TITLE: Interconnections; Leading the development of the unconventional gas value chain.

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Abstract:

The best way of promoting the unconventional gas is by adapting itself to the existing Value Chain model used for the conventional gas.

By overcoming the specific particularities that are derivative from the origin of the raw material, the extraction of the natural gas, the transmission system as well as the strategy followed for the development and maintenance of the infrastructures should not be differentiated.

There are three main reasons which motivate this argumentation:

1. The final using of the natural gas (both conventional and unconventional) is exactly the same.
2. Even if the origins of the gas are different, this should not prohibit that the supply chain used for the conventional gas was not be used by the unconventional gas to be transported to the final users.
3. The unconventional gas could play an important role in the common objective of guaranteeing the security of supply and the market integration thanks to the development of new international connections.

This is way, the objective of this document is to analyze the value chain of the unconventional gas and to justify the importance of the international connections, traditionally associated to the conventional gas value chain, for the promotion of a raw material that, even if it is not as known as the conventional one, it can also be part of the energetic mix which guarantees the security of supply, the market integration and the economic competitiveness.

Interconnections: Leading the development of the unconventional gas value chain

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1. Introduction

In the last IEA (International Energy Agency) published reports[1], it can be observed that both reserves and production of hydrocarbons have being systematically decreasing during the last years.

On the other hand, the demand trend is nowadays increasing. This is basically due to the economic growth that is taking place since a few years ago. The forecasts for the next decade point out that the natural gas will keep being the main resource of the energetic mix.

Thus, both the data and the forecasts indicate that the world is on the road to a situation in which natural gas would be the main actor in the strategy for getting a more sustainable energy.

The spot market and the gas exchange market have already a significant weight in the current energetic mix; they will become more and more important as far as the des-indexation of the petroleum and the natural gas prices will happen. At the same time, and due to the last developments in new technologies, some new possibilities have appeared in the gas industry, facilitating the access to some gas fields that were non-accessible before. Without any doubt, these facts opened the door to explore and to make use of the unconventional gas.

By focusing on the particularities of the unconventional gas, it is important to analyze the relevance that this hydrocarbon could have in Europe. It is well known that the irruption of the unconventional gas in the USA generated a *quiet revolution*[2] which produced a radical change in the energetic situation. On consequence, the USA moved its position in the market from a gas importer to a gas exporter. The *quiet revolution* implied a radical change in the industry and it generated a domino effect in the political ground worldwide. The unconventional gas has become an important challenge with important geopolitical consequences; two of the main ones are: (1) The European markets have already started to review their natural gas prices and (2) the separation of the 15% of Gazprom prices from the indexation of the oil ones.

The stellar show of the unconventional gas has helped to rebalance a market based on sellers, in favor of the buyers. It is getting to be the new political option in most of the European countries, by allowing the renegotiation of old contracts with high prices indexed.

Even with a small production in Europe, the unconventional gas is placing some limits to the natural gas prices, as it is being positioning itself as a potential diversification source of energy for the mix.

This argumentation makes feasible the development of the unconventional gas industry and its integration in the natural gas value chain in Europe in both an economically and politically attractive way. It could become a new negotiation tool for Europe in a gas market that is evolving. In addition, it would increase the security of supply of the European region by diversifying the energy sources and letting the prioritization of own sources.

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1 IEA. "World Energy Outlook 2014. Executive summary". 2014. Available at: http://www.iea.org/textbase/npsum/weo2014sum.pdf
IEA, "Resources to reserves 2013". 2013. Available at: https://www.iea.org/publications/freepublications/publication/Resources2013.pdf

2 Directorate general for external policies. Policy Department. "The Shale gas 'revolution' in the United States: Global implications, options for the EU". 2013. Available at: http://www.europarl.europa.eu/RegData/etudes/briefing_note/join/2013/491498/EXPO-AFET_SP(2013)491498_EN.pdf

How the unconventional gas could have a main role in the energy industry in order to achieve all the changes described above? This report defends that if we focus on the Value chain, the only differences between the natural gas and the unconventional natural gas are mainly in the extraction and treatment of the raw material:

- Extraction: done through new innovative methods from the accessing to the fields to getting the commodity.
- Treatment: This uses a specific method depending on the type of the unconventional gas to be extracted.

Regarding the rest of the value chain, once the unconventional gas is both extracted and treated properly it can be injected into the conventional gas transmission network. Thus, this report is showing the importance of the gas transmission interconnections in order to facilitate the unconventional gas guaranteeing the security of supply and the integration of the different markets with the goal of a single European market.

An analysis of the value chain of the unconventional gas is done in order to compare it with the value chain of the conventional one. The analysis reinforces the initial idea mentioned, which is that the use of the already existing (and future) conventional gas infrastructures shall be the key to promote the use of the unconventional gas. This approach leads to realize the value of the efficiency and it analyses the need of an efficient using, development and management of the interconnections in order to achieve the greatest goal: the unconventional gas favoring market integration.

Last but not least, the entry of the unconventional gas promotes the concept of the security of supply as it also diversifies the energetic mix in a national and European level. In addition, it would potentially reduce the gas imports from instable producers or politically problematic countries.

2. Building an efficient value chain for the unconventional gas; the importance of the interconnections

2.1 Comparative analysis of conventional and unconventional gas value chains

The industry defines as unconventional gas the one that is found in rocks or in unusual crystalline substances, which increases the difficulty of extracting the gas due to (1) the low permeability and porosity of the rocks or (2) because of the way the gas is hosted in those rocks.

Unconventional gas is also defined as:

1. The gas that cannot be extracted in an economically profitable way by using a common technology and
2. The one that requires a production based on new special technics of drilling and stimulation.

The specific technics of drilling generally means an over cost which make the production of unconventional gas depending directly on the conventional gas prices.

The IEA lists these different types of unconventional gas: “Tight gas”, “Shale gas”, “Coal-bed methane” (CBM) and “Gas hydrates”.

The potential contribution that each type of conventional and unconventional gas (excluding gas hydrates) can provide to the global supply in a long term basis is resumed in the following graph:

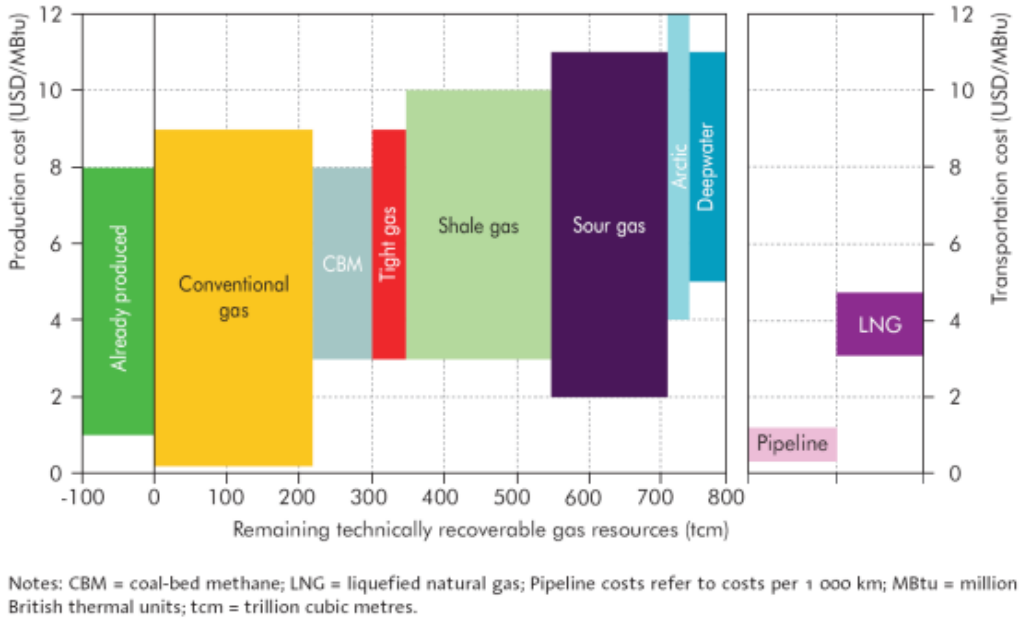

Figure 1: Production costs in 2008 (USD/MBtu) and remaining technically recoverable gas resources (tcm).

The right graph is showing the transmission costs of the natural gas (USD/MBtu) (/1000km in case of pipelines)
Source: IEA, "Resources to Reserves", 2013.

Currently, the commercially exploitable unconventional resources are about $343x10^{12}$ cubic meters. From that quantity, $212x10^{12}$ cubic meters are shale gas, $81x10^{9}$ cubic meters are tight gas and $50x10^{12}$ cubic meters are coal bed methane. The total costs of production are between 3 and 10 USD per MBTU.

The IEA predicted[3] in the *2014. New Policies Scenario* that the consumption of natural gas worldwide will grow up from $3,4x10^{12}$ cubic meters in 2011 to (at minimum) 5x1012 cubic meters in 2035. The 40% of that growth will be used for electric generation. It means an annual growth rate of around 1.6 %, even if this rate is different depending on the region.

The IEA considers that the 52% will be contributed by conventional gas and the remaining 48% will be contributed by unconventional gas. In any case, the AIE noticed that the previsions presented about the global production of unconventional gas are still uncertain and they will depend on both the governments and the industry ability to develop an adequate regulatory framework. Good practices will have to be developed too in order to let producers to obtain the social license to operate and to satisfy the big public concerns related to the environmental and social impacts.

The value chain in the gas industry covers production, treatment, transmission, storage and distribution, and each of these areas have a social and a business impact in the industry. In the case of the unconventional gas, the value chain is really similar to the conventional one, except for specific own features in terms of sustainability, cost effectiveness and social and environmental impact.

In the following figure it can be observed that the main differences between the conventional gas value chain and the unconventional gas value chain are focused upstream, being the rest of the chart almost the same one for both conventional and unconventional gas.

3 IEA. World Energy Outlook 2014. 2014.

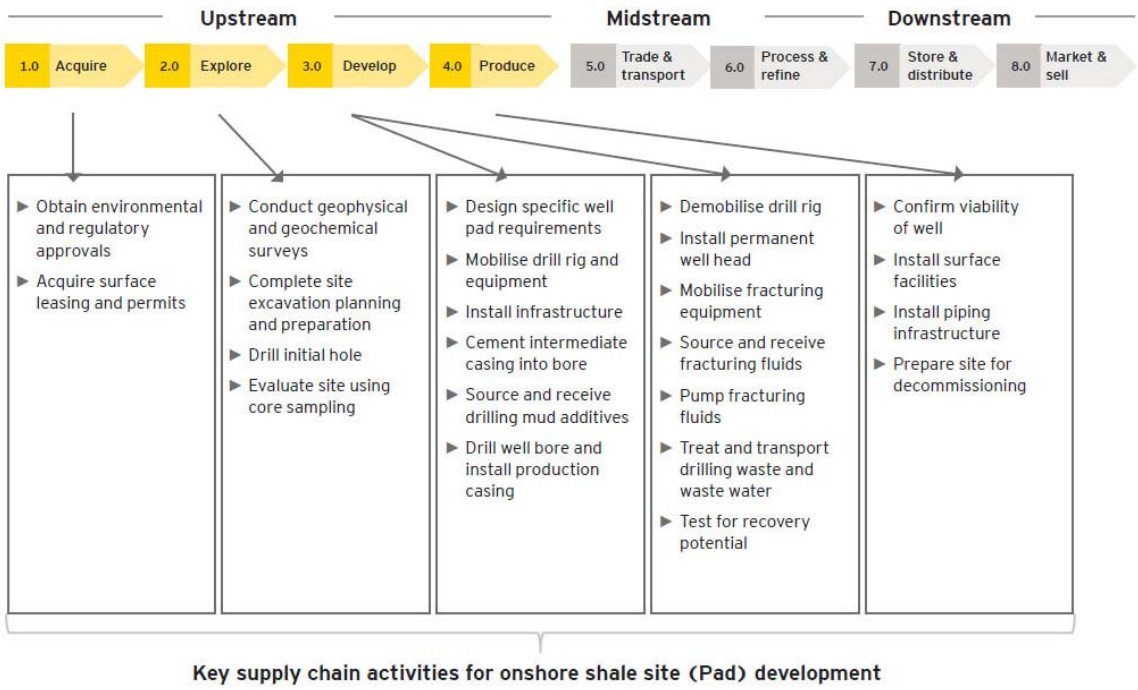

Figure 2: The onshore shale gas value chain and supply chain.
Source: EY, "Getting ready for UK shale gas Supply chain and skills requirements and opportunities". April 2014.

Thus, the unconventional gas value chain can potentially grow up quickly in the short term. There is just one thing which remains uncertain: the size of the mentioned growth. Except in North America, the unconventional gas business is currently in a nascent period and there are a lot of questions to be answered yet. Special mention to the ones related to the quality of the raw material, and the ability of companies to develop the business efficiently talking about economic terms.

As mentioned before, the social concerns and the environmental damage that could occur when treating the unconventional gas have increased as much as the demand does. The constant publication of reports related to water pollution, earthquakes and other kind of disruptions which already took place in local communities have damaged the production of unconventional gas (even more if the shale gas is mentioned). It is still pending to know how much this discussion will influence in different regions worldwide.

Therefore, to reach the objective of promoting the unconventional gas, all these obstacles shall be overcome through deep studies and understanding, and by using appropriate instruments and procedures for each exploited field to assure the environmental integrity of the area Once producers are made aware of these principles, there is no obstacle to assume that politicians should motivate the use of unconventional gas as the potential benefits from an economic point of view are out of discussion.

Regarding the Supply Chain, it is relevant to notice that it is relatively expensive to transport the gas if it is compared with its own production costs or even If it is compared with oil transmission costs. This is the main reason producers are attracted just by reliable resources that are well connected to the final consumers and that are offering the needed incentives both to produce gas and to transport to other markets.

The analysis is bringing two important conclusions which will reinforce the argumentation developed later in the paper:

1. It is a proven fact, that the unconventional gas is already playing a key role in the market.
2. It will play a main role in the future when it will achieve a quota close to the 48% of the total production of natural gas. This data reinforces the idea that the potential contribution of the unconventional gas to the global supply chain is becoming more and more relevant.
3. The main difference between the value chain of the unconventional gas and the value chain of the conventional one is found upstream in the exploration, production and treatment of the gas. This makes possible to use the conventional gas transmission system to transport unconventional gas to the final consumer.

This implies that once the existing social dilemma is overcome, the promotion and improvement of the conventional gas transmission systems, and more specifically the cross border interconnection points, will be one of the best ways to promote the use of unconventional gas.

2.2 The key significance of the Interconnections

When considering that the only important differences between the unconventional and the conventional gas are in the extraction and the treatment of the raw material it is logical to try to use the already existing value chain already existing for the conventional gas to the unconventional one, in order not to duplicate infrastructures. This means that the already existing infrastructures in place for the conventional gas should be also ready to transport the unconventional gas. In addition, the existing regulatory framework should be adapted too.

As there is a lot of variety when talking about transmission network infrastructures (pipelines, interconnection points, LNG terminals, underground storages…) and there are also so many different regulations worldwide, this report is focused on:

1. Interconnection points (IPs) as they are one of the main infrastructures needed for the correct transmission of the gas among markets and,
2. European market as it is traditionally an importing market.

An IP means a physical or virtual point connecting adjacent entry-exit systems or connecting an entry-exit system with an interconnector[4].

Originally, a traditional picture of the gas market showed a seller side which had the power of negotiating the price as the natural gas was considered a scarce resource. However, a picture taken today would show different things. The tendency of the market is being readdressed to a market where the buyer side is empowering his position. The reasons that are motivating this change are the discovery of new origins of supply and the improvement of the rules to third parties to access the markets and the transmission networks. As a result, the offer is increasing and the buyer side has more options to decide which one from the seller side will supply him which means the buyer side is getting a greater negotiating position.

In such a way, the only limitation not to let the market to grow properly is the lack of capacity to transport the natural gas to those areas where the demand is allocated. Thus, the promotion of natural gas (the conventional and the unconventional one) depends on the correct development, maintenance and operation of the existing interconnection points and the investment on new capacity.

[4] EC, "Regulation (EC) 984/2013 on establishing a Network Code on Capacity Allocation Mechanisms in Gas Transmission Systems". October 2013. Available at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:273:0005:0017:en:PDF

a. Congestion and capacity investment

In the year 2014 there were 36 congested IPs in Europe[5]. This means that there were network users that wanted to transport natural gas, for consumption, electric generation or just trading but they did not have the possibility to do it

	Individual IP sides	Bundles
Virtual	2	1
Cross Border	21	1
Third country	5	0
In-country cross-zonal	4	2

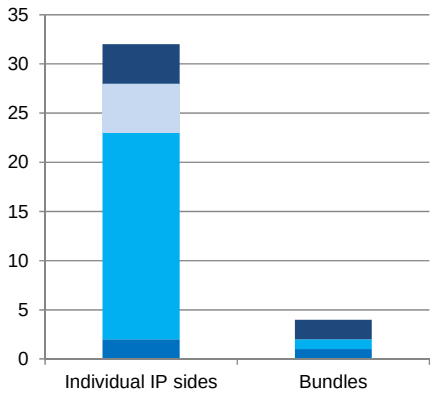

Figure 3: Contractual congestion by IP types (number of occurrences).
Source: Self-made based on ACER "Annual report on contractual congestion at interconnection points". 2015.

A contractual congestion situation occurs when the level of demand for firm capacity (means gas transmission capacity contractually guaranteed as uninterruptible by the transmission system operator) is higher than the technical capacity of the pipeline (means the maximum firm capacity that the transmission system operator can offer to the network users, taking into account the system integrity and the operational requirements of the transmission network). In the graph above it can be observed that the majority of the contractual congestion situations took place in cross border markets and not between markets inside the same country.

One of the main causes of these congestions is the difference between prices in the adjacent markets. On contrary, the main consequence is that the development of the market where the transmission is congested is suffering a real break as there is a potential demand in the market that cannot be satisfied.

A congested interconnection point is a barrier to entry to the market. Both congestion management procedures, which are categorized in the Annex I of the Regulation (EU) 715/2009[6], and the creation of new capacity are tools that help to surpass these barriers.

The correct application of the congestion management procedures facilitates the entry to new network users the congested capacity market; it provides a potential increase of competitiveness. However, the congestion management procedures just provide an optimization of the using of the existing transmission capacity. In case the IP is both fully booked and nominated the only way of satisfying the existing demand is the creation of new IPs or the increasing of the existing technical capacity in one of the IPs.

Whereas competition has been introduced in the European gas market, the infrastructures have largely remained in the regulated domain because they were considered essential facilities (even natural monopolies) which required proper regulation. Most of the European

5 ACER, "Annual report on contractual congestion at interconnection points". 2015. Available at: http://www.acer.europa.eu/official_documents/acts_of_the_agency/publication/20150529_acer%202015%20report%20on%20congestion%20at%20ips%20in%202014.pdf

6 EC, "Regulation (EU) 715/2009 on conditions for access to the natural gas transmission networks". July 2009. Available at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:211:0036:0054:en:PDF

Transmission System Operators has their retribution guaranteed by their own government under a revenue cap regime.

In Spain, the basics of the regulation on hydrocarbons are approved in the *Ley 34/1998 del Sector de Hidrocarburos*[7] (modified by the *Ley 8/2015*). In it, there is stablished a planning which is compulsory in the case of building and keeping new infrastructures in the network. This planning is made by the Government with the participation of the autonomic regions involved. The retribution for the infrastructures is published by the Government in an "Order procedure".

However, in the rest of the European Union, there is usually a national regulatory framework strongly established to ensure that the building of new infrastructures and the increasing of existing capacity at certain points is only being carried out under a market based mechanism, in order to assure that the costs of building and operating the infrastructures are being paid directly by the use of such infrastructure.

The market based national regulation is being extrapolated to the European regulation. A good example is the amendment to the Regulation (EU) 984/2013 on principles linked to the offer of incremental and new capacity in gas transmission systems [8] (pending on approval from European Commission) that will typify that the processes are established by *which capacity demand beyond the offer of existing capacity can be satisfied in a market-based manner, if the necessary investments are efficient and financially viable*[9].

There are two objectives at stake in regulating gas infrastructure expansion:

1. On one hand by combining the regulatory framework and the market environment incentives ensuring that an enough level of infrastructure investment should be provided.
2. On the other it should not lead to largely inefficient market outcomes that unnecessarily increase the cost of gas supply for final consumers.

b. Market liquidity and prices

When talking about market liquidity, it is necessary to take into account the situation of two different sides:

1. Buyer side: they are gas consumers no matter if they buy for own consumption, industrial consumption or electric production.
2. Seller side: they are network users acquiring the commodity and having access to the gas market in order to offer the gas to a third party.

The European markets are roughly captured by gas consumers but to get to be a network user, the seller side, depends on the real capacity to entry to a market. This is represented in the following picture:

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7 BOE, "Ley 34/1998, de 7 de octubre, del sector de hidrocarburos". October 1998. Available at: https://www.boe.es/buscar/pdf/1998/BOE-A-1998-23284-consolidado.pdf

8 ENTSOG, "ENTSOG PROPOSAL on amending Commission Regulation (EU) No 984/2013 of 14 October 2013 on principles linked to the offer of incremental and new capacity in gas transmission systems". December 2014. Available at: http://www.entsog.eu/public/uploads/files/publications/incrementalcapacity/INC0224_141226_Amendment%20Proposal%20CAM%20NC.pdf

9 ACER, "ACER guidance to ENTSOG on the development of amendment proposals to the Network Code on Capacity Allocation Mechanisms on the matter of incremental and new capacity". December 2013. Available at: http://www.acer.europa.eu/Gas/Framework%20guidelines_and_network%20codes/Documents/ACER%20Guidance%20on%20NC%20CAM%20Amendments%20(final).pdf

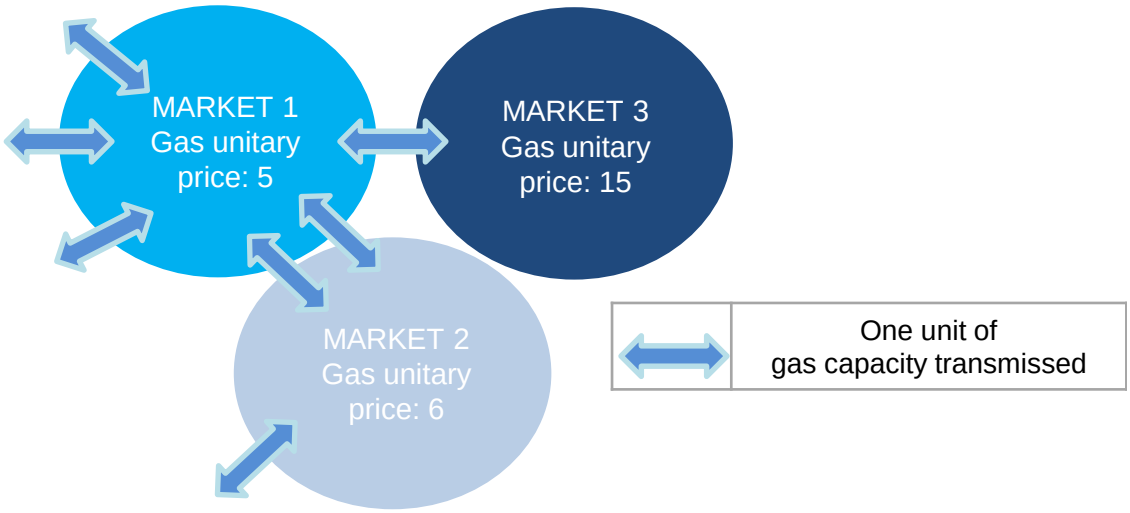

Figure 4: Example of market prices variation.
Source: Self-made.

In the example, the market 1 and the market 2 have IPs among each other and with third countries; consequently, the gas prices are influenced by the prices of the other markets. As the transmission capacity is high, the seller side has more possibilities to access to the markets what let them to compete within the prices to be offered to the buyers. The buyers can choose which one of the seller side will supply them. The market 3 has only one IP with the market 1. The access to the market 3 is limited and consequently there will be fewer sellers that will have the chance to offer gas to the buyers in the market. At the same time, sellers can increase the prices easily as there is not much competence. Thus, the price difference between market 3 and markets 1 & 2 are huge.

There are two ways to solve this situation:

1. To increase the existing capacity of the IPs between market 1 and 3, and/or
2. The building of a new IP with other market, which will open the market 3 to new sellers and will increase the competition by promoting market liquidity.

In case enough infrastructures between the three markets are built, a balanced price in the three markets could be reached.

The European markets would tend to a market integration of the markets in a unique one, which is one of the main goals of the Third Energy Package in Europe[10].

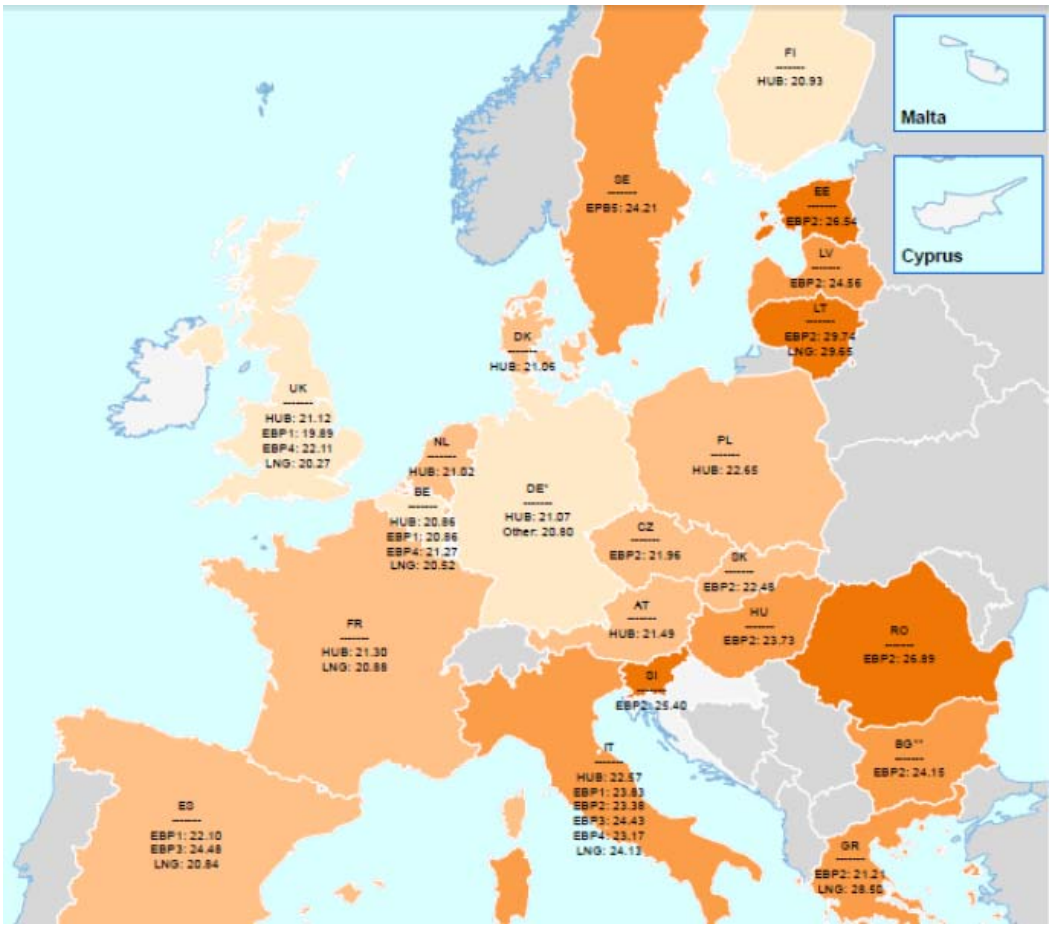

Figure 5: Comparision of EU average wholesale prices during the second quarter 0f 2015
Source: EC, "Quarterly report on European Gas markets". 2015.

Spain is the 6th country with the highest gas price after Romania, Latvia, Lithuania, Estonia and Croatia (Latvia and Estonia are not 100% liberalized markets, as they are partially intervened by their governments and they have a derogation for most of the Gas European regulation).

This difference in prices between adjacent countries means that consumers, even if they are separated by small distances, are spending such a different quantity for acquiring the same product.

Thus, the building of new IPs and the possibility of incrementing capacity in the existing ones would generate:

- Higher competitiveness between network users.
- Market integration, following the goal of the single European gas market. As stated by Booz&co[11] market integration would produce important economic benefits from price effects. If the potential situation of the unconventional gas oversupply occurs, market

[10] The third energy is a regulatory package for an internal gas and electricity market in the European Union. The package was proposed by the EC in 2007, and adopted by the European Parliament and the Council of the EU in 2009. It entered into force on 3 September 2009. Core elements of the third package include ownership unbundling, the establishment of a National regulatory authority (NRA) for each Member State and the Agency for the Cooperation of Energy Regulators which provides a forum for NRAs to work together

[11] Booz&co. "Benefits of an integrated European Energy Market". July 2013. Available at: https://ec.europa.eu/energy/sites/ener/files/documents/20130902_energy_integration_benefits.pdf

integration could facilitate a maximum benefit from price effects for EU 27. As further markets within the EU mature in terms of market liberalization and integration, more member states will be able to experience similar benefits. For market integration to occur, enough available connecting infrastructures between markets are necessary.

Although the existing infrastructures and the current regulatory framework established for the transmission network are key aspects for the development of the unconventional gas, it is necessary that the future projects to be built, will be done in a competitive way to assure the promotion of the market integration, the price equalization and the diversification of the current existing supply.

3 On the road to the balance of the energy trilemma

From a strategic perspective, the unconventional gas reaches the 3 main objectives from the energy trilemma. As Marta Camacho Parejo[12] pointed out, the trilemma is referring to the complicated objectives that all governments shall upfront: (1) a competitive energetic supply, deriving into (2) universal access to the energy and (3) the protection of environment.

In such a way, the trilemma treats the three main aspects of energy: security of supply, social equity and mitigation of the environmental impact. To reach the balance between these three principles is the key point in the road to prosperity and competitiveness between countries. The energetic sector shall accomplish the climate objectives imposed by the institutions and they also must reach a balance between the other two dimensions to assure the sustainability of the energetic systems.

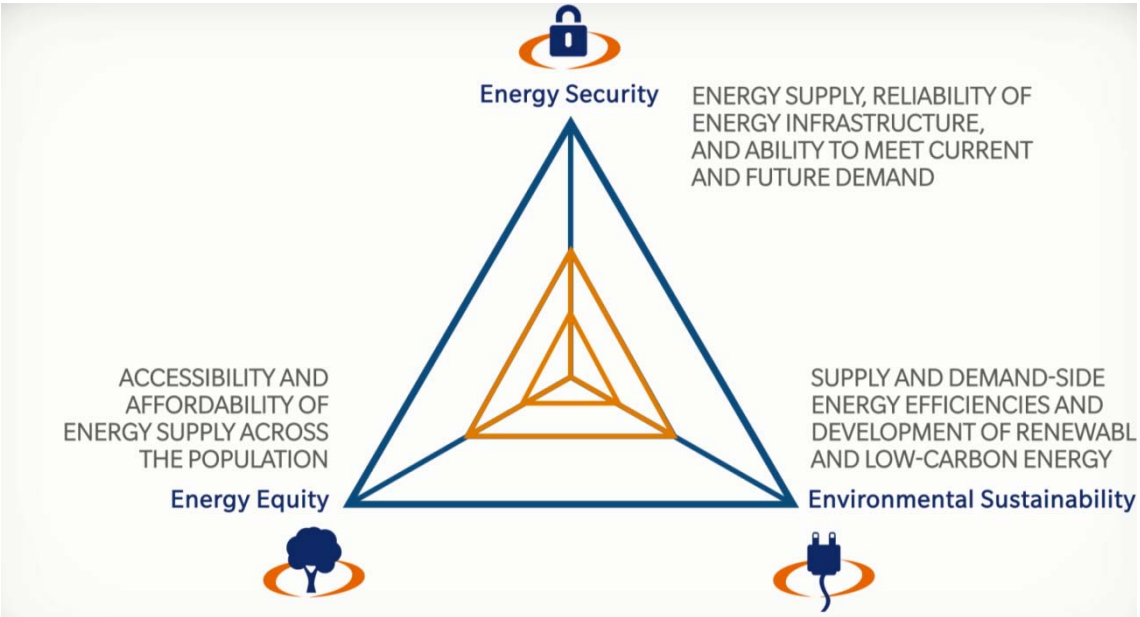

Figure 6: Balancing the Energy Trilemma
Source: WEC," World Energy Trilemma 2015: Priority actions on climate change and how to balance the trilemma", 2015.

The input provided to the energetic trilemma by unconventional gas is:

- **Security of supply:** the unconventional gas increases the security of supply as it diversifies the energetic mix and reduces the gas importation from instable producers or politically problematic countries.

  In a European perspective, even in a scenario where the production of the unconventional gas is zero (which is not the case), it offers an increase of importing

[12] Camacho Marta, "El trilema energético", 2012. Available at: https://www.worldenergy.org/wp-content/uploads/2012/12/Trilema-Energ%C3%A9tico-2012-Espanol.pdf

possibilities (by considering the LNG too) and consequently it is also contributing to the security of supply.

A high dependency of imports is not necessarily an indicator of a low level of security of supply for a country; actually, a scenario where there is a high level of supply diversification (no matter if the national production is included or not) coming from more than one country shall be considered a secure scenario which is adequate, reliable and accessible if the county is efficiently interconnected.

Thus, the diversification of the sources of natural gas offered (including both conventional and unconventional gas) assures the security of supply in a short and a long term. The combination of different resources, the development of new infrastructures and the efficient use of the existing ones is beneficial to reach an efficient and sustainable solution to assure the supply.

- **Economic competitiveness**: the unitary supply costs are still higher in Europe than in the USA but lower than the estimations of the future price of gas transported by pipeline from Russia, the Barents Sea or the Artic, that will be more expensive due to the old long term contracts.

  Additionally, the unitary production costs of the unconventional gas will tend to decrease in Europe, thanks to an improvement of the infrastructures and the optimization of the processes of extraction, treatment and operation.

  This defines the unconventional gas position as one of the top energies with the brightest future in the energetic mix.

- **Environmental sustainability**: in the time being, an intense debate is running in relation to the procedures to extract the unconventional gas. This boom regarding the exploration and the extraction of reserves is due to innovatory techniques as the horizontal drilling and fracking. Despite of this, the biggest environmental problem is the one that impacts in the floor and the landscape, due to the high quantity of drills that are necessary to explore a deposit, even if after the operation of the deposits are ended, they have to be restored. Therefore, the production of this type of gas should not suppose, in principle, a higher risk that the one that supposes the extraction of oil or the extraction of the conventional gas.

  On the other hand, an important part of these issues can be almost solved with an adequate policy of public transparency in all operations that are taking place. Although there is still any specific regulation in the European Union that specifically completes all the activities related to the unconventional gas, there is some European regulation related to environmental issues that has to be applied if treating with the unconventional gas. Besides, there are several non-binding studies which are becoming more and more relevant.

The correct balance of these three concepts guarantees a position for the unconventional gas close to the top one as a key energy in the following years.

4 Conclusions

- If the gas hydrates are not taking into account, the reserves of the unconventional gas are around the ¾ of the conventional gas. At the end of 2012, the shale gas was almost the 62% of the total of the unconventional recoverable resources pending of being extracted. The tight gas was almost the 23% and the other 15% was for the coal bed methane.
- The unconventional gas will provide around the 48% to the total growth of the production of natural gas between 2011 and 2035.
- The cross border trade of the natural gas will increase between 2011 and 2035. Thanks to the unconventional gas new producer countries as Australia, the USA and Canada will play a main role by taking advantage of their own fields. This will challenge the traditional exporters as Russia and Qatar.
- The exploitation of the unconventional gas is still in a first stage; studies may be carried out in order to develop it properly. The European governments should not focus the strategies on the already existing myths not to omit a potential bright future. It is essential for them to reach a long term strategy.
- The unconventional gas would modify the structure of the whole industry in the middle term. Besides, the excessive gas offer will take an important role in the European liberalization process and it will present great consequences for the natural gas suppliers.
- The gas value change is formed by production, treatment, transmission and distribution. Each of them has a different social impact and it is covered by a different business. The unconventional gas value chain is so similar to the conventional one but it is formed by some own features related to sustainability, cost effectiveness and both social and environmental impact.
- By considering that the main differences between the value chain of the unconventional gas and the conventional gas are focused on the extraction and treatment of the raw material it is logical to share the part of the value chain which is focused on the transmission no matter the origin of the gas.
- An IP is a physical or virtual point connecting adjacent entry-exit systems or connecting an entry-exit system with an interconnector. By building new IPs under market based procedures generates competitiveness by diversifying the supply and promoting market integration and price equalization.
- Further connecting infrastructures reduce the dependency of markets on a limited number of sources of supply, and can therefore improve the market's security of supply.
- The security of supply will be improved by the unconventional gas as the origin of the commodity would be diversified. In addition, it is necessary to develop a proper regulation.
- In principle, the unconventional gas is covering the main objectives of the energy trilemma as it increases the security of supply by offering and alternative to the energy mix and it reduces the imports from instable countries. In addition, it will be easily positioned as one of the top energies in the European mix and its extraction is not more dangerous than the oil or the natural gas one.

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