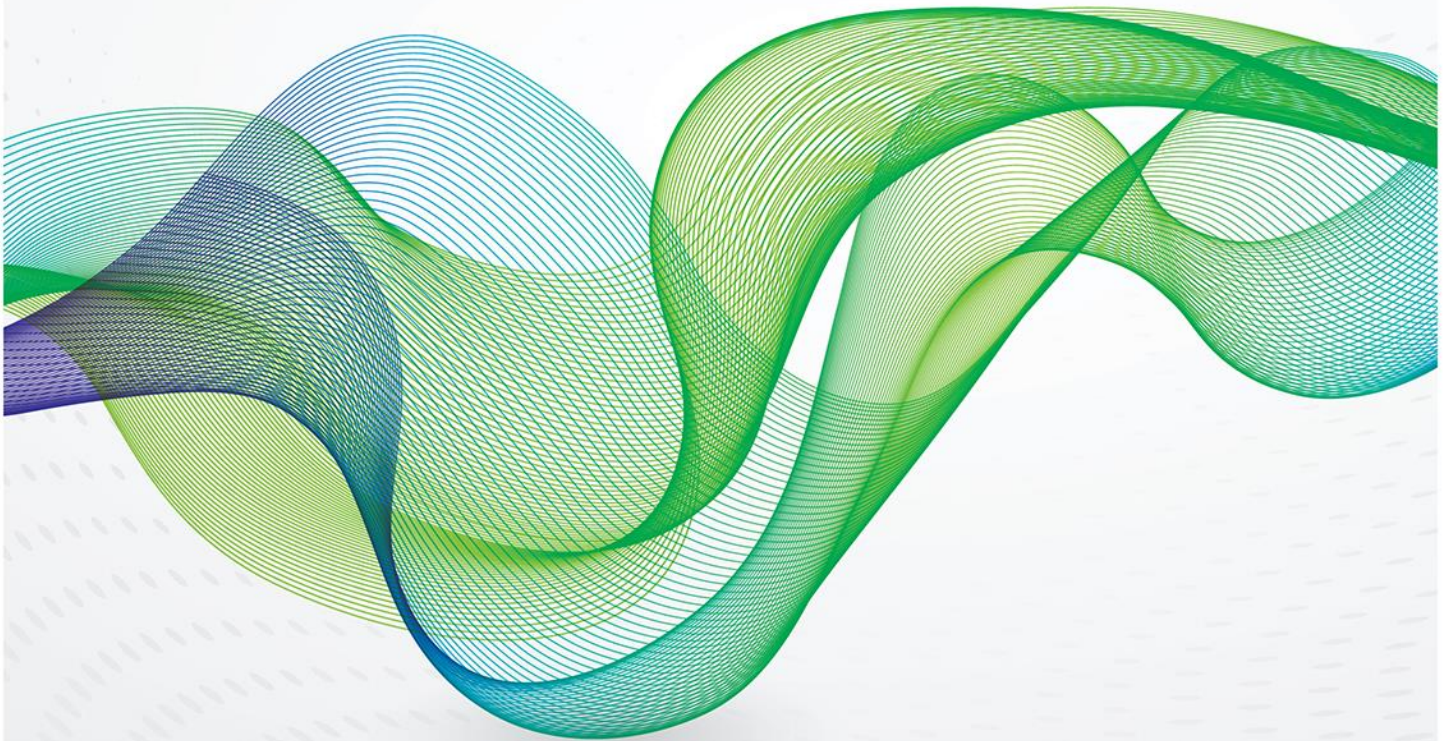
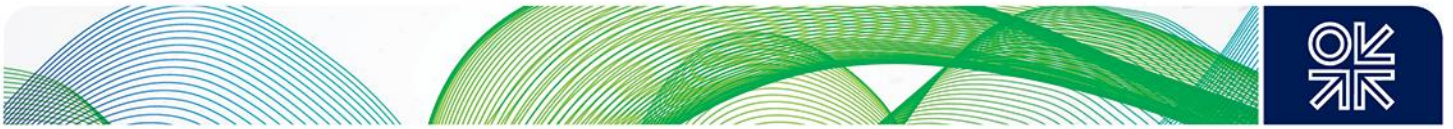


March 2019

# “A Hub for Europe” The Iberian promise?





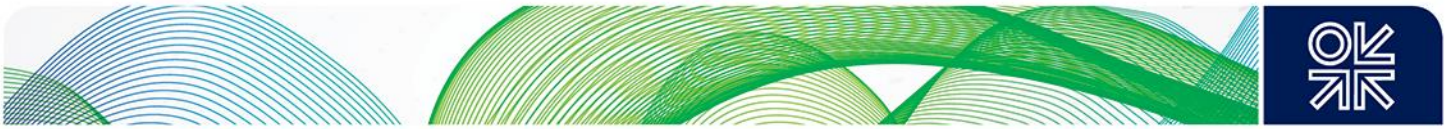
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ISBN 978-1-78467-132-7

DOI: <https://doi.org/10.26889/9781784671327>



## Acknowledgements

I would like to thank all those who helped me in this project, who answered my many questions, who helped me plan and arrange my visits, and who gave presentations to help me understand the current situation regarding the traded gas market in Iberia; in particular:

Alejandro Alonso Suárez, María Junco Madero, Grégory Héloir, Sergio López Perez, Rocío Prieto González, Lucie Roux, Raúl Santamaría Álvarez, María Sicilia Salvadores, and Rob Songer; if I have omitted anyone I sincerely apologise but thank you all the same!

The task of collecting all the relevant trading data was made easier by the help and assistance I received from several companies, in particular:

My thanks to LEBA, ICIS-Heren and Platts for providing OTC data and background information and news items; thanks to Pegas and MibGas for supplying data files of their exchange trades; thanks to the various market participants who advised, informed and helped me during the writing of this paper.

Lastly, but by no means least, I would like to thank my colleagues at the OIES for their ongoing help, guidance and encouragement, and in particular to Jim Henderson for his support and patience! Many thanks also to Kate Teasdale and John Elkins for their help in preparing the paper for publication.

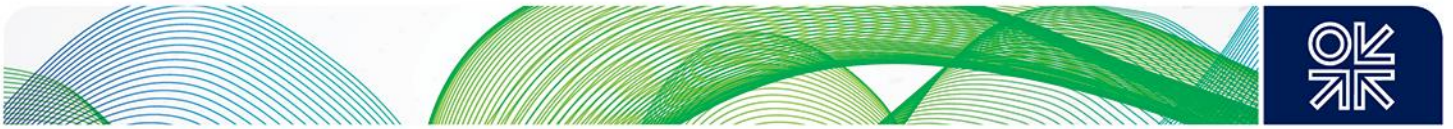


## Contents

<b>Acknowledgements</b> .....	ii
<b>Contents</b> .....	iii
<b>Figures</b> .....	iii
<b>Tables</b> .....	iv
<b>Maps</b> .....	iv
<b>1. Introduction</b> .....	1
<b>2. Contextual background</b> .....	2
2.1 Findings from the 2015 paper on the evolution of European traded gas hubs .....	2
2.2 Iberia: a ‘separate’ gas market .....	3
<b>3. Iberian gas infrastructure</b> .....	4
3.1 Iberian gas grid .....	4
3.2 Infrastructure connections outside of Iberia .....	7
<b>4. Iberian traded gas market</b> .....	11
4.1 A review of 2017 trading statistics .....	12
4.1.1 Objective parameters: The Five Key Elements .....	13
4.1.2 Subjective parameters: The Three Main Indicators .....	15
4.2 An initial update on 2018 trading statistics .....	16
<b>5. Commercial and trading implications going forward</b> .....	17
5.1 Prices and price correlation .....	18
5.2 The ability to arbitrage physical gas between Spain and France .....	21
5.3 Alignment of political will in Spain, Portugal, France and the EU .....	25
5.4 Italy: a new contender for the mantle of European SoS provider? .....	26
<b>6. Important development in January 2019</b> .....	29
<b>7: Summary and Conclusions</b> .....	30
<b>8: Appendices</b> .....	32
A) Interconnections and firm capacities in the South Region .....	32
B) Iberian Gas Network System .....	33
C) North African gas pipelines to Europe .....	33
D) EU Project of Common Interest 5.5.1, STEP: Information Sheet .....	34
E) EU Project of Common Interest 5.5.1, STEP: Implementation Plan .....	35
F) LNG hub proposal .....	36
G) European traded gas hubs in 2018 .....	37
H) Correlations between selected pairs of hubs .....	38
I) French grid North/South reinforcement projects .....	39
J) Prisma Capacity Auction Calendar .....	40
K) Actual Spain to France gas flows: 5th - 9th February 2018 .....	41
L) ICIS Infographic on PSV reverse flow project .....	42
M) Cross border entry/exit charges and transit fees, in €/MWh .....	43
<b>9: Bibliography</b> .....	44

## Figures

Figure 1: Spanish LNG sector in 2017 .....	8
Figure 2: DA prices at TTF, PEG Nord and PVB: 1 <sup>st</sup> October 2016 – 30 <sup>th</sup> June 2018 .....	19
Figure 3: DA prices spread for PVB/TRS and TRS/PEG Nord: 1 <sup>st</sup> October 2016 – 30 <sup>th</sup> June 2018 .....	20
Figure 4: France/Spain capacities and flows compared to the price spread: 1st October 2016 – 30th June 2018 .....	22
Figure 5: France/Spain capacities and flows: 1 <sup>st</sup> October 2013 – 30 <sup>th</sup> June 2018 .....	23
Figure 6: Pipeline imports into Spain from Algeria and France: 1 <sup>st</sup> January 2015 – 30 <sup>th</sup> June 2018 .....	25
Figure 7: DA prices at TTF and PSV: 1 <sup>st</sup> October 2016 – 30 <sup>th</sup> June 2018 .....	27
Figure 8: Spanish and Italian gas imports by source, 2017 .....	28



## Tables

Table 1: Transmission projects in the South Region .....	5
Table 2: Summary of the 5 Key Elements: 2017 .....	14
Table 3: Progression of the 5 Key Elements for Spain: 2015 - 2017 .....	15
Table 4: EFET Hub Scores categorised as mature/active, poor and inactive .....	16
Table 5: PVB Exchange and OTC traded volumes, 2017 and 2018 .....	17
Table 6: Progression of the 5 Key Elements for Italy: 2015 - 2017 .....	29

## Maps

Map 1: Projects in the Iberian Peninsula .....	9
Map 2: European gas regions, markets and hubs .....	13



## 1. Introduction

This is the fourth paper by the Author that explores the development of traded gas hubs in Europe. The first ‘The Evolution and Functioning of the Traded Gas Market in Britain’<sup>1</sup> explained how a traded market operates, as well as charting the sometimes rocky path taken by the British NBP to becoming a successful, mature traded gas market used for physical deliveries and balancing transactions but also, and more significantly, for risk management trades. The second, ‘Continental European Gas Hubs: Are they fit for purpose?’<sup>2</sup> posed the question whether the Continental European<sup>3</sup> gas hubs were ready to offer credible price creation, discovery and reference points, which could be used to provide a price index on which to base medium and long-term gas contractual pricing terms.

As the (North-West) European traded gas hubs continued to develop and gain traction with market participants and as new hubs were set up across Europe, with the promise of more to come, the author’s third paper, ‘The evolution of European traded gas hubs’<sup>4</sup> gave a comprehensive study of the whole of Europe, particularly in the context of the European Commission’s vision for a single energy market (in gas). There then followed a market update<sup>5</sup> co-authored with Beatrice Petrovitch.

This fourth paper will follow on from the chapter in Heather (2015)<sup>6</sup>, which gave an overview of the Iberian gas infrastructure and traded market in 2014. It will update the reader before posing the question, and analysing the viability, of Iberia becoming a hub for Europe, which until now was seen as very much a ‘separate’ market.

This paper will review the Iberian gas infrastructure, both internally and cross-border with France, before looking at the improvements in the traded market since 2014. Chapter 5 will give the results of an analysis of the price correlation between North-Western Europe and the actual physical cross-border flows to and from France, and see whether the resultant arbitrage of physical gas between Spain and France corresponds to the commercial signals.

In order to research this Paper, the Author travelled to Spain, to gain an in-depth understanding of the capabilities and the resilience of the gas infrastructure; of what progress has occurred in recent years towards a fully liberalised traded gas market; and of where the project to unify the Spanish and Portuguese gas hubs is at today? Meetings were held with the Spanish Energy Ministry, the Regulator, the Transmission System Operator (TSO), the Exchange and, perhaps most importantly, with Spanish and French market participants. This provided the insight to be able to present the findings to a wider public and to determine whether there is the right political will to see Iberia take a leading role in being a ‘port of entry’ for European gas supplies and fulfil the ‘promise’ in the paper’s title – that of becoming “a hub for Europe”?

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<sup>1</sup> Heather (2010).

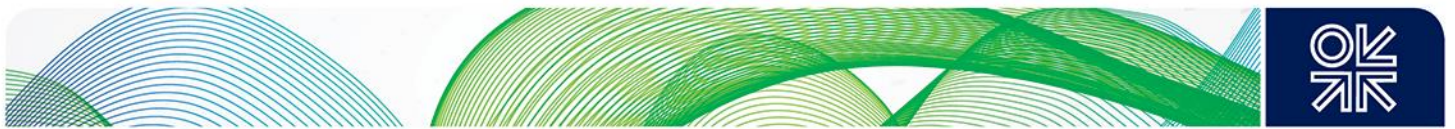
<sup>2</sup> Heather (2012).

<sup>3</sup> Specifically: Austria, Belgium, France, Germany, Holland, and Italy.

<sup>4</sup> Heather (2015).

<sup>5</sup> Heather/Petrovitch (2017).

<sup>6</sup> Heather (2015): Chapter 5.5.1 The Iberian Peninsula.



## 2. Contextual background

### 2.1 Findings from the 2015 paper on the evolution of European traded gas hubs

Chapter 5.5.1 of the 2015 paper presented the situation in 2014; it described the Iberian Peninsula as being “a ‘separate’ gas market from the rest of Europe, being primarily fed by LNG and pipeline gas from Algeria. Despite Spain having two Interconnection Points (IP) with France, there have been relatively limited flows of physical gas between the two countries, although this has increased over the past four years”. It went on to discuss the relative sizes of the Spanish and Portuguese gas markets and how there is a large focus on LNG supplies, despite Spain also having good pipeline connections with North Africa and with France. Indeed, in 2014, LNG accounted for 47% of Spain’s demand.

There had already been for some time the notion that Spain and Portugal would both benefit from a joint energy market, as well as satisfying the EU’s market integration objectives. This resulted in the aim to integrate the gas markets of Spain and Portugal into a single Iberian Gas Market (Mercado Ibérico de gas, or MIBGAS); however, progress up to that time on creating a single Market Area was very slow.

The paper described the situation in 2014 of the wholesale markets, the ‘traded’ hub and the newly formed electronic exchange. In respect of the wholesale markets, it said that “Spain’s physical gas market can be compared to a ‘spider’s web’, with LNG terminals and storage around the perimeter of the country, feeding the national distribution grid within. This allows for good flexibility to balance against the high installed capacity of renewables, in particular wind”.

At that time, the traded hub consisted of the AOC<sup>7</sup> which, in design, was very different to the virtual trading hubs in Britain, Germany and the Netherlands, which were based on trading in the whole of their respective gas grids; the AOC was a ‘balancing’ point in Spain’s storage facilities and therefore not a ‘proper’ virtual trading hub. The 2015 paper said that “there is very little or no OTC trading in Portugal and only a relatively small amount of ‘real’ trading at the Spanish virtual hub, the AOC” and “disappointingly, progress on creating an open and transparent trading hub has been very slow”. The electronic exchange, also called MibGas, had been operational since June 2013 and had started to record very limited traded volumes.

The AOC was replaced by the PVB<sup>8</sup> in 2015 and both transparency and liquidity have improved, as we will discover in Chapter 4 of this paper. The exchange has also benefitted from the introduction of the PVB hub.

Lastly, there was one project in particular that Spain was very keen to promote: “Spain has been pushing for the adoption by the EU of a Project of Common Interest, to build a new IP between Spain and France. In principle, Spain could export gas to northern Europe, thereby improving Europe’s security of supply. However, this aim can only be achieved once the French grid is strengthened in the latter part of the 2010s”. This is the project known as MidCat<sup>9</sup>, now essentially replaced by STEP<sup>10</sup>, which will be described in Chapter 3.2 of this paper.

The Chapter on Iberia concluded that “there are already four OTC brokers operating on the Spanish market (ICAP, CIMD, Prebon and IGH) and brokers are normally vital in encouraging development in an emerging market. With OTC presence, the changes brought in by the new Hydrocarbons Law, the promise of a new Iberian Gas Hub, the Spanish and Portuguese gas markets could develop to become an important entry point for physical gas to western Europe as well as a southern pricing hub”.

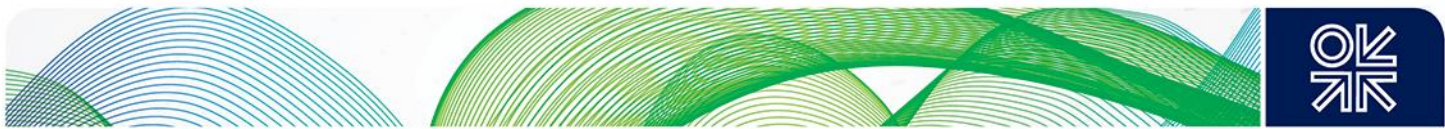
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<sup>7</sup> Almacenamiento Operativo Comercial (Commercial Operating Storage).

<sup>8</sup> Punto Virtual de Balance (Virtual Balancing Point).

<sup>9</sup> Midi-Catalonia pipeline.

<sup>10</sup> South Transit Eastern Pyrenees pipeline, considered as Phase 1 of MidCat but could suffice as a replacement.



It is this last main point that prompted the author to review the situation in Spain, and Portugal, and to analyse whether there has in fact been progress in the traded market; what the situation is regarding the STEP project; and whether Iberia could indeed be “an important entry point for physical gas to western Europe as well as a southern pricing hub”.

## 2.2 Iberia: a ‘separate’ gas market

The situation in 2018 regarding the Iberian infrastructure is much the same as it was in 2014. The Peninsula is still regarded as being a ‘separate’ gas market, with a pricing system different from that of its neighbours because it is still reliant on significant supplies of LNG.

The focus on LNG is still a feature<sup>11</sup> of the Spanish, and Iberian, gas market, although there is willingness for change, especially by the Spanish regulator who would like to integrate LNG better with its national gas market. Despite having 7 LNG terminals in Spain plus the one in Portugal, spread around the coastline, one is mothballed and the others are underutilised.

The Iberian market is linked more to the global LNG market and therefore LNG prices, rather than to the European wholesale market. Iberian wholesale gas prices are derived from the link to (Asian) LNG prices and also to TTF (and NBP) which is used as a reference for some downstream contract prices; this is what creates an unusual and particular commercial environment. The decision that importers of LNG need to make is whether to accept a cargo (for storage or re-gasification), to reload to northern Europe/Asia, or to divert it before it arrives.

One important development has been the move away from the AOC hub to the PVB virtual hub, which has certainly attracted more participants and which has resulted in a marked increase in traded volumes.

Iberian gas consumption rose nearly 15% from 2014 to 2017<sup>12</sup>; it is set to be a little higher again at 32.5bcm (or 364TWh) in 2018. Trading at the PVB has risen sharply from 2015 to 2018: just 3.29TWh traded in 2015, 28.71TWh in 2016, doubling to 60.33TWh in 2017 and, finally, increasing by a further 61% to 96.99TWh in 2018. However, this is still some way behind all the other western European gas hubs.

After 1<sup>st</sup> November 2018, with the fusion of PEG Nord and TRS in France, and given that the southern French hub will no longer act as a price signal for LNG imports, it should mean that the Spanish price could replace TRS as the pricing signal to attract LNG to Europe. This is further explained in Chapter 5 of this paper.

There have been a number of political and regulatory interventions to help promote the Spanish traded gas market since the publication of Heather (2015). Nevertheless, there are still some serious anomalies, both within Spain and between Spain and Portugal, which are not helping the further development of the market and not aiding the creation of a merged Iberian hub.

This paper will explore not only why Iberia is still today a separate gas market from the rest of Europe but also what are its future possibilities to develop both within the Peninsula and together with northern Europe.

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<sup>11</sup> GRIP (2017), p.92: “The Iberian Peninsula relies primarily on LNG<sup>11</sup> and Algerian gas<sup>11</sup>, due to its proximity to Algeria and higher LNG import capacity”.

<sup>12</sup> IEA yearly statistics of Spanish gas consumption: 27.1bcm in 2014; 27.9bcm in 2015; 28.6bcm in 2016; and 31.0bcm in 2017.





### 3. Iberian gas infrastructure

Situated at the extreme south west of Europe, the Iberian Peninsula is attached to southern France at the Pyrenees where there are two cross border pipelines; it also has two pipeline connections with north Africa and eight LNG import terminals. Furthermore, there is sufficient underground storage to supplement the very good LNG terminal storage capacity.

The transportation grid is unified across the Peninsula and although there are two separate TSOs and two sets of regulations, they do cooperate well and have plans to fully integrate the two gas markets in time. In 2014 the two existing physical IPs were 'merged' to form a single Virtual Interconnection Point, along with additional capacities and simplified access to the markets. In the same year the two physical IPs with France were 'merged' into one single Virtual IP also.

Spain's total import capacity is around 88bcma, compared to recent demand levels of 28-31bcma. This figure excludes the mothballed El Musel LNG terminal that could provide a further 7bcma. Portugal's import capacity is over 12bcma compared to recent demand levels of 5-6bcma<sup>13</sup>.

Thus for both countries, their import capacities are twice or more their most recent demand figures<sup>14</sup> and so there could be potential for exports towards northern Europe, given the right commercial framework. In the first instance though, it would be a case of maximising the current export route to France<sup>15</sup> but even then the current 60bcma of excess capacity would barely be affected. If the additional exports of the MidCat project<sup>16</sup> are included, were it to be completed, the excess capacity would still be of the order of 45bcma.

#### 3.1 Iberian gas grid

Spain started to develop its natural gas system long before Portugal although it was the Maghreb-Europe Gas Pipeline (MEG)<sup>17</sup> project, launched in 1990 to transport Algerian gas to Spain and Europe, which linked the gas systems of Spain and Portugal. Today there is a fully integrated gas grid<sup>18</sup> across Iberia.

From the start, the MEG was conceived as a joint project between Spain and Portugal, not only to bring additional gas supplies to Spain but also to gasify Portugal whilst creating a new direct supply route to Galicia in northern Spain.

From the outset, Spain's intention in co-financing the pipeline into Portugal was to deliver extra volumes of Algerian gas destined for the Galicia region. All the compression though is in Spain and, along with all of the Spanish high pressure and mid pressure grids, is operated by the Spanish TSO's<sup>19</sup> operations subsidiary, Enagás GTS<sup>20</sup>.

The MEG pipeline entered service on 1 November 1996, delivering new gas supplies to Spain from that year; the Portuguese section was operational from 1997 with 25% of the Algerian volumes going into Portugal. At that time, the total capacity was 8.5bcma, which increased to 12.5bcma in 2005.

The full project included two Interconnection points between Spain and Portugal, at Campo Maior (PT) – Badajoz (ES) in the south and Valença do Minho (PT) – Tuy (ES) in the north. Through

<sup>13</sup> IEA Monthly Gas Statistics: Portuguese demand was 5.16bcm in 2016; and 6.2bcm in 2017.

<sup>14</sup> See Appendix A for a map of the interconnections and firm capacities in 2017.

<sup>15</sup> Maximum Spain to France capacity in 2018 is 225GWh/d, or 7.3bcma, or 82TWh/yr.

<sup>16</sup> MidCat target firm Spain to France capacity is 230GWh/d, or 7.5bcma, or 84TWh/yr.

<sup>17</sup> For more information on the Maghreb pipeline see: <http://www.emplpipeline.com/en/>

<sup>18</sup> See Appendix B for a map of the Iberian gas grid.

<sup>19</sup> For more information on Enagás activities, see: [https://www.enagas.com/WEBCORP-static/CatalogoInteractivo\\_eng/files/assets/common/downloads/Enagas-Catalogue\\_2016.pdf](https://www.enagas.com/WEBCORP-static/CatalogoInteractivo_eng/files/assets/common/downloads/Enagas-Catalogue_2016.pdf)

<sup>20</sup> Gestion Tecnica Sistema.



cooperation between the REN<sup>21</sup> and Enagás, a new Virtual Interconnection Point called VIP Ibérico became fully operational since October 2014. Specific procedures have been established and applied by REN and Enagás regarding the optimisation of the available firm capacity at this point to ensure ease of use by the market participants. The capacities at the VIP are 4.6bcma from Spain to Portugal and 2.6bcma in the other direction.

There is a project regarding a potential third physical interconnection<sup>22</sup> through the northeastern part of Portugal at Vale de Frades on the border. This project has reached an advanced stage (see Table 1) with a planned commissioning date of early 2021. There will need to be new pipelines built in both countries to link up with the existing grids, from Celorico da Beira (PT) to the IP and then on to Zamora (ES). [Refer also to Map 1 below]

The planned firm cross-border capacity, in both directions, is 2.6bcma<sup>23</sup>, which would double the current capacity to Portugal and increase the current capacity to Spain by 56%. It is questionable whether there is a need for this extra connection but, like many infrastructure projects, there appears to be a political will to see it through.

Indeed, the project has been described thus<sup>24</sup>: “*This capacity enhances flexibility of both Spanish and Portuguese networks and consequently integrates the Portuguese market at Iberian Peninsula level. The 3<sup>rd</sup> IP between Spain and Portugal allows a better integration of Iberian and European markets and therefore improving competition in these markets. It also contributes to diversification of European gas supplies, promoting the market integration, security of supply and competition*”.

**Table 1: Transmission projects in the South Region**

TRANSMISSION PROJECTS IN THE SOUTH REGION				
Name	TYNDP Code	Status	Commissioning Year	Promoter
3 <sup>rd</sup> IP between Portugal and Spain (pipeline Celorico-Spanish border)	TRA-N-283	Advanced Non-FID	2021	REN-Gasodutos, S.A.
Interconnection ES-PT (3 <sup>rd</sup> IP) – 1 <sup>st</sup> phase	TRA-N-168	Less-Advanced Non-FID	2021	Enagás Transporte, S.A.U.
South Transit East Pyrenees (STEP) – Enagás	TRA-N-161	Advanced Non-FID	2021	Enagás Transporte, S.A.U.
Iberian – French corridor: Eastern Axis – Midcat Project	TRA-N-727	Less-Advanced Non-FID	2022	Enagás Transporte, S.A.U.
Interconnection ES – PT (3 <sup>rd</sup> IP) – 2 <sup>nd</sup> phase	TRA-N-729	Less-Advanced Non-FID	2025	Enagás Transporte, S.A.U.
3 <sup>rd</sup> IP between Portugal and Spain (Compressor Station)	TRA-N-284	Less-Advanced Non-FID	2025	REN-Gasodutos, S.A.
3 <sup>rd</sup> IP between Portugal and Spain (pipeline Cantanhede – Mangualde)	TRA-N-285	Less-Advanced Non-FID	2025	REN-Gasodutos, S.A.

Source: ENTSOE Gas Regional Investment Plan - South Region 2017, taken from Table 6.5, p.77

Storage facilities in Iberia are more than sufficient for the needs of the region. They comprise four underground storage (UGS) facilities in Spain<sup>25</sup> and one in Portugal<sup>26</sup>, as well as the extensive

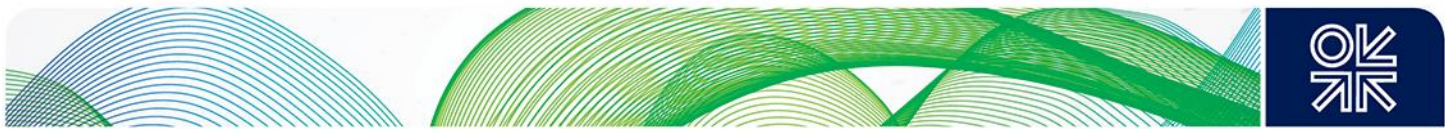
<sup>21</sup> Portuguese TSO, Redes Energéticas Nacionais.

<sup>22</sup> Full details are given in GRIP (2017): p.79.

<sup>23</sup> To which there will be a further 2.6bcma of interruptible capacity.

<sup>24</sup> GRIP (2017): p.80.

<sup>25</sup> The largest, AS Gaviota (1546 Mm<sup>3</sup>) is offshore Bilbao; AS Yela (1050 Mm<sup>3</sup>) is northeast of Madrid; AS Serrablo (820 Mm<sup>3</sup>) is in the Pyrenees; and AS Marismas (62 Mm<sup>3</sup>) is north of Cadiz. Source: CNMC.



storage available at the LNG terminals. The UGS and LNG terminals are quite evenly spread around the Peninsula. The UGS working gas capacity in Spain is 2.6bcm with a maximum withdrawal rate of 16mcm/d; in Portugal, the working capacity is 0.2bcm and the maximum withdrawal rate is 7mcm/d<sup>27</sup>.

The seasonal modulation is lower in this part of Europe and so storages play a secondary role in the Spanish gas system resulting from its lower capacity compared to LNG terminals or IPs and strategic stocks. However, Carriço underground storage in Portugal helps with daily modulation especially on higher demand days.

Another project high on the list of politicians, in Spain, Portugal and in Brussels, is the merger of the two Iberian grids into one Market Area. The Portuguese and Spanish electricity grids were merged in 2004 but gas has proved to be more problematical. The Iberian Gas Hub has been talked about for a number of years and there have been many intergovernmental meetings and treaties but progress has been painfully slow.

Despite the apparent political will<sup>28</sup>, it seems as though it is the politicians and the respective TSOs who are dragging their feet. The main issue<sup>29</sup> is the redistribution of cross-border capacity tariffs when creating a single merged Market Area. Portugal wants the IP tariffs to be dropped completely before progressing to a unified Iberian hub but Spain<sup>30</sup> is insisting that there should be a financial split reflecting the current tariff structure<sup>31</sup>.

In Spain, the Energy Ministry is currently in control of setting entry/exit tariffs although this should change following pressure (see below) from the CNMC<sup>32</sup>. Indeed, the regulator's role is now under ministerial review and, should it regain control of setting the tariffs, this will facilitate discussions with ERSE<sup>33</sup> directly to agree a new repartition of 'cross border' fees.

To further complicate the issue, the Spanish government wants<sup>34</sup> a high level, fully detailed, Inter-Governmental Agreement (IGA) with Portugal, in order to proceed to creating the new Iberian gas hub; this is what it did regarding the electricity merger. However, CNMC and ERSE both believe that progress could and probably will be made by the two regulators cooperating, and potentially without, or before, any IGA is signed.

According to CNMC there are very few physical and even IT issues to merge but one interim solution might be to establish an 'Iberian trading region', with two separate TSOs but one traded market, in a similar way to the French TRS (and now TRF). Of course, this is just a suggestion made by market participants frustrated at the lack of progress and, in itself could take quite some time to agree.

Frustratingly, the current situation is one where there is no virtual trading hub in Portugal (although there is a regulated 'virtual point') and there is no balancing zone with daily balancing (as required under the European Network Code). Although MibGas has been authorised and is set up and ready to take that role operationally, REN is balancing using Spanish balancing tariffs<sup>35</sup>.

The disagreement between the CNMC and the Spanish energy ministry (of the former government) was a serious matter, leading to a conflict between the CNMC and the European Commission; it has

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<sup>26</sup> AS Carrizo (171 Mm<sup>3</sup>) is half way up the Atlantic coast. Source: CNMC.

<sup>27</sup> Cedigaz (2017), Table 3, p.7.

<sup>28</sup> See Lisbon Declaration in the following Chapter.

<sup>29</sup> The views expressed in this chapter come from comments by interested parties made during interviews with the Author.

<sup>30</sup> The Author understands that it is the Ministry and not the TSO that is currently opposing eliminating the tariffs.

<sup>31</sup> The 2017 combined exit/entry tariffs (in €/MWh) are for ES-PT: 1.01 for Annual, 1.18 Monthly and 2.28 Daily; however, in the PT-ES direction they are: 0.36 Annual, 0.36 Monthly and 0.87 Daily.

<sup>32</sup> Spanish Regulator, Comision Nacional de los Mercados y la Competencia.

<sup>33</sup> Portuguese Regulator, Entidade Reguladora dos Serviços Energéticos.

<sup>34</sup> According to CNMC in an interview with the Author.

<sup>35</sup> Information given to the Author in an interview with the MibGas exchange.



even been a matter of headlines in the Spanish press<sup>36</sup>. However, it appears that the new administration has made it clear that it wants to resolve the matter by moving more authority from the Ministry to CNMC. The Ministry, through the State Secretariat for Energy, sent letters to the European Commissioner for Energy and Climate Action and the president of the CNMC on 19<sup>th</sup> June 2018.

The Minister for the Ecological Transition of Spain has stated<sup>37</sup> that she “*is already working to deactivate the measures adopted by the previous Government, for which it reserved the fixing of electric tolls in detriment of the competences of the National Commission of Markets and Competition (CNMC), such and as required by European rules*”.

In the statement made by the Secretary of State, he expressed<sup>38</sup> his desire to “*resolve this issue in the shortest time possible*” and, for that, proposes to the CNMC the creation of a working group with the purpose of “*defining an adequate legal framework in this matter*”.

Following these events, CNMC now believes that it will regain its full regulatory powers, including in the gas sector. There might then be a more positive approach to creating a single Iberian gas market.

### 3.2 Infrastructure connections outside of Iberia

There are 7 active LNG terminals plus one mothballed, and pipeline connections with North Africa and France. To add to these there is a project to build a new pipeline connection with France, which has been classified as a European Project of Common Interest (PCI).

The Portuguese TSO subsidiary, REN Atlântico, owns and operates the LNG Terminal at Sines, in the south of the country.

The Spanish TSO operations subsidiary, Enagás GTS, is responsible operationally for all the Spanish LNG terminals which are either 100% or majority owned by Enagás. They are shown, along with general LNG information on the CNMC slide in Figure 1. The El Musel terminal is awaiting government approval to start operations if and when further LNG capacity is required. All the terminals have the same exit tariffs into the Spanish grid, set at €1.50/MWh.

As can be seen in Figure 1, the average utilisation rate is a low 25% but that equals just short of half Spanish demand. What is a notable point is that the terminals can store up to 23 days of gas demand, meaning that they play an important role in helping balance the grid. This clearly underlines why Spain is said to be an LNG market.

There are two gas pipelines from North Africa, both bringing Algerian gas<sup>39</sup>: the MEG pipeline brings 12.5bcma of gas from the Hassi R'Mel field in central northern Algeria, via Morocco to land at Tarifa in south-western Spain; and the Medgaz pipeline bringing 8bcma of gas from the same field to land at the south-eastern tip of Spain at Almería.

Sonatrach recently announced<sup>40</sup> that it wants to boost the capacity through the Medgaz pipeline, initially to 10bcma by installing a turbo-compressor; and with the addition of more turbo-compressors the Medgaz capacity could be further expanded to 16 bcma by 2020. Sonatrach is also building a new pipeline in Algeria, to connect the MEG at the Algerian/Moroccan border with the Medgaz export facility at Beni-Saf, thereby creating a ‘loop’, giving the company more flexibility and optionality in its exports to Spain.

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<sup>36</sup> See Europa Press, 21st June 2018: “Ribera ya trabaja para resolver el conflicto abierto por Nadal con la CNMC y devolverle sus competencias” (Ribera is already working to resolve the conflict opened by Nadal with the CNMC and return its powers): <http://www.europapress.es/economia/energia-00341/noticia-ribera-ya-trabaja-resolver-conflicto-abierto-nadal-cnmc-devolverle-competencias-20180621115432.html>

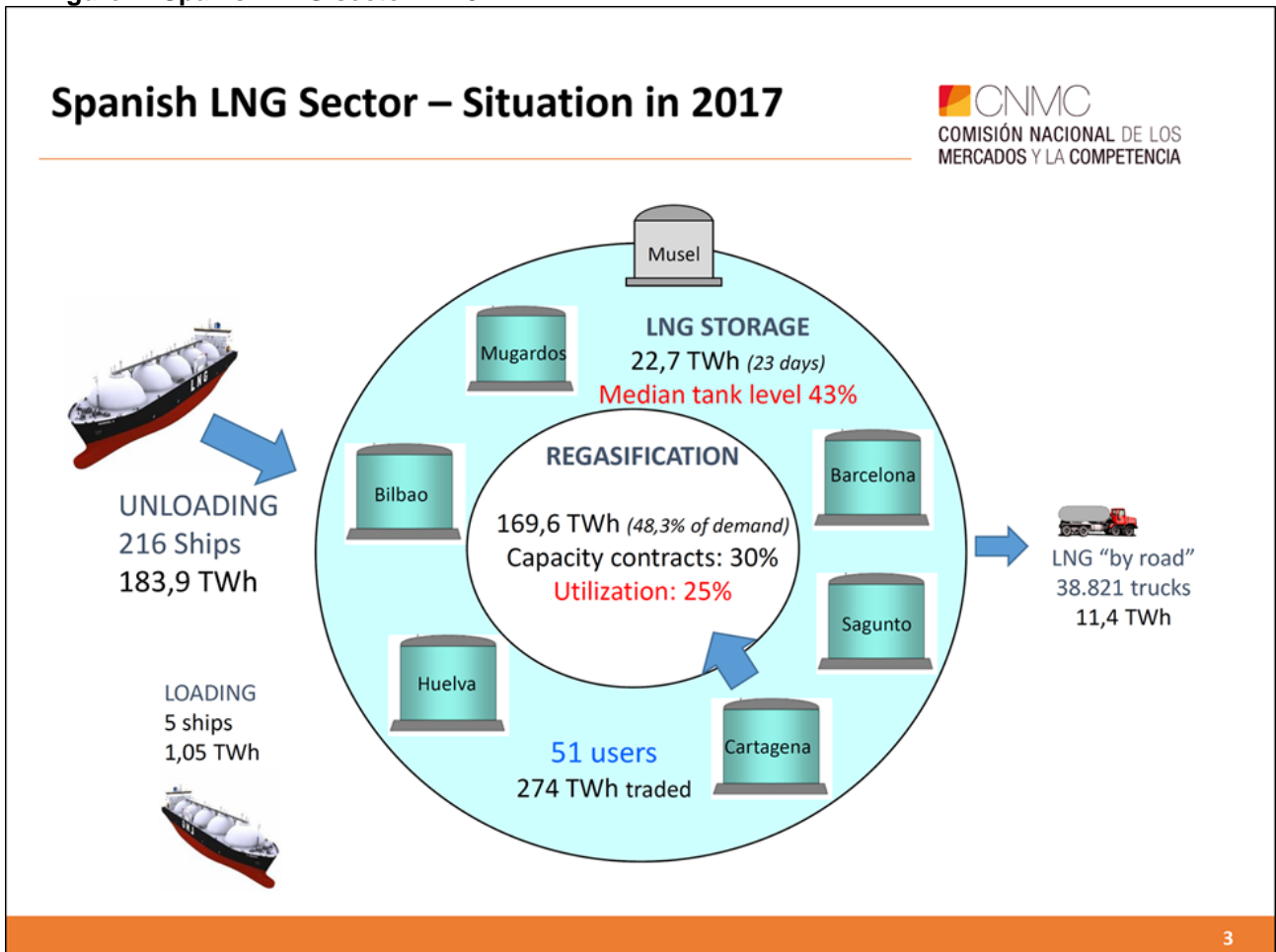
<sup>37</sup> Ditto.

<sup>38</sup> Ditto.

<sup>39</sup> See Appendix C.

<sup>40</sup> Petroleum Africa, 17<sup>th</sup> September 2018: “Sonatrach Looking to Boost Medgaz Capacity”: <https://www.petroleumafrika.com/sonatrach-looking-to-boost-medgaz-capacity/>

Figure 1: Spanish LNG sector in 2017



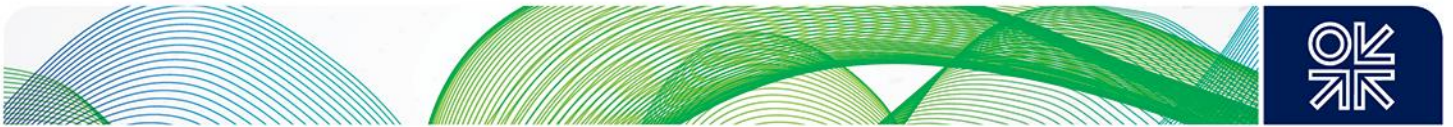
Source: CNMC presentation, July 2018

The two existing pipeline connections with France are situated on the western side of the border, at Biriadou (FR) - Irún (ES), which is bi-directional and at Col de Larrau, which is mainly used for importing into Spain. These two physical IPs were merged in 2014 into one single virtual point known as VIP Pirineos.

The development of gas interconnection capacity between France and Spain has been a priority for integrating the Iberian Peninsula with the rest of Europe, with the TSOs on both sides committed to developing available capacity and usage. The capacity has been recently increased on the basis of long-term commitments taken by shippers through the 2013 and 2015 'open seasons'. Since 1<sup>st</sup> January 2016, the import capacity into Spain at the VIP Pirineos was increased by 60GWh/d to 225GWh/d during the winter period and to 235GWh/d during the summer; export capacity from Spain to France was also increased on the same date, from 175GWh/d to 225GWh/d, all year round.

Further development of the cross border flows is being promoted by Enagás and Teréga<sup>41</sup> with a project to build a third physical interconnection between the two countries, on the eastern side of the border. The full project is known as the Midi-Catalunya (MidCat) project with an estimated cost of

<sup>41</sup> Teréga is the TSO for the TIGF (Transport et Infrastructures Gaz France) gas grid in South-West France.



€3.1Billion, although it has now been joined by a scaled down version, known as the South Transit East Pyrenees (STEP)<sup>42</sup>, with an estimated cost of €400-450Million.

These projects can be seen on Map 1: MidCat would go from Hostalrich in Spain to Barbaïra in France, crossing the border at Le Perthus but also includes grid reinforcements across north-eastern Spain (TRA-N727) as well as two projects in France, the Gascogne-Midi reinforcement and the Barbaïra to Saint Martin de Crau through Cruzy reinforcement (dotted line on the map). STEP consists of just the cross border section from Hostalrich in Spain to Barbaïra in France and the Gascogne-Midi reinforcement elements.

**Map 1: Projects in the Iberian Peninsula**



Source: ENTSOG Gas Regional Investment Plan - South Region 2017, Figure 6.6, p.70

MidCat and the 3rd Portugal-Spain interconnection were underpinned by strong political support, although the words were never followed up with direct financing. On 4<sup>th</sup> March 2015, the President of France, the Prime Minister of Spain, the Prime Minister of Portugal and the President of the European Commission signed the “Madrid Declaration”<sup>43</sup>. The President of the European Investment Bank also

<sup>42</sup> See Appendices D and E for more information.

<sup>43</sup> Madrid Declaration: <https://ec.europa.eu/energy/sites/ener/files/documents/Madrid%20declaration.pdf>



attended the meeting. In this declaration, they “agree on the need to actively assess in order to complete the Eastern gas axis between Portugal, Spain and France, allowing bidirectional flows between the Iberian Peninsula and France through a new interconnection project currently known as the MIDCAT. The 3rd Portugal-Spain interconnection should be developed in accordance”.

These intentions were reinforced 3 years later by the signing of the “Lisbon Declaration”<sup>44</sup> on the 27<sup>th</sup> July 2018 by the President of the French Republic, the Prime Minister of the Portuguese Republic, the President of the Government of the Kingdom of Spain, and the European Commissioner for Climate Action and Energy. In this declaration they agreed that “Portugal, France and Spain recognise the importance of gas interconnections in the region, both for regional purposes and as a key contribution to security of supply in the European natural gas market”. Furthermore, “This strategy should promote the increase of two-way gas flows between Portugal, Spain and France, contributing to a more secure and affordable internal energy market”. Finally, they conclude “The signatories also recognise the relevance of the signature of the MIBGAS Treaty between Portugal and Spain, which will allow a deepening of the Iberian gas market and its future integration with the French gas market, thus contributing to the full establishment of the internal energy market”.

Both MidCat and STEP were granted European Union Project of Common Interest status and even attracted some financing to establish their viability. Some of that was spent on commissioning Pöyry Management Consulting (Pöyry) to perform a cost/benefit analysis<sup>45</sup> for the STEP project in line with the ENTSOG methodology.

Pöyry concluded “that STEP may have economic value but in presence of a specific combination” of factors, including low levels of European demand, restricted availability of gas from Algeria and a tight LNG market with high prices. However, the body of the report is quite negative towards the project, suggesting that in most scenarios it analysed, there was no real benefit to the STEP project.

As well as the political support, Enagás and Teréga have been keen to promote both the MidCat and now the STEP projects. The TIGF grid was bought<sup>46</sup> by the Italian gas TSO, SNAM, who made the investment decision based on the cross-border project/s going ahead. Of the regulators, CNMC had not made a pronouncement<sup>47</sup>, whilst the French regulator has been resistant. However, the French incumbent gas company, ENGIE, and the other French TSO, GRTgaz have both been strongly against the two projects; GRTgaz has said that if Europe needs more gas then it has spare import capacity at its LNG terminals!

If STEP does go ahead Spain will need to reinforce its grid, in order to meet cross-border capacities in the situation where LNG is not available at Barcelona; this is because Barcelona is one of the main LNG import terminals and the volumes of gas it injects into the Spanish grid in the north east are quite significant. Therefore, if for whatever reason there was a lack gas in that part of the grid, the guaranteed minimum capacity flows towards France would be compromised. Some extra compression will also be needed to push the gas across the border.

Providing extra security of supply for Europe is certainly feasible operationally: there is more than enough pipeline and IP capacity already, with even more if STEP is built. The Iberian gas grid is resilient with plenty of sources of supply and good storage facilities and well placed geographically. Therefore, it should be possible, today and without any grid infrastructure improvements, to have a single Iberian Market Area and to ship gas north to France and beyond.

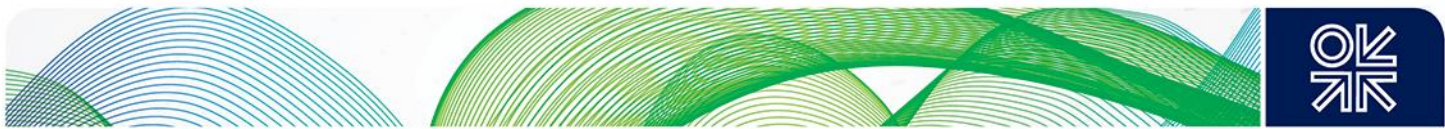
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<sup>44</sup> Lisbon Declaration: Second Energy Interconnections Summit: Portugal-France-Spain -European Commission-EIB : Lisbon, 27 July 2018: [https://ec.europa.eu/info/sites/info/files/lisbon\\_declaration\\_energyinterconnections\\_final.pdf](https://ec.europa.eu/info/sites/info/files/lisbon_declaration_energyinterconnections_final.pdf)

<sup>45</sup> Pöyry (2017).

<sup>46</sup> SNAM became a 45% majority shareholder in the purchase of TIGF from Total in 2013.

<sup>47</sup> Prior to January 2019; see Chapter 6.



#### 4. Iberian traded gas market

When looking at the traded gas market in Iberia, there are trading data to analyse in Spain, but none in Portugal. The Portuguese regulator, ERSE, qualifies this, stating<sup>48</sup>: “*The Portuguese wholesale gas market lacks liquidity and transparency, which hinders the efficient allocation of resources, risk hedging and new entries. Portugal is not a transparent market, in the sense of a “market” whereby the sum of gas trading activities with delivery is agreed on a specific delivery point and is concluded using a transparent trading venue*”.

The Portuguese Regulator has designated MibGas as the market operator in Portugal but it is still negotiating the conditions of insertion of the VTP (mainly linked to the issues surrounding the repartition of ‘cross border’ fees). Portugal has accepted the MibGas regulations but is still reluctant to unify the balancing zones into one Market Area; in the interim, the exchange has suggested/offered running a ‘market coupling’ service (bundled with implicit IP capacity) but this proposal has not received any real interest. This less positive approach by Portugal compared to Spain might be due to it being less committed to the exchange’s operation<sup>49</sup>.

Spain on the other hand does have a traded gas market which has experienced progressive development over the past few years. There is now a virtual hub, the PVB, and both OTC and exchange trading takes place there. The two forms of trading are very different in the types of contract transacted<sup>50</sup>: the OTC market trades far more along the forward curve, whereas the exchange only trades spot and prompt contracts, up to and including the Month Ahead (MA).

The OTC market is primarily used to hedge against LNG cargoes (and it does trade in large volumes). Indeed, the far curve on PVB is a good barometer of future LNG supply. There have been several new entrants to the OTC market since 2017, namely Axpo (who brought the first Yamal LNG into Spain) sharing cargoes with other independents. Another new entrant is MET, a small Hungarian trading house based in Switzerland, as well as Gunvor, BP, Vitol, and Trafigura, who are probably more in the category of opportunistic traders.

The MibGas exchange is mainly used for shipper balancing of portfolios, although it has applied to extend the range of available contracts beyond the MA expiry. It would also like to introduce cleared futures but the rules governing those are still being devised. In addition, the publication of the Royal Decree 335/2018 of May 25th allows for the development of new regulated LNG capacity products.

In order to try and foster greater liquidity, MibGas has been allowed<sup>51</sup> to make agreements with companies who will assume the role of market makers. Further to that resolution, the Ministry of Energy launched a public consultation on the conditions to allow the dominant market operators to become market makers. However, the final Resolution has not been published yet. At present, Axpo Iberia and ENGIE España are the voluntary market makers and they have been introducing offers into the market until December 2018 when a new call was made; the same two market makers have been approved by the Ministry<sup>52</sup> for the first half of 2019.

The MibGas exchange has also requested Ministry approval to lengthen the trading hours of its prompt and MA contracts to end at 6pm instead of 5pm, in order to attract trading after the close of

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<sup>48</sup> ERSE (2017), p.1.

<sup>49</sup> REN (as is CNMC) is a shareholder of MibGas but does not financially contribute to its running costs (unlike CNMC who contribute €4M/a); there are other shareholders too.

<sup>50</sup> OTC contract split: Spot/prompt 6%; Months 32%; Qtrs/Ssns/Yrs 62%; Exchange split: Spot/prompt 87%; Months 13%.

<sup>51</sup> Resolución de 6 de junio de 2016 de la Secretaría de Estado de Energía: [https://www.boe.es/diario\\_boe/txt.php?id=BOE-A-2016-5718](https://www.boe.es/diario_boe/txt.php?id=BOE-A-2016-5718)

<sup>52</sup> Ministerial Resolution, 26<sup>th</sup> December 2018:

[http://www.mibgas.es/files/resolucion\\_creador\\_mercado\\_voluntario\\_1sem19.pdf\\_1.pdf](http://www.mibgas.es/files/resolucion_creador_mercado_voluntario_1sem19.pdf_1.pdf)





the PRISMA daily auctions. It also would like to extend trading in the spot Within Day contract from 9pm to 9.30pm and introduce a new Weekend contract.

There is no doubt that the exchange in particular is trying very hard to develop liquidity in the PVB market, and to help establish an Iberian market; this seems to be supported by CNMC and the Spanish Ministry but not by the Portuguese authorities.

An interesting development in the trading of gas in Spain is the idea of introducing LNG trading and even of creating an 'LNG Hub'. The Ministry, CNMC<sup>53</sup> and MibGas, are promoting this idea as a way of concentrating liquidity in one LNG hub and thereby fostering more trading between that hub and the PVB. The idea stems from the fact that Spain's 6 operational LNG terminals are spread around the coastline and feed into the national grid, whilst having a lot of spare capacity. The proposal is that all 6 terminals would be within one LNG 'hub' and there would be three main types of trading: Within Day and Day Ahead trading at the LNG hub; swaps between the LNG hub and the PVB; and swaps of LNG in storage between two terminals within the LNG hub.

Sergio López, Deputy Director for Hydrocarbons at the Ministry of Energy wrote a short paper<sup>54</sup> on the subject, published in the Magazine of Economy of Spanish Commercial Information, in which he says: *"The Iberian Peninsula, given its geostrategic position [...] can play an essential role as a LNG market of last resort."* He concluded: *"The development of an LNG hub in the Iberian Peninsula would allow to position it as a reference of the global LNG market, would increase the level of competition in the wholesale market, would favour international expansion of marketers currently settled in the Peninsula and would optimize the use of currently under-contracted facilities and, therefore, the regulated revenues of the gas system"*.

Although not necessarily referring to a traded hub, Repsol's deputy director of gas and LNG trading was quoted by ESGM saying<sup>55</sup> at the Gastech conference in Barcelona that *"Spain is set to play an increasingly important role as a global LNG market; it has a unique combination of features that fits all the criteria of an ideal LNG trading hub"*.

The ESGM article goes on to explain that there are a number of *"key developments necessary to allow Spain to become a benchmark LNG hub for the Atlantic Basin"*, [namely] *"deeper liquidity at the PVB gas hub, a better interconnection with the rest of Europe, (and) more flexible and competitive LNG logistic costs"*.

Finally, the article quotes Repsol *"commenting that the planned STEP, formerly MidCat, project – an additional pipeline between France and Spain – is pivotal to allow better interconnection with the rest of Europe and the development of an LNG hub in Spain"*.

It remains to be seen whether this initiative can indeed get off the ground and, if it does, whether it can attract sufficient traders to participate and develop liquidity, both at the new LNG Hub and at the PVB?

#### 4.1 A review of 2017 trading statistics

This section gives a brief overview of the Iberian traded gas market, taken from the Author's on-going analysis of the development of the European traded gas hubs. The analysis is based on two sets of parameters, the objective "5 Key Elements" and the subjective "3 Main Indicators". The full description of each is given in Heather (2015)<sup>56</sup>, as well as the methodologies used for each Key Element.

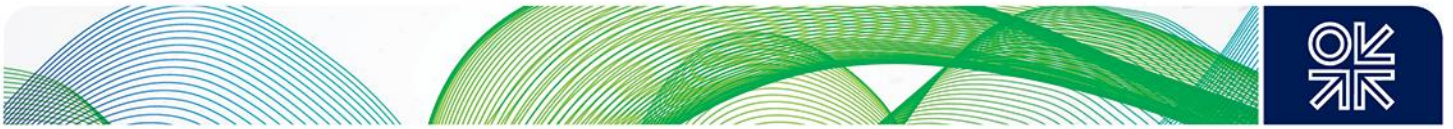
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<sup>53</sup> See Appendix F for a graphic by CNMC of the proposals.

<sup>54</sup> López (2017).

<sup>55</sup> Quoted in ICIS ESGM 24.182, 19th September 2018: "Spain has potential as Atlantic Basin LNG hub".

<sup>56</sup> Heather (2015), Chapter 6: "Analysis of the European gas hubs".



Map 2: European gas regions, markets and hubs<sup>57</sup>



Source: worldbookatlas.com; P. Heather

The map shows that the European hubs are categorised as being 'Mature', 'Active', 'Poor' and 'Inactive'; the categories are derived from the results of each of the 5 Key Elements, as detailed in the summary (Table 2 below).

There were two 'mature' hubs in 2017, the Dutch TTF and the British NBP; four 'active' hubs, the German NCG and GPL, the Italian PSV and the Austrian VTP; five 'poor' hubs, the Belgian ZEE/ZTP, the Italian PSV, the French PEG Nord and TRS, and the Spanish PVB; and four 'inactive' hubs<sup>58</sup>.

#### 4.1.1 Objective parameters: The Five Key Elements

In order to evaluate the depth, liquidity and transparency of the traded gas hubs across Europe, the results of 5 Key Elements are analysed; as far as these are available. The 5 Key Elements analysed are:

- Who trades in each of the hubs;
- What products are traded there;
- How much volume is traded, and over which periods;
- The Tradability Index;
- The churn rates.

<sup>57</sup> A list of the hubs, with full names and dates of commencement can be found in Appendix G.

<sup>58</sup> Five, including the Turkish UDN.

They are all important but the churn is possibly the pre-eminent factor. From the results it is possible to determine which hubs are 'mature', which are active, which are improving and which are yet to show signs of development.

**Table 2: Summary of the 5 Key Elements: 2017**

2017	5 KEY ELEMENTS					
HUB	Active Market Participants*	Traded Products**	Traded Volumes	Tradability Index (Q4)	Churn Rate	Score /15***
TTF	240	49	23855	20	55.2	15
NBP	185	44	21620	16	24.7	14
NCG	160	22	1730	15	3.4	9
GPL	130	20	1130	14	2.6	9
VTP	100	17	530	10	5.3	9
PSV	105	19	945	14	1.2	8
ZEE+ZTP	35+30	16	550	8	2.9	6
PEG Nord	42	17	540	12	1.7	6
VOB	21	12	100	6	1.1	5
PEG TRS	22	9	100	3	0.6	5
PVB	44	9	60	0	0.2	5

\* Hub Score in the OTC Active Traders table.

\*\* Score /64 derived from the OTC and Exchange product categories in the Traded Products Table.

\*\*\* Score based on each of the Key Elements scoring zero for Grey; 1 point for Red; 2 points for Amber; 3 points for Green.

Source: P. Heather

Table 2 is a summary of each of the five elements analysed. The Author has then used a simple scoring methodology to derive the final ordering of the hubs, to reflect their level of development: mature, active, poor and inactive as indicated in Map 2. The points system is indicated at the bottom of the table and, adding up each of the constituent Key Elements will give a hub score out of 15. A hub is classified as being 'mature' if the score is 12-15; 'active' if the score is 8-11; 'poor' if the score is 5-7; and 'inactive' if the score is 1-4.

The Spanish PVB made much progress in 2017 from 2016 but it is still at the bottom of the table. There are some positive points to note though: the active participant score is higher than at the two Belgian hubs, at the two French hubs and at the Czech hub; the total traded volumes doubled from 2016; and, although total traded volumes are still relatively low, the Author noted that there was trading all along the curve<sup>59</sup>. When analysing the split of traded products as a percentage of total volumes traded, the PVB ranked 5<sup>th</sup> amongst all the hubs<sup>60</sup>.

The progress made from the 'old' AOC hub is really quite noticeable: in 2015, the last year of the AOC trading, it was ranked as an inactive hub with just a handful of incumbent traders and slightly under 10TWh of total trades. Furthermore, there was very little transparency in the market. The progression of the 5 Key Elements in Spain, from 2015 to 2017, is detailed in Table 3.

<sup>59</sup> As mentioned in Chapter 4 above, there is a lot of forward hedging against LNG cargoes.

<sup>60</sup> After TTF, NBP, PSV and GPL.



**Table 3: Progression of the 5 Key Elements for Spain: 2015 - 2017**

2015-2017	5 KEY ELEMENTS					
HUB	Active Market Participants*	Traded Products**	Traded Volumes	Tradability Index (Q4)	Churn Rate	Score /15***
<b>AOC 2015</b>	<10	n/a	10	0	<0.1	<b>3</b>
<b>PVB 2016</b>	<10	9	30	0	0.1	<b>5</b>
<b>PVB 2017</b>	44	9	60	0	0.2	<b>5</b>

\* 2015/16: Estimated number of traders who trade regularly; 2017: Hub Score in the OTC Active Traders table.  
 \*\* Score /64 derived from the OTC and Exchange product categories in the Traded Products Table.  
 \*\*\* Score based on each of the Key Elements scoring zero for Grey; 1 point for Red; 2 points for Amber; 3 points for Green.

Source: P. Heather

Preliminary data for 2018 show (see Chapter 4.2 below) that total trading has risen to 97TWh. Therefore, the PVB continues to improve but quite obviously still has a long way to go before even making it to the 'active' category.

#### 4.1.2 Subjective parameters: The Three Main Indicators

In order to evaluate the path to liberalisation and market development, the political willingness and cultural attitudes to trading that are also key to the development of successful gas trading hubs are assessed; in turn these often dictate the level of commercial acceptance in a given country.

The EFET<sup>61</sup> Review of Gas Hubs Assessments quantifies 5 regulatory conditions, 6 TSO conditions and 6 market conditions; these broadly follow the Three Main Indicators. Their 2018 Review was used to create Table 4, which summarises the scores awarded by EFET to each of the traded gas hubs in Europe, including the emergent hubs, covering 17 criteria regarding the development of a hub for which they give a score of 0-2 out of a possible total of 20.

The results for 2017 of this independent analysis, using very different criteria to the Author's, are broadly in line with those of the 5 Key Elements: there are two dominant hubs in Europe, the British NBP and the Dutch TTF; slightly more 'active' hubs; slightly less 'poor' hubs; and more 'illiquid' ones.

The Spanish PVB has developed well, achieving a score more than double that of two years previously, placing it, in this study, about mid-way in the table, with a respectable score of 16/20. Much of the improvement is thanks to better market transparency, implemented by the regulator; documentation for new entrants to participate is now available in English, implemented by the TSO; and a focused approach to developing traded products on the PVB, adopted by the Exchange. This shows that there has indeed been the political will and the right attitude to carry forward the necessary changes to attract new market participants and to foster more trading.

<sup>61</sup> The European Federation of Energy Traders.

**Table 4: EFET Hub Scores categorised as mature/active, poor and inactive**

HUB	2014	2015	2016	2017
NBP	20	20	20	20
TTF	19	19½	19½	19
ZTP	16	17½	18	19
NCG	15½	19	19	17½
PEGs	16	16½	18½	17½
GPL	16	19	19	17
ZEE	17	17	17	16½
PSV	10½	15	15	16
VTP	13	13	13½	16
AOC/PVB	7	7	13½	16
GTF	9	11	14	15½
VOB	8	8½	9½	13
MGP	5	6½	9	12½
VPGS	4½	5½	9½	10
SK	3½	7	8	8½
GR	4½	5½	5½	6½
UDN	5½	5	4	5½
UA	n/a	n/a	n/a	3½
RO	2½	1½	2	3
BG	1½	1	1½	1

Source: Gas hub scorecard 2018 update; P. Heather

#### 4.2 An initial update on 2018 trading statistics

The Spanish PVB hub continued its growth pattern into 2018. Preliminary analysis of the 2018 data shows that there was a 96% increase in Exchange trading and a 51% increase in OTC trading, where there was a marked increase in curve trading, whereas the prompt remained similar to 2017. The actual figures are given in Table 4. The number of companies registered to trade on MibGas also increased, from 65 at the end of 2017 to 83 at the end of 2018.

**Table 5: PVB Exchange and OTC traded volumes, 2017 and 2018**

PVB HUB (TWh)	EXCHANGE TRADING TOTAL	OTC TRADING		
		TOTAL	PROMPT	CURVE
2017	13.38	46.95	3	44
<b>2018</b>	<b>26.26</b>	<b>70.73</b>	<b>2.2</b>	<b>68.5</b>

Sources: ICIS, MibGas, P. Heather

Regarding prices, the premium that PVB has had over the northern hubs (See Figure 2 below) appears to have decreased towards the end of 2018<sup>62</sup> at around €1.50/MWh, mainly due to low Spanish demand and general oversupply. The calendar Year 2020 contract was only €1.40/MWh over TTF, which is less than the cost of shipping gas from northern Europe into Spain; this could indicate that the market is expecting oversupply, possibly related to new US LNG contracts starting in 2019 and 2020. This tends to reinforce the analysis throughout this paper that Iberia is very much focused on LNG, influenced more by global LNG supply and demand than by northern European pipeline gas dynamics.

## 5. Commercial and trading implications going forward

If Iberia is to ever become a 'hub for Europe', there should already be the signs of a market that does indeed want to assume that role: a market that is attracting more trading participants, that is markedly increasing in liquidity along the whole traded curve, that is progressively moving towards a single Iberian hub and, most importantly, a market that is already showing signs of active commercial arbitrage with the adjoining French market.

Having analysed the traded market and seen that it is indeed growing, this chapter will give the results of an analysis of the price correlation with North-Western Europe against the actual physical cross-border flows to and from France, and see whether the resultant arbitrage of physical gas between Spain and France corresponds to the commercial signals.

If market participants are currently showing signs of taking commercial advantage of arbitrage possibilities, then this could and probably would develop into a situation whereby there could be increased flows of gas from Iberia to North-West Europe, especially as the Iberian traded market improves further.

After exploring prices and price correlation, there will be an analysis of whether market participants are arbitraging between Spain and France on those days where the price in Spain is higher than that in France, before looking at the political will and commercial attitudes in the two countries towards further linkage of their gas markets. The period analysed in this chapter is from 1<sup>st</sup> October 2016 until 30<sup>th</sup> June 2018 as there was no price data for the Spanish market published by ICIS prior to that date.

Lastly in this chapter, there will be an analysis of whether any other market could become a 'hub for Europe'? Indeed, following the upgrading of the south to north capacities into Switzerland and beyond to France and Germany, could Italy's PSV potentially be a southern Europe price marker and take on the mantle of European SoS provider?

<sup>62</sup> ICIS EGHR, Q4-2018 Update.



It should be noted here that in France, since 1st November 2018 there is one virtual trading hub, the TRF<sup>63</sup>; there is one Market Area, the PEG<sup>64</sup>, although in reality<sup>65</sup> two sub- balancing zones exist, the previous Nord+Sud and TIGF, operated by the two TSOs, GRTgaz covering Nord and Sud, as well as Teréga for TIGF.

## 5.1 Prices and price correlation

Traders will use Day Ahead (DA) prices (as well as Within Day) to optimise their gas portfolios right up to the physical delivery of their various contracts. Figure 2 shows the DA prices at the Spanish PVB, the French PEG Nord and the European benchmark hub, the Dutch TTF.

The first point to note is the extreme spike at the start of March 2018, due to a short period of very cold weather<sup>66</sup> that affected gas supplies, particularly in northern Europe. The Netherlands was worst hit as it struggled to meet demand from its own Groningen field following the mandated reduction in production. This in turn had a knock-on effect at neighbouring hubs, to a greater or lesser degree depending on their alternative supplies.

The figure shows that there is good price correlation between TTF and PEG Nord and that their respective prices are very close, but that the PVB is poorly correlated with, and not at the same price level as, the other hubs.

The statistical result of the correlation<sup>67</sup> between TTF and PEG Nord over that period is a very high 0.97, whereas the correlation between TTF and PVB over the same period is only 0.5. Correlation describes the strength of the relationship between two variables, in this case TTF against PEG Nord and TTF against PVB; if the correlation is close to 1, the two variables will evolve the same way and if correlation is close to 0, the two variables will evolve independently. With respect to gas trading, if the prices at two different hubs are well correlated, any change in that correlation may be followed by a reversion to the hub prices' mean trend, thereby creating a profit opportunity<sup>68</sup>.

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<sup>63</sup> Trading Region France.

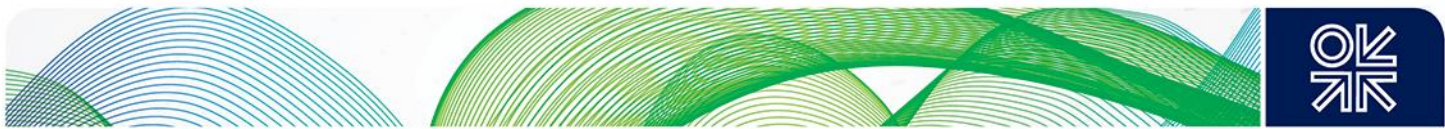
<sup>64</sup> Point d'Echange de Gaz.

<sup>65</sup> See further explanation below.

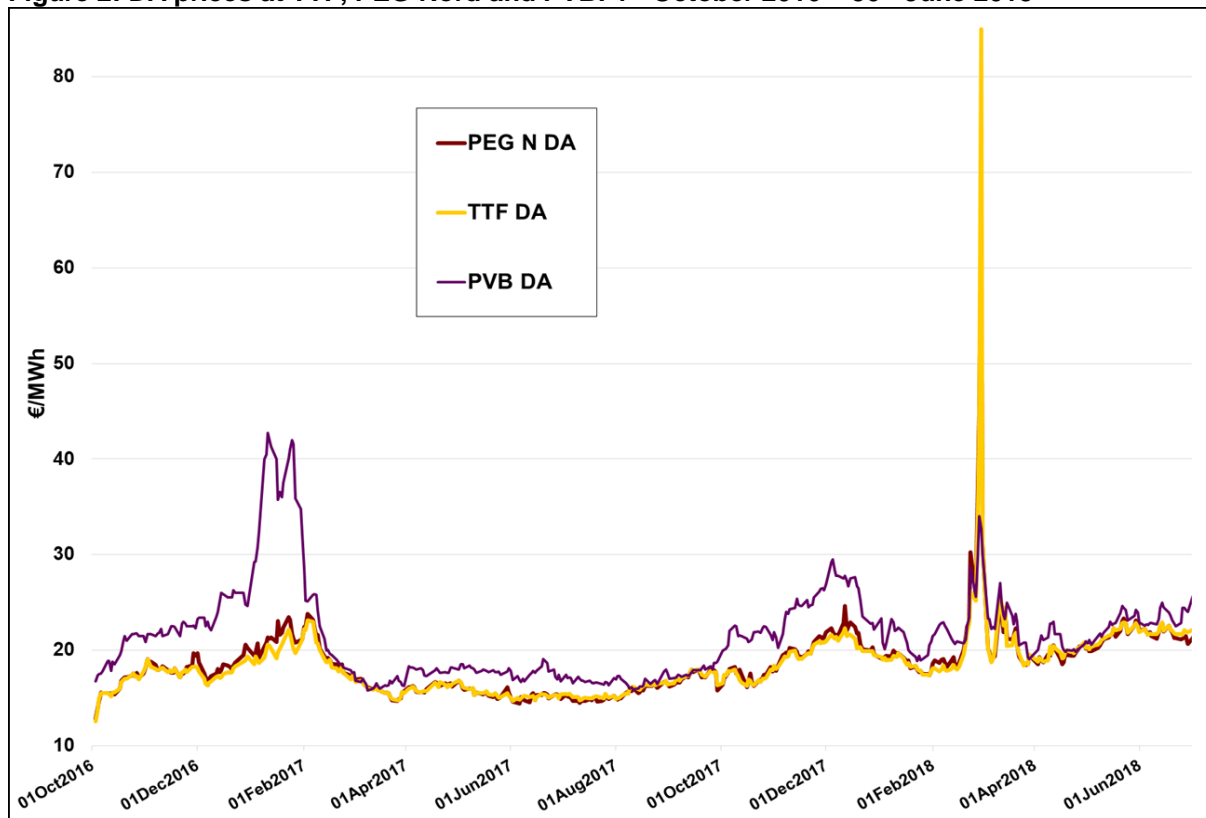
<sup>66</sup> The so-called 'Beast from the East', which lasted 10 days from 24<sup>th</sup> February to 4<sup>th</sup> March 2018.

<sup>67</sup> See Appendix H.

<sup>68</sup> For more detail on European gas hubs correlation, see Heather/Petrovitch (2017), Chapter 3.



**Figure 2: DA prices at TTF, PEG Nord and PVB: 1<sup>st</sup> October 2016 – 30<sup>th</sup> June 2018**



Source: ICIS Heren

When large quantities of gas can flow easily, without limitation, from one country to another, the correlation between the corresponding hub prices is generally high, that is to say close to 1, as is the case for PEG Nord and TTF. However, should there be a reason for physical flows to be restricted, usually due to infrastructure constraints, then the adjoining hub prices are likely to be less well correlated and possibly more volatile.

In France there has been a longstanding infrastructure ‘bottleneck’ between the PEG Nord and the PEG Sud Market Areas<sup>69</sup>, limiting physical flows of gas when demand in the south is high and it cannot be met with LNG supplies or in-tank storage. There have not been any constraints between PEG Sud and TIGF.

Indeed, the capacity of the transport pipelines<sup>70</sup> connecting PEG Nord and PEG Sud in France is insufficient to meet fully the transit needs from one zone to another, in the direction from north to south<sup>71</sup>. While PEG Nord has significant interconnection capacities with the Norwegian, German and Belgian networks, the Nord-Sud link capacity does not cover all of the needs in the southern zone<sup>72</sup>. Consequently, to cover about 40% of its demand, the south depends upon LNG arriving at the two Fos-sur-Mer terminals.

The French regulator, CRE<sup>73</sup> had been in discussions with GRTgaz, TIGF and market users for many years to determine a solution to resolve this bottleneck and others in the south of France. Following

<sup>69</sup> PEG Sud is one of the two Market Areas that formed the TRS virtual trading hub, the other being TIGF.

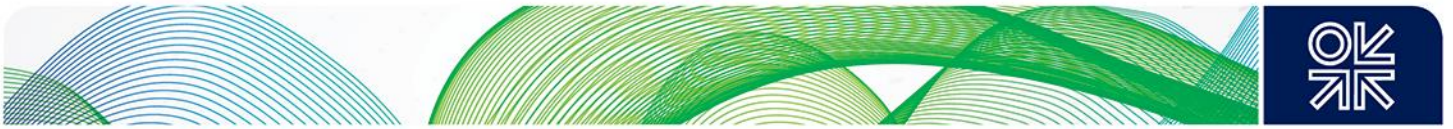
<sup>70</sup> There are two north/south connections, one central route, one eastern, called ‘Val de Saône’.

<sup>71</sup> However, this is not in reality the case from south to north, as the demand in that direction is less.

<sup>72</sup> This is particularly true of the eastern route, serving a high gas demand area in south-east France.

<sup>73</sup> La Commission de Régulation de l’Energie.





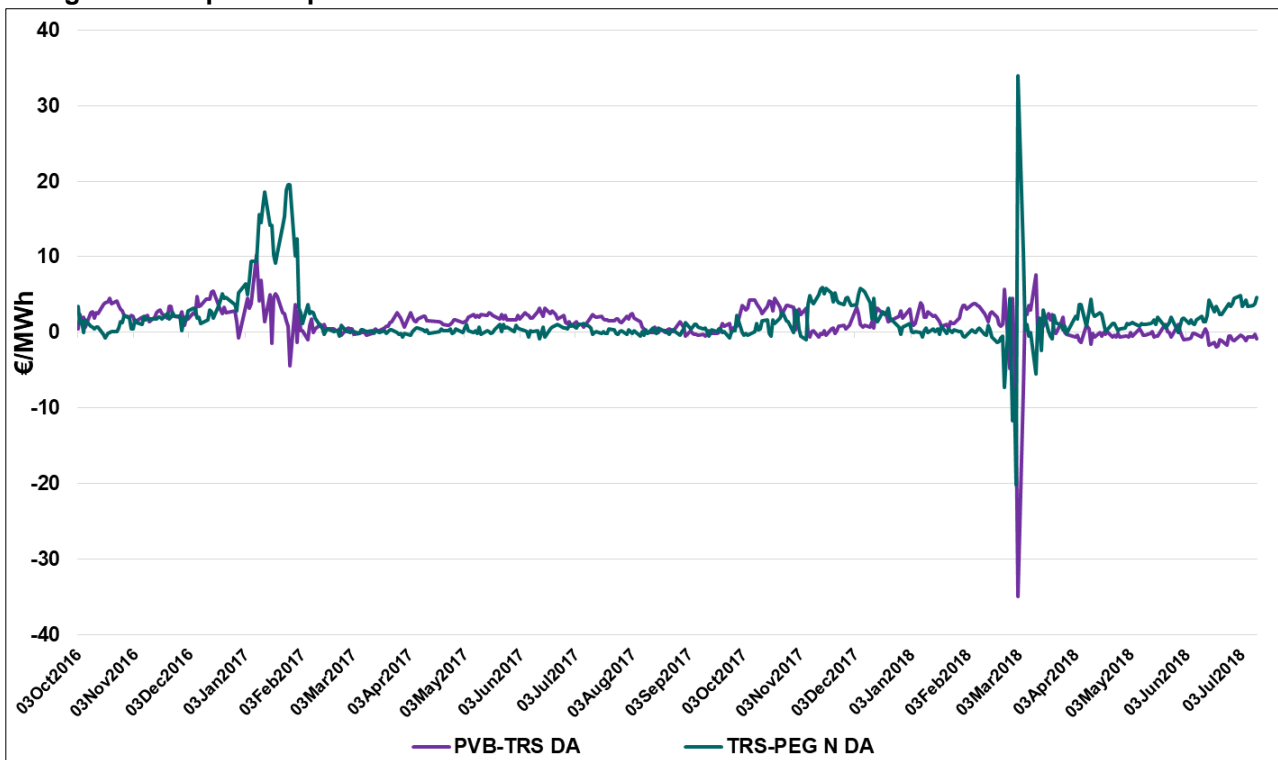
analysis and a public consultation launched in 2014, the Val de Saône project was selected to reinforce the north-south link, as well as the Gascogne-Midi project in the TIGF area to reinforce west-east flows in the south west of France. These projects<sup>74</sup> subsequently received French government financing approval and, along with a number of smaller improvements to the gas grid, were inaugurated<sup>75</sup> ahead of the start of the single French marketplace on 1<sup>st</sup> November 2018.

Even after the merger between PEG Nord and TRS, depending on the flow situation and the respective demand levels in the north and the south of France, some residual congestion will continue to exist. In such instances the TRS price signal that, prior to the merger, made it possible to bring some LNG into the south of France, might not exist anymore and GRTgaz/Teréga would need to buy or sell some locational products to balance the grid.

With that price signal now gone, it is possible to imagine that PVB would replace TRS as the market signal to bring LNG into Southern Europe and then transported north into southern France. However, the lack of liquidity seen in the Spanish market could make that very difficult.

Figure 3 shows the PEG Nord/TRS and TRS/PVB price spreads and their evolution over the same period. The extreme weather situation mentioned above is visualised here by the sharp spike/trough in March 2018. In this case TRS suffered more than PEG Nord as it could not get sufficient pipeline supplies from the north, nor did it have enough LNG in-tank. Therefore, the TRS/PEG Nord spread recorded a massive €34 premium on the 2<sup>nd</sup> March. By contrast, the Spanish market had ample supplies so that the PVB/TRS spread recorded an equally large discount of €35 on that same day.

**Figure 3: DA prices spread for PVB/TRS and TRS/PEG Nord: 1<sup>st</sup> October 2016 – 30<sup>th</sup> June 2018**



Source: ICIS

<sup>74</sup> See the map in Appendix I.

<sup>75</sup> For more information, see the respective company Press Releases:

<http://www.grtgaz.com/en/press/press-releases/news-details/article/lancement-de-la-zone-de-marche-unique-du-gaz-en-france.html>

<https://www2.terega.fr/en/press-resources/press-releases/2018/terega-ready-for-the-trading-region-france-with-the-inauguration-of-its-rgm-project-gascogne-midi-reinforcement.html>



The statistical result of the correlation between TRS and PVB is a very good 0.89, (compared to TTF/PEG Nord 0.97; and TTF/PVB 0.50). This suggests that the congestion within the French gas network can at least in part explain the poor correlation between prices at the PVB and prices at the TTF (or other north European gas hub).

The whole chain, from Northern Europe to Spain, must be considered to get the full picture and to have a better understanding of what drives the gas prices at the PVB. Starting with the most liquid hub, TTF, it is possible to evaluate the 'correlation corridor' from north to south; the correlations of the two ends have already been given above and the 'link' in that chain, between PEG Nord and TRS, is a poor 0.73<sup>76</sup>.

Figure 3 shows that the PVB/TRS spread is 'flatter' over time than the PEG Nord/TRS spread; this is reflected in its higher correlation. It also shows that this spread is mostly at a premium, thereby indicating that the Spanish PVB is mainly dearer than the French TRS; in an efficient liquid market, one would expect there to be arbitrage trading of cross border flows from the dearer market to the cheaper one but in reality, this has rarely been the case.

## 5.2 The ability to arbitrage physical gas between Spain and France

There appears to be more than enough capacity at the Spanish/French border to flow gas north but this has rarely happened in any significant quantities, as can be seen in Figure 4. As we have already seen, in fully liquid traded markets, prices are closely correlated and any divergence, beyond normal transportation costs, is quickly brought back into line by arbitrage trading. There can be exceptions, often due to physical constraints, but invariably divergent prices are temporary.

In the Spanish/French case the absence of northwards flows can be partly explained by the fact that the incumbent gas companies in Spain do not have large trading desks and their primary goal is to obtain reliable supplies of gas to satisfy their contracts with downstream customers. To that end, they have bought large quantities of capacity at the FR/ES Interconnection Point and, it is said<sup>77</sup>, they are not 'hungry' for trading.

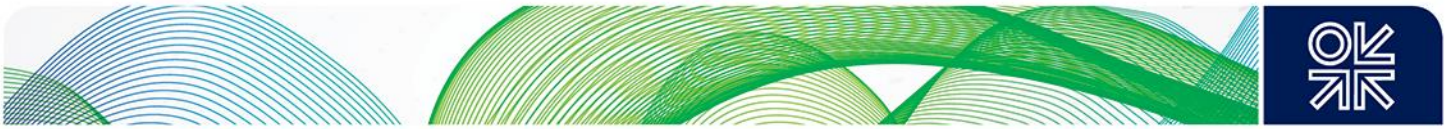
There are two physical interconnection points at Larrau and Irún-Biriatou but, since 2015, they have operated as one Virtual Interconnection Point, known as VIP Pirineos; a focus on this link between France and Spain could shed new light on the situation of Spanish gas prices and the apparent lack of commercial arbitraging between the two markets.

Figure 4 shows the maximum capacities available in both directions and the actual flows compared to the DA price spread. The capacity from Spain to France is 225GWh/d and is all firm capacity; the capacity from France to Spain is 225GWh/d from November to March (165GWh/d firm + 60GWh/d interruptible) and 235GWh/d from April to October (175GWh/d firm + 60GWh/d interruptible). In practice, the interruptible capacity is available most of the time.

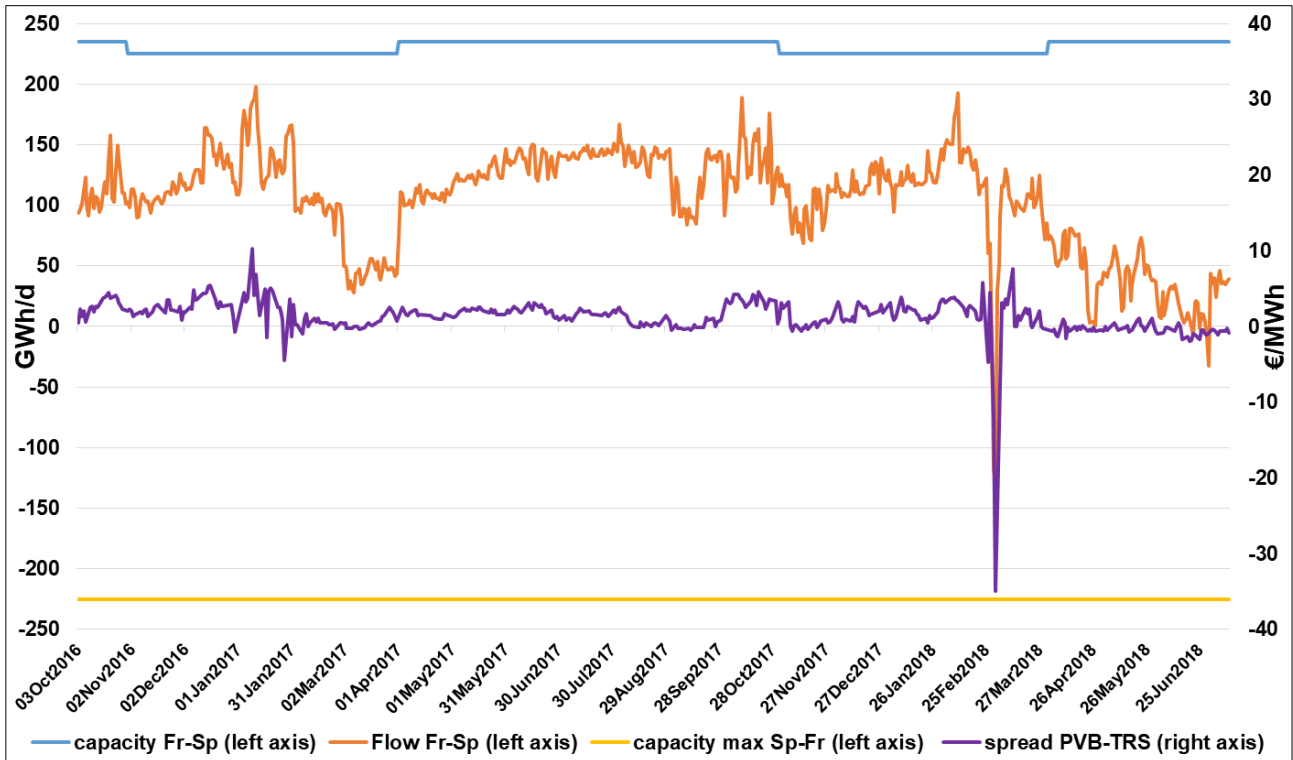
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<sup>76</sup> See Appendix H.

<sup>77</sup> Comment made in an interview with the Author by an observer of the Spanish market.



**Figure 4: France/Spain capacities and flows compared to the price spread: 1st October 2016 – 30th June 2018**



Sources: ICIS Heren, Teréga

The figure shows that for all of the period, except for just 7 days, the flows of gas were from France to Spain despite the spread being negative on a total of 91 days, including 20 days when it was more than €1/MWh and 6 days more than €2/MWh. Indeed, out of the seven days when there were exports of gas to France, on only two of those were they of a reasonably large volume<sup>78</sup>, whilst on the remaining days the flows were minimal<sup>79</sup>. On the face of it, this shows that there is a lack of active commercial arbitrage in the gas flows in either direction, or at very least, a lack of sensitivity to the value of the spread.

Not only were the flows predominantly in the France to Spain direction but the usage ratio<sup>80</sup> in that direction was just 46%. With regards to the amounts of booked capacity, the levels are 90% of the maximum from France to Spain and only 50% of the maximum from Spain to France.

In fact, when looking at the actual flows of gas compared to the maximum capacity available, whether imported into Spain or exported, compared to the maximum capacities available, and extending the period out to the beginning of 2013, the maximum has rarely been reached.

Figure 5 shows the flow of gas between France and Spain relative to the maximum capacities available. Those flows, in *both* directions, have only been at more than 98% of the marketable capacity 33 times between 2013 and 2014 but at much lesser percentages since 2015.

If we now focus on the flows from France to Spain, the premium in spread prices (as seen in Figure 4) at TRS over the prices at PVB has been greater than the cost of the capacity at Pirineos on many occasions since October 2016. The cost of the capacity from France to Spain at Pirineos, which

<sup>78</sup> 1st and 2nd March 2018 at 116 and 132 GWh/d.

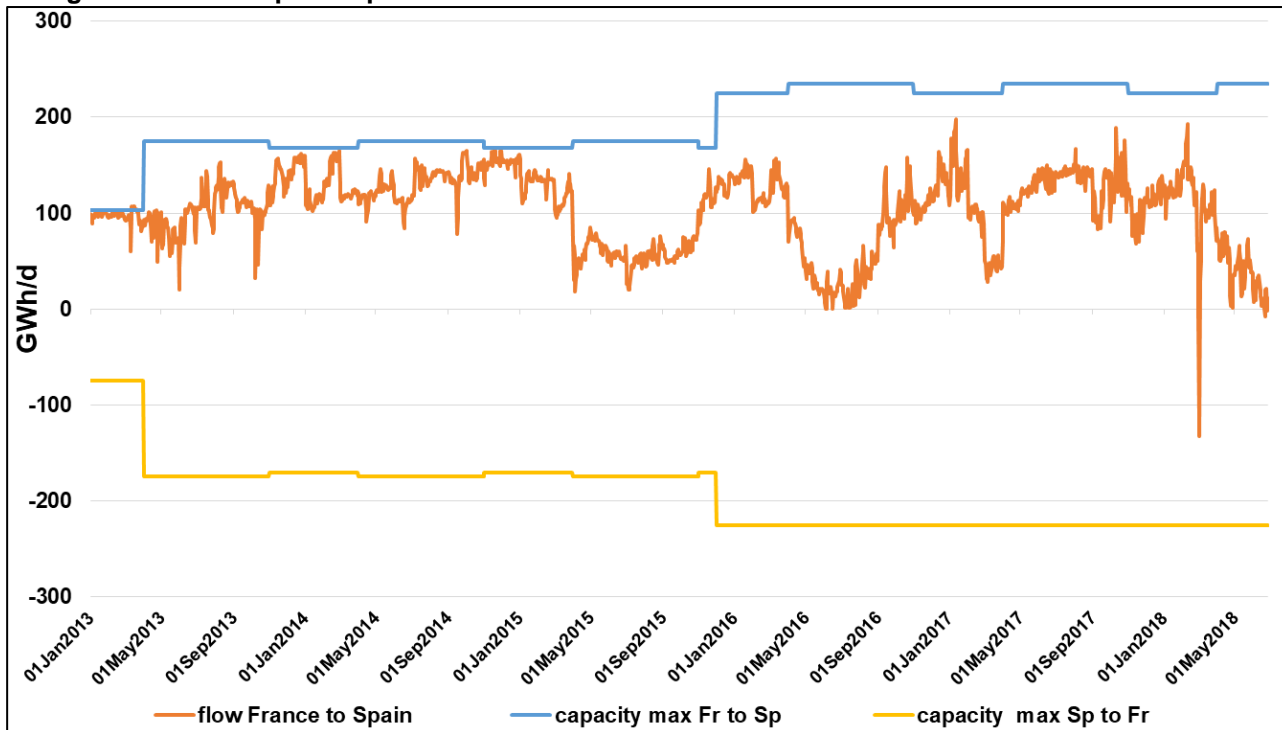
<sup>79</sup> Varied from just 1 to 32GWh/d.

<sup>80</sup> The ratio between the actual daily physical flows against the maximum capacity available on the same day.



evolves every year in line with the new transportation tariffs on both sides of the border, has generally been between 2€/MWh for annual capacity bookings and approximately 3€/MWh for daily capacity bookings.

**Figure 5: France/Spain capacities and flows: 1<sup>st</sup> October 2013 – 30<sup>th</sup> June 2018**



Source: Teréga

With that price range in mind, one could anticipate that the flows from France to Spain would tend towards the maximum marketable capacity when the spread between PVB prices and TRS prices is greater than the cost of the capacity. That spread has been more than 2€/MWh on more than 1 day out of 3<sup>81</sup> between 1st October 2016 and 30th June 2018 and it has been more than 3€/MWh on more than 1 day out of 7 during the same period<sup>82</sup>.

However, as stated above, the flows into Spain have never attained maximum capacity nor have they ever been greater than 88% and then on only 8 days in total were they above 80%. The apparent lack of commercial arbitraging between the two markets could be due to the poor liquidity and depth of the PVB but there might also be other reasons why the flows at the France-Spain border are not optimised according to the market conditions.

In order to have the right to flow gas at Interconnection Points, shippers must book capacity through the PRISMA<sup>83</sup> trading platform; this is done through a process of auctions which are organised at specific times, according to a schedule set out in the CAM<sup>84</sup> Rules. Both firm and interruptible Day

<sup>81</sup> 161 days in total between 1<sup>st</sup> October 2016 and 30<sup>th</sup> June 2018.

<sup>82</sup> 71 days in total between 1st October 2016 and 30th June 2018.

<sup>83</sup> PRISMA is Europe's leading gas capacity trading platform. With the ability to serve a high number of TSO backend systems, PRISMA provides a single platform through which TSOs and shippers may auction transmission gas capacity at primary and secondary market level respectively: <https://corporate.prisma-capacity.eu/>

<sup>84</sup> Capacity Allocation Mechanism: The Network Code on Capacity Allocation Mechanisms in Gas Transmission Systems requires gas grid operators to use harmonised auctions when selling access to pipelines. These auctions sell the same product at the same time and according to the same rules across the EU. It has applied since 1 November 2015. See Commission Regulation (EU) 2017/459: <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1503060564207&uri=CELEX:32017R0459>



Ahead capacities can be booked on the platform during the daily auctions which take place the day before delivery: the firm capacity auction takes place between 16:30 and 17:00 CET<sup>85</sup>; the interruptible capacity auction takes place from 17:30 CET<sup>86</sup>.

To optimise the flow on a spot basis without having to bear a market risk, a trader must first obtain the required capacity on PRISMA before buying physical gas on one side of the border and selling on the other side the corresponding quantity to realise the profit. Because additional capacities can only be bought on the PRISMA platform and because the times of the auctions are late in the day, there is an inherent risk of not being able to conclude both capacity and physical gas transaction in markets with poor liquidity.

In the case of the Spanish PVB this is of particular concern, as it can be quite difficult to find counterparties to trade with after 5pm; in these situations, the trader would have bought capacity without being able to buy/sell the physical gas. Conversely, and incurring more financial risk, would be to trade the physical arbitrage when the market is active but before knowing whether or not it will be possible to obtain the required capacity to actually flow the gas across the border.

Shippers with flexibility on both sides of the border would not need to act on the market to hedge their volumes. Instead of buying gas on one side of the border, transporting it from that country to the other and selling it at the hub of the importing country, such a shipper can optimise their own portfolio.

Such a shipper could do this through purchase contract flexibility, withdrawing from storage, or increasing LNG send out in the 'dearer' country; and conversely, reduce its offtake on a long term supply contract, or injecting into its storage capacity on the other side of the border in the 'cheaper' country.

However, if a shipper must act on the market, finding large volumes of natural gas after 5pm CET at the PVB can be quite challenging. This constraint explains why the flow of physical gas between Spain and France is not fully optimised on a daily basis. For example, during the week of 5<sup>th</sup> – 9<sup>th</sup> February 2018, the Day Ahead spread between PVB and TRS was greater than €3/MWh every day<sup>87</sup> but the daily marketable capacity was never fully booked. In fact, at the end of that week, 26.7GWh/d of interruptible capacity was still available<sup>88</sup>.

The ability to arbitrage physical gas between Spain and France will need to improve if there is to be any chance of true integration between the two markets and for, one day, Iberia to provide extra security of supply to the rest of Europe. To do so, the PVB must become a deep and liquid enough gas hub to make it possible for traders to buy or sell large quantities of natural gas on the market. Even if capacity is increased repeatedly<sup>89</sup> but if there is no liquid market, the flow cannot be optimised and the available capacity will almost never be fully utilised.

Some shippers who hold long term capacity at the VIP Pirineos also have the ability to arbitrage between many different supply sources (LNG, natural gas from Algeria, natural gas from Northern Europe, etc.). These shippers are most likely to optimise their portfolios rather than book more capacity on a spot basis. Indeed those shippers who have gas supply agreements generally book the transportation capacity at Interconnection Points to import the gas into their domestic market according to the daily maximum quantity that they can purchase through their supply contract. Thus, the flexibility they can use comes more from their usage of the contract and not from the booking of the capacity at the border point. On a day where it would make economic sense to flow as much gas as possible from one country to another, they would maximise their offtake on the supply contract and would use 100% of the capacity already booked at the border point.

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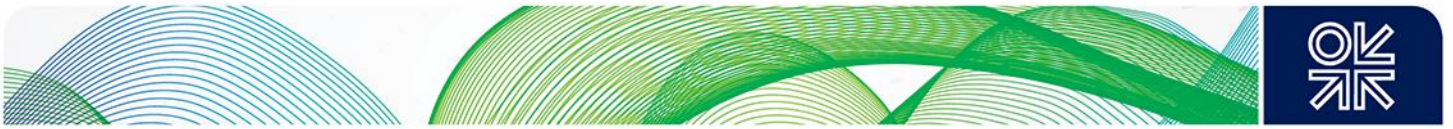
<sup>85</sup> Prisma officially uses UTC/GMT which is 1 hour behind CET in winter and 2 hours behind CET in summer.

<sup>86</sup> See the PRISMA CAM NC Auction Calendar 2018/19 in Appendix J.

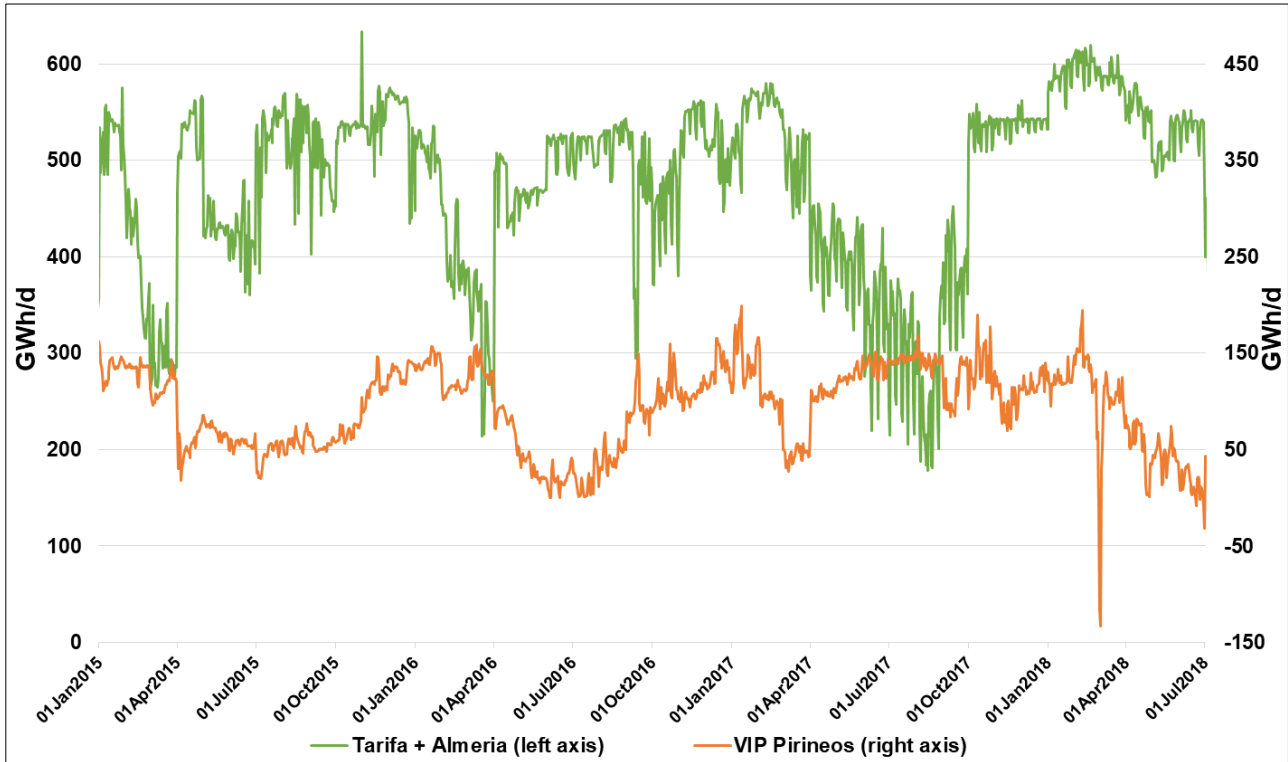
<sup>87</sup> €3.65/MWh on average.

<sup>88</sup> See Appendix K.

<sup>89</sup> For instance through the STEP project.



**Figure 6: Pipeline imports into Spain from Algeria and France: 1<sup>st</sup> January 2015 – 30<sup>th</sup> June 2018**



Source : Enagás

Interestingly, those shippers who can arbitrage between supply from Algeria, LNG or from NWE actually have an option between gas and oil in their portfolio. This is because gas from NWE is indexed mainly to hub prices, whereas pipeline gas from Algeria and LNG into southern Europe are still mainly oil-indexed. The arbitrage related to this option appears clearly when analysing the imports into Spain (Figure 6). One can generally observe that when flows at Tarifa and Almería are high, flows from France are low and when flows from France are high, flows at Tarifa and Almería are low.

Only the incumbents, with arbitrage options in their supply portfolio, can actually have a significant impact on the physical flows at the border. They are the ones who hold most of the capacity at the border as they have booked it in advance to make sure they will be able to import the gas from their supply contracts, even though the demand during auctions for DA or WD capacity is higher than the available capacity.

### 5.3 Alignment of political will in Spain, Portugal, France and the EU

The various issues surrounding the development of a liquid Iberian gas market and the ability to effectively flow gas from Spain into France have already been set out in the chapters above. The main issues are the continued delays in implementing the integrated single Portuguese/Spanish hub; the new Spain/France Interconnection Point (whether MidCat or STEP); the friction between the Spanish Ministry and the regulator; and the absence of optimisation of cross border capacity. All of these issues are in effect due to the lack of real political will, to differing cultural attitudes and to the absence of commercial acceptance.

There appears to the Author, following various discussions and meetings with concerned parties in Spain and/or those who follow or trade in the Spanish gas market<sup>90</sup>, that there is a feeling that the two main infrastructure projects, to unify the Iberian gas market and to bring closer ties between it and

<sup>90</sup> Despite repeated attempts, it was not possible to hold meetings with any Portuguese market participants.



France and the rest of Europe, are being frustrated by a lack of political will in both Portugal and France. There is a view that Portugal is “some years behind Spain” and that “our neighbours won’t cooperate”! However, there have been some significant political developments, treaties signed and the award by the EU of Projects of Common Interest to bolster the infrastructure. Portugal is already an integral part of the Iberian gas grid so in theory it should just be a case of agreeing a joint transportation tariff; and the unification of the Portuguese and Spanish electricity grids is seen as a success, although Portuguese forward trading is effected on the Spanish market. Possibly, one explanation for the delays in implementation is that Spain still has a ‘managed’ approach in its energy policy, in that it has medium to long term goals with apparently little flexibility; this approach does not auger well for developing a different course of action reflective of changing political and industry demands and practices.

The costs of cross border capacity and of transportation, in conjunction with the PVB/TRS spread, are not being reflected in cross border physical flows. This is partly the result of most of the firm capacity at VIP Pirineos being held on a long term basis by the incumbents, and linked to their long term supply contracts, including for delivery into Portugal. They do not appear to want to change their strategy or methods of trading, so the situation is unlikely to change regardless of the addition of an extra cross border Interconnection Point.

The emergence of a liquid market in Spain would make it attractive for new entrants with no or little flexibility to optimise the cross border flows based on market conditions. The merger of PEG Nord and TRS in France could accelerate the increase in liquidity as the spread between the new TRF and PVB could create more frequent and more profitable arbitrage opportunities that would push new entrants to challenge the Spanish administration for the development of the liquidity at the PVB.

Chapter 5.1 above described that the price signal to import LNG that existed when TRS was a separate zone, has now gone following the creation of the single French hub, TRF. With that price signal now gone, PVB (or a new Iberian hub) could become the new market signal to bring LNG into Southern Europe and then transport it north into southern France. However, given the current lack of liquidity in the Spanish market and the fact that only once in the last five years have any significant flows of gas gone from Spain to France, it remains unlikely.

Another potential price signal for LNG in southern Europe could come from the Italian PSV, which could become a market providing physical flows of gas towards the north, or at least allowing for lesser gas flows from the north to Italy; this would allow LNG shippers to arbitrage with Asia and create a new supply route for gas supplies to Europe.

#### **5.4 Italy: a new contender for the mantle of European SoS provider?**

Italy was for the first time ever a net exporter of gas in June 2018. The political will in Italy to see a strong PSV gas hub that can be a marker price for Mediterranean gas has resulted in significant changes to its market structure, especially since 2014. This has resulted in a PSV hub that progressed<sup>91</sup> from ‘poor’ to ‘active’ and was 6<sup>th</sup> out of 11 hubs in the 2017 rankings<sup>92</sup>, whereas PVB was last.

The government has backed some major infrastructure improvements. These include the TAP<sup>93</sup>, the reinforcement of the grid in the north-west, leading to the Passo Gries Interconnection Point at the Swiss border, and increasing the south to north compression into the Transigas<sup>94</sup> pipeline. This

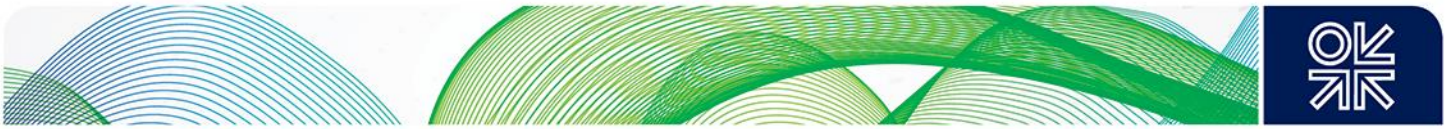
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<sup>91</sup> Total traded volume in 2013 was 282TWh; in 2017, 944TWh.

<sup>92</sup> See chapter 4.1 above.

<sup>93</sup> Trans Adriatic Pipeline will transport natural gas from Greece via Albania and the Adriatic Sea to Italy and further to Western Europe. At the end of 2018, the TAP project was 84.1% completed and due to start operations in 2020: <https://www.tap-ag.com/about-us>

<sup>94</sup> The 293-kilometre Transigas Pipeline in Switzerland connects the Trans Europa Naturgas Pipeline (TENP) from Wallbach at the German border and the GRTgaz gas grid from Rodersdorf/Oltingue at the French border with the Snam gas grid at the Italian border: <https://www.fluxys.com/en/company/fluxswiss>



means that Italy has now moved from a primarily gas importing country to one that also has the ability to transport and export gas north.

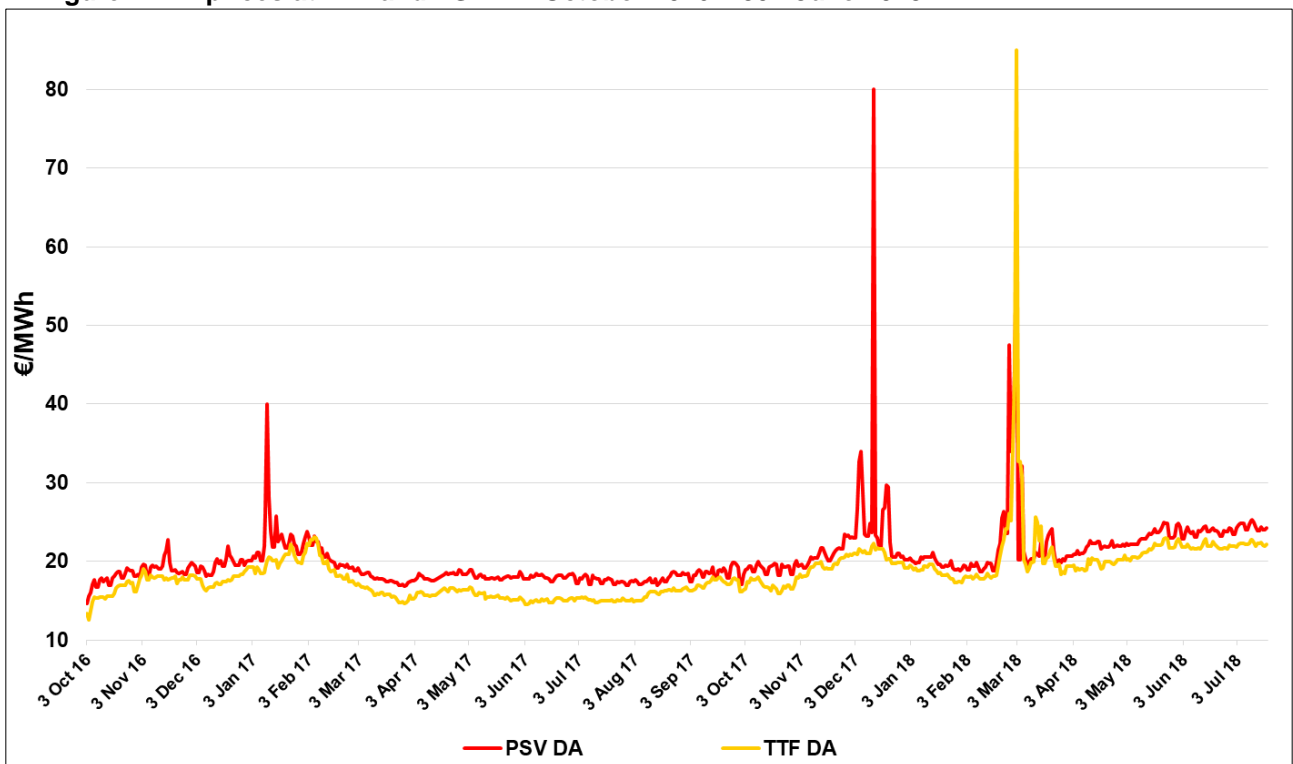
The increase in compression has been completed<sup>95</sup> and Italy can now export up to 40mcm/day to Switzerland, of which up to 22.3mcm/day could go to Germany and up to 18.6mcm/day to France. That is equivalent to 14.6bcm/a, 8.14bcm/a to Germany and 6.79bcm/a to France. Italy can theoretically export today as much gas north as Spain could after completion of the STEP project.

Despite the political will to make PSV a Mediterranean reference price, the problem here is that the PSV is currently dearer than its northern neighbouring hubs; on average €1.50-€2/MWh dearer as can be seen in Figure 7<sup>96</sup>.

Although the PSV price is generally higher than the TTF, the correlation between TTF and PSV Day Ahead prices is 0.72<sup>97</sup>, which is better than the 0.5 correlation between PVB DA and TTF DA prices over the same period.

The different country supply mixes may explain the different behaviours of PVB and PSV compared to TTF. Italy is equally well supplied with pipeline gas (with additional volumes from 2020 via TAP) and LNG, although with less LNG than Spain (Figure 8). The pipeline supplies are more varied than Spain's, including gas from Libya<sup>98</sup> and the sources of LNG are much more diversified than the Spanish ones, and tend to be more gas-indexed.

**Figure 7: DA prices at TTF and PSV: 1<sup>st</sup> October 2016 – 30<sup>th</sup> June 2018**



Source: ICIS

<sup>95</sup> See ICIS Infographic at Appendix L.

<sup>96</sup> The price spike in December 2017 was caused by an explosion at the Austrian Baumgarten gas processing plant.

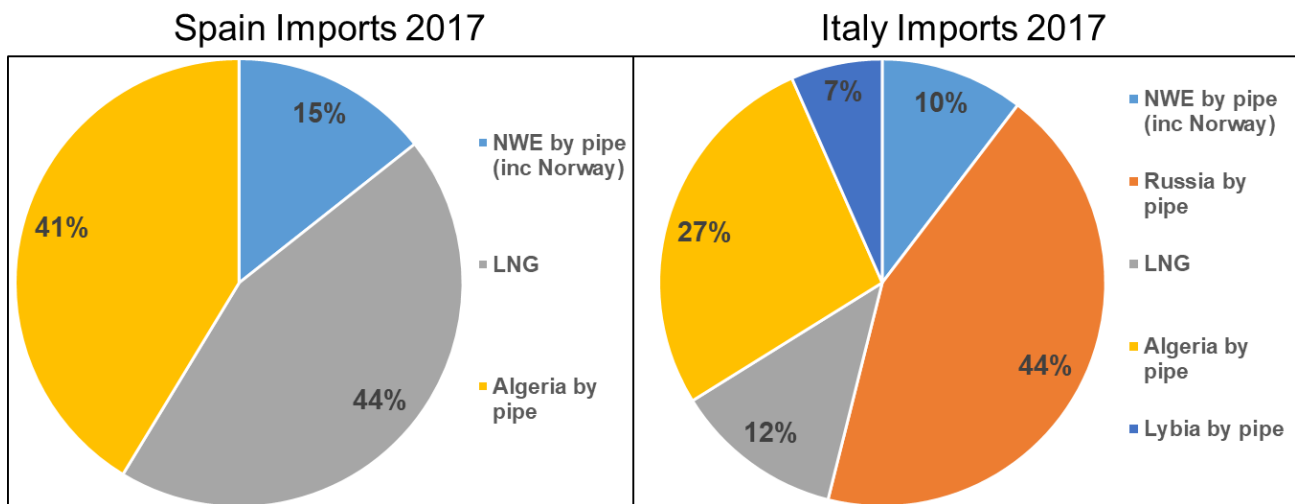
<sup>97</sup> See Appendix H.

<sup>98</sup> See map in Appendix C.





**Figure 8: Spanish and Italian gas imports by source, 2017**



Sources: Italy: SNAM; Spain: Enagás

Despite the relatively easy access to Italy from hubs located in NWE, one can observe from Figure 7 that a spread between PSV and TTF does exist. On average, PSV was at a premium of €1.95 to TTF during the period analysed. This is because the Transigas pipeline across Switzerland can add additional costs partly the result of Switzerland not adhering to European regulations on releasing unused capacity and partly the actual transit fee<sup>99</sup>.

The Italian government published a plan<sup>100</sup> to reduce the PSV premium by introducing what it called a 'Liquidity Corridor'<sup>101</sup>, whereby a regulated entity would purchase long-term north to south capacity and sell it on a short-term basis in auctions to boost liquidity; the cost of this would be socialised across all market participants.

This plan is just a proposal but has already received negative feedback from several sources, including existing capacity holders, other industry participants and EFET<sup>102</sup> as being non-competitive; it may also struggle to obtain regulatory approval. Nevertheless, it does show the Italian government's commitment and willingness to boost the attractiveness of the PSV and its liquidity.

<sup>99</sup> The transit fee is €1.17/MWh. See Appendix L for other cross border entry/exit charges.

<sup>100</sup> Italy's National Energy Strategy 2017 published on 11<sup>th</sup> May 2017 and ratified on 10<sup>th</sup> November 2017: [https://www.mise.gov.it/images/stories/documenti/BROCHURE\\_ENG\\_SEN.PDF](https://www.mise.gov.it/images/stories/documenti/BROCHURE_ENG_SEN.PDF)

<sup>101</sup> A description of the 'Liquidity Corridor' is given in this Argus Media article, p.3: <https://webcache.googleusercontent.com/search?q=cache:1DYzA1PUTn8J:https://www.argusmedia.com/-/media/Files/white-papers/italian-energy-strategy-white-paper.ashx+&cd=7&hl=en&ct=clnk&gl=uk&client=firefox-b>

<sup>102</sup> Italian National Energy Strategy (SEN): EFET comments, 1<sup>st</sup> August 2017: [https://www.efet.org/Files/Documents/Downloads/EFET%20response%20to%20the%20consultation%20on%20the%20Italian%20National%20Energy%20Strategy%20\(SEN\).pdf](https://www.efet.org/Files/Documents/Downloads/EFET%20response%20to%20the%20consultation%20on%20the%20Italian%20National%20Energy%20Strategy%20(SEN).pdf)



Table 6: Progression of the 5 Key Elements for Italy: 2015 - 2017

2015-2017	5 KEY ELEMENTS					
HUB	Active Market Participants*	Traded Products**	Traded Volumes	Tradability Index (Q4)	Churn Rate	Score /15***
PSV 2015	15	21	720	13	1.0	7
PSV 2016	18	23	885	15	1.2	7
PSV 2017	105	19	945	14	1.2	8

\* 2015/16: Estimated number of traders who trade regularly; 2017: Hub Score in the OTC Active Traders table.  
\*\* Score /64 derived from the OTC and Exchange product categories in the Traded Products Table.  
\*\*\* Score based on each of the Key Elements scoring zero for Grey; 1 point for Red; 2 points for Amber; 3 points for Green.

Source: P. Heather

The statistical results for the PSV over the past three years (Table 6) show not only that it has improved consistently each year, and that it is further along the path to maturity than the Spanish PVB, but also that it has progressed from a 'poor' hub to an 'active' hub, alongside the two German hubs and the Austrian VTP. In fact, it surpasses the VTP in four of the five Key Elements, falling far short though on the churn rate due to a much higher physical demand.

Although the PSV hub is not perfect and still has further to go on the road to maturity, it could become *the* reference hub for southern Europe, giving the pricing signals to attract LNG and possibly become, in time, a supply route for gas into northern Europe.

## 6. Important development in January 2019

The analysis done in this paper suggests that, in reality, it has never looked likely that Iberia would become a 'hub for Europe' and that the MidCat/STEP project to allow it to fulfil that role, did not respond to a commercial need.

In January 2019 however there has been an important development regarding the STEP project. The French regulator, CRE, has published a joint decision<sup>103</sup> with the Spanish regulator, CNMC, in which it has rejected the investment request jointly made by the French and Spanish TSOs (Teréga and Enagás respectively), concerning the gas interconnection between Spain and France.

The English version of the press statement states that: "*The National Regulatory Authorities (NRAs) of Spain and France, [...] following their joint assessment of the investment request submitted by the concerned transmission system operators [...], have achieved a coordinated decision under Article 12 of Regulation (EU) No 347/2013, on the STEP interconnection project*".

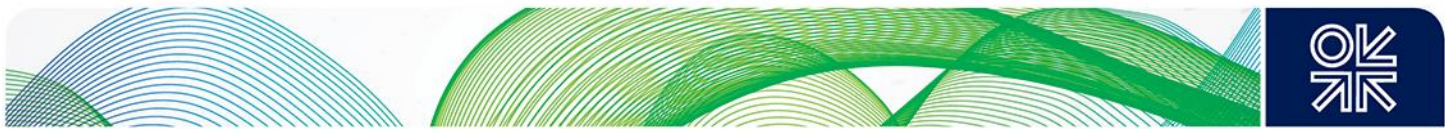
It goes on to explain that: "*In this context, the parties agree that the above Project of Common Interest, in the current configuration and capacities, as presented by the Transport System Operators, fails to comply with market needs and lacks sufficient maturity to be considered for CBCA<sup>104</sup> due to six reasons<sup>105</sup>.*"

<sup>103</sup> La Commission de Régulation de l'Energie: Délibération N°2019-008 du 17 janvier 2019: the relevant documents in French and in English can be found at: <https://www.cre.fr/Documents/Deliberations/Decision/Projet-d-interconnexion-gaziere-STEP>

<sup>104</sup> Cross-Border, Cross-Allocation.

<sup>105</sup> The statement lists six reasons:

1. TSOs have failed to submit a project that will offer firm interconnection capacity.
2. The market has shown no commercial interest for new capacity in the interconnection, as shown by the following market tests.



The statement concludes with: *“For these reasons, the parties reject the investment request, and recommend the TSOs to perform further evaluations on this PCI in order to assess whether the project would provide a clear and positive cost-benefit ratio in the future, taking into account the nature of the capacities offered”.*

The above decision now clearly puts the whole STEP project in jeopardy. Unless Enagás and Teréga can comply with the regulators’ request to perform further cost-benefit analyses adequate to show that, inter alia, the future role of gas in the region, market development, and market interest in additional capacity at the French-Spanish border, would positively improve the evaluation of the project, it is highly unlikely to progress any further.

Not only would that signal the end of the STEP project, but inevitably, also the wider MidCat project and leave Iberia as a gas ‘island’, commercially separated from the rest of Europe.

## 7: Summary and Conclusions

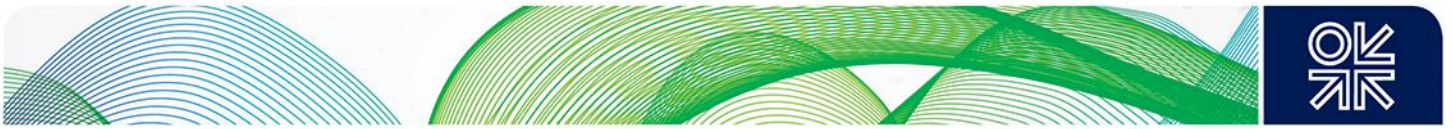
This paper has analysed the current infrastructure and available transportation and cross-border capacities, as well as any potential future improvements, upgrades and increases. What is clear from the analysis is that there is already today ample capacity to import pipeline gas and LNG into Spain and Portugal and to transport it north to the French border; there is also sufficient capacity to transport that gas from there through TIGF/TRS to PEG Nord on to Germany and other northern countries.

What is also clear from the analysis is that shippers are not transporting gas north when the pricing signals would indicate that they should; neither are they curtailing their imports into Spain (which would have a similar market effect) in those same situations. This indicates that a disconnect exists between the actual physical flows, both to France and from France, and the respective PVB/TRS market pricing signals.

The much talked about creation of a single Iberian Market Area has been extremely slow to develop, mainly due to a lack of political action, despite the apparent will expressed through the signing of Treaties and various press statements. To frustrate this issue further, there has been friction between the Spanish Energy Ministry and the Regulator, the CNMC, over who has the powers to determine the entry/exit tariffs between Portugal and Spain. The situation is currently under ministerial review and, should CNMC regain control of setting the tariffs, this will facilitate direct discussions between CNMC and ERSE to agree a new repartition of ‘cross border’ fees. A further complication is that the Spanish government wants a high level, fully detailed, Inter-Governmental Agreement (IGA) with Portugal, in order to proceed to creating the new Iberian gas hub but the CNMC and ERSE both believe that progress could and probably will be made by the 2 regulators cooperating.

The other major infrastructure project, the third Spain-France cross-border pipeline (MidCat), was downgraded to a shorter and cheaper proposal (STEP) in the hope that it would be granted permission to go ahead. However, there have been two important setbacks; the first was the Pöyry cost/benefit analysis which concluded that there was no real benefit to the STEP project; the second came in January 2019 when the investment request was rejected by the French and Spanish Regulators. Although the respective TSOs were asked to submit further cost-benefit analyses to

- 
3. The current gas interconnection capacity between France and Spain is not congested.
  4. The cost of the project is high when compared with European standards.
  5. The project does not guarantee price coupling between gas hubs in France and Iberia.
  6. The project’s cost-benefit analysis does not clearly show that its benefits outweigh its costs in the most credible scenarios”.



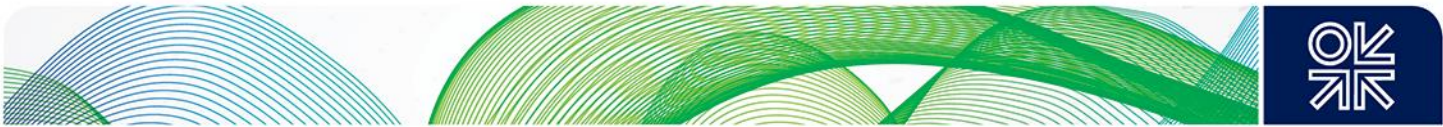
positively improve the evaluation of the project, unless they can adequately provide these, STEP is highly unlikely to progress any further.

Most importantly though, it is the ability to arbitrage physical gas between Spain and France that will need to improve if there is to be any chance of true integration between the two markets and to allow Iberia to provide extra Security of Supply to the rest of Europe. To do so, the PVB must become a deep and liquid enough gas hub to make it possible for traders to buy or sell large quantities of natural gas on the market. Even if capacity is increased repeatedly, if there is no liquid market, the flow cannot be optimised and the available capacity will almost certainly never be fully utilised.

Portugal has not yet created its own virtual traded hub and does not have a traded gas market despite the efforts of the MibGas exchange in particular. Trading at the Spanish PVB hub has improved significantly since it was created in late 2015 but is still far behind most other European traded gas hubs; the liquidity in the traded markets will need to improve far more before it can possibly become a 'gateway' to Europe for gas supplies.

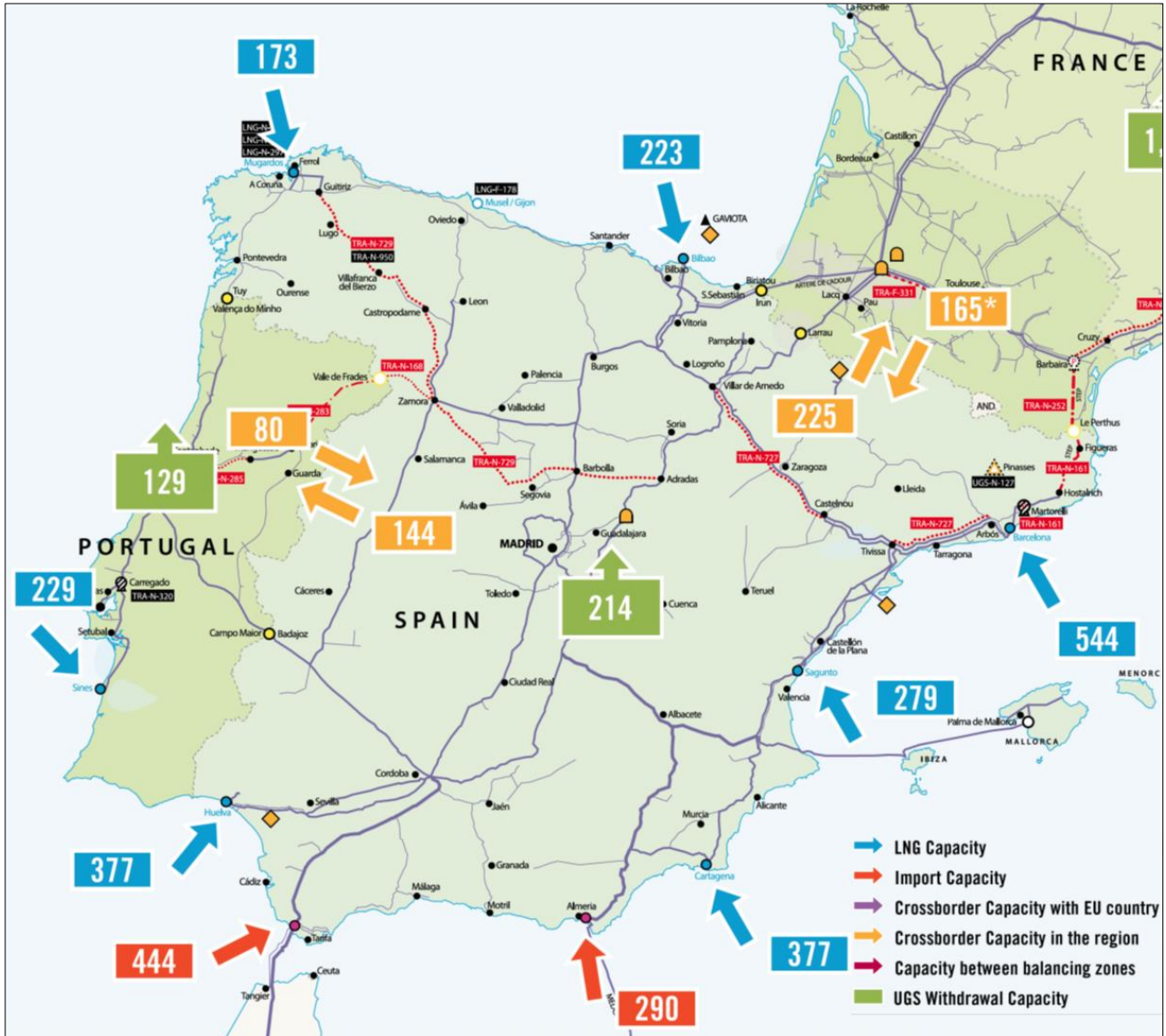
PVB had all the attributes to become the Mediterranean reference hub but its poor liquidity and the lack of actions by the Spanish administration to change this situation will probably leave the door open to other contenders. Despite having ample capacity today (even without the extra ES/FR link) and after the analysis in this paper, it is highly unlikely that Iberia will ever become a 'Hub for Europe', a new route to enhance Europe's security of gas supply.

The suggestion that PSV could take over that role is maybe promising: although the PSV hub is not perfect and still has further to go on its road to maturity, it could become *the* reference hub for southern Europe, giving the pricing signals to attract LNG and possibly become, in time, a supply route for gas into northern Europe.



## 8: Appendices

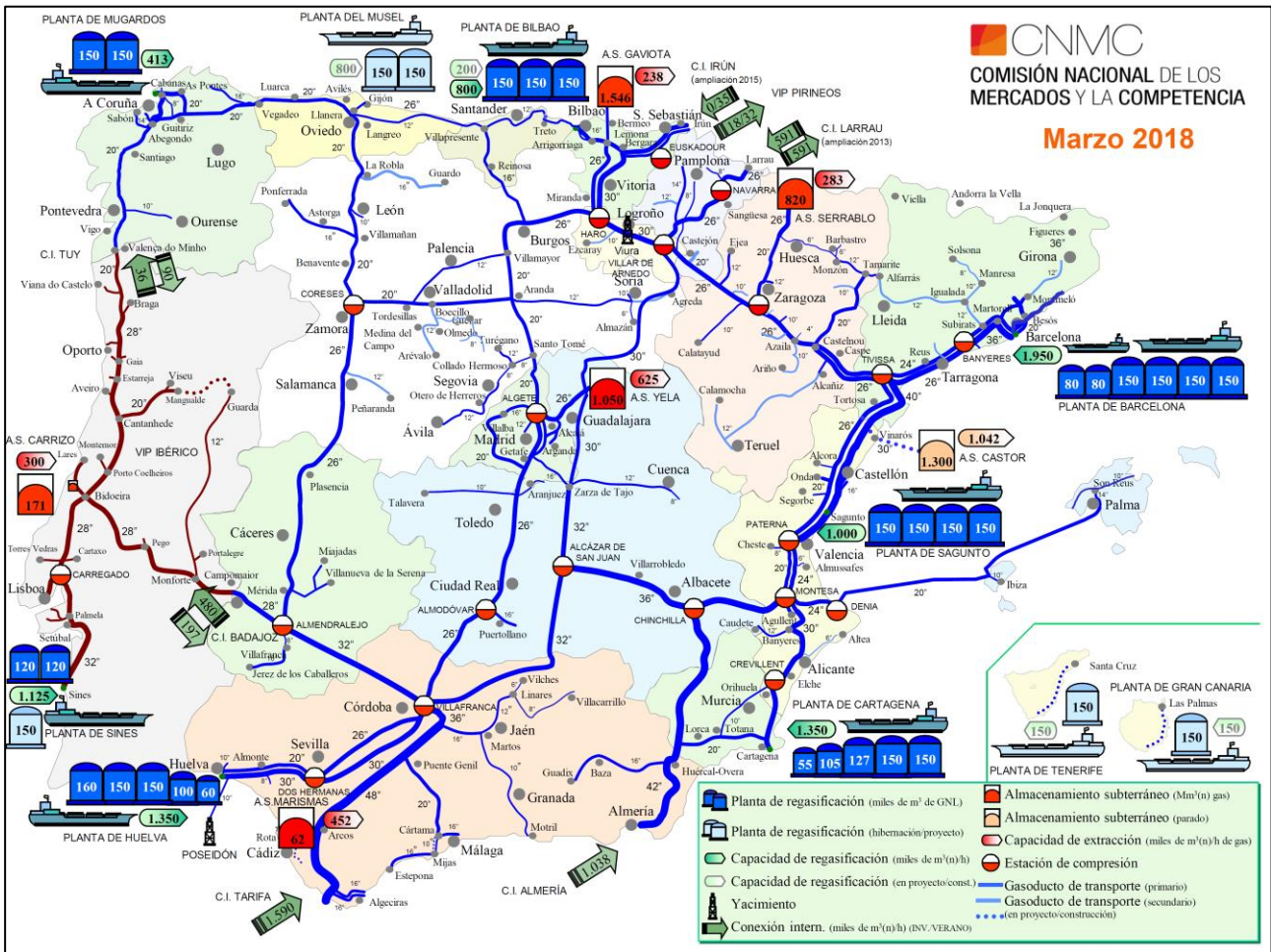
### A) Interconnections and firm capacities in the South Region



Source: ENTSOE Gas Regional Investment Plan - South Region 2017, Figure 6.1, p.56



### B) Iberian Gas Network System

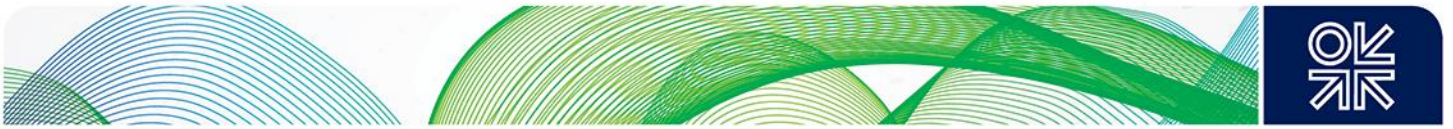


Source: CNMC


### C) North African gas pipelines to Europe



Source: Interfax



**D) EU Project of Common Interest 5.5.1, STEP: Information Sheet**



European Commission

*Project of common interest:*

**5.5.1**

*PCI fiche*

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**CATEGORY**  
Gas

**COUNTRIES CONCERNED**  
Spain (ES)  
France (FR)

**PROMOTERS**  
Teréga (FR)  
Enagas Transporte S.A.U. (ES)

**PCI WEBSITE(S)**  
[https://www.enagas.es/enagas/en/MarcoRegulatorio/Proyectos\\_Interes\\_Comun](https://www.enagas.es/enagas/en/MarcoRegulatorio/Proyectos_Interes_Comun)  
<https://www.step.terega.fr/>

**LOCATION**  
Hostalrich (ES) – Barbaïra (FR)

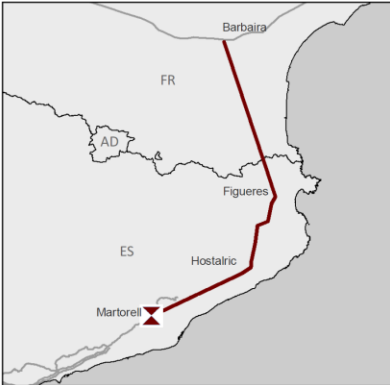
**COMMISSIONING DATE**  
31/12/2022

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**LAST UPDATE**  
December 2018

## South Transit East Pyrenees [currently known as "STEP"]

### North-South gas interconnections in Western Europe



▲ PCI 5.5.1 - Gas compressor station

— PCI 5.5.1 - Gas pipeline

— Existing pipeline network

Source: PLATTS, GISCO, European Commission

**Technical description**

On the Spanish side, the project consists on a pipeline between Hostalrich and Figueras (79 km, 36"/900 mm), a pipeline between Figueras and the French border (28 km, 36"/900 mm) and a compressor station in Martorell (36 MW).

On the French side, the project consists on a pipeline between Barbaïra and the Spanish border (120 km, 36"/900 mm), two connections with the existing pipe and the adaptation of the Barbaïra compression station piping.

**CEF funding**

5.5-0048-FR-S-M-15: Awarded CEF co-funding: 4,150,000 EUR  
<https://ec.europa.eu/inea/en/connecting-europe-facility/cef-energy/5.5-0048-FR-S-M-15>

5.5-0054-ESFR-S-M-15: Awarded CEF co-funding: 1,477,125 EUR  
<https://ec.europa.eu/inea/en/connecting-europe-facility/cef-energy/5.5-0054-ESFR-S-M-15>

5.5-0011-ES-S-M-17: Awarded CEF co-funding: 1,701,375 EUR  
<https://ec.europa.eu/inea/en/connecting-europe-facility/cef-energy/5.5-0011-ES-S-M-17>


Energy

Note: In line with the provisions of the TEN-E Regulation, the content of this document relies on information provided by the promoter(s) of the Project of Common Interest and INEA does not guarantee its accuracy. The European Commission and INEA accept no responsibility or liability whatsoever with regard to the information contained therein.

Source: [http://ec.europa.eu/energy/maps/pci\\_fiches/pci\\_5\\_5\\_1\\_en\\_2017.pdf](http://ec.europa.eu/energy/maps/pci_fiches/pci_5_5_1_en_2017.pdf)



## E) EU Project of Common Interest 5.5.1, STEP: Implementation Plan



European Commission

*Project of common interest:*

**5.5.1**

*PCI implementation plan*

### South Transit East Pyrenees [currently known as "STEP"]

North-South gas interconnections in Western Europe

**CATEGORY**  
Gas

**PROMOTERS**  
Teréga (FR)  
Enagas Transporte S.A.U. (ES)

**1. Implementation status**  
Planned but not yet in permitting

**2. Timeline of the implementation plan (\*)**

**2.1. Estimated timeline for the completion of feasibility and design studies for the project**

Project stage	Start date	End date
Feasibility study	01/2009	01/2017
FEED study	01/2016	09/2019

**2.2. Estimated timeline for obtaining the approval by the national regulatory authority and the Final Investment Decision**

Project stage	Date of request	Date of decision
Approval by the NRA	23/07/2018	No data
CBCA (if applicable)	23/07/2018	No data
Exemption (if applicable)	N/A	N/A
Final Investment Decision		06/2019

**2.3. Estimated permit granting schedule<sup>1</sup>**

Date of request	Date of decision
01/2019	12/2020

<sup>1</sup>This schedule should be in line with the permit granting schedule required by Article 10 4(b) of the TEN-E Regulation, where applicable. According to this Article, a permit granting schedule has to be drawn up by the competent authority in close cooperation with the project promoter and other authorities concerned.

**2.4. Estimated timeline for construction and commissioning**

Activities	Start date	End date
Construction	04/2021	01/12/2022
Commissioning date		31/12/2022

(\*) Please note that all dates in this document refer to the latest dates of each implementation stage for the entire PCI, considering all infrastructures included in the project. The implementation status reflects the least advanced status of all PCI infrastructures.

**LAST UPDATE**  
December 2018

Energy

Note: In line with the provisions of the TEN-E Regulation, the content of this document relies on information provided by the promoter(s) of the Project of Common Interest and INEA does not guarantee its accuracy. The European Commission and INEA accept no responsibility or liability whatsoever with regard to the information contained therein.

Source: [http://ec.europa.eu/energy/maps/pci\\_fiches/pci\\_annex2\\_5\\_5\\_1\\_en\\_2017.pdf](http://ec.europa.eu/energy/maps/pci_fiches/pci_annex2_5_5_1_en_2017.pdf)





## F) LNG hub proposal

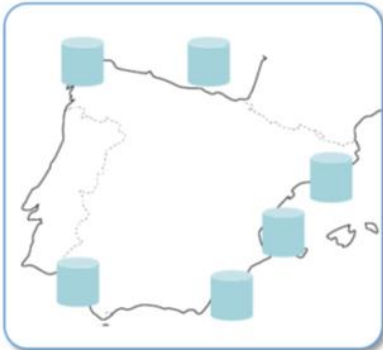
### LNG Exchange Market – New services

**CNMC**  
COMISIÓN NACIONAL DE LOS  
MERCADOS Y LA COMPETENCIA

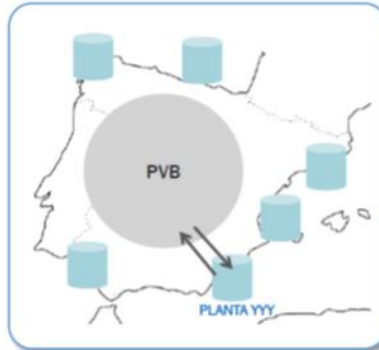
**MIBGAS**  
DERIVATIVES

MIBGAS derivatives is going to launch trading of LNG products at his market platform, including:

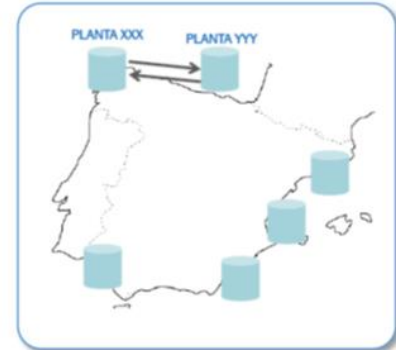
WD and D+1 product  
at 6 LNG terminals



Swaps between an  
LNG terminal and PVB

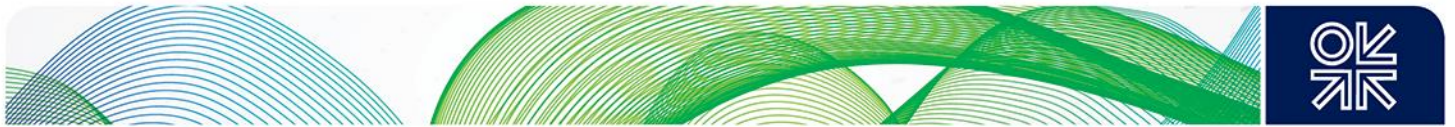


Swaps of LNG  
between 2 terminals



9

Source: CNMC presentation, July 2018



## **G) European traded gas hubs in 2018**

### **NBP**

National Balancing Point; Great Britain; 1996

### **ZEE/ZTP**

Zeebrugge Hub / Zeebrugge Trading Point; Belgium; 2000/2012

### **TTF**

Title Transfer Facility; Netherlands; 2003

### **PSV**

Punto di Scambio Virtuale; Italy; 2003

### **PEG (N,S,T) / TRS / TRF**

Points d'Echange de Gaz (Nord, Ouest, Est, Sud, TIGF) ; France: 2004

PEG Nord (merger of PEGs N,O,E); France: 2009

Trading Region South (covering PEG Sud and TIGF); France: 2015

Trading Region France (covering PEG Nord, Sud and TIGF); France: 2018

### **AOC / PVB**

Almacenamiento Operativo Comercial / Punto Virtual de Balance; Spain; 2004/2015

### **GTF / ETF**

GasTransfer Facility / Electronic Transfer Facility; Denmark; 2004

### **CEGH / VTP**

Central European Gas Hub / Virtual Trading Point; Austria; 2005/2013

### **GPL**

Gaspool; Germany; 2009

### **NCG**

NetConnect Germany; Germany; 2009

### **MGP**

Magyar Gázkiegyenlítési Ponton; Hungary; 2010

### **VOB**

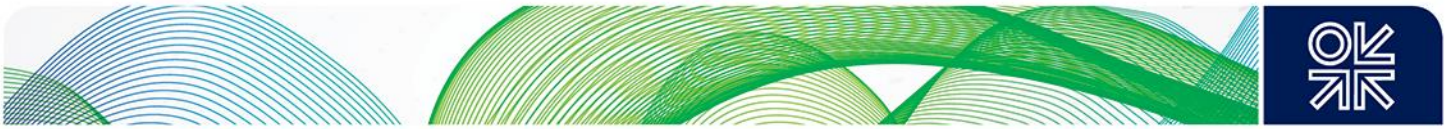
Virtuální Obchodní Bod; Czech Republic; 2011

### **VPGS**

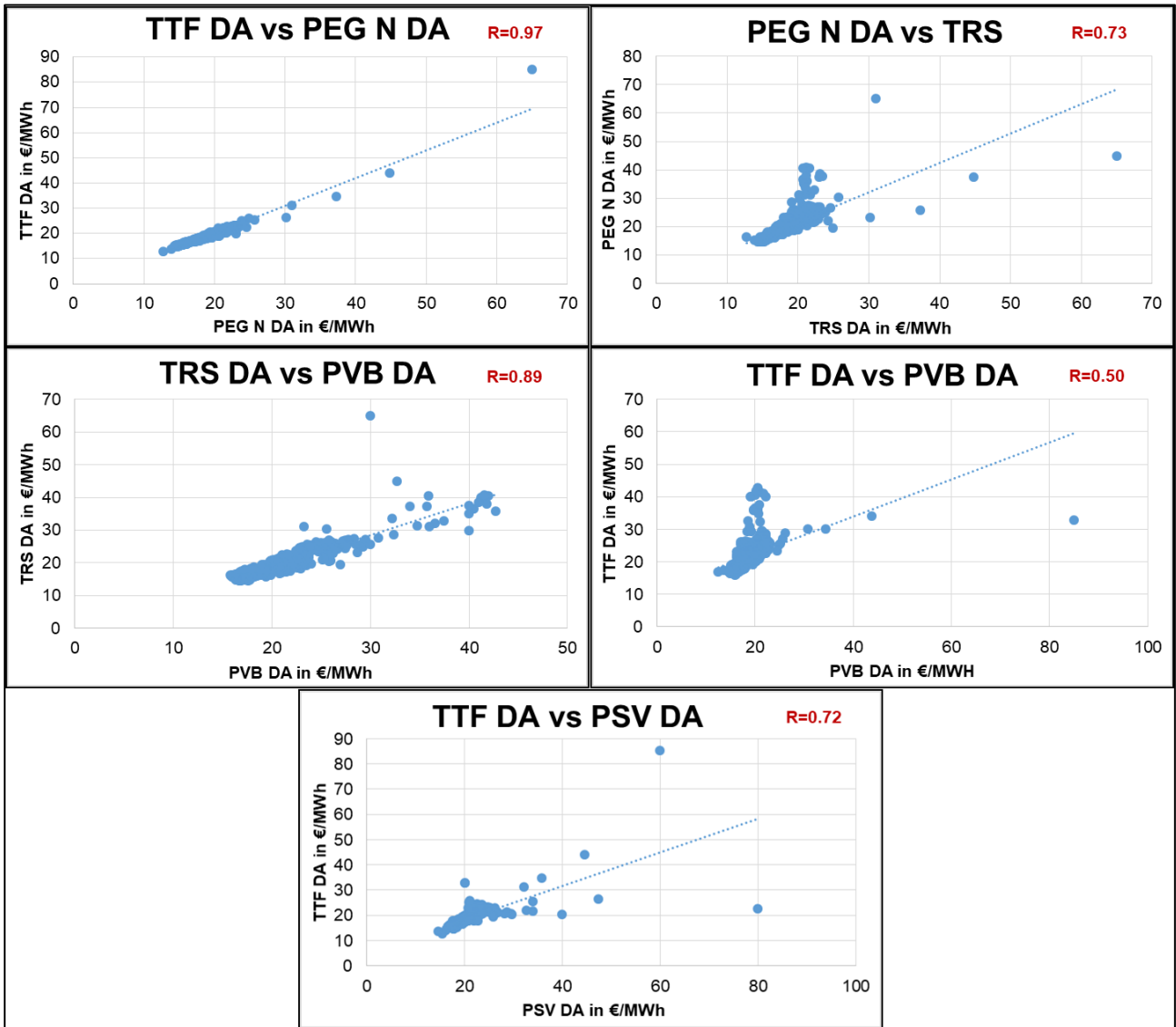
Virtual Point Gaz-System; Poland; 2014

### **SK (VOB)**

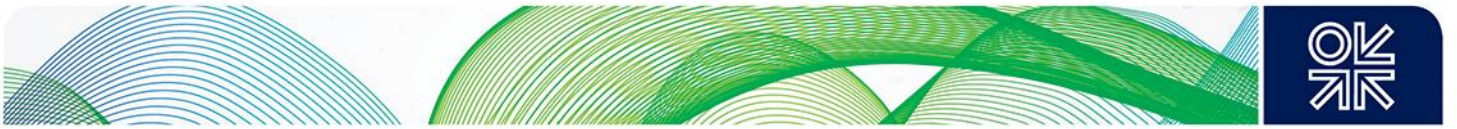
Slovenskom Virtuálnom Obchodnom Bode; SK; 2016



H) Correlations between selected pairs of hubs



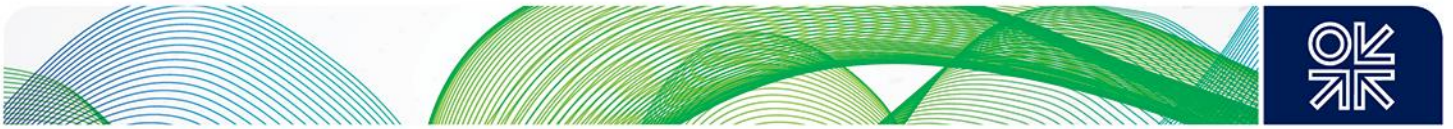
Source: ICIS, P. Heather



*1) French grid North/South reinforcement projects*



Source: CRE



**J) Prisma Capacity Auction Calendar**

**CAM NC AUCTION CALENDAR 2018/19: DAILY**

**FIRM CAPACITY - default timing**

Auction		Product				
Start date	Start time (UTC)	Run date	Run start (UTC)	End date	End time (UTC)	
01.03.2018	15:30	02.03.18	05:00	03.03.18	05:00	as an example for days falling on winter time
01.04.2018	14:30	02.04.18	04:00	03.04.18	04:00	as an example for days falling on daylight sav

*and repeating daily through 28.02.2019*

**INTERRUPTIBLE CAPACITY - 1 hour after FDA auction**

Auction		Product				
Start date	Start time (UTC)	Run date	Run start (UTC)	End date	End time (UTC)	
01.03.2018	16:30	02.03.18	05:00	03.03.18	05:00	as an example for days falling on winter time

Source: [https://corporate.prisma-capacity.eu/wp-content/uploads/2018/02/CAM-NC-auction-calendar-2018-2019\\_rev9.pdf](https://corporate.prisma-capacity.eu/wp-content/uploads/2018/02/CAM-NC-auction-calendar-2018-2019_rev9.pdf)



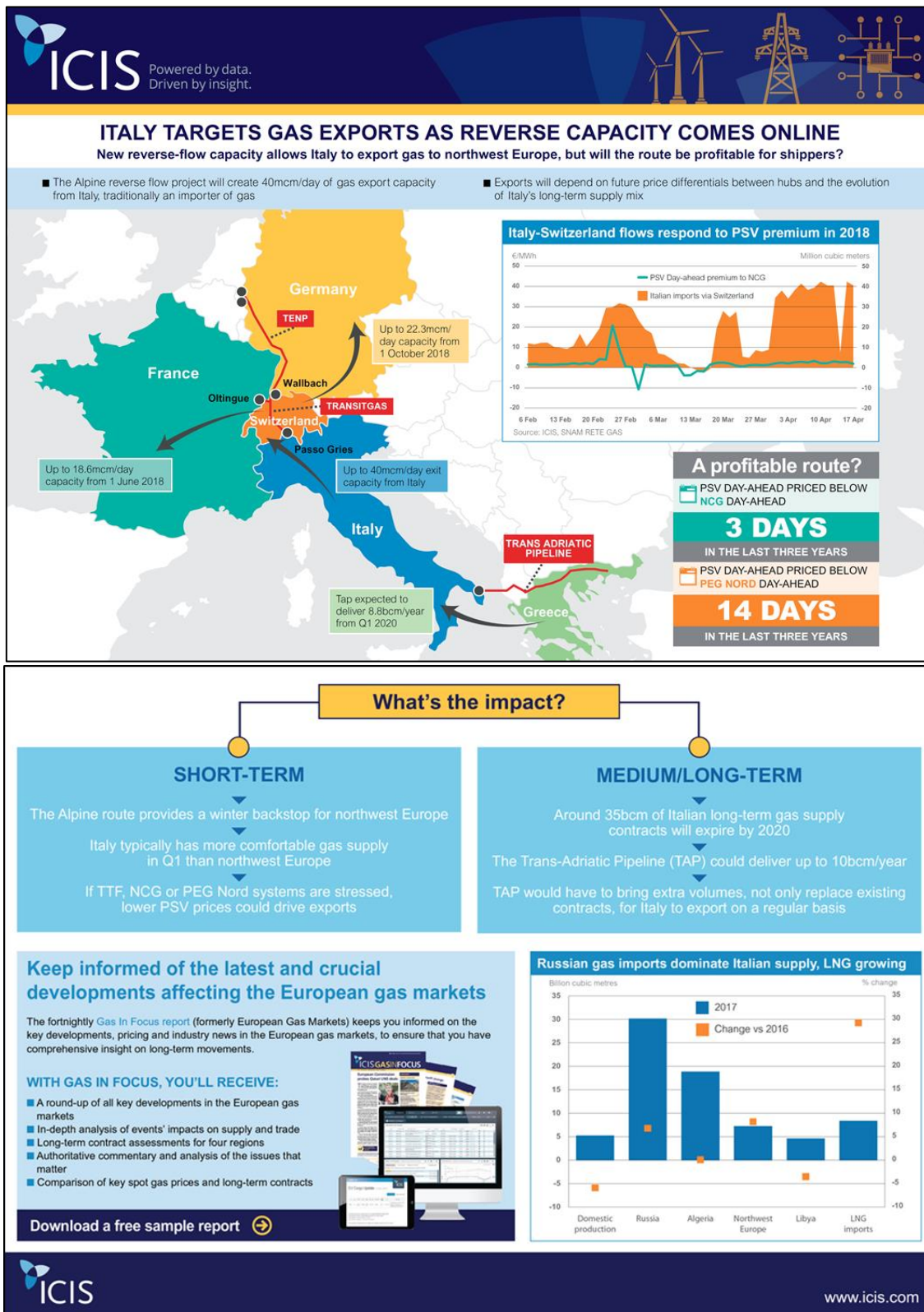
K) Actual Spain to France gas flows: 5th - 9th February 2018

MWh/d at 0°C		Transport capacities daily			
		PITT-PIRINEOS			
		Entry		Exit	
		Firm	Interruptible	Firm	Interruptible
05/02/2018	Net marketable	48,200.976	-	16,971.048	60,000.000
	Subscribed Daily	0.000	-	4,499.668	0.000
	Subscribed Intraday	0.000	-	6,486.336	0.000
	<b>Available</b>	<b>48,200.976</b>	<b>-</b>	<b>5,985.044</b>	<b>60,000.000</b>
06/02/2018	Net marketable	48,200.976	-	16,971.048	60,000.000
	Subscribed Daily	0.000	-	9,620.964	0.000
	Subscribed Intraday	0.000	-	0.000	0.000
	<b>Available</b>	<b>48,200.976</b>	<b>-</b>	<b>7,350.084</b>	<b>60,000.000</b>
07/02/2018	Net marketable	48,200.976	-	16,971.048	60,000.000
	Subscribed Daily	0.000	-	16,971.041	0.000
	Subscribed Intraday	0.000	-	0.000	0.000
	<b>Available</b>	<b>48,200.976</b>	<b>-</b>	<b>0.007</b>	<b>60,000.000</b>
08/02/2018	Net marketable	48,200.976	-	16,971.048	60,000.000
	Subscribed Daily	0.000	-	16,971.041	6,352.473
	Subscribed Intraday	0.000	-	0.000	0.000
	<b>Available</b>	<b>48,200.976</b>	<b>-</b>	<b>0.007</b>	<b>53,647.527</b>
09/02/2018	Net marketable	48,200.976	-	16,971.048	60,000.000
	Subscribed Daily	0.000	-	16,971.041	33,326.448
	Subscribed Intraday	0.000	-	0.000	0.000
	<b>Available</b>	<b>48,200.976</b>	<b>-</b>	<b>0.007</b>	<b>26,673.552</b>

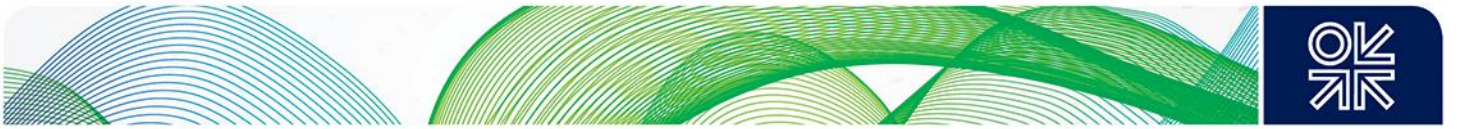
Source: Teréga



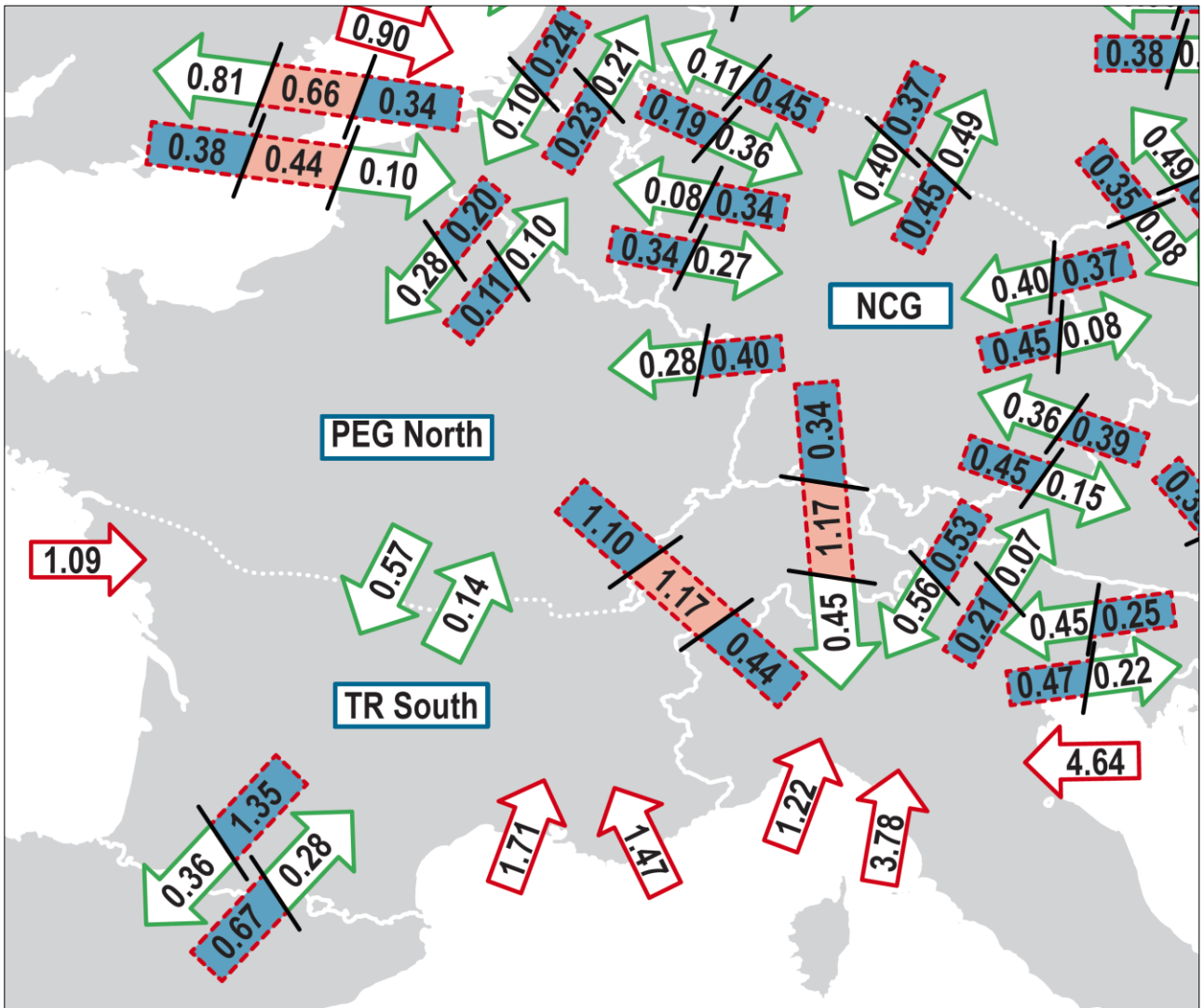
## L) ICIS Infographic on PSV reverse flow project



Source: ICIS Infographic, August 2018

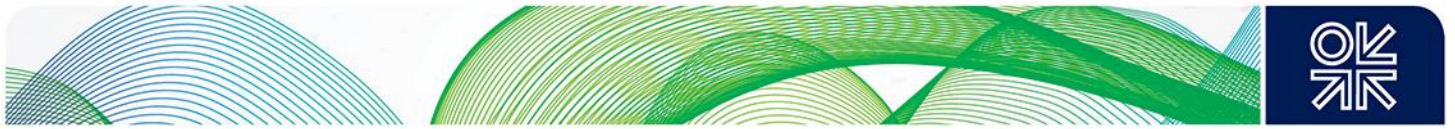


M) Cross border entry/exit charges and transit fees, in €/MWh



Source: ACER annual report on the results of monitoring the internal natural gas markets in 2017, taken from Figure 30, p.34





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