especially the gas consumption is large enough to enable a functioning wholesale market within the national borders.

In case of Member States with a lower level of gas consumption, the cross-border merger of their market area with other Member States, that will normally be required in order to enable a functioning wholesale market, needs alignment of national legislation and the agreement on a single entity for balancing all final customers in the cross-border market area. Ensuring proper common legislation and establishing clear regulatory competences are special challenges regarding such common balancing entities.

This market integration model requires a high level of interconnection capacity between Spain and Portugal, large enough to allow for almost any type of flow asked for the market results. If interconnection capacity is scarce (compared with the market results – commercial dispatch), the single balancing operator will incur in high costs of balancing actions, in order to reconcile the commercial program with the physical restrictions of the networks. These high balancing costs reduce market integration net benefits in a social perspective.

Summarizing, the creation of a cross-border market area for Spain and Portugal is likely an onerous and time consuming process, with many risks of slow progress and unknown outcomes.

Main conclusions about the Market Area Model:

- This model suits better large Member States in order to integrate more than one balancing zone, where overall gas consumption is as large as needed to enable functioning wholesale markets within their own borders.
- This model of market integration requires a high level of interconnection capacity inside the Iberian gas system.
- The creation of a cross-border market area for Spain and Portugal will require a full alignment of national legislations and the creation of a single entity to perform the balancing of the system.
- Any form of implementation of the cross-border market area model for the Iberian gas system will need much time and resources from Governments, regulators and TSOs.

3.2. The Trading Region Model

The present description of the trading region model follows the proposal by Jean-Michel Glachant of the MECO-S model.

In the Trading Region Model, the transmission networks that are situated in the same geographical area and that are well interconnected are forged into a single entry/exit system, but, as a main difference with the Market Area Model, the Trading Region Model maintain two end user balancing zones.

Thus, this model will require a less exigent degree of alignment of the national legislations, allowing to maintaining two national balancing entities for the operation of each national grid.

3.2.1. Detailed description of the model

In the Trading Region Model, the transmission networks that are situated in the same geographical area and that are well interconnected are forged into a single entry/exit system.

- The trading region includes all gas transmission systems of participating countries (one single market).
- The trading region enables a single wholesale market with a single virtual point.
- The trading region has two end-user balancing zones.

1. One trading region.

   The network access to the trading region is organized as an integrated entry/exit network spanning all participating countries.

   Within the trading region, national borders are irrelevant for shippers (and respective interconnection points need not be booked by shippers anymore).

   The main implications of the trading region model for the Iberian Market will be:

   - Transport tariffs between Spain and Portugal are removed
   - International border points between Spain and Portugal are not booked by shippers.
   - Need to develop a cost allocation methodology to assign the induced loss of tariff income.
   - Entry transmission tariffs should be determined with a common methodology and in a coherent way, so that price signals for each entry point are effective and economically sound.
   - Data interchange between the two TSO.
   - Merged or harmonized TPA contract for infrastructure usage by shippers.

   As a difference with the market area model, allocation rules for final customers can be different, and the model maintains two end-user balancing zones, as explained in paragraph 3.

2. A single virtual point that is shared by the trading region and all attached national balancing systems and where changes of ownership and the

accounting of gas flows in the trading region as well as to the national end user zones are affected.

As in Market area model, regarding changes of ownership, the single virtual point of the trading region is the only place admitted for shippers to carry out it with the exception of flange trading at EU import points and storage facilities.

- The Virtual Trading Point is located in the Trading Region.
- The Virtual Trading Point is the only point, where a handover of gas between shippers can be accomplished (this implies that no trading is allowed inside the end user zones).
- The Virtual Trading Point is the delivery point for any hub services and gas exchanges operating within Trading Region.

3. Two end user balancing zones, one for Spain and one for Portugal.

- Common rules for nomination of transport flows in /out the trading region
- Each End User Balancing Zone is a separate balancing zone. Two National balancing entities operate each national grid and each end user balancing zone (ENAGAS GTS in Spain and REN in Portugal).
- Each National End User Balancing Zone includes all gas distribution systems of one participating country. An End User Balancing Zone includes all end users of a member state, i.e. even those, which are physically connected to a gas transmission system.
- Shippers can allocate gas from the balancing system of the Trading Region to a specific End User Balancing Zone by nominating the desired transfer quantity from the virtual trading point to the end user balancing zone.
- Need to develop a rule to allocate any unbalance in the trading region to the two end-user balancing zones. Thus, the responsibility of the resolution of any energy unbalance is transferred to the national balancing entities.
- Balancing in the End User Balancing Zones is performed according to the respective national rules for end user balancing (unbalance is managed by the National balancing entities).
- Buying or selling energy for the balance of the end user balancing zones shall be managed (in addition to any sources of physical flexibility available to the entity in charge of physically balancing an End User Balancing Zone) by using the gas exchange on the Virtual Trading Point of the Trading Region.

The following graph visualizes the trading region model in a cross-border application:

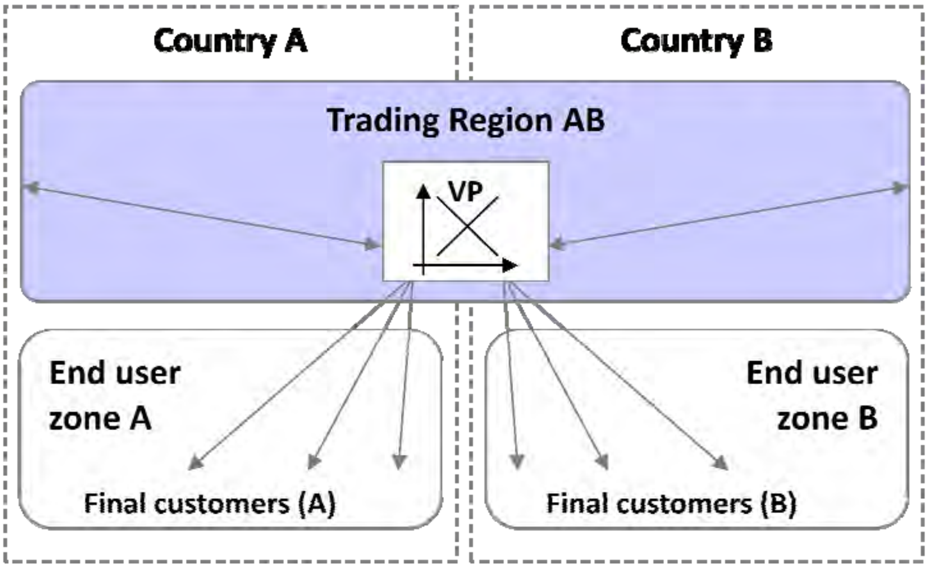


Illustration 2 Trading Region Model in a cross-border application

 *Entry or exit contract*

 *Exit contract*

Virtual point of the trading region serving as the sole marketplace of the trading region and all attached end user zones.

End user zone = National balancing zone for national final customers, no matter the system (distribution or transmission) they are connected to

Trading Region AB = Cross-border entry/exit system including all nominated points on the transmission systems of countries A and B

3.2.2. Application to the Iberian Market. Advantages and drawbacks of the Trading Region Model

The trading region model has important differences with market area model.

A similar pre-requisite is that gas transport systems are well interconnected and can be forged into a single entry/exit system. Thus, trading can be done at the single virtual point, without restrictions. Also, this allows performing the balancing actions by each TSO (buying or selling gas for the balancing of each end user zone) at the single virtual point of the market area.

The main difference is that it is not necessary the fully harmonization of balancing regime (nomination, balancing period, prices for balancing energy, tolerances, rights and obligations of shippers regarding the management of their balancing accounts), as the balancing of each end used zone continues to be managed in a country level.

However, a minimum level of harmonization of key aspects of allocation and balancing obligations is highly desirable, in order to not create distortion and different treatments among the two markets. As an example, the timetable for allocation and balancing account needs to be the same in the two markets.

The model requires a high level of coordination of the entities responsible for the balancing at each end user zone (ENAGAS-GTS and REN). Also, it needs a clear definition of roles regarding the balancing of the trading region and the end user balancing zones.

In particular, it is necessary to develop a rule to allocate any unbalance in the trading region to the two end-user balancing zones, as there is no entity responsible to balance the trading region. Developing this rule can be complex.

Thus, the responsibility of the resolution of any energy unbalance is transferred to the national balancing entities. Although, in theory, this model will allow differences in the balancing penalties among the end user zones, this can also create distortions in the behavior of shippers, affecting the stability of the model.

The physical balancing of the system may also need to perform cross-border or locational actions by the TSOs (in addition of buying or selling gas at the virtual point). Regarding the trading region there are two ways to organize roles.

- First one, TSOs interested, establish a central balancing operator for the trading region as in the cross-border market area region.
- Second one is based on a trading account where TSOs offer an account for the shipper in the trading region and the necessary exchange of information in the background based on cooperation contracts.

Summarizing, the creation of a cross-border trading region for Spain and Portugal requires a minimum level of harmonization of key aspects of allocation and balancing, in order to not create distortion and different treatments among the two markets. Developing the detailed rules of functioning of this model can be complex.

Main conclusions about the Trading Region Model:

- This model of market integration requires a high level of interconnection capacity inside the Iberian gas system.
- In this model is not necessary the fully harmonization of balancing regime, as the balancing of each end user zone continues to be managed at country level. However, a minimum level of harmonization of key aspects of allocation and balancing is necessary, in order to not create distortion and different treatments among the two end user zones.
- Developing the detailed rules of functioning of this model can be complex, although in terms of time and resources this model may be considered of easier implementation than the Market Area model.

3.3. Gas Market integration with implicit allocation of capacity

According to the Commission Regulation (EU) N.º 984/2013 establishing a Network Code on Capacity Allocation Mechanisms in Gas Transmission Systems 'implicit allocation method' means "*an allocation method where, possibly by means of an auction, both transmission capacity and a corresponding quantity of gas are allocated at the same time*".

This model is focused on the development of a common gas exchange platform, in order to allocate the cross-border capacity among two balancing areas.

An implicit allocation mechanism will allocate cross-border capacity on the basis of the bids and offers to buy and sell gas on a functioning gas exchange on either side of the border. Thus, capacity allocation (and gas flow) will follow the market signals.

In this model, the Market Operator would match bids together independently of the area, so a bid to buy gas on one side of the border can be matched with a bid to sell gas on the other side. The Market Operator would then allocate cross-border capacity which would enable the maximum increase in welfare. More specifically this involves allowing trades between the buyers with the highest willingness to pay and the sellers that will accept the lowest price.

The capacity allocated by this mechanism can range from a minimum of 20% to a maximum of all available capacity at the interconnection point. An implicit allocation can serve as the sole allocation mechanism for the cross-border capacity, but also can co-exists with explicit auctions that allow traders to buy cross-border capacity in advance, as regulated in the CAM Network Code.

- <u>Requirement about interconnection capacity</u>

The implementation of a Market Area Model or a Trading Region Model requires a high level of interconnection capacity between Spain and Portugal, so the shippers don't need to book nor nominate interconnection capacity (and the transmission tariff is zero).

By contrast, the model of market with implicit allocation of capacity can also be applicable to the integration of markets with limited interconnection capacity. Although there has always been available interconnection capacity over the years, the gas flows at the interconnection still rely much on a balanced use of the points of entry into the Iberian Peninsula, namely the LNG terminals and African and European pipelines (that is even the case inside the Spanish system).

Regarding the cross-border capacity, ACER defines that "the corresponding exit and entry capacity available at both sides of every point connecting adjacent entry-exit systems shall be integrated in such a way that the transport of gas from one system to an adjacent system is provided on the basis of a single allocation procedure and a single nomination".

To simplify the implicit allocation mechanism, capacity need to be allocated through a virtual interconnection point between the two markets.

Regarding the terms and conditions of the contracts on both sides of the border, it should be sufficient that the day-ahead gas product is harmonized in both countries, e.g., that it is the same product.

This model would allow optimized cross-border trades between the two markets, providing greater price convergence when there is sufficient physical interconnection capacity available between the two markets but allowing price divergence when the interconnection is insufficient.

The **annex 3** of this document provides several simplified examples which illustrate the functioning of an Iberian wholesale market with implicit capacity allocation, to have a clear understanding of the concept of gas trading with implicit allocation of capacity in gas markets.

In the examples, it can be seen that the model does not require the removal of the entry – exit tariffs at the interconnection, while the previous models do.

3.3.1. Implicit allocation of interconnection capacity at EU regulation

The implicit auctions are envisaged as one of the possible mechanisms for short term allocations of the interconnection capacity, according to article 12 of Regulation (EC) Nº 715/2009:

Article 12 Regional cooperation of transmission system operators

2. Transmission system operators shall promote operational arrangements in order to ensure the optimum management of the network and shall promote the development of energy exchanges, the coordinated allocation of cross-border capacity through non-discriminatory market-based solutions, paying due attention to the specific merits of ***implicit auctions for short-term allocations*** *and the integration of balancing mechanisms.*

The implicit auction requires to allow the TSOs to deliver some of the interconnection capacity by using the implicit mechanism, instead of selling the capacity into the market though explicit auctions.

The CAM network code set out a fully harmonized auction design for the interconnection of capacity, but his design does not aim to prevent Transmission System Operators from implementing implicit auctions. According to article 2.4 of the CAM Network Code, where implicit allocation methods are applied, National Regulatory Authorities may decide not to apply Articles 8 to 27 of CAM Network Code, so the allocation of interconnection capacity can be also done through implicit auctions mechanisms.

According to Gas Target Model document, a market platform whereby shippers can submit bids and offers for gas trades and capacity is implicitly allocated to these trades may be a more efficient alternative than the explicit auctions:

"Explicit auctions are more efficient than current first-come-first-served arrangements and require shippers to coordinate buying network capacity with gas in order to trade across borders, which may be challenging in short timescales. Therefore, a platform (whether it is operated by TSOs or third parties such as exchanges or hub operators) whereby shippers can submit bids and offers for cross-border gas trades and capacity is implicitly allocated to these trades may be a more efficient alternative. Under implicit allocation, market participants submit bids and offers onto the platform to buy and sell gas on two (or more) entry-exit zones. The platform collates all bids and offers into a single "bid-offer ladder", TSOs provide details on the available interconnection capacity between the entry-exit zones and those bids and offers with the greatest price spread will be accepted until the capacity is fully used or wholesale gas prices converge. As gas is traded on a continuous basis an approach to implicit allocation, which is appropriate for the gas market, has to be ensured. As such, it may be preferable for the implicit capacity allocation to be a continuous process or to be repeated several times during the gas day to facilitate shippers and traders within-day gas trading rather than on a purely day-ahead basis."

3.3.2. Advantages and drawbacks of the implicit allocation model.

One of the main problems in the European gas market model is the co-ordination problem related with cross-border capacity. With the implicit allocation model one of the main problems is solved and turn into the main benefit.

Under an explicit auction mechanism, the trading of capacity and the commodity does not take place at the same time. If there is no implicit allocation, in one hand, a trader could operate as a *"short"* on cross-border capacity that is means for example buying gas in one side and sell in the other side before obtaining the cross border capacity and in the other hand a trader could operate as a "*long" on capacity border*, obtaining the cross border capacity before any trade operation that needs the allocation of capacity.

The problem of the capacity is solved by implicit allocation model. Operations of gas trade and allocation capacity are assigned simultaneously via the exchange or capacity allocation platform, meaning than the cross-border capacity would be available for all market users. This would result in higher level of cross-border trade and therefore increase the liquidity of the market, so gas prices would better reflect actual supply and demand conditions and result in more efficient decisions regarding resource use. A more liquid gas hub could promote competition in the retail market, by making it easier for entrants to procure gas.

One can conclude that there are potential benefits from the introduction of implicit allocation of cross-border capacity. Moreover, an improved allocation mechanism which leads to further price alignment could still have benefits in terms of improving price signals and resource allocation relative to other capacity allocation mechanisms, including explicit auctions.

As recently indicated by CEER:

"The main benefits of an implicit capacity allocation are that it optimizes flows and capacity usage on cross-border connections and increases liquidity in gas trading. By matching capacity against the trades with the greatest value, the platform ensures that the gas flows to where it is valued most whilst taking into account network constraints. Essentially, it allows for the cross-border trades between the two markets to be optimized, such that there is greater price convergence when there is sufficient physical interconnection capacity between the two markets but for prices to diverge when the interconnection is insufficient. It is a "dynamic" approach, integrating gas markets and ensuring the efficient use of available capacity."[4]

Risk of holding the cross-border capacity

Using the Implicit allocation mechanism it is possible to allocate the cross-border capacity at the same time of the acceptance of bids and offers. The

[4] Draft Vision for a European Gas Target Model, A CEER Public Consultation Paper Ref: C11-GWG-77-03 5 July 2011, p.17.

implicit value of border capacity at that moment is given by the difference between the buying price on one side of the border and the selling price on the other side.

- Under an explicit auction TSO tries to sell the capacity before this would have been used, though
- Implicit allocation mechanism waits until capacity is used for a trade, therefore it would be possible for a trader to execute profitable cross-border trades only as opportunities arise.

<u>Benefits of increasing market liquidity</u>

The implicit allocation model can increase liquidity, allowing matching bids and offers among traders between the two markets connected. As an example, GRTgaz have found that their implicit allocation project had increased the volume of trading in the PEG Sud zone. The system automatically generates offers for PEG Sud based on the more liquid PEG Nord zone and the price of inter-zone transportation.

There are clear benefits of the increment of liquidity:

- Reflect <u>actual supply and demand conditions</u>, that plays an important role regarding the generation of electricity from gas because it will be clearer what kind of resource to use. However without a liquid market, the price will not reflect the actual value at any point of time.
- Will promote <u>more competition</u> on the retail markets, this competition seeking to increase their market share must have the possibility to purchase the gas they require.
- Will guarantee a <u>lower entry barrier:</u> new entrants can secure access to gas at wholesale level. In the absent of a liquid gas hub, marketers would need to source all of their gas via a bilateral agreements with a supplier.
- <u>Enable some cross-border capacity to all market participants</u>, either via exchange or capacity allocation platform, facilitating cross-border trading by selling in one zone and buying in another zone.

3.3.3. Application of the implicit allocation of capacity to the Iberian Market.

The implementation of a Market Area Model or a Trading Region Model requires the absence of gas transport limitations between Spain and Portugal, enabling shippers to avoid interconnection capacity booking (there is no transport tariff in between).

The first two models analyzed (the trading region model and the market area model) require a great effort on harmonization on the national legislations of

Spain and Portugal. The implicit allocation model doesn't require a high level on harmonization of national legislations, so the implementation can be faster.

By contrast, the model of market with implicit allocation of capacity is also applicable to the integration of markets with limited interconnection capacity.

At least a certain amount of interconnection capacity needs to be reserved for implicit allocation. If the market gains liquidity, a higher share can be assigned by this mechanism in other to allow market coupling.

Also, the implicit allocation model does not require removing the entry – exit tariffs at the Spain – Portugal interconnection, but an alignment of cross-border tariffs and balancing regimes is also highly desirable.

The implicit allocation will directly promote market liquidity on the Iberian gas market, as the focus is oriented, from the beginning, to the creation on a common gas hub.

Main conclusions about the Implicit Allocation Model:

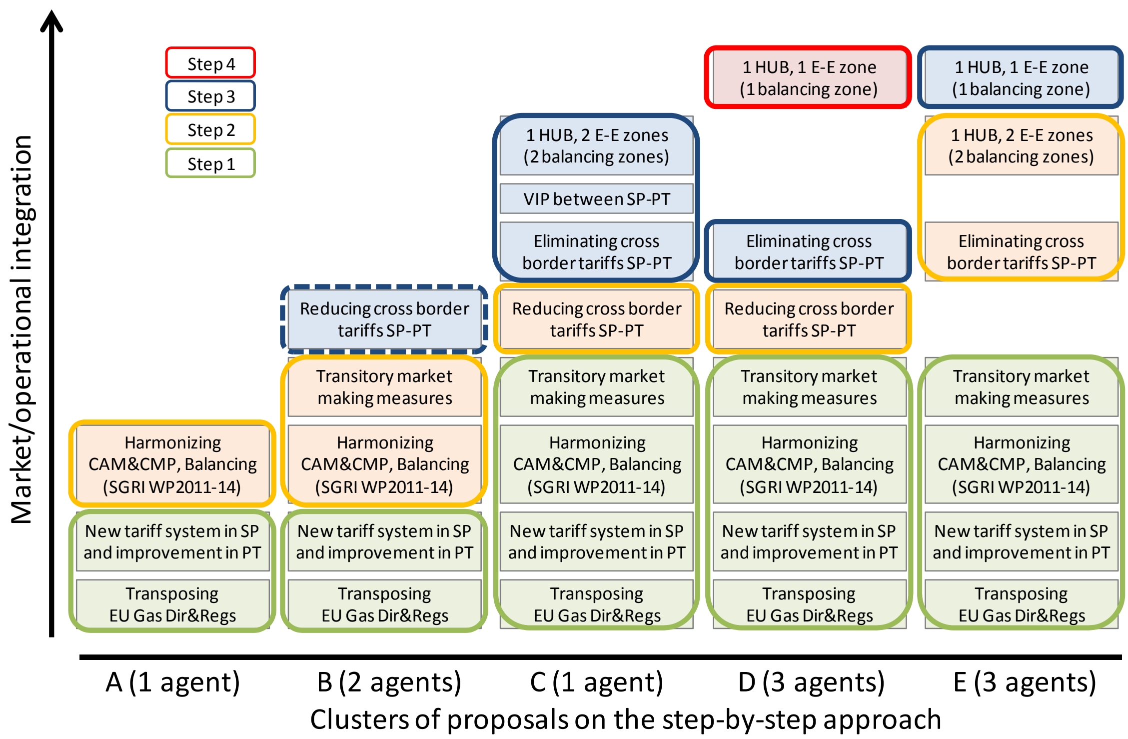
- This model can be applied also with limited interconnection capacity (the markets will decouple when the interconnection capacity is fully used).
- The implicit allocation model does not require a high level on harmonization of national legislations, so the implementation can be faster.
- The implicit allocation will directly promote market liquidity on the Iberian gas market, as the focus is oriented, from the beginning, to the creation on a common gas hub.

4. Public consultation on integration models for the Iberian Gas Market

4.1. Stakeholder expectations from Iberian gas market integration and progress report

In the framework of the South Gas Regional Initiative, CNMC (previously CNE) and ERSE conducted a joint public consultation on cross border tariffs of gas interconnections between Spain and Portugal. This public consultation took place during 2012 and its results were presented in September 2012.

The figure below was included in the summary of comments[5] to the public consultation and reviews the stakeholders' views.



Note: For strategy B the dashed line means that the stakeholder's proposal mentions that such a step must be taken carefully in order to avoid cross subsidies between transmission systems.

Figure 4. Summary of proposed strategies for a step-by-step approach to market integration

The public consultation revealed a large consensus among the stakeholders around a gradual step-by-step implementation of the Iberian market, towards an integrated wholesale market. This integration should, no doubt, be built on the

[5] This document can be found at CNMC and ERSE's webpages (link).

grounds of the 3rd Energy Package and on the network codes for the internal energy market.

The transposition of the 3rd Package already took place in Spain and Portugal and its implementation is under way. The network codes are being developed under ACER coordination and the first network code has been published on October 15th, 2013 (Network Code on Capacity Allocation Mechanisms in Gas Transmission Systems – NC CAM). The South GRI is now fully committed to the early implementation of this network code across the region.

In the 2012 public consultation, stakeholders broadly agreed in this basic set of integration and harmonization priorities. There was also a consensus on the harmonization process should be made towards a European model envisaging the future integration of the Iberian market in the rest of European market. These kind of concrete steps are worth mentioning outlined the regulatory harmonization fostered in the South Gas Region. The NC CAM early implementation resulted, by March 2014, in using a common platform (PRISMA) to allocate capacity in virtual interconnection points of the region, complying with the NC both in terms of the allocation algorithm the calendar and the standard capacity products. Congestion Management Procedures are also being harmonized within the framework of Regulation (EC) 715/2009.

It is worth referring the regulatory reviews on access rules (capacity products, allocation procedures, etc.) done in Portugal[6] and in Spain and on transmission tariff methodologies (still ongoing in Spain). This process of unilateral rule changing is bringing results towards regulatory harmonization of the two national systems, which stakeholders can easily verify.

In order to make accessible and comparable the developments of the topics covered in the previous public consultation with the current one, the following table presents a progress report of the main issues about the implementation of MIBGAS identified by stakeholders in the previous public consultation. The progress presented has happened since 2012.

Licensing procedures	This subject was planned on the priorities of S-GRI Work Plan 2011-14. In the present Portuguese law, Decree-Law nº 231/2012, it is established that recognition of supplier by one country determines the automatic recognition by the other. In Spain, Pursuant to Law 25/2009 of 22 December, companies wishing to sell natural gas must only inform the pertinent authority, in all cases, the Ministry of Industry, Energy and Tourism. . A responsibility statement of on compliance with regulatory requirements must also be submitted.
Transposition of the	Portugal has made the transposition of the European rules, the 3rd

[6] ERSE has done a review of the gas codes (April 2013) and the definition of new access rules and implementation of the capacity allocation platform by September 2013.

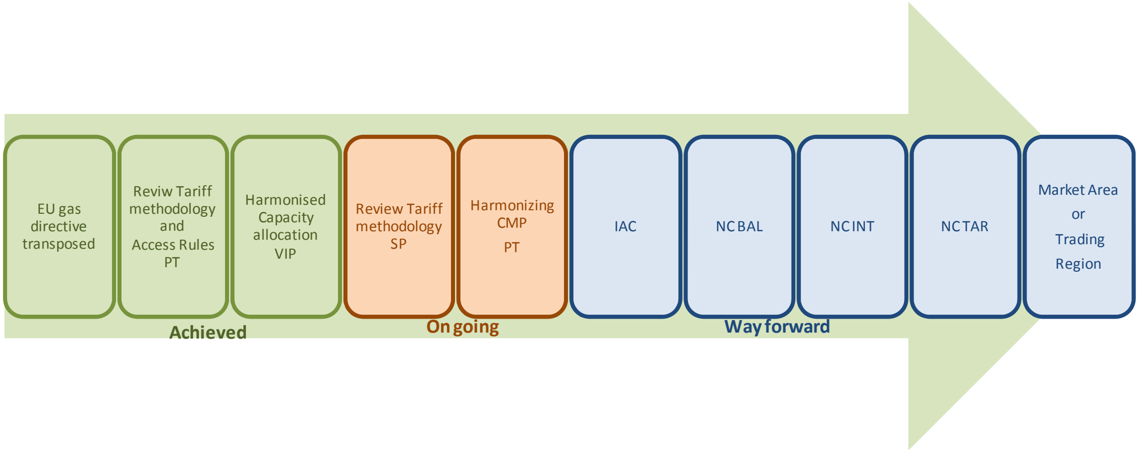
3rd package	energy package, through Decree-Law nº 230/2012 and D.L. nº 231/2012. Spain has made the transposition of the European rules, the 3rd energy package, through the Royal Decree-Law 13/2012
Capacity allocation procedures	Until October 2013 there was no capacity booking for the Portuguese gas system, which was identified as an issue pending harmonization. Since this date, with new regulations in Portugal, capacity booking was implemented for the high pressure infrastructures, with capacity products compatible with the ones in CAM NC for interconnections. This capacity booking is made through the allocation of capacity rights to shippers, who then have to pay for these rights, independently from its use, aligned with the provisions established in the NC CAM.
Secondary market	Since 2013, Portugal has implemented a secondary capacity market platform for capacity booked in national infrastructures. Since 2010, Spain has implemented a Bulletin Board of secondary capacity market platform for capacity booked in national infrastructures
Harmonized gas year	For the PT-SP interconnection the common mechanism for capacity allocation implemented since October 2012 established a common gas year for this interconnection, consistent with the CAM NC (from October to September). From October 2014, with the regional capacity allocation procedure (through PRISMA platform), also the interconnection SP-FR is allocated with the gas year of CAM NC. Additionally, in Portugal, Regulation nº 139-C/2013 which approves Regulation of Access to network, infrastructures and interconnections and its Procedure Manual approved by Directive nº 15/2013 set the same gas year for capacity allocation in the other infrastructures of the gas system.
Capacity Allocation at interconnection points	From October 2014, all available capacity at interconnections will be allocated through virtual interconnection points, between Portugal and Spain and between Spain and France, in accordance with the yearly implementation of CAM NC in the South Gas Region. The capacity allocation mechanisms were approved by ERSE Directive 8/2014, of 3 of April and Decision 1/2014, of 3 of April. European regulations have been transposed in Spain by the National Commission on Markets and Competition, in **Circular 1/2014**, of 12 of February, establishing capacity allocation mechanisms to be applied at international connections by pipeline with Europe, by Resolution of the CNMC of 20 of February of 2014 about standard contract for entry-exit capacities in Spanish-France Interconnection" and **Circular 1/2013**, of 18 December, establishing congestion management mechanisms to be applied

	at international connections by pipeline with Europe. As from 2014 capacity will be allocated through market mechanisms, with auctions that are conducted in accordance with a specific timetable and simultaneously on all interconnections of the European Union.
Capacity booking through an IT platform	The NRA of Spain and Portugal, as well the TSO of both countries, have decided to use the same IT platform, known as PRISMA, and harmonized arrangements for the capacity booking in the interconnection points.
Improvements in the tariff systems	Spain has held a public consultation to establish new rules for tariff calculation methodology, avoiding cross-subsidies, with an additive tariff methodology. Portugal has anticipated some of the provisions established in the tariffs Framework guideline, establishing payment rules according to booked capacity rights and introducing multipliers for the products foreseen in the CAM NC. Regarding the domestic tariffs new flexible tariff options were approved.
Cross border tariffs	In 2012 Portugal has set to 0 Euro/(MWh/day) the exit price (towards Spain) in cross border tariff, because the flows from Portugal to Spain are backhaul flows. Spain has reduced the exit price (towards Portugal) in the cross border tariffs.
Harmonized CAM NC and CMP	As referred before, Portugal and Spain have the national regulation in accordance with CAM NC, at interconnections points. The complete implementation of the CAM Network Code is scheduled for November 2015 (with the allocation of daily and intra-day capacity products). The implementation of CMP is ongoing, being foreseen the approval of the final rules for Portugal during 2014. Spain has already adopted CMP rules according to Reg. 715/2009.

4.2. Way Forward

In 2012 stakeholders suggested implementing changes in both systems which favor harmonization and market development. From the comments received, stakeholders support the adoption of transitory measures, both on the regulatory side and on the operational side that can produce results in the short term. These measures shall recognize the longer term objectives and act on concrete problems, in a coordinated way. The Implicit Auction Model could fit this goal as well as some of the harmonization tasks being conducted in the South GRI. Furthermore, the majority of stakeholders stated the will to go forward with the merger of entry-exit zones and even balancing regime.

In the following picture it can be seen the milestones we have achieved and the way forward. Even if we are now some steps further towards harmonization than we were in 2012, many of stakeholders' views and expectations expressed in the public consultation are still valid to be implemented in the Iberian gas market.



Legend: VIP (Virtual Interconnection Point); CMP (Congestion Management Procedures); IAC (Implicit Allocation Capacity); NC BAL (Network Code on Balancing); NC INT (Network Code on Interoperability and Data Exchange Rules); NC TAR (Network Code on rules regarding harmonised transmission tariff structures for gas).

Figure 5. Milestones achieved and way forward

The South GRI is now fully committed to the early implementation of the network codes across the region. The way forward cannot ignore the network codes which are being developed and which enter into force in 2015.

Besides the NC on CAM already mentioned, NC on Balancing was published the 26th of March 2014. The way forward cannot ignore the provisions established on this code, which will enter into force on the 1st October 2015. In the absence of sufficient liquidity of the short term wholesale gas market TSOs will have, as a maximum, an interim period of 5 years to comply with the NC, but suitable interim measures shall be implemented. If the transmission system operator foresees that implementing interim measures is necessary, it has to prepare a yearly report with a roadmap (subject to a public consultation and NRA approval).

The NC on Interoperability is on Comitology process. Interoperability issues like nomination and renomination schedules, gas day, and standard gas temperature for measurement or energy are also being addressed in the South Gas Regional Initiative context.

Regarding the NC on transmission tariffs, ACER submitted the FG to the EC in December 2013. ENTSOG is now developing the NC which will have to be sent to ACER before 31st December 2014. Portugal has anticipated already most of the provisions foreseen in the FG and Spain is also doing it on its regulatory review ongoing. However some actions still need to be taken.

The implementation of the NC will lead us necessarily to a more integrated market, but it is important to access which will be the best model for Iberia, a Market Area or a Trading Region Model.

Meanwhile, a cross border gas exchange platform with implicit allocation of capacity can be discussed as an interim step for the aimed Iberian market integration with a common hub.

4.3. Questions to Stakeholders

CNMC and ERSE seek comments from stakeholders on the way forward with the goal of setting a common Iberian Natural Gas Market. This consultation must take into account the South Gas Regional Initiative Work Plan for 2011-2014 and all the developments that have been achieved since the beginning of the South Gas Regional Initiative.

Stakeholders are asked to have in mind the need for short term concrete positive developments in the market integration of the wholesale gas markets of Portugal and Spain and the longer term, and also the necessary steps to reach those goals, taking into account the current regulatory framework in both countries.

Question 1: Would you agree with the analysis made on current market situation and on the major issues affecting the creation of an Iberian market?

Question 2: Do you agree with the implementation of the wholesale market with implicit allocation of capacity as a step for market integration, but aiming for an even more integrated market in the longer term?

Question 3: What are the most important aspects to take into account and to harmonize from a regulatory point of view for the creation of the wholesale market with implicit allocation?

Question 4: Which is the best model for the integration of Iberia in the longer term? Market area model, trading region or others?

Question 5: When and how the Balancing Network Code and the Interoperability Network Code should be implemented to contribute to the goal of the Iberian market?

Question 6: Identify any issue you think is important to achieve Further integration. How would you set the timing and prioritization for the discussion/implementation on these issues?

All interested parties are invited to provide comments to the consultation paper by 15th September 2014, to mibgas@cnmc.es and mibgas_models@erse.pt. All comments received will subsequently be published on the Agency’s website.

Annex 1. Experiences in gas market integration

As referred on KEMA study, before July 2013 trading regions and market coupling have not been applied in the European gas markets, or only as pilot projects, and their actual ability to integrate markets had not been tested[7]. However, it´s implementation was being considered by several Member States and in October 2013 the Cross-border Operating Strongly Integrated Market Area (COSIMA) has been implemented.

We present briefly three experiences of market gas integration: (i) a pilot project executed by Eustream (from Slovakia), Net4Gas (from Czech Republic) and E-Control (from Austria) to develop a conceptual model and its basic principles for a CEE Trading Region (CEETR); (ii) The integration of balancing zones in France; and (iii) the COSIMA market model.

CEETR Project

One of the pilot projects defined in the Work Program of the Gas Regional Initiative for the South-South East European region was the development of a conceptual model and its basic principles for a CEE Trading Region (CEETR), which involved Eustream (from Slovakia), Net4Gas (from Czech Republic) and E-Control (from Austria) CEETR, that took place in spring / summer 2012.

E-Bridge Consulting developed a study on cross-border market integration, which presents a macroeconomic analysis for CEE Trading Region[8].

In the E-Bridge study one of the main findings concerning capacity utilization at European interconnections points in 2011 is that the capacity utilization is different across Europe. Three European regions may be distinguished: the North-West European region, which has significant excess capacities compared to 2011 utilization, the South-West European region, where cross-border capacities between France and Spain were highly used and the Central-East European region around Austria, which is relatively high loaded, but still significant capacities are available at many interconnection points.

A second part of the E-Bridge report is devoted to the assessment of the potential economic benefits resulting from cross-border market integration. As a result of estimated economic benefits analysis, we highlight the following main results:

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[7] Kema Study on Entry-Exit Regimes in Gas – Part B: Entry-Exit Area Integration, July 19/2013.
[8] Available at http://www.acer.europa.eu/Gas/Regional_%20Intiatives/South_South-East_GRI/Documents/Final%20Report_2_cross-border_integration_part_I_and_II_20120918.pdf.

- The market integration of Austria and the Slovak Republic, as well Slovak Republic and the Czech Republic would generate additional economic benefits, because it´s possible to increase and improve the utilization of free physical capacity on the interconnectors.
- As qualitative benefit is referred the increase of competing parties, because it would enhance the pressure on competitive prices. Stable prices would increase transparency and create a more robust and reliable basis for trade at the exchanges as well as for the OTC trade. Despite the fact that the number of independent producers would hardly increase, this region may become a major hub due to its significant amount of transits.
- The expected social welfare gain in the region is estimated to amount to more than € 15 million. Although the social welfare gain is only moderate, a single market appears to be promising. For this conclusion important prerequisites for a well-functioning common market are given. Past price differences have been moderate while cross-border capacities are sufficient. Furthermore, all three markets have a large share of transit gas, which depending on the market design might considerably increase the liquidity in the region, and all three markets are of a similar size, which reduces the risk of spillovers of market imperfections through trade liberalization.

On ACER web page it can be found a summary of the main achievements, according the stakeholders, in the course of the project[9]. Bellow we present the main design principles and architecture developed for this trading market.

CEE Trading Region would be a supranational gas market involving the three countries referred above. The basic structure includes one Trading Region, one Virtual Trading Point and three End User Balancing Zones, one per participating country.

For the Trading Region is foreseen the following design principles:

- Includes gas transmission systems of all three participating countries.
- Network access to the Trading Region is organized as an integrated entry/exit network spanning all three participating countries.
- Within the Trading Region, national borders are irrelevant for shippers (and respective interconnection points need not be booked by shippers anymore).
- The Trading Region is a single, integrated balancing zone.

[9] http://www.acer.europa.eu/Gas/Regional_%20Intiatives/South_South-East_GRI/Documents/CEETR%20Basic%20Model,%20Part%20I%20-%20Principles%20of%20the%20CEE%20Trading%20Region,%20121105_.pdf

- The Trading Region enables a single wholesale market including three EU member states.

The Virtual Trading Point is located in the Trading Region. The Virtual Trading Point is the only point within CEETR, where a handover of gas between shippers can be accomplished, and is also the delivery point for any hub services and gas exchanges operating within CEETR.

Concerning the End User Balancing Zones, each End User Balancing Zone includes all gas distribution systems of one participating country[10], and all end users of a member state, i.e. even those, which are physically connected to a gas transmission system. Each End User Balancing Zone is a separate balancing zone. Shippers can move gas from the balancing system of the Trading Region to a specific End User Balancing Zone by nominating the desired transfer quantity. The access to each End User Balancing Zone[11] and to storage facilities[12] shall be commercially enabled at the Virtual Trading Point.

Concerning entry/exit capacities there are foreseen three types:

- freely allocable capacity;
- dynamically allocable capacity; and
- interruptible capacity.

Freely allocable capacity allows network usage on a firm basis from the booked entry point to the Virtual Trading Point of the Trading Region (and vice versa for exit points). Dynamically allocable capacity allows network use on a firm basis from the booked entry point to one or more defined exit points of the Trading Region (and vice versa for exit points). Additionally, access to the Virtual Trading Point is granted on an interruptible basis (i.e. access is only granted if the total flow pattern in the network allows for it). Interruptible capacity allows network usage on a purely interruptible basis only (i.e. depending on the use of the point in question by shippers using the two other types of capacity).

The capacity model of the Trading Region has two steps:

- Entry/exit networks per participating country are designed such that physical bottlenecks are managed (i.e. considered in the network

[10] This is with the exception of Austria, where only the distribution networks of market area east are included (since the two other market areas, namely Vorarl-berg and Tirol, share no physical connection with any other gas network within CEETR).

[11] This is achieved by a designated entity per End User Balancing Zone booking the required interconnection capacities between gas transmission and gas distribution systems (and allocating the respective cost on distribution system exits). Where the TSO is in charge of physically balancing the End User Balancing Zone, a separate booking process is not required; instead a downstream cost allocation is sufficient.

[12] This is achieved by the respective storage system operator booking the required capacities between his facility's interconnection point with the gas network and the Virtual Trading Point (and allocating the respective cost to storage users).

model) on exits and freely allocable capacity is maximized under this constraint.

– Any physical bottlenecks becoming unlocked upon joining the national network models to one integrated network model for the entire Trading Region are managed on the entries of the respective upstream network (while maximizing the entry capacity made available to the market under this constraint).

To increase the amount of freely allocable capacity on their network TSOs may, subject to European and national regulation and on their own account and financed in case of additional cost incurred, use operational flow commitments; and/or oversubscription and buy-back schemes[13]; and/or investment (as a long-term measure).

In the course of the CEETR project, a monetary simulation of how following principles operate in practice and what their outcome would be was not performed, that´s why it is referred that such simulation may lead to additional insights potentially requiring additional CEETR tariff principles.

The tariff design principles only refer to the gas transmission systems. However CEETR has to deal with the fact that – after realization of CEETR – all international border points between CEETR countries cannot be booked by shippers anymore, potentially leading to a loss of tariff income by TSOs within CEETR. For avoiding any CEETR-induced loss of tariff income by any TSO operating within CEETR, the following mechanisms are used:

1. Allocation of **lost entry income** to the points on the same network: a) the remaining bookable points and b) downstream interconnection points with other TSOs operating within CEETR (to be paid by means of Inter-TSO Compensation)
2. Compensation **of lost exit income** by Inter-TSO Compensation; and a reasonably moderate increase of tariffs at bookable entry points on the network of the TSO losing the exit income.
3. Any **losses in tariff income** from current long-term transport contracts not recovered through the above measures shall still be payable by the current long-term transport customers until the end of their respective contract's term.

In the context of CEETR Inter-TSO Compensation means that downstream TSOs at intra-CEETR border points book capacity with their respective upstream TSO to the extent required for accommodating peak flow from the upstream network. The booked capacity is paid for according to the tariff

[13] Not applicable to interconnection point End User Balancing Zones

foreseen by the upstream TSO's national regulation. The respective cost incurred by the downstream TSO is recognized in its cost base and subsequently allocated to the bookable points on its network and border exits to other CEETR countries.

Balancing in the Trading Region operates according the following main principles:

- Every TSO operating within CEETR offers balancing contracts (so called "General Balancing Contracts" establishing a "General Balancing Account") covering the entire Trading Region and shippers may choose among them at will and ex-ante (i.e. based on nominated values) on an hourly basis. All General Balancing Accounts – no matter with which TSO the respective General Balancing Contract is concluded – include the Virtual Trading Point of the Trading Region, enabling the nominated exchange of gas between all shippers.
- All gas flows relevant for balancing in the Trading Region are based on nominations, which are allocated as nominated and include nominated exits to the End User Balancing Zones.
- The required system energy is bought/sold for each shipper on the gas exchange operating on CEETR's Virtual Trading Point.

Additionally, for all bookable points on the gas transmission networks, a supplementary system of point-specific balancing accounts is implemented. Under this system shippers are obliged to balance in-kind and ex-post any surplus or missing gas resulting from a discrepancy between (confirmed) nomination and allocation on a network point. Such discrepancies may arise for instance from the lack of an operator balancing account the (short-notice) interruption of interruptible capacity. Point balancing accounts are used only for balancing imbalances which are unavoidable by shippers.

In respect to balancing CEETR includes two principles systems, the balancing system of the Trading Region and the balancing system of each of the End User Balancing Zones. Balancing in the End User Balancing Zones is performed according to the respective national rules for end user balancing. The Balancing accounts in the End User Balancing Zones shall also include the Virtual Trading Point. And the System energy for the End User Balancing Zones shall be managed (in addition to any sources of physical flexibility available to the entity in charge of physically balancing an End User Balancing Zone) by using the gas exchange on the Virtual Trading Point of the Trading Region.

According to KEMA study, the project is envisaged to enter into a second phase for the development of an implementation model, after which a final decision regarding the actual implementation of the CEETR can be made.

THE FRENCH MARKET

In January 2003 the French market had eight balancing zones and in January 2005 five balancing zones. The French market now has three balancing zones. On 1 January 2009, the merging of the three West, North and East zones of GRTgaz into one big zone called GRTgaz North simplified market access and improved players' ability to choose between various gas sources. This merger brought the PEG North an increased level of liquidity.

The French gas market currently includes three marketplaces, called Gas Transfer Points (PEG): the North and South PEGs (respectively called "North" and South" PEGs below) on the GRTgaz network and the TIGF PEG. It was verified that while the PEG North enjoys an adequate level of liquidity and competition in the wholesale and retail market, the GRTgaz South and TIGF PEGs remain with lack of liquidity. The structuring of the French market into several marketplaces is linked to the existence of physical congestion in the gas transmission networks. Thus, significant investments were made by GRTgaz to create the North Zone. There were also significant investments made by GRTgaz and TIGF in order to develop and to restrain eventual constraints in the interconnections with Spain. The investments removed the congestion between their networks. However, significant physical constraints still exist between the North and South zones of GRTgaz. These constraints sometimes lead to significantly higher prices in the south of France in comparison to the north. This was what happened in 2012, where significant price differential was found between the North zone of GRTgaz and the South zones of GRTgaz and TIGF.

The French Energy Regulation Commission (CRE) in 2012 had set temporary measures to improve the operation of the gas market in the south of France and shad set the goal of a single marketplace in France in 2018. CRE believes that French wholesale gas market can operate in an optimal way, thereby allowing the disappearance of spreads and contributing to the development of an effective retail market for the benefit of end-consumers.

For this purpose, several studies have been conducted over the past few years concerning:

- The creation of a common South-TIGF PEG: a study conducted jointly in 2009 and 2010 by GRTgaz and TIGF concluded that there was no structural congestion between the two networks;
- The creation of a single GRTgaz PEG: a study conducted during the second half of 2011 by the KEMA[14] consultant dealt with the possibility of a merger of the GRTgaz North and South zones by market based mechanisms.

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[14] Study on the Merger of the Market Areas GRTgaz Nord and Sud - Final Report (February – 2012).

Based on those works, CRE organised two workshops at the start of 2012, bringing together the stakeholders. Most contributors wish this consolidation to lead to the ultimately creation of a unique France wide PEG. As a result of the consultation, CRE has confirmed its will to seek the consolidation of the marketplaces as soon as possible, aiming at the creation, in the long term, of a unique France PEG by 2018 and an intermediate step of merging the GRTgaz South and TIGF PEGs on 1 April 2015.

Creating a single marketplace in 2018 will require additional investment, in addition to that already set aside but it will significantly reduce physical congestion between the north and south of its network. This investment will be complemented by market mechanisms, to provide gas at certain points of the network, in order to reduce the residual congestion.

In 18 February 2014 CRE launched a Public consultation related to the creation of a unique marketplace in France in 2018. This consultation aims to collect the opinions of stakeholders on the launch of an investment program by gas TSOs', GRTgaz and TIGF, in order to remove bottlenecks between the North and South zones of the French gas market and create a single marketplace by 2018.

COSIMA

The gas market model “Cross-border Operating Strongly Integrated Market Area” (COSIMA) has been designed to enable a stronger link between the Tyrol and Vorarlberg market areas, located in Austria, and the market area Net Connect Germany (NCG). The COSIMA successfully started on 1st October 2013.

As the Austrian market areas are quite small compared to NCG it was quite a specific case of market integration. In essence, it was abolished capacity bookings (for shippers) at the cross-border IPs and the Austrian system operators were obliged to book the exit capacity with the German TSOs. The costs for this capacity are then treated in the same way as original costs on Austrian side and are included in the tariff setting process.

COSIMA means, for shippers, unobstructed links between the Austrian market areas of Tyrol and Vorarlberg and the German NCG market area. This was obtained by eliminating the need for shippers to book cross-border capacity: any and all capacity that is needed to supply consumers in Tyrol and Vorarlberg is booked by the Austrian distribution area manager (DAM). It is not necessary to allocate the capacity to individual balance groups in Germany and Austria. The costs for this capacity are then treated in the same way as original costs on Austrian side and are included in the grid tariff setting process.

COSIMA has been designed to be operational without causing the need for excessive changes to the neighbouring market areas' existing rules. This has been largely achieved by charging the DAM of the Tyrol and Vorarlberg market areas with the role of "designated system operator / translator" between the regulatory frameworks of the market areas involved.

From a balancing point of view, there are separate balancing regimes in Austria and Germany. So there is not yet a cross-border integration of balancing zones. For market players, acting within COSIMA simply means that they have to have corresponding balance groups in the relevant market areas, either by designating existing balance groups or by establishing new ones. The Austrian market model requires all balance groups in Tyrol and Vorarlberg to have one corresponding balance group in the NCG market area each, to enable gas handover.

Regarding shipper communication Gas is transported to Tyrol and Vorarlberg by way of nominations at the virtual trading point in the NCG market area (NGC VTP). The DAM receives the gas at the NCG VTP and organizes shipping into the two Austrian market areas. Sticking to the "allocated as nominated" principle, gas that is handed over at the NCG VTP is considered to have been delivered into the respective downstream market area. Apart from this, German balance groups can handle transports into Tyrol and Vorarlberg in the same way as any other transports. Gas received from the German balance groups at the NCG VTP is allocated to the corresponding Austrian groups. The latter's consumer schedules (or schedules for other kinds of injection and withdrawal in the Austrian market areas) are netted and compared to the gas volumes handed over by the corresponding German balance groups at the NCG VTP. In accordance with the Austrian market rules, the rules for financial settlement of balancing energy apply to these gas volumes. The financial flows are handled by the clearing and settlement agent, the balancing group coordinator.

There was a 45% increase in registered market participants (from 11 to 16) at 1st October 2013.

Annex 2. Actual situation of the Iberian Gas Market

4.4. Iberian infrastructures

In order to evaluate the integration of the Spanish and Portuguese natural gas markets in a common Iberian natural gas hub, it is relevant to characterize the present available infrastructures, regarding import capacity, market supply capacity and storage capacity.

With this objective in mind, the Iberian Peninsula has a total of 3.236 GWh/day import capacity. This capacity is detailed in the next table.

2012		Capacity GWh/day
PT	LNG terminal	213
	Underground Storage extraction	86
	Total	**299**
SP	LNG Terminal	1978
	Underground Storage extraction	152
	International pipeline	807
	Total	**2 937**
Total	LNG terminals	2 191
	International pipelines	238
	Storage extractions	807
Total		3 236

Table 1. Iberian Peninsula natural gas infrastructures capacity in 2012. Source: ERSE and CNMC

Regarding the storage capacity, the Iberian Peninsula has a total of 57741 GWh, considering all storage available both from the underground storages and LNG Terminals storage infrastructures.

2012		Storage GWh
PT	LNG terminal	2 843
	Underground storage	2 616
	Linepack	280
	Total	**5 739**
SP	LNG Terminal	22 239
	Underground Storage	28 956
	Linepack	807
	Total	**52 002**
Total		**57 741**

Table 2. Iberian Peninsula natural gas storage capacity in 2012. Source: ERSE and CNMC

In 2012, the maximum daily demand in Portugal was 218 GWh/day and in Spain of 1.643 GWh/day. The total Iberian demand represents 57%of the total available injection capacity into the grid.

Maximun daily demand 2012	Date	GWh/day
Portugal	31 - jan-2012	218
Spain	9-feb-2012	1.643
Total		**1.861**

Table 3. Maximum daily demand in Portugal and Spain, in 2012. Source: ERSE and CNMC

The next table characterizes the relation between the maximum available capacities and the total demand in the Iberian Peninsula, in 2012.

2012	GWh/day	
Maximum demand	**1 861**	100%
LNG terminals	2 191	118%
Storage extractions	238	13%
International pipelines	807	43%
Total	**3 236**	174%

Table 4. Iberian Peninsula capacities and its ratio with the maximum daily demand, in 2012. Source: ERSE and CNMC

It is important to characterize also the existing cross border interconnections between Spain and Portugal. Portugal and Spain have two cross border interconnections points, located at Campo Maior/Badajoz and Valença do Minho/Tuy. The maximum available capacities at the interconnection virtual point are presented, for winter and summer periods, in the following table,

Interconnection virtual point		
SP->PT	164	174
PT->SP	60	95

Table 5. Interconnections between Portugal and Spain at the interconnection virtual point, in 2012. Source: ERSE and CNMC

4.1.1. Campo Maior/Badajoz interconnection

The figure below shows the evolution of the total natural gas imports from Spain at Campo Maior interconnection, since 2010 to 2012. In 2012 the average utilization was of 28%.

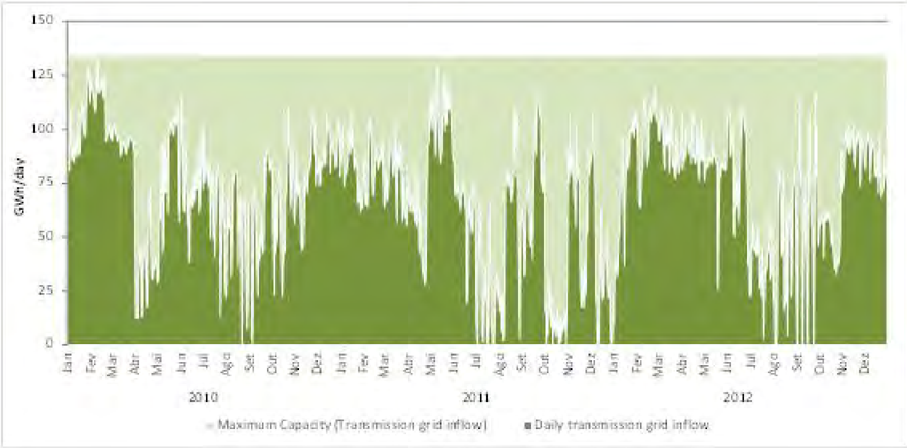


Figure 6. Campo Maior/Badajoz interconnection daily injection capacity. Source: ERSE

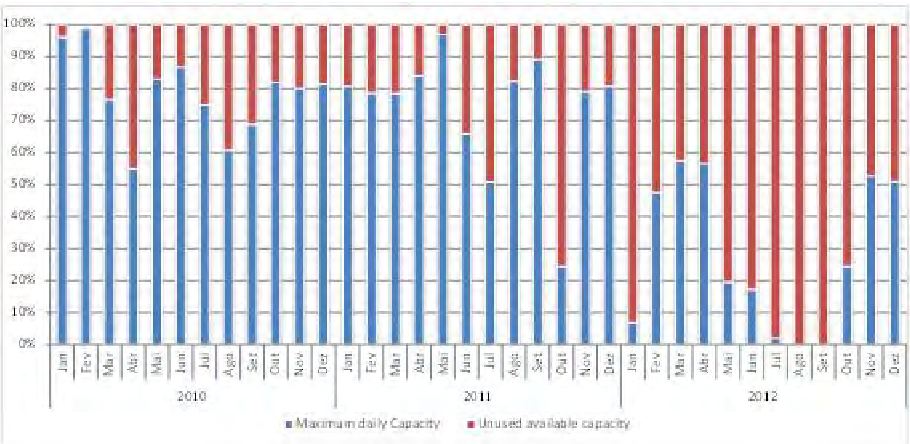


Figure 7. Utilization of Campo Maior/Badajoz interconnection monthly capacity. Source: ERSE

4.1.2. Valença do Minho/Tuy interconnection

The daily inflow/outflow into the transmission grid is characterized in the next figure, since 2010 to 2012. This figure shows the evolution of the total natural gas imports/exports from/to Spain at Valença do Minho interconnection. In 2012 the average utilization was of 15%.

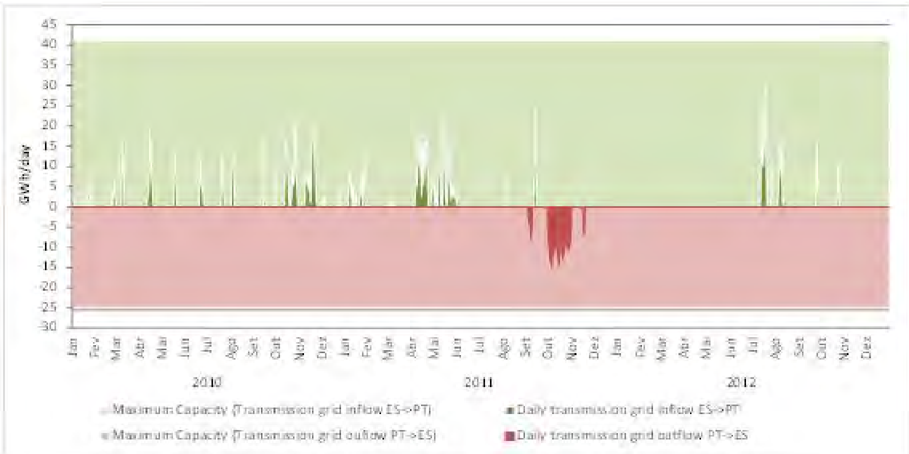


Figure 8. Valença do Minho interconnection daily injection capacity. Source: ERSE

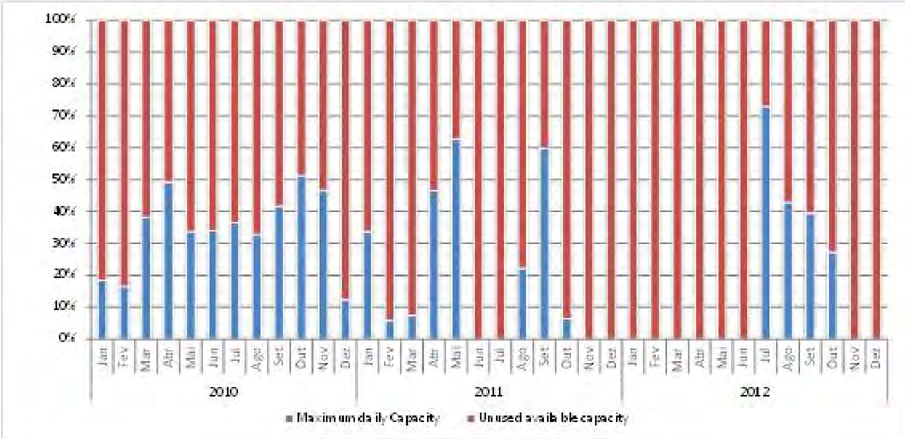


Figure 9. Utilization of Valença do Minho/Tuy interconnection monthly capacity. Source: ERSE

4.1.3. Virtual Interconnection Point

The daily inflow/outflow into the transmission grid virtual point is characterized in the next figure, since 2010 to 2012. The virtual interconnection point is defined as the sum of Campo Maior and Valença do Minho flows and capacities. This figure shows the net evolution of the total natural gas imports/exports from/to Spain at the virtual interconnection point. In 2012 the average utilization was of 25%.

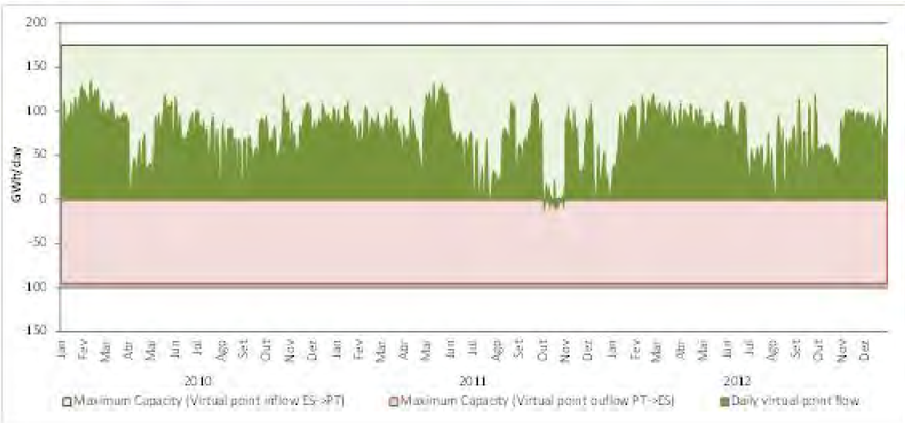


Figure 10. VIP interconnection daily flow capacity. Source: ERSE

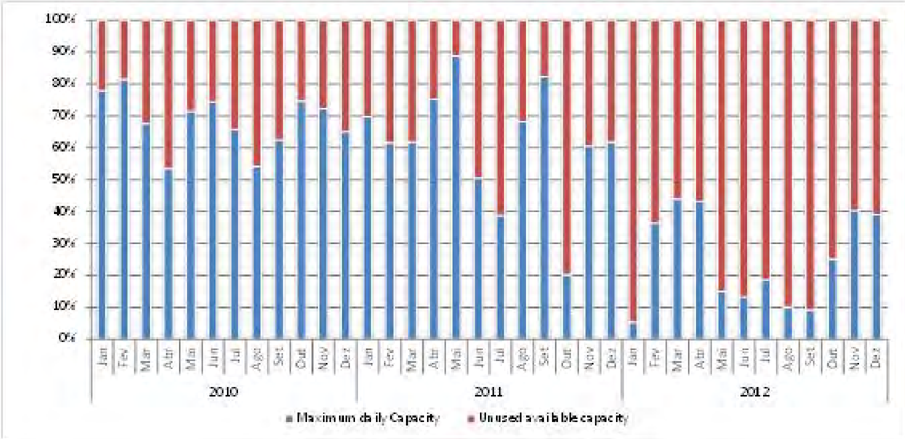


Figure 11. Utilization of the Virtual point monthly capacity. Source: ERSE

4.1.4. Spanish infrastructures use

The infrastructures in operation in the gas system, such as regasification plants, international connections, underground storage facilities, international gas pipelines are characterized next, regarding maximum capacity, maximum storage capacity and daily flow. The next figure shows the infrastructures in operation in the gas system

Figure 12. Infrastructures in operation in the Gas System. Source: ENAGAS GTS

4.1.4.1. LNG Terminal

In Spain there are six LNG regasification plants. All of them are subject to regulated TPA, allowing the access to new capacity by the new entrants, which has favoured the development of gas competition in Spain. The capacity use rate in 2012 is around 32,5 % in average for these plants, varying from 20% (the minimum, at Cartagena), to 49% (maximum, at Bilbao).

In 2012, the system had a total capacity of 6.863 million vaporization Nm³/h, 26 LNG storage tanks and 8 berths able to manage downloads of LNG tankers between 40.000 and 270.000 m³ capacity.

Regarding regasification plants, a new plant in Gijon (El Musel) was finished by the end of the year, but operation has been delayed due to the decrease of demand in the country by the Royal Decree Law 13/2012.

The next figure shows the evolution of the production plants at Spanish LNG Terminals, from 2008 to 2012.

Figure 13. Spain LNG Terminal Evolution. Source: Enagas GTS

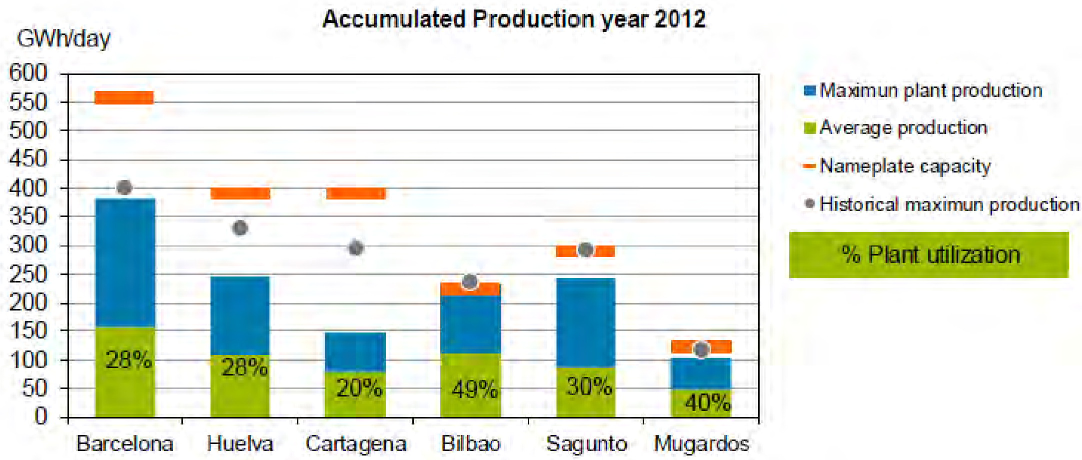


Figure 14. Use rate of LNG terminals in 2012. Source: Enagas GTS

The following table shows the LNG storage and send-out capacity of each one of the six terminals:

LNG Terminal	LNG Storage Capacity(m3)	Send-out capacity(m3 (n)/h)
Barcelona	840.000	1.950.000
Huelva	919.000	1.350.000
Cartagena	587.000	1.350.000
Bilbao	300.000	800.000
Sagunto	600.000	1.000.000
Mugardos	300.000	413.000
Total	**3.546.000**	**6.863.000**

Table 6. Capacity of LNG terminals at Dec, 31 2012. Source: Enagas GTS

The next figure shows the evolution of the storage capacity at Spanish LNG Terminals, from 2008 to 2012.

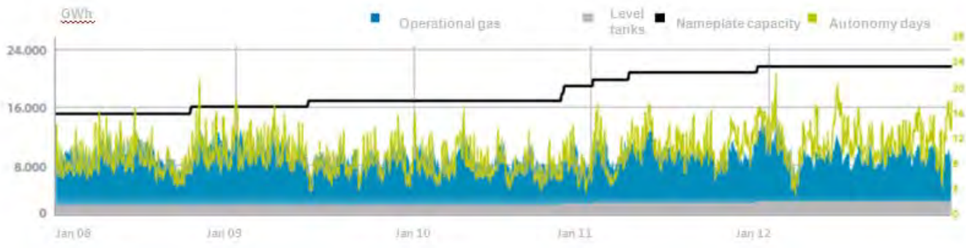


Figure 15. Regasification Plant: Gas in Tanks. Source: Enagas GTS

During 2012, the average storage of gas in LNG tanks reached 39% of total storage capacity, a percentage that was 8% reduction in the average level of stored energy compared to the year 2011.

4.1.4.2. Underground storage

In Spain, underground storage capacity is small – only 9,1% of demand in 2012 – and has historically been a scarce resource with limited withdrawal capacity. That is why the available capacity is subject to a specific allocation mechanism: a first amount of underground storage capacity is allocated to those users obliged to keep strategic and operational gas reserves proportionally to the gas sales in the previous year; the remaining capacity is allocated through an auction.

There are four underground storage facilities in Spain: Serrablo, Gaviota, Marismas and Yela, these two last entered in operation in 2012.

- The Serrablo gas field is located between in the province of Huesca, near the Pyrenees.
- Gaviota is an off-shore facility located near Bermeo (Vizcaya).
- Yela Underground Storage Facility is located at Guadalajara, in the central area of Spain, and is connected to Enagas' basic network by three different gas pipelines. It is still inyecting cushion gas so it is not fully operational
- The other new underground storage of Marismas that entered in operation in 2012, and is located in Huelva.

In 2012, due to the incorporation of Yela and Marismas, the available storage capacity increased in the Spanish gas system, which went from 28.070 Gwh in 2011 to 28.956 GWh in that year.

The Ministerial Order ITC/3862/2007 of 28 December, the Ministerial Order ITC/3128/2011 of 17 November and the Ministerial Order IET/849/2012 of 26 April, established a yearly mechanism for the allocation of underground storage capacity for natural gas to their users for each annual period from the 1 April of the current year to the 31 March of the following one.

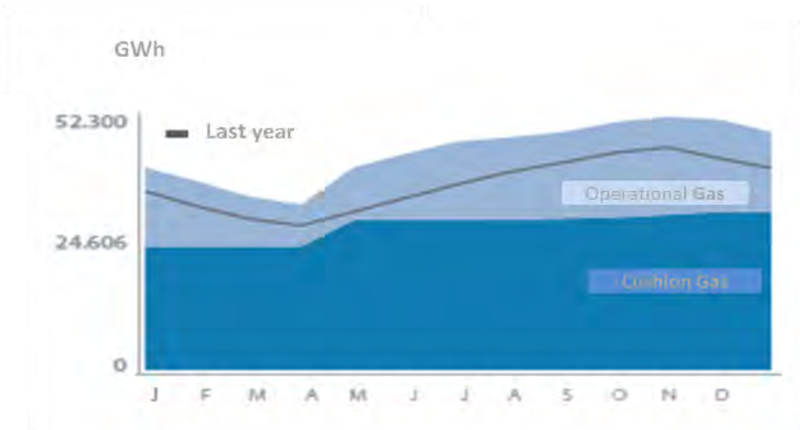


Figure 16. Underground storage monthly storage energy in 2012. Source: Enagas GTS

4.1.5. International interconnection

Spain has several international gas pipeline connections to other countries: to Algeria through Morocco (Tarifa) and directly with Almeria, to Portugal through Tuy and Campo Maior (Badajoz), and to France through Larrau and Irún.

The new interconnection with Algeria, MEDGAZ, is operational since April of 2011. MEDGAZ is a strategic project for Algeria and Spain. It allows natural gas to be supplied directly from Algeria, without requiring transit through third countries, and in addition it considerably enhances security of supply and diversification in the balance NG/LNG in the imports to the Iberian Peninsula. Its initial capacity is 8 bcm/year, and the pipeline will possibly be enlarged in the future in order to reach other European countries, becoming this way an entrance corridor of gas into Europe.

The current capacities of international interconnections are the following:

Pipeline connection	Capacity (GWh/day)
Larrau (ES->FR)	100
Larrau (FR->ES)	30 (Winter) / 50 (Summer)
Irún (ES->FR)	5 (Winter) / 9 (Summer)
Irún (FR->ES)	0 (Winter) / 10 (Summer)
Tarifa (MO->ES)	444
Almería (AL->ES)	266
Badajoz (ES->PT)	134
Badajoz (PT->ES)	35 (Winter) / 70 (Summer)
Tuy (ES->PT)	30 (Winter) / 40 (Summer)
Tuy (PT->ES)	25

Table 7. Interconnection physical capacities at Dec, 31 2012. Source: Enagas GTS

(*) Since 1st April 2013 the interconnection capacity of Larrau is 165 GWh/day in both directions

The year 2012 was increased supply of natural gas through international connections. Overall, the system received 157.192 GWh, an increase of 17% over 2011.

Figure 17. International interconnection: Commercial movements in 2012. Source: Enagas GTS

In order to manage capacity allocation and congestion at the international interconnection with France, it is worth mentioning the work carried out in the framework of the South Gas Regional Initiative that has led to the implementation of a system of Open Subscription Periods (OSP) and Open Season procedures (OS) at the FR-SP border. As a result of the Open Season procedures the capacity at the French interconnection will reach 7,5 bcm/year from 2015.

Also in the summer of 2012 launched a pilot capacity auction in Spain and Portugal interconnection process and it arose VIP.

These two initiatives were done before the common allocation mechanism development in all the interconnection in March 2014.

4.1.6. Portuguese infrastructures use

The Portuguese international interconnection and high pressure infrastructures are characterized next, regarding maximum capacity, maximum storage capacity and daily flow.

4.1.6.1. Sines LNG Terminal

The next figure shows the evolution of the storage capacity at Sines LNG Terminal, from 2010 to 2012. Since the beginning of 2012, there is a third LNG reservoir available which increases the maximum available storage capacity.

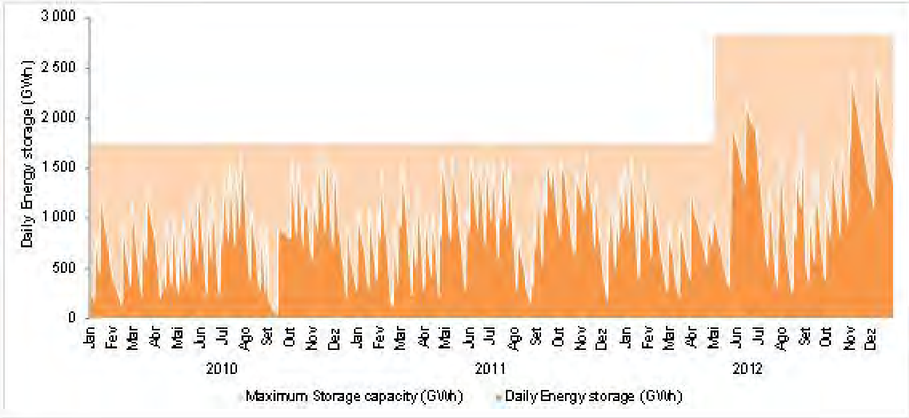


Figure 18. Sines LNG Terminal daily storage capacity. Source: ERSE

The next figure shows the daily injection from Sines LNG Terminal into the transmission grid, from 2010 to 2012. Besides the LNG reservoir investment there was also an investment in the maximum injection capacity into the transmission grid, also available since the beginning of 2012.

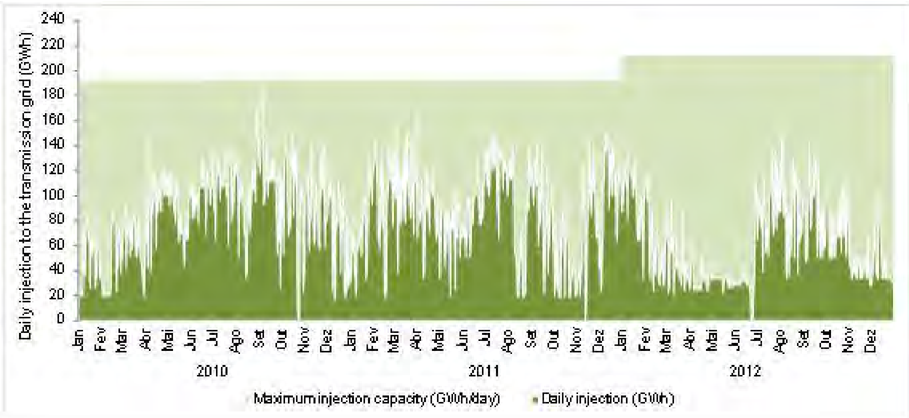


Figure 19. Sines LNG Terminal daily injection capacity into high pressure grid. Source: ERSE

4.1.6.2. Underground storage

The daily storage capacity in the Portugal underground storage at Carriço is characterized in the next figure, from 2010 to 2012. This figure shows the maximum storage capacity, daily storage energy and the total number of days of consumption at the Portuguese underground storage. There are foreseen investments to increase the maximum available storage capacity.

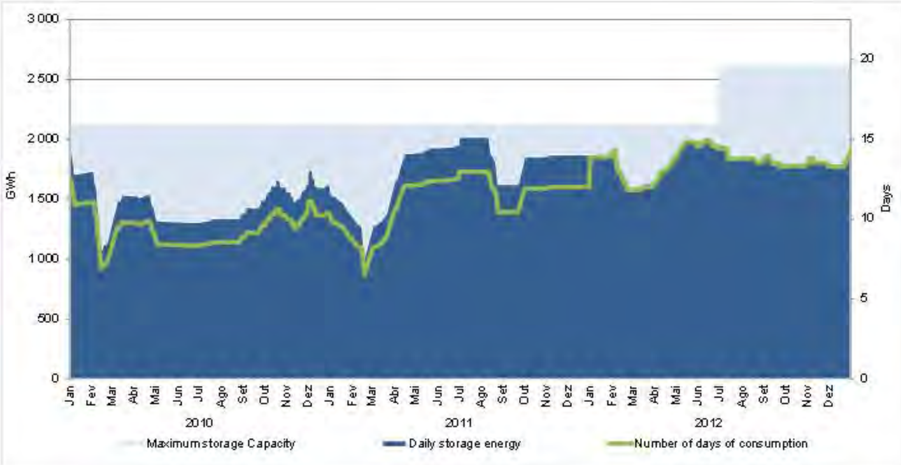


Figure 20. Underground storage maximum storage capacity, daily storage energy and total number of days of consumption. Source: ERSE

4.2. Spanish gas market

4.2.1. Imports

The domestic production of Spanish gas fields is marginal and reached only 393 GWh, representing 0,1% of Spanish gas demand in 2012. This production comes from three gas fields that are close to depletion and are thought to be used as underground storages in the future. The rest of the gas consumed in Spain is imported.

In 2012 Spain received natural gas from a total of 10 different countries. The figure below shows the mix of gas supplies to the Spanish system in 2012.

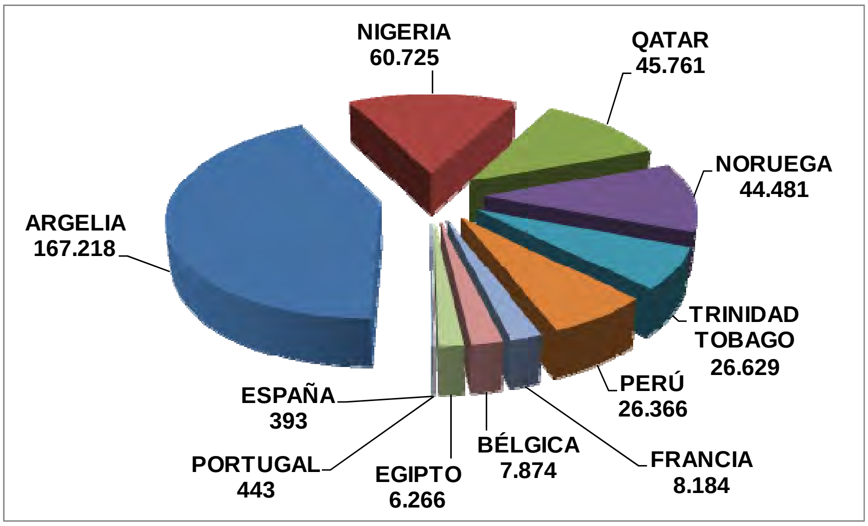


Figure 21. Sources of gas imported to Spain (by origin) in 2012. Source: CNE

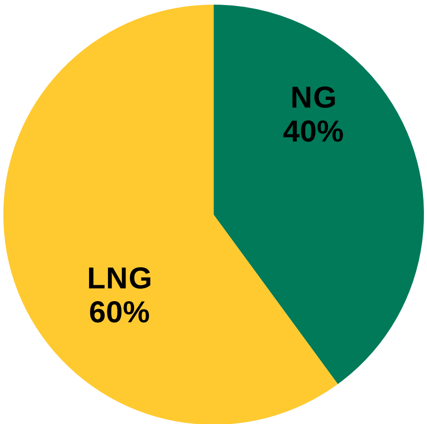


Figure 22. Sources of gas imported to Spain (LNG vs pipeline) in 2012. Source: CNE

In 2012, Spain was the main LNG importer in Europe and the fourth largest importer in the world.

LNG imports in 2012 (bcm)	
Japan	87.18
South Korea	36.41
China	14.70
Spain	14.16
India	13.99

Table 8. *Main LNG importing countries*

This diversification in gas supplies contributes very significantly to security of supply in the Spanish system, representing a natural risk-hedging against a possible disruption of gas from a source, due to problems in infrastructure, geopolitical issues or any other reason.

Another relevant factor that influences positively security of gas supply in Spain is the importance of LNG in gas procurement. The LNG presence provides the Spanish system with a high level of flexibility, favouring the access to new upstream gas sources and enabling gas suppliers to benefit from arbitrages among other markets.

Moreover, the geographic situation of Spain, with access to both Atlantic and Mediterranean basins, enlarges the scope of available LNG sources, allowing gas suppliers to import gas from many LNG producing countries. Finally, LNG also serves as a competition driver, enabling newcomers to access the wholesale market and introduce gas in the Spanish network via spot contracts. The high share of LNG in gas imports is a consequence of the remarkable development of LNG import capacity in Spain.

The increase in the imports through pipeline is due to the entry into operation in 2011 of the new international interconnection which joins Spain with Algeria, Medgaz, and the diversion of LNG cargoes to Asia and South America.

4.2.2. Wholesale Markets

In Spain there is no organised gas hub at present. In order to provide a price reference for gas in Spain, the CNE has developed an index for natural gas border prices, out of gas imports data which are available in the Web of the Office of Economics and Export Control (AEAT).

The following figure shows the evolution of natural gas prices at the border according to this index, from January 2002 to December 2012, including LNG and natural gas introduced to Spain through pipelines from Maghreb and France.

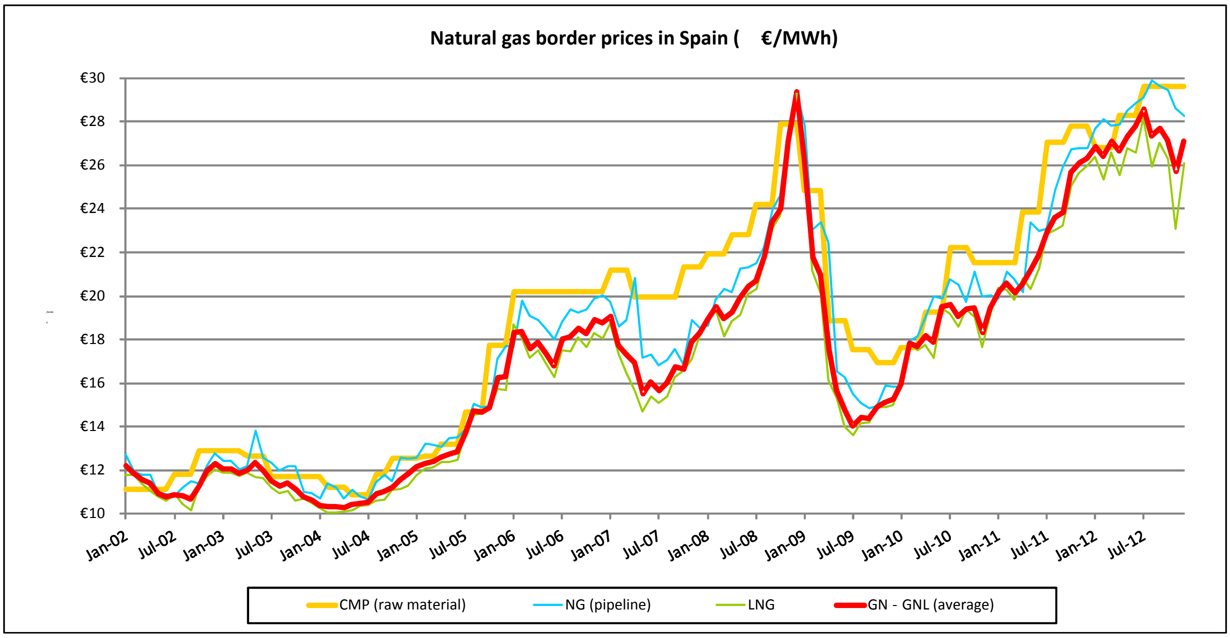


Figure 23. Evolution of natural gas border prices in Spain (€/MWh), January 2002-December 2012. Source: CNE

As shown in the figure above, prices reached their peak values in 2008, when prices rose sharply up to 29,37 €/MWh in December 2008. In the year 2012, natural gas border price has remained in the band of 26-28 €/MWh. The prices from July 2009 to December 2012 have rise up a 93% from 14,03 up to 27,10 €/MWh.

The table below shows the monthly evolution of these prices in 2012 (in €/MWh):

(€/MWh)	Natural gas (pipeline)	LNG	Average import price
Jan 2012	27,68	26,38	26,86
Feb 2012	28,10	25,35	26,41
Mar 2012	27,81	26,60	27,12
Apr 2012	27,89	25,55	26,65
May 2012	28,51	26,77	27,37
Jun 2012	28,86	26,58	27,79
Jul 2012	29,11	28,17	28,59
Aug 2012	29,88	25,97	27,34
Sep 2012	29,62	27,06	27,69
Oct 2012	29,44	26,27	27,14
Nov 2012	28,62	23,11	25,73
Dec 2012	28,29	26,12	27,10

Table 9. Natural gas border prices in Spain, 2012. *Source: CNE*

Regarding the Spanish OTC market (MS-ATR Platform), most of gas traded in the Spanish market is negotiated in bilateral OTC transactions, over an electronic trading platform developed by the Spanish Transmission System Operator, ENAGAS, called “MS-ATR”. There are nearly 41 active traders in this platform.

At the moment, gas is actively traded in Spain across eight balancing points: the six LNG terminals; the virtual balancing point (so called AOC) and the virtual storage point comprising the four Spanish underground storage sites in operation (Serrablo, Gaviota, Marismas, Yela and Castor), with two of them that have been put into service in 2012 (Marismas and Yela).

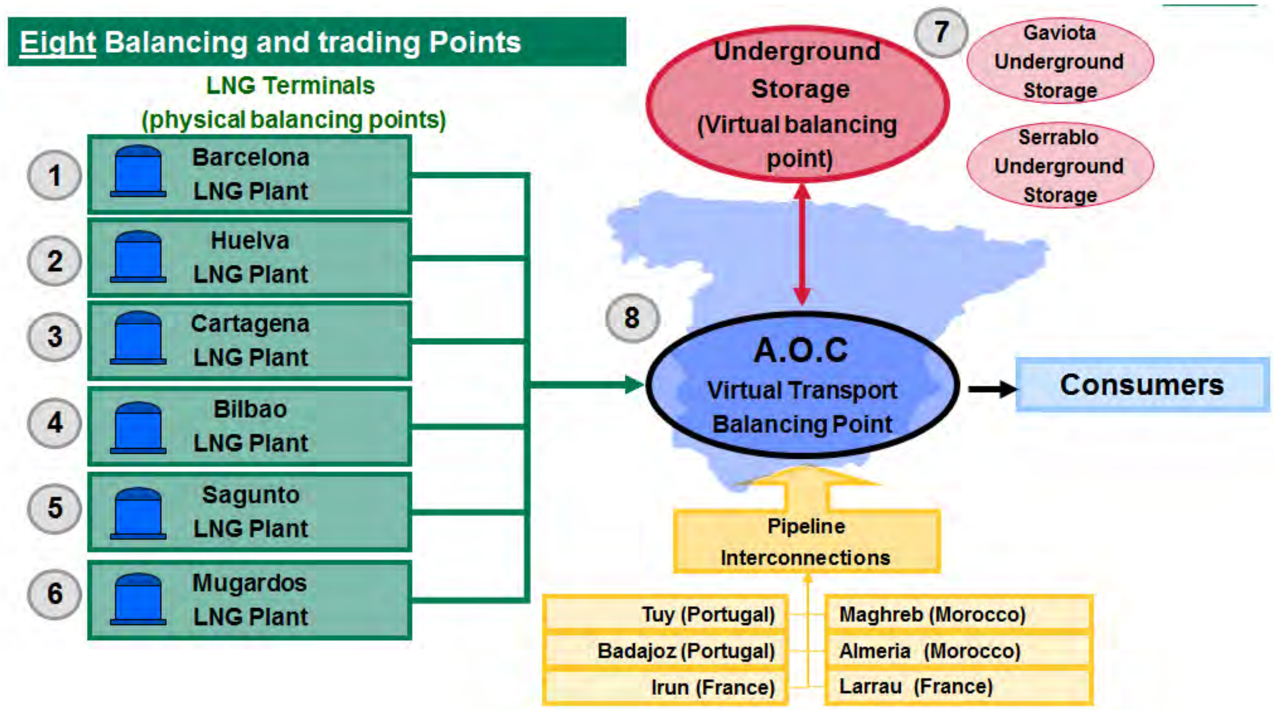


Figure 24. Balancing and trading points. Source: CNE

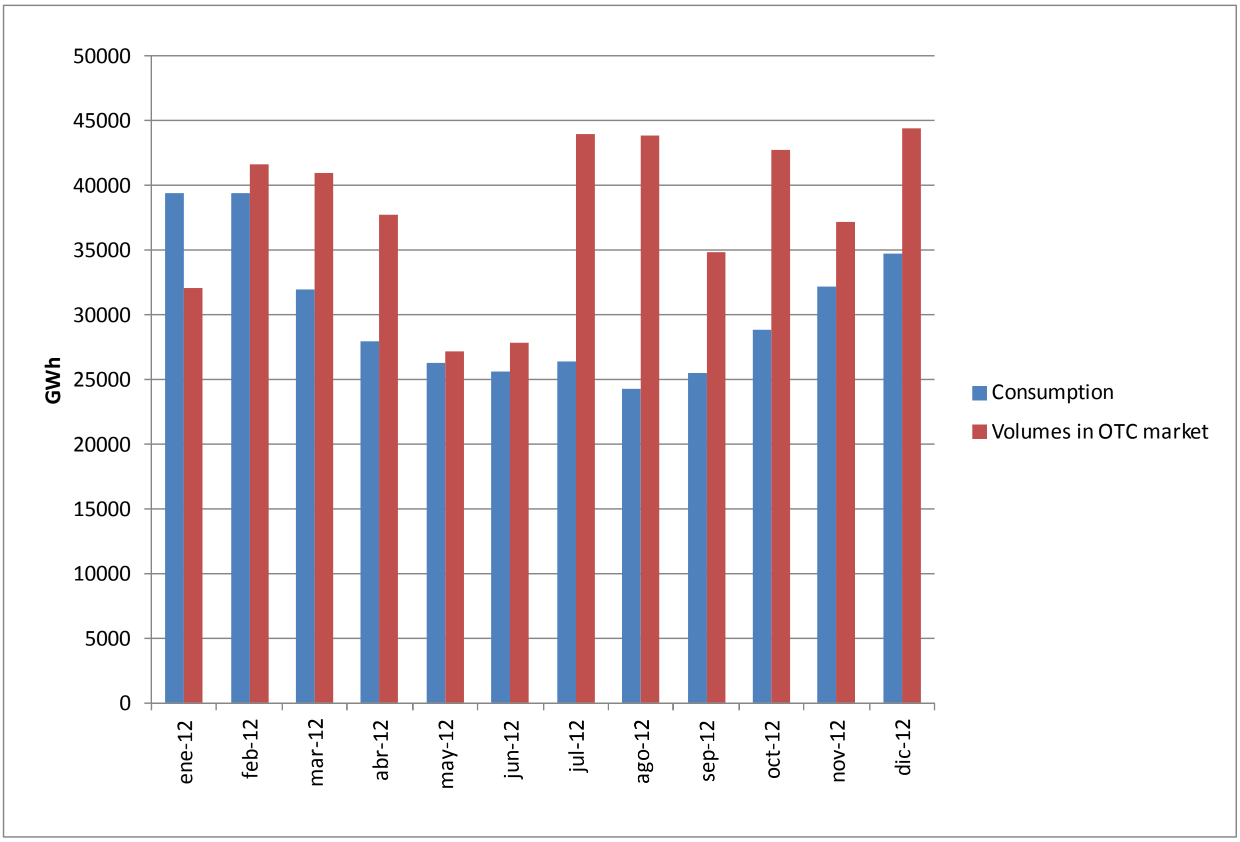


Figure 25. Gas traded at the Spanish OTC gas market and gas consumption in 2012 (GWh/month). Source: CNE

Liquidity lies almost completely on the LNG terminals, which accounted for 78,2% of all OTC trade in 2012. Barcelona LNG terminal was the main trading point with 24,7% of gas trade. The AOC, which could look like an attractive virtual trading point, only drew 21,2% of OTC trade.

Balancing point	Traded gas 2012 (TWh)	Production (TWh)	Churn rate	Number of active traders	Market share of 3 main traders
Barcelona LNG Terminal	112.352	57.408	2,0	20	59%
Huelva LNG Terminal	90.262	40.059	2,3	13	59%
Bilbao LNG Terminal	61.068	40.374	1,5	8	66%
Cartagena LNG Terminal	43.699	28.813	1,5	14	87%
Mugardos LNG Terminal	20.706	17.987	1,2	10	81%
Sagunto LNG Terminal	26.912	31.918	0,8	8	91%
Total LNG	354.999	216.559	1,6	26	51%
Underground storage	2.776			15	69%
Transmission balancing point	96.217	145.138	0,7	35	37%
Total Spain	453.992	361.697	1,5	42	47%

Table 10. Spanish OTR gas market. Main features. Source: CNE

Transactions in the Spanish OTC market in 2012 represented globally 1,25 times the natural gas demand.

The next figures show the monthly evolution of gas traded and of the number of transactions – almost 50.000 – registered in the Spanish OTC market in 2012.

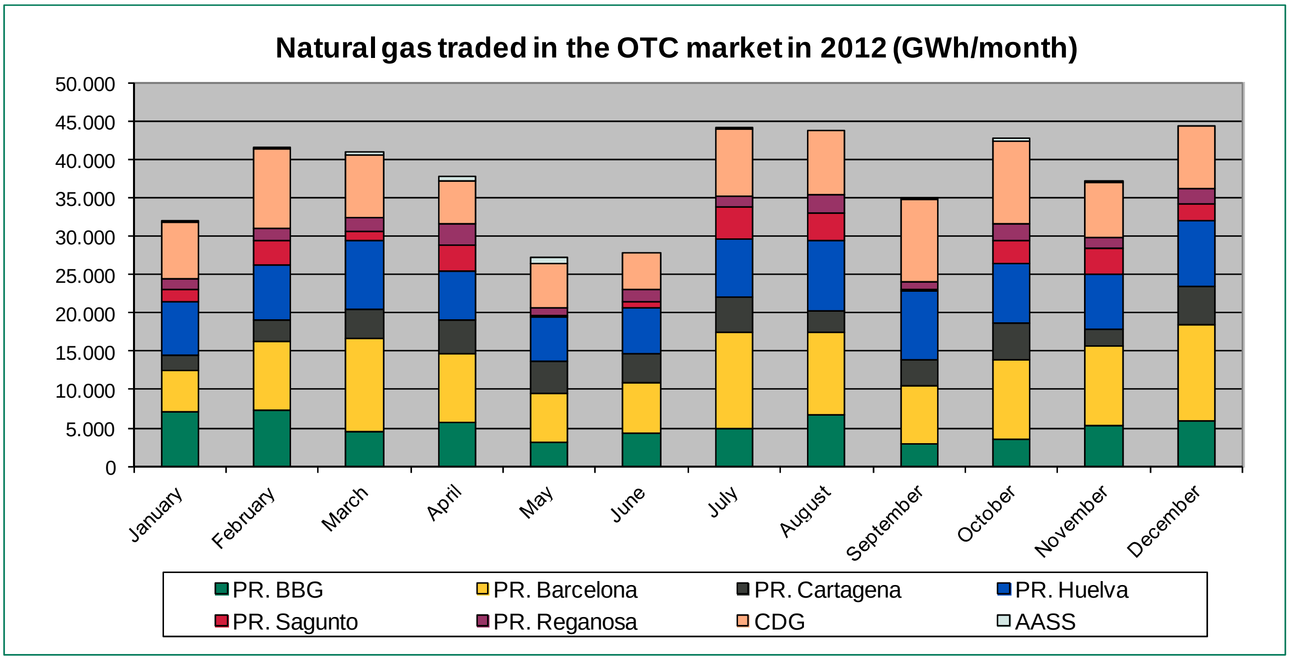


Figure 26. Gas traded 2012 (GWh/month) Source: CNE

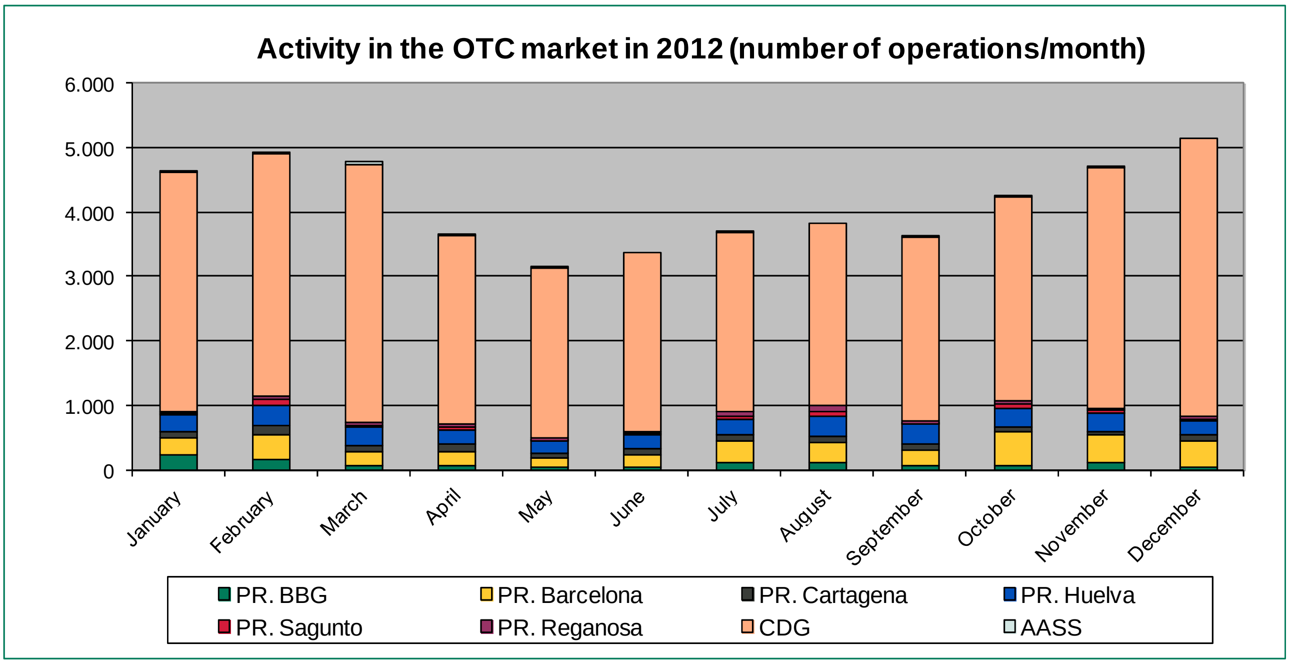


Figure 27. Gas transactions 2012 (nº Transactions/month) Source: CNE

The figure below shows the market sharing-out in the OTC gas market for 2012 in terms of purchased energy. The highest shares belong to Unión Fenosa with 18,8% and Gas Natural Comercializadora with 15,3%.

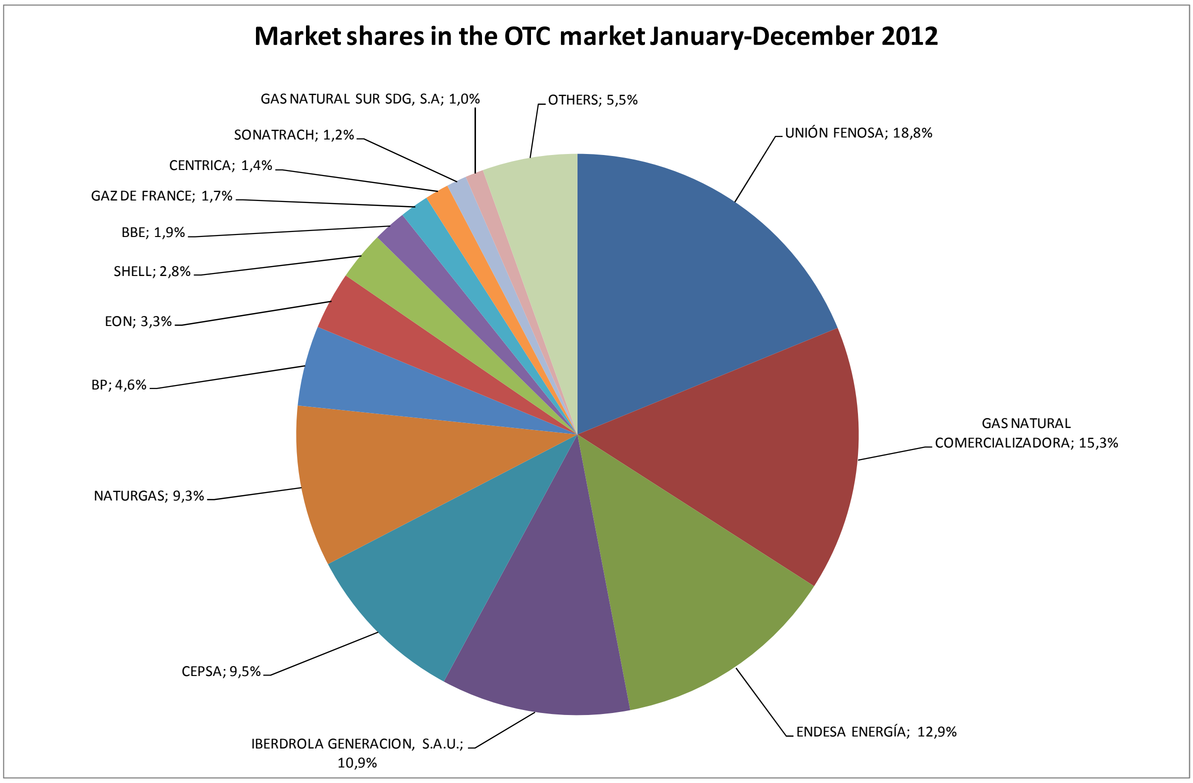


Figure 28. Market share (purchases) in the OTC market in 2012. Source: CNE

Given that the OTC platform MS-ATR allows free trading through direct gas exchanges (not including the communication of the gas price to the platform) there is no public information available on OTC prices.

The current MS-ATR platform, where shippers perform OTC trade operations at various system points, can be considered as a starter of a gas hub. Currently, the majority of such trades are swap operations to cover shipper positions, particularly on LNG. In 2012, Spain saw a reduction in the volumes traded at the platform, mainly at some LNG terminals, as a result of decreasing demand and the diversion of LNG cargoes to Asian markets and the increase of the pipeline imports.

4.2.3. Retail market structure

The total number of gas consumers in December 2012 was 7.385.202 (+106.701 consumers with regard to December 2011), and the gas demand was 362 TWh (-3,4% compared to 2011).

The figure below shows the share of supplies in the Spanish market in 2012 by company, in terms of energy volume.

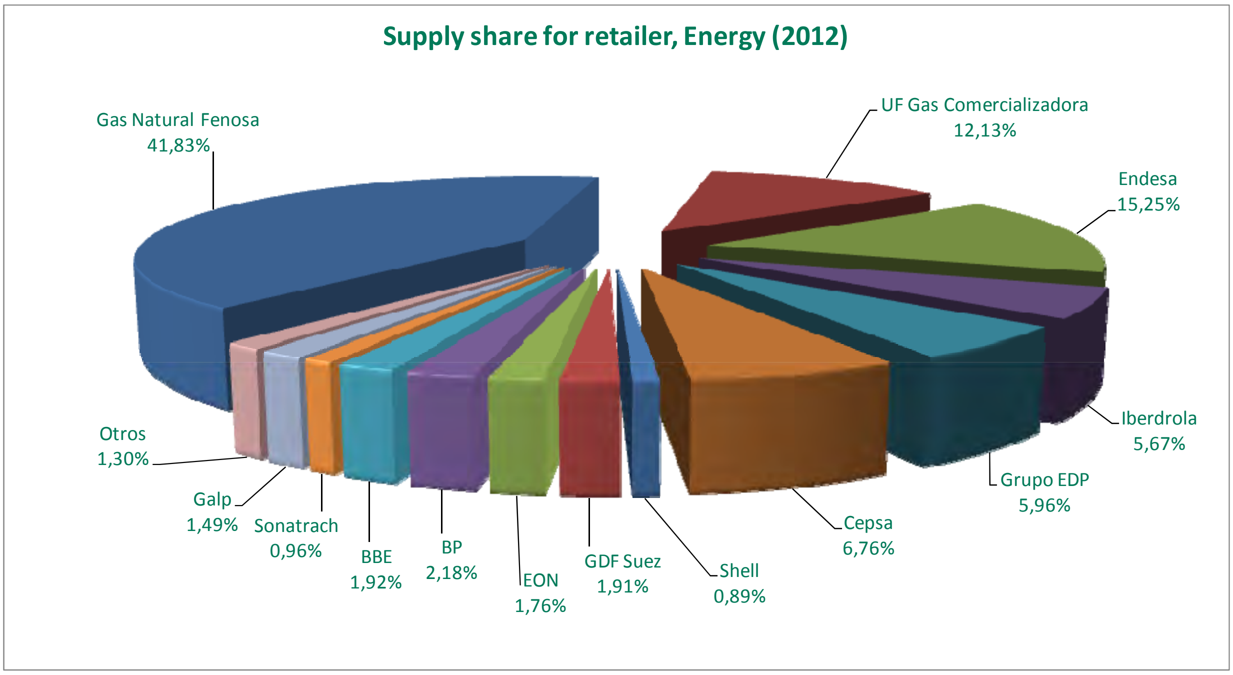


Figure 29. Share of natural gas supplies by company (in energy volume). Source: CNE

In terms of number of customers, the sharing-out of supplies at 31 December 2012 was dominated by 5 supplying companies.

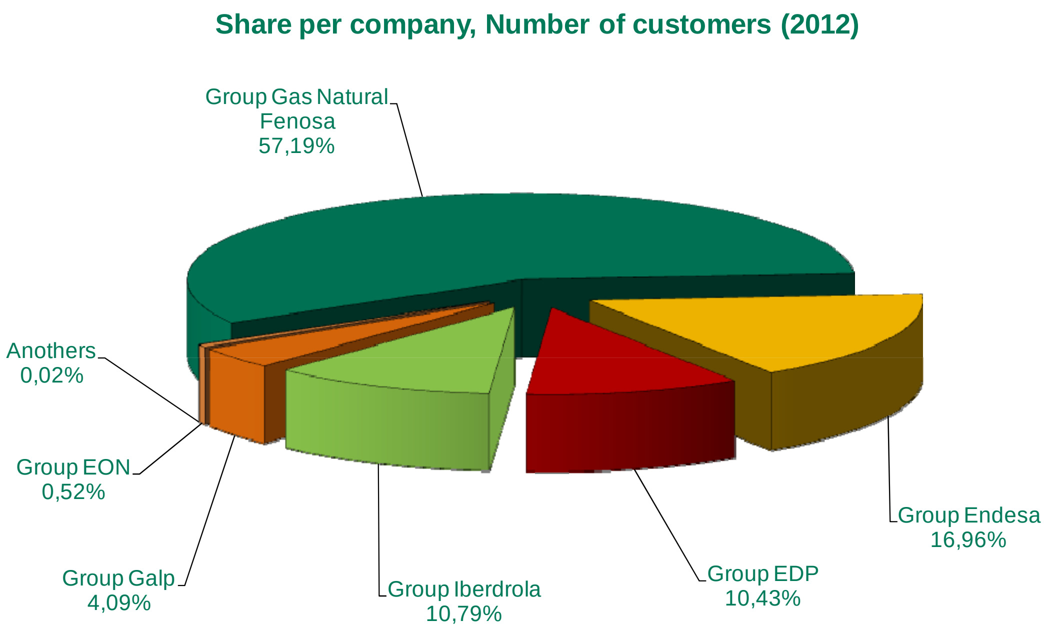


Figure 30. Share of natural gas supplies by company (in energy volume). Source: CNE

The sharing-out of natural gas consumption by end-use sectors in 2012 was as follows:

- Household-commercial: 15,7%
- Industrial: 59,8%
- Electricity generation (CCGTs and gas-fired power plants): 23,3%
- Non-energetic use (natural gas as raw material): 1,2%

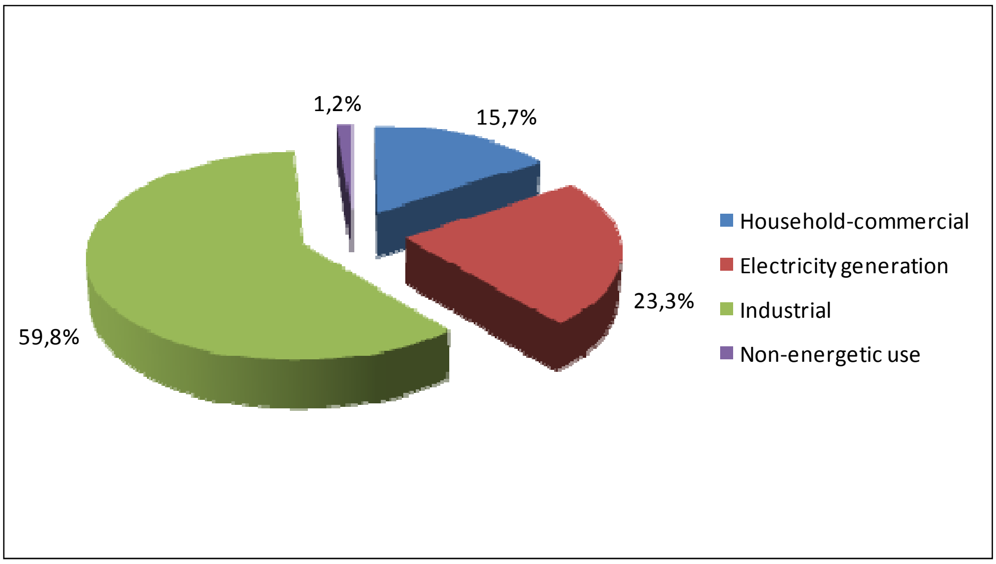


Figure 31. Consumption of natural gas by sectors (2012). Source: Sedigas

The evolution of this segmentation over time shows a very remarkable decrease in the share of gas dedicated to electricity generation, reaching a percentage of 23% in 2012 from a 40% in year 2009. In the last four years, there has been a decrease in the use of gas in electricity generation due to the reduction in consumption because of the crisis and the increase of production with renewable energies and with coal.

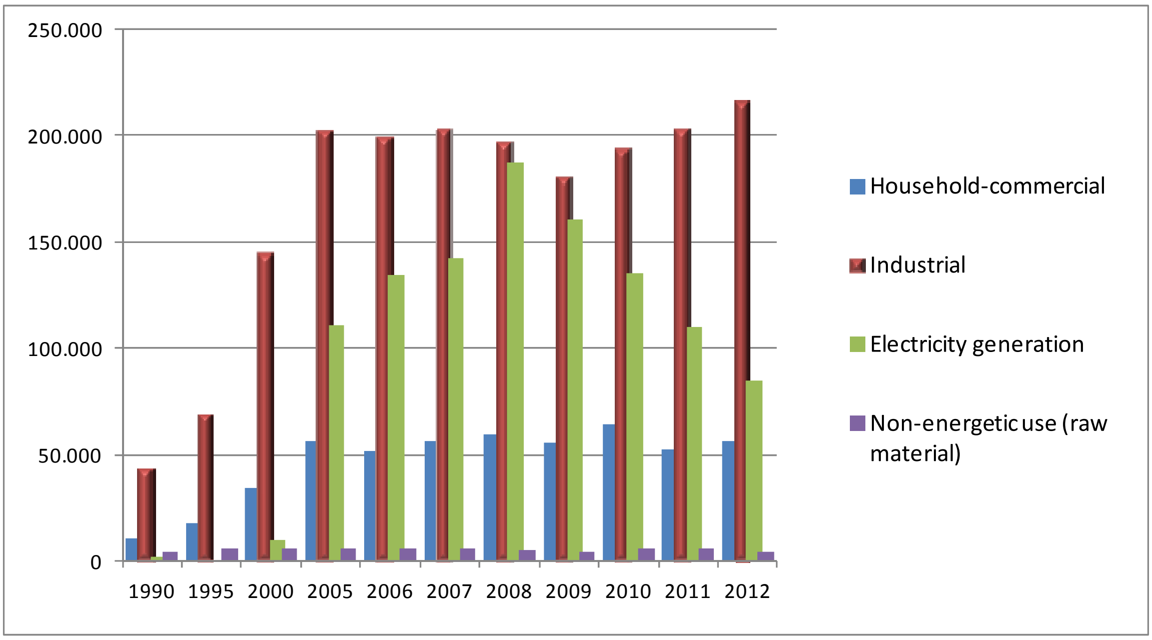


Figure 32. Natural gas sales in Spain (GWh). Source: Sedigas

Regarding the evolution of gas market share, at the end of 2012 there were 74 companies registered as retailers in the Spanish gas market. The share of the retailers in the liberalised market could be seen in the next figure.

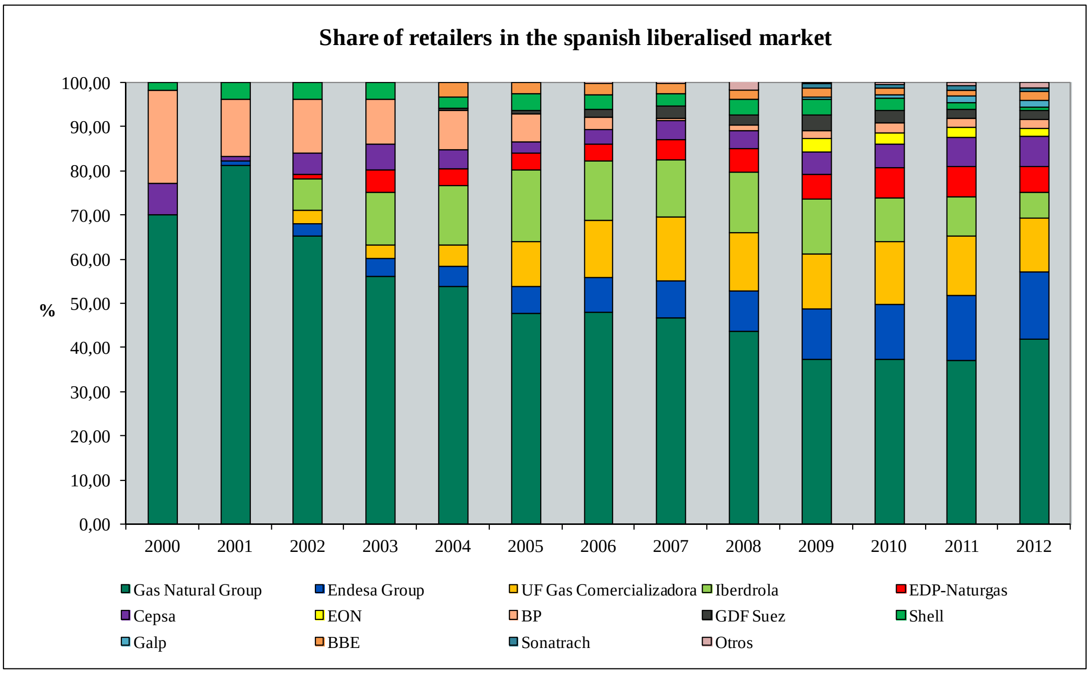
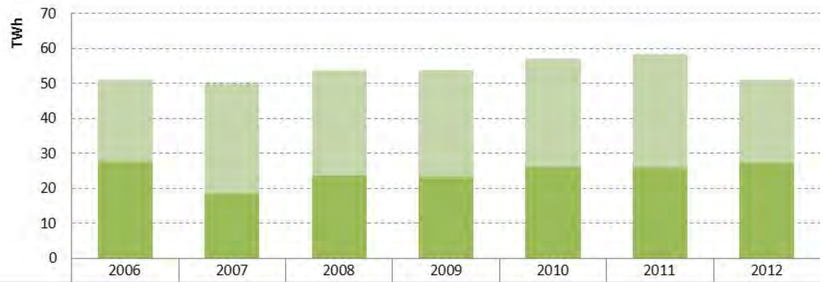


Figure 33. Market share of retailing gas companies in Spain (in terms of energy). Source: CNE

4.3. Portuguese Gas Market

4.3.1. Imports

Portugal has no exogenous production of natural gas, which means that the domestic demand is covered by imports. The entry points to the National Natural Gas System (SNGN) are Campo Maior and Valença do Minho interconnections and Sines LNG terminal. The Figure below shows the evolution of natural gas imports, from 2006 to 2012.



	2006	2007	2008	2009	2010	2011	2012
Sines LNG Terminal	23,1	31,5	30,1	30,2	30,8	32,7	23,9
Interconnections (Campo Maior e Valença do Minho)	27,8	18,3	23,5	23,4	26,1	25,7	27,1

Figure 34. Evolution of natural gas imports for Portugal. Source: ERSE

In recent years, Sines LNG terminal has been the infrastructure that contributed the most to the domestic supplies of natural gas. However, the decrease in the domestic demand observed in 2012 was mainly at the expense of LNG imports, resulting in a bigger contribution of natural gas imported from the interconnections (which didn't occur since 2006).

In 2012 Portugal received natural gas from 5 different countries. The figure below shows the mix of gas supplies (in bcm) to the Portuguese system in 2012. The main sources of natural gas to the Portuguese market are Algeria (through Spain) and Nigeria, supplying gas by pipeline (NG) and LNG, respectively.

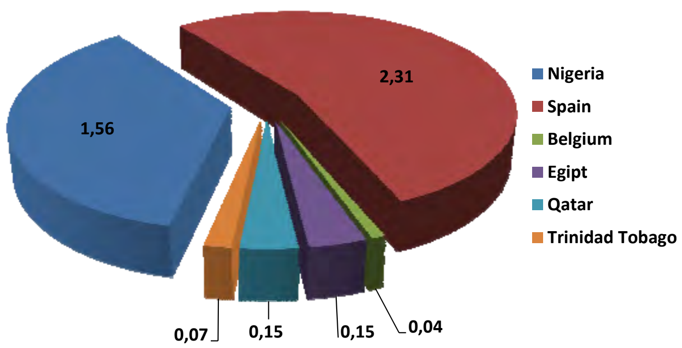


Figure 35. Sources of natural gas imported to Portugal (by origin in bcm). Source: REN

The following figure presents the supply mix, between NG and LNG, to the Portuguese system, in 2012.

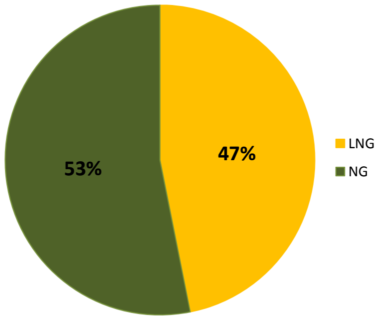


Figure 36. Sources of natural gas imported to Portugal (LNG vs pipeline). Source: REN

4.3.2. Wholesale Markets

At the moment there is no organized gas hub in Portugal. The following figure shows the evolution of natural gas prices at the Portuguese border, from 2006 to 2012, in €/MWh. It is presented the NG and LNG gas introduced either by pipeline, through Spain from Maghreb, or by the LNG terminal, respectively.

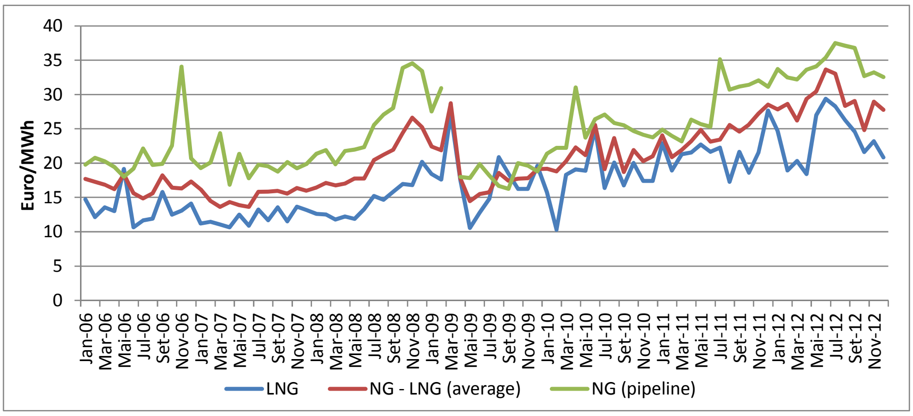


Figure 37. Evolution of natural gas import prices in Portugal (€/MWh), 2006-2012. Source: Eurostat

The following table shows the monthly evolution of these prices in 2012 (in €/MWh)

€/MWh	Natural gas (pipeline)	LNG	Average import price
Jan 12	33,71	24,70	27,82
Fev 12	32,48	18,94	28,62
Mar 12	32,18	20,33	26,21
Abr 12	33,61	18,40	29,38
Mai 12	34,10	26,93	30,45
Jun 12	35,38	29,38	33,63
Jul 12	37,50	28,26	33,02
Ago 12	37,11	26,27	28,35
Set 12	36,77	24,60	29,04
Out 12	32,67	21,61	24,81
Nov 12	33,23	23,20	28,96
Dez 12	32,55	20,85	27,76

Table 11. Natural gas import prices in Portugal. Source: Eurostat

4.3.3. Retail market structure

At the end of 2012 the total number of natural gas consumers in Portugal was 1,2 million and the total demand was 51 TWh (-13% compared to 2011).

The following figure illustrates the market share in the Portuguese market in 2012, by company, in energy volumes[15].

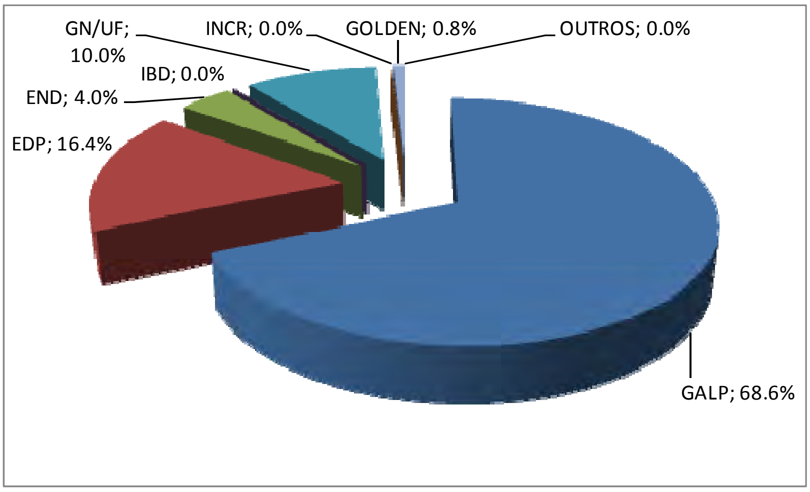


Figure 38. Share of natural gas supplies by company in 2012 (in energy volume). Source: ERSE

The figure below presents the Portuguese market share in 2012, by company, in terms of customers. The respective sharing-out was clearly dominated by 2 supplying companies.

[15] Energy quota and client quota data were obtained from the switching supplier operator (REN Gasodutos).

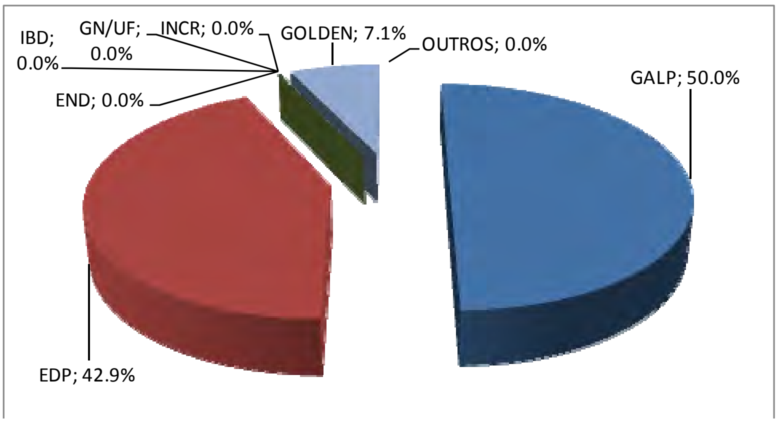


Figure 39. Share of natural gas supplies by company in 2012 (in customers volume). Source: ERSE

In 2012 the natural gas consumption by end user sector behaved as presented in the next figure.

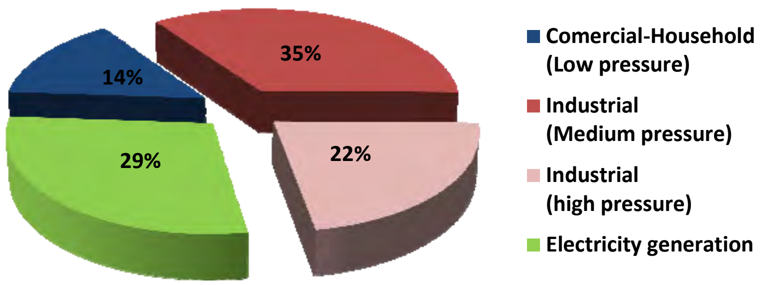


Figure 40. Consumption of natural gas by sectors 2012. Source: ERSE

Annex 3. Practice Case. Iberian Market with Implicit Allocation Model

This annex provide several simplified examples which illustrates the main points of the concept of implicit allocation of capacity in gas markets, and the practical functioning of the Iberian Market under different situations of interconnection capacity.

Case 1: Enough interconnection capacity and no border tariffs.

This example consider the functioning of a Iberian Market in a situation with enough capacity in both sides of the border like the main feature, either from Portugal to Spain [+200 units of capacity] or from Spain to Portugal [-1100 units]. In this first example, in order to simplify the understanding we consider that the tariffs at the interconnection between Spain and Portugal are zero, so buy and sell orders among both markets can be matched without price adjustment.

In the starting point, we can see the order book in both countries with their sell´s and buy´s offers. The bids and offers here could be viewed as the results of a 'batch' or discreet auction, or as a set of bids and offers made during continuous trading.

Illustration 3 Start point Order book SP-PT

In the second step, we can observe how to connect a sell offer and a buy offer taking account the quantity and the capacity. In the illustration bellow we can observe that agent P1, from Portugal, is selling 35 units (at a price of 28,75) while in Spain there are offers to buy from agents E1, E2, E3… starting at a price of 28,81.

Illustration 4 Offers connection

The next step reflects the transaction. In order to buy the 35 units, the agent E1 (at Spanish market) will buy 20 units and the second one, and the agent E2 will buy the last 15.

We consider that the tariffs at the interconnection between Spain and Portugal are removed, so buy and sell orders among both markets can be matched without price adjustment.

Illustration 5 Transaction development

The matching requires to use 35 units of transit capacity from Portugal (selling gas) to Spain (buying gas), so the available capacity for the market (after the transaction) is adjusted to 165 (P -> S) and 1135 (S -> P)

Therefore the situation after the transaction, the agent P1 from Portugal has sold all his position and the second agent from Portugal P2 takes now the first place in the order book, and in Spain E1 agent has bought everything so the E2 agent goes to the first place (with the remaining 40 units).

In conclusion, with enough interconnection capacity and no border tariffs, the combined order books in both markets are the same for the Iberian Market.

Illustration 6 Final situation. Balance after transaction.

Case 2: Limited interconnection capacity and no border tariffs

This example consider the functioning of an Iberian Market in a situation of lack of enough capacity from Portugal to Spain (only 50 units, meaning that it just can transfer 50 units from Portugal to Spain), and 1100 units from Spain to Portugal. Therefore, the matching of the offers may be limited by this restriction. In this example, we continue to consider that the tariffs at the interconnection between Spain and Portugal are removed, so buy and sell orders among both markets can be matched without price adjustment.

In the starting point, we can see the order book in both countries with their seller´s and buyer´s offers. The order books of the illustration bellow is the same that the first example, with the unique difference than the capacity from Portugal to Spain has been reduced to 50.

Illustration 7 Start point Order book SP-PT/ Offers connection

Illustration 8 Transaction development

As in the previous case, P1 buys 35 units, but after the transaction, the available transit capacity is now limited to 15 units.

Illustration 9 Situation after the transaction

So the balance after the transaction is that the agent E2 is still in a buying position of 40 units at 28.75 in the Spanish market, but traders in Portugal can only see an offer of 15 units 28.75 in the Portuguese order book, because available transit capacity is now limited to 15

Illustration 10 Final situation. Balance after transaction.

Case 3: Not enough interconnection capacity and no border tariffs

This case explains the functioning of an Iberian Market with implicit allocation in the occurrence of a situation of not enough interconnection capacity.

To illustrate this, we consider the same example as in previous cases, but now we consider than the available capacity from Portugal to Spain is limited to 20 units,

In the start point, we can see the order book in both countries with their shell´s and buy´s offers.

Illustration 11 Start point Order book SP-PT/ Offers connection

In this situation the capacity is more restrictive than the other cases, so the selling order of P1 (35 units at 28,75) can only be matched against 20 units of buying offers in Spain, due to the capacity constrain.

Illustration 12 Transaction development

We can observe in the follow illustration that there is no capacity to match the last 15 units at 28,75

Illustration 13 Situation after the transaction.

Finally, buying offers of E2 and E3 (market in red) are removed from the Portuguese order book (as there is no more transit capacity), and similar is done with selling offers of P1, P2 and P3 in the Spanish order book, and the price between both markets can start to be decoupled.

Illustration 14 Final situation. Balance after transaction.

Case 4: Enough Capacity and border tariffs

In this example, we consider that the transit tariffs at the interconnection between Spain and Portugal is 0,10 € (per unit moved) in both directions. Therefore the matching of offers has to take in account the transit tariffs.

The model also allows different transit tariffs, like for example 0,10 € from Spain to Portugal and 0,11 € from Portugal to Spain. We use same tariff for simplicity of the example.

The start point will be the same that before.

Illustration 15 Start point Order book SP-PT

The follow illustration shows the market working like if it was an unique virtual point, therefore, either column that simulate Spain or column that simulate Portugal are the same.

Illustration 16 Balance before including transit tariffs

Now the selling order from E4 in Spain (70 units on sale at 28,91), is transferred to the Portuguese order book including the transit fee (70 units at 29,01), and the same process is applied to all orders

The next figure illustrated the combined order books before taking into account the transit tariffs:

Illustration 17 Tariffs applied

So the transit tariffs results in a reordering of offers at the order's books:

Illustration 18 Final situation after reordering of offers.

Case 5: Enough Capacity and reduced border tariffs

This example illustrates how a reduced transit tariff will result in more matching of offers than the previous example. In this case interconnection tariff is 0.05€.

The start point will be the same that before.

Illustration 19 Start point Order book SP-PT

Illustration 20 Balance before including transit tariffs

In the illustration bellow, we can observe how is applied the cross border tariff (red's number)

Illustration 21 Application of the transit tariff

Illustration 22 Matching

Matching of some offers. 20 units on sale in Portugal at 28.75€ match with 20 units (buy order) from Spain at 28.81€

Illustration 23 Transaction development

The last figure is the final situation after the transaction

Illustration 24 Final situation. Balance after transaction.

Annex 3. Related Documents

CEER documents

- CEER Vision for a European Gas Target Model, http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_PUBLICATIONS/CEER_PAPERS/Gas/Tab/C11-GWG-82-03_GTM%20vision_Final.pdf

- Analysis of cross border transmission gas tariffs between Portugal and Spain, http://www.erse.pt/eng/naturalgas/mibgas/Documents/Cross%20Border%20Tariff%20Analysis%20in%20MIBGAS%20(Final%20Version).pdf

- Pre-Release Gas Target Model: The MECOS Model, http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_CONSULT/CLOSED%20PUBLIC%20CONSULTATIONS/GAS/GTM_CfE/Tab1/20110404_Gas%20Target%20Model%20The%20MECOS%20Model%20Version%203.7%20-%20pre-release_fin.pdf

ACER documents

- Gas market integration via implicit allocation: Feasibility from the North-West European gas market perspective, http://www.acer.europa.eu/Gas/Regional_%20Intiatives/North_West_GRI/Documents/The%20Brattle%20Group%20%20gas%20implicit%20allocation%20report.pdf
- http://www.acer.europa.eu/Official_documents/Public_consultations/Pages/PC_2013_E_05.aspx

External Documents

- Regulation (EC) No 715/2009 of the European Parliament and of the Council of 13 July 2009 on conditions for access to the natural gas transmission networks and repealing Regulation (EC) No 1775/2005, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:211:0036:0054:EN:PDF

- Directive 2009/73/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in natural gas and repealing Directive 2003/55/EC, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:211:0094:0136:EN:PDF

- European Council – Conclusions – 4 February 2011, http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/ec/119175.pdf
- Benefits of an integrated European Energy Market, Booz&Company, David Newberry, Goran Strbac, Pierre Noel, Leigh Fisher, July 2013, http://ec.europa.eu/energy/infrastructure/studies/doc/20130902_energy_integration_benefits.pdf
- Entry-Exit Regimes in Gas, KEMA, July 2013, http://ec.europa.eu/energy/gas_electricity/studies/gas_en.htm

Web Documents

- http://www.gie.eu/
- http://www.entsog.eu/
- http://www.sedigas.es/
- http://www.erse.pt/eng/Paginas/ERSE.aspx
- http://www.omie.es/files/flash/ResultadosMercado.swf

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