

CEER

**Council of European
Energy Regulators**



Fostering energy markets, empowering **consumers**.

How to Foster LNG Markets in Europe

CEER Report

Liquefied Natural Gas Work Stream of Gas Working Group

**Ref: C18-LNG-37-03
24 July 2019**

INFORMATION PAGE

Abstract

The main objective of this report is to identify possible ways to foster the development of LNG market at an EU level to find solutions to both real and anticipated problems.

The deliverable focuses on initiatives to achieve the goal, by increasing LNG flexibility and liquidity, removing rigid contracts clauses, simplifying TPA conditions, suggesting new services to foster terminal utilisation and exploring ways to promote price signals arise compatible with the *Quo Vadis* study of the Single European Gas Market. It also contains case studies that identify innovative approaches.

The outcome of the questionnaire circulated among NRAs and the meetings with key stakeholders, EUROGAS, EFET and GLE have also been taken into consideration.

The findings of this report are intended to foster the development of a market for LNG in Europe and facilitate its role in the European market.

Target Audience

European Commission, National Regulatory Authorities, Member States, energy suppliers, traders, gas customers, gas industry, consumer groups, LNG and other network operators, academics and other interested parties.

Keywords

Liquefied natural gas, LNG, LNG terminal, Competition between EU terminals, Underutilization of LNG terminals, New LNG services, Regulatory coordination, LNG tariffs and transparency, National Regulatory Authorities, European Commission.

If you have any queries relating to this paper please contact:

CEER Secretariat

Tel. +32 (0)2 788 73 30

Email: brussels@ceer.eu

Related Documents

CEER Documents

- CEER Report on [Removing LNG barriers on gas markets](#), December 2017, Ref. C17-LNG-32-03.
- CEER Presentation on [Removing barriers to LNG and to gas storage product innovation](#), October 2016.
- [CEER Analysis on the role of LNG to improve security of supply](#), February 2016, Ref: C15-LNG-25-03.
- [CEER Status Review on monitoring access to LNG terminals in 2009-2013](#), September 2014, Ref: C14-GWG-111-03.
- [CEER Monitoring Report on Implementation of the Transparency Template in the European LNG Terminals](#), 20 December 2013, Ref.C13-GWG-102-04.
- [CEER Status Review and evaluation of access regimes at LNG terminals in the EU](#), CEER, 12 March 2013, Ref. C12-LNG-15-03.

External Documents

- [Communication from the Commission to the European Parliament, the Council, the European economic and social committee and the committee of the regions on an EU strategy for liquefied natural gas and gas storage](#), European Commission, February 2016.

Table of Contents

EXECUTIVE SUMMARY	6
1 INTRODUCTION.....	8
2 LNG MARKETS OUTLOOK	9
2.1 Key trends of the LNG market.....	9
2.2 Demand side outlook	11
2.3 Supply side outlook.....	12
2.4 Supply contracts	14
2.5 LNG pricing.....	15
3 EU LNG MARKETS: FUTURE EVOLUTION	15
3.1 Role of LNG	15
3.2 Access conditions	16
3.3 Competition between EU terminals at regional level.....	17
3.4 Underutilization of LNG terminals. The potential impact on the tariffs methodology	19
3.5 Increase of spot LNG trading	20
4 INNOVATIVE APPROACHES: CASE STUDIES	21
4.1 The Spanish case: Merging LNG plants. Virtual regasification and storage capacities	21
4.1.1 Current regulation and motivation for improvement	21
4.1.2 CNMC proposal for a new LNG model	22
4.1.3 Consultation and implementation processes	24
4.2 The Italian case: Auction procedures for the allocation of regasification capacity ...	26
4.2.1 The infrastructural, regulatory and market context in Italy.....	26
4.2.2. Pre-Auctions rules for the allocation of the regasification capacity.....	26
4.2.3 The introduction of auctions	27
4.2.4 The case of Toscana Terminal (Offshore)	29
4.3 The Belgian case. Adapting infrastructures and services to an evolving market.....	31
4.3.1 The Belgian liberalisation process	31
4.3.2 The current regulatory framework.....	32
4.3.3 Zeebrugge terminal	33
4.4 The Lithuanian case. LNG as a source of competition with pipeline gas and diversification of supply	34
4.4.1 The principles for LNG regasification prices	35
4.4.2 The security of supply model.....	36
4.4.3 Supply costs of the designated supplier	37
4.4.4 Administrative costs incurred by the TSO	37

4.4.5	LNG impact to natural gas market	38
4.4.6	Practical example of calculation of LNG regasification prices	38
5	IDENTIFIED WAYS TO FOSTER A MARKET FOR LNG IN EUROPE.....	39
5.1	Developing shared analysis on the future role for GNL in energy transition.....	39
5.2	Developing price references in all parts of the European market.....	40
5.3	Opportunity of disclosing LNG prices	40
5.4	Flexibility of LNG contract and spot trading expansion	41
5.5	Regional streamlining of gas infrastructures – Access and utilization efficiency.	41
5.6	Developing new services and maximizing users choices.....	42
5.7	Regulatory coordination	42
6	CONCLUSIONS.....	44
	ABOUT CEER	46

EXECUTIVE SUMMARY

Background

Net natural gas imports to Europe grew by almost 11% in 2017, reaching 3,855 TWh, supported by a combination of an increasing demand and decreasing indigenous production. As import dependence increases, EU becomes more exposed to global gas market dynamics. In this context LNG contributes to the security of supply and diversification while also allowing for greater competition in the European Gas Market.

In 2017, Europe represented only 16% of global LNG imports (29% in 2010), due to the decrease of the European demand during the economic crisis, to the competition with natural gas arriving through the pipeline and to the increase of Asian demand. Nevertheless, LNG imports have recently increased and are expected to grow further under the influence of the rising LNG competition context, gas consumption growth, price competition with pipeline gas, renewable sources availability and price differentials between Basins.

Objectives and Contents of the Document

As LNG represents an important source of gas that stimulates competition in the European market, CEER has adopted a proactive role and focus on future challenges. This document intends to reflect the ways that LNG competitiveness at an EU level could be fostered and, potentially, ways to raise the level of utilisation of existing assets. Special attention is given to problem assessment, solution and anticipation.

This report starts with an outlook of global and European LNG markets to feed our analyses with the main LNG facts and figures globally. We analyse the key trends of the LNG market, from both demand and supply sides, supply contracts and LNG pricing evolution.

The second part of this report analyses the expected situation of the future LNG in Europe focusing specifically on the regional context.

The third chapter is dedicated to several case studies that look at recent regulatory developments showing solutions promoted by Lithuania, Italy, Belgium and Spain to address specific LNG issues and particularly serving the development of competition.

In the final chapter, the report highlights several ways and orientations that could contribute to foster a market for LNG in Europe including considerations on transparency, LNG price references, the flexibility of LNG contracts, regional streamlining of infrastructures, innovation in terms of services and regulatory coordination.

Brief summary of the conclusions

According to the LNG outlook carried out in this report, the importance of LNG is expected to grow in the future and remains a cornerstone of EU security of supply that contributes to gas market competition. In this context, any new regulatory developments should focus primarily on quick adaptation to changing conditions.

Concerning access to LNG terminals, we observe different regulatory approaches in Europe, which are evolving in order to help the opportunities that LNG offers to its national markets. The development of new services, the way the terminals are regulated (or not), the eventual adaptation of rules and concepts must follow market needs and innovation principles.

As shown in the case studies, flexibility allows a quick response to changing market conditions and adaptation in accordance with country specific peculiarities. In this respect, the current legal framework is fit for purpose and CEER does not identify a need for further regulation of LNG terminals at European level.

CEER believes that attracting LNG to come to Europe could be further enhanced with the development of price references, where these have not developed yet, to rely on price signals for attracting LNG where it is most valued.

Market developments could potentially increase the sensitivity to price signals of deliveries in Europe. In this respect, a certain level of flexibility on the upstream part of the chain would be welcomed which could be served, when possible, by more convergence in the global gas market trading arrangements or higher flexibility on particular clauses to help short term arbitrages.

Further coordination of EU regulators may be advisable, at least at regional level, mainly regarding transparency about changes on access regimes and conditions, granting different parties the opportunity to adapt to the changing conditions. Common regulatory principles could be adapted to best fit LNG market needs and regional specificities.

CEER acknowledges that the opportunity to develop new LNG infrastructures should be assessed thoroughly, as there is a significant potential for improving the use of existing infrastructures in a context of low utilisation rates.

1 INTRODUCTION

Natural gas is one of the main energy sources of the European Union. It accounted for more than 23% of gross inland consumption in 2016 making it the second energy source after oil. Furthermore, it has the potential to contribute to the energy transition as its evolution represents a transitional alternative to the more CO₂-intensive technologies and as a security vector for the overall system, supporting renewable energy development and ensuring security of supply. These challenges are at the heart of ongoing discussions regarding the future Gas Package, which represents a key opportunity to prepare the future of gas infrastructure and to develop a shared strategy within the European Union.

Net natural gas imports to Europe grew by almost 11% in 2017, reaching 3,855 TWh, supported by a combination of increasing demand due to more favourable economic conditions (5% in 2017, after a 7% increase in 2016) and decreasing indigenous production (a 40% decrease considering the last ten years period). These figures illustrate the new growing trend of natural gas since 2016, after a period of decrease, between 2011 and 2015.

As import dependence increases, the EU becomes more exposed to global gas market dynamics. In this context liquified natural gas (LNG) has a role to play in the European gas market, contributing to security of supply, diversification and greater market competition. In the context of the energy transition, it can also provide flexibility to the system operation. In 2017 more LNG infrastructures were commissioned worldwide and net LNG imports increased by 19.5%¹ on yearly basis, accounting for 12% of total natural gas imports. In the framework of the future legislative Gas Package, conducting in-depth analysis on sustainability and security of supply would be advisable to develop a shared European vision on the future of LNG in the European Union.

In 2016, CEER activities were focused on gathering views from stakeholders on existing and potential barriers with regard to bringing LNG volumes into the EU, access to terminals and possible benefits to spread LNG across Europe. It led to an Evaluation of Responses (EoR), which summarized the key messages from both stakeholders and CEER.

Also in 2016, the European Commission (EC) published a package of proposals focusing on gas security of supply. This package included a Communication on an EU strategy for LNG and gas storage. The Commission's strategy aims to exploit the potential of LNG and storage to make the EU gas system more diverse and flexible. In order to achieve this goal, it focuses on three main themes: completing missing infrastructure, completing the internal gas market, and strengthening EU's role on the international gas market. The underlying principle guiding the strategy is that well-functioning markets should deliver this diverse and flexible gas system. CEER welcomed the EC focus on ensuring access to liquid markets as the main driver to guarantee that European gas flexibility markets work in the interests of consumers.

In 2017, CEER carried out analysis that aimed to identifying ways to remove barriers in LNG markets. It focused on services offered by the LNG terminals and tariffs applied; this analysis was CEER's contribution to contribute to the EC LNG and storage strategy. It led to the publication of the report *"Removing LNG barriers on gas markets"* in end 2017.

In 2018 CEER decided to adopt a proactive role looking ahead to future challenges, with greater focus on how to foster the development of the LNG sector at an EU level, identifying solutions to real problems alongside the anticipation of new ones.

¹ Despite this significant increase, in the world context EU's LNG imports share has fallen from 29% in 2010 to 16% in 2017.

In 2018, the European Commission Directorate for Energy and the Ministry of Economy, Trade and Industry of Japan co-organized a Workshop series on “Key drivers to promote the liquidity, flexibility and transparency of the global liquefied natural gas (LNG) market”. The focus was on the global development of LNG markets which is also the purpose of this document.

Future contributions from CEER to the Gas Package might include the evaluation of the competitiveness of LNG, as well as the assessment of the value of LNG facilities for the energy policy of EU.

2 LNG MARKETS OUTLOOK

Even though the main goal of this report is to find possible ways to foster the development of the LNG sector at EU level it is also important to understand the main facts and figures of the LNG sector at international level.

2.1 Key trends of the LNG market

The LNG market is an active international market, where the number of players does not stop growing year after year. Only ten years before, in 2007, the number of LNG-importing countries (18 importers) were less than half of the current number (40 importers), and the LNG traded was 58% of the amount traded today.

In Figure 1 below the main facts and figures of the LNG sector at an international level are summarised for 2017. The data relating to the EU28 are shown in blue italic letters.

Demand - side	Supply - side
<p>40 importing countries (13 in EU)</p> <p>+ 1 new country vs 2016 (Malta)</p>	<p>19 exporting countries -</p> <p>0 new exporting countries -</p>
<p>850 Mt (*) <i>regasification capacity</i> (156 Mt in EU = 18,3 % share)</p> <p>+ 2.4 % (20 Mt) vs 2016</p> <p>34% average use</p>	<p>365 Mt <i>liquefaction capacity</i> -</p> <p>+ 7.5 % (25.4 Mt) vs 2016</p> <p>79% average use</p>
<p>Biggest five consumers: Mt, (% share):</p> <ul style="list-style-type: none"> ○ Japan: 84 Mt (29 %) ○ China: 39 Mt (14 %) ○ South Korea: 34 Mt (13 %) ○ India: 19 Mt (7 %) ○ Taiwan: 17 Mt (6 %) 	<p>Biggest five producers: Mt, (% share):</p> <ul style="list-style-type: none"> ○ Qatar: 78 Mt (27 %) ○ Australia: 56 Mt (19 %) ○ Malaysia: 27 Mt (9 %) ○ Nigeria: 20 Mt (7 %) ○ Indonesia: 19 Mt (7 %)
<p>289.8 Mt Global trade (45.98 Mt in EU = 15.9 % share)</p> <p>+ 9.9 % (26,2 Mt) vs. 2016</p>	

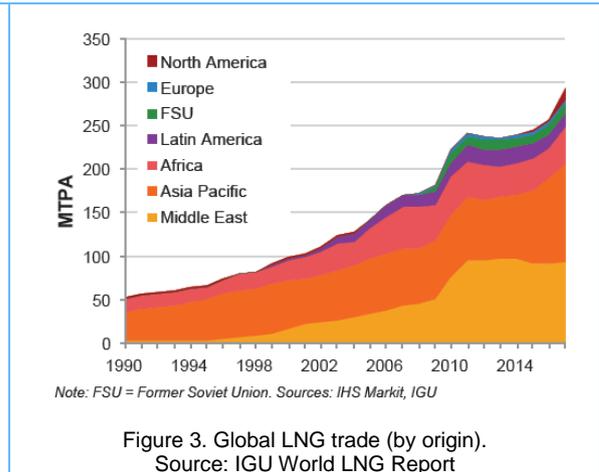
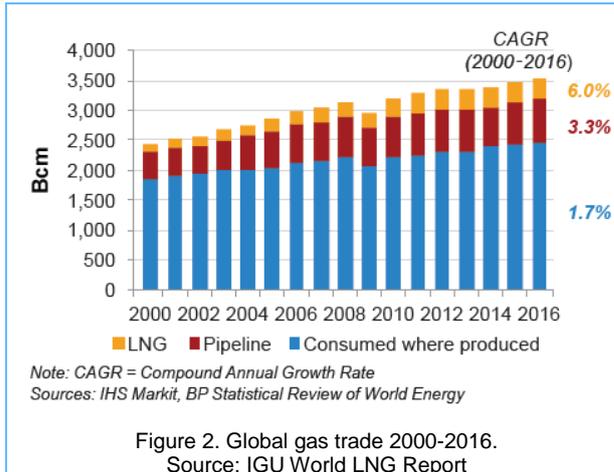
(*) Mt = Million tons.

Figure 1. Key figures of international LNG sector. Source: GIIGNL Annual report 2018

Traded LNG volumes are growing across the globe. This is due to the development of demand in countries remote from other gas infrastructures or with no direct access to gas sources via pipeline, as well as energy diversification for security of supply in markets with enough pipeline connections.

Since 2000, LNG trade has grown at a rate of 6% (compound annual growth rate), almost double the pipeline trades of natural gas (3.3%).

LNG trade has been growing at different rhythms during the last three decades. After a steady growth during the 90's, in the first decade of the 2000's, there were some sharp increases, especially at the end of the period. In the current decade, after a few years of an almost constant LNG demand, the pace of growth has accelerated again, and 2017 has experienced one of the highest yearly incremental growth in LNG trade globally due to strong demand from Asia



This is one of the reasons why the expected LNG export surplus (“LNG glut”) foreseen by many international players that was supposed to be occurring now, has not yet taken place . However, the same sources think that due to the “*recent slow-down in FIDs in the last two years and the significant demand growth prospects, risks of a potential tightening of demand and supply must not be minimized for the medium term*”².

Re-exporting operations, mainly from the Atlantic to the Pacific Basin, have significantly decreased after a peak of 6.4 Mt in 2014 (3% of the net LNG trade during that year) and represented less than 1% of the net LNG traded at only 2.7 Mt in 2017. Considering that the main drivers for this kind of operations are price differentials between regions, this drop is an indicator that LNG prices were closer. Additionally, considering that LNG offer in the Pacific Basin will grow in the coming years, and an increasing proportion of supply contracts are destination flexible, it is likely that re-exports could decrease even more in the future.

2.2 Demand side outlook

There has been a significant global expansion of the regasification capacity especially during the last decade when the capacity has almost doubled, reaching at present 850 Mt. Europe accounts for 20% of the regasification capacity, and three European countries (Spain, UK and France) are part of the 8 largest countries in terms of infrastructures. Nevertheless, the utilization rate of these terminals is significantly below the average: 27% at a European level, 24% for Spain, 30% for France and 14% for the UK.

This growing trend is expected to be maintained in the near future. Since the beginning of 2018, 88 Mt of new regasification capacity are under construction. Although 81% of this new capacity is located in already importing countries, the rest will allow 5 new countries to enter the LNG market (after the recent incorporation of Malta, in 2017). New capacity projects include the expansion of some existing terminals, twelve new onshore plants and seven Floating Storage and Regasification Units (FSRU). Concerning FSRUs, although these projects emerged only about twelve years ago, they are expected to continue to play an important role in the future, as they are a flexible solution that allows new countries or regions to start importing LNG relatively quickly.

² GIIGNL.

The rate of use of the regasification terminals reached 34% on average globally remaining essentially flat during the last three years. This is less than half the rate of use of the liquefaction plants. Nevertheless, this value increases to 41% if US regasification terminals are not considered. Despite this country holding the second largest world regasification capacity, the utilization was barely 1%, due to its conversion from importer to net LNG exporter, after the discovery of a significant amount of shale-gas reserves in the country. In fact, several of those infrastructures are being converted into liquefaction plants, reducing the development costs of these projects.

In terms of regional developments, Asia is the undisputed main consumer, concentrating 73% of the imports in 2017 and the five largest LNG importing countries. Japan has historically been the main consumer of LNG and still represents, approximately 29% of global demand. In 2017, China overtook South Korea as the second largest importer, the evolution of China's imports should be seen as a structural factor.

While, a decade ago, China's regasification capacity was only 8 Mt, its weight in the LNG market has grown continuously. In 2017, the country accounted to one third of net global demand growth. This is due to the environmental policies in the country, that favour natural gas consumption in substitution to other more pollutant sources, like coal. Its imports grew at a 39% rate in 2018, reaching 53.8 Mt (+15 Mt). South Korean imports, the third world importer, also increased significantly in 2018, to cover the reduction in production of nuclear stations and the lower use of coal in periods of high pollution.

In Europe, LNG imports have increased during the last four years, reaching 48.6 Mt in 2018, representing only 16% of global LNG imports, half of its share a decade ago (29% in 2010, 65 Mt imported in 2011). This is due, on the one hand, to the decrease of the European gas demand during the economic crisis and the competition with natural gas arriving through pipeline, mainly from Russia, Norway and Algeria and, on the other hand, to the increase of Asia demand. In the future they will likely continue to be influenced by gas consumption growth, price competition with pipeline gas, hydropower and renewable sources availability and the price differentials between Basins.

2.3 Supply side outlook

In 2017 liquefaction capacity increased by 7.5%, adding more than 25 Mt to the global LNG export capacity. This development is almost the same as the increase of the LNG demand, which is currently being led by Asia. In fact, the utilization rate was in the average value since 2010 and the anticipated LNG surplus foreseen in the previous years by many international players has not yet taken place.

The LNG world production increased again by 8.6% in 2018, reaching 314.7 Mt, driven by plants' commissioning in Australia (+12 Mt), US (+7.9 Mt) and Russia (+7.2 Mt).

Furthermore, the number of projects proposed all around the world, expected to be commissioned during the 2020s, totalize a much higher quantity, around 876 Mt³. If they were commissioned the liquefaction capacity would (more than) triple along the next decade, showing the great interest of existing and new players in developing the LNG sector. Even though there is a very low probability that all of them will reach a Final Investment Decision (FID). Given the low probability, it will depend on the evolution of the LNG demand and many other factors like gas prices.

³ According to International Gas Union (IGU) 2019 World LNG report.

Significant liquefaction capacity is expected to be commissioned in Australia and the United States in the coming years. Additional LNG supply from Russia is also expected from Yamal. As a result, if this additional supply does not face any setback, LNG prices are expected to decrease over the next few years, and EU imports are therefore likely to increase.

The LNG supply currently comes from 19 countries. The LNG production structure has significantly evolved in the last decade and will continue to change significantly in the future. During the last years, four additional countries have joined the supplier's list (Russia, Angola, Peru and Papua-New Guinea) and others are expected to start to export (Cameroon and Mozambique). Qatar has been the most important supplier during the past decade, accounting for 27 % of global exports, and exporting 76.8 Mt in 2018.

However, the countries which witness the most important of production increase are Australia and the United States. Together, they represent almost two-thirds of the growth of the market.

Australia exports reached 67.4 Mt in 2018. With the entry into operation of Ichthys plant's 1 and 2 liquefaction trains, Australia reached a nominal liquefaction capacity of 83.2 Mtpa, surpassing Qatar's nominal capacity (77,5 Mtpa) and will probably equal its production in 2019.

Liquefaction capacity also grew in the USA in 2018, with the commissioning of the terminal of Corpus Christi in Texas and Sabine Pass enlargement (Louisiana). At the end of 2018, the USA accounted for a nominal capacity of 32.3 Mtpa, becoming the fourth global producer, after Malaysia. In addition, in 2019 new liquefaction trains in Corpus Christi, Cameron and Freeport are expected to enter into operation, which could bring production up to 40 Mt, making the USA the third world producer.

The production increase in Russia (7.3 Mtpa) is due to the Yamal plant, that entered into operation at the end of 2018. Most shipments were unloaded in Europe (61%) and the rest in Asia (24%), the Middle East (7%) and America (7%).

In 2018 the production in Angola, Oman and Norway also increased due to fewer maintenance stops. Egypt also started to export again in this year (1.5 Mtpa in 2018).

In Europe, the only liquefaction plant is located in Norway, it was commissioned in 2008 and represents just 1.2% of the global capacity.

The world's first floating liquefaction plant (FPSO) was commissioned in 2017 in Malaysia, and more FPSO projects are expected, among which four additional plants already sanctioned, totalling 11 Mt. Like it was the case for the FSRU on the consumers' side, this type of projects (with built or converted vessels) are being increasingly considered, due to their benefits over onshore solutions, notably regarding time-to market reduction, regulatory and permitting simplicity, cost optimization opportunities and the possibility to relocate the terminal. The latter opens the door to new business models (i.e. rental or leasing instead of capital investment).

Generally, it can be observed that capital costs have been fallen in the last years, after a five years period (2010-2014) of higher costs, opening new opportunities. In fact, costs have fallen from the higher values of 2,000 \$/TPA to 600 – 1,400 \$/TPA, which implies a 30 – 50 % reduction⁴.

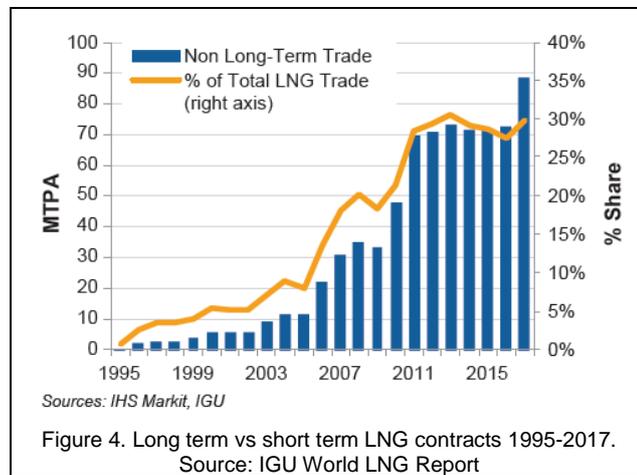
⁴ Source: "LNG Plant Cost Reduction 2014-18". The Oxford Institute for Energy Studies. October 2018.

If a more important and diverse supply represents a clear opportunity for the EU, it also raises challenges regarding foreign policy. As such, it is crucial that security of supply in the EU promotes a liquid and transparent LNG market to improve market conditions at the borders.

2.4 Supply contracts

The market has evolved from a situation where LNG volumes were only supplied under long term contracts, with restrictive destination clauses, to a more flexible context, where supplies combine long term contracts, short term contracts and even spot transactions.

This process started in the second half of the nineties, growing slightly at the early stages of the 2000s and more significantly by 2006 and 2011. The share of short term contracts remained almost constant since then until 2017 when it experienced a strong increase.



According to GIIGNL figures, contracts of less than 4 years duration today represent 27% of global LNG supplies. In 2017 the majority of these contracts (more than three quarters) were signed on a spot basis, of less than three months duration, reaching 20% of global LNG trade.

There are various reasons that explain the emergence of shorter term and spot contracts. It is important to highlight the increase in the number of players (suppliers, consumers, traders, aggregators, etc.), which implies a greater market diversity and complexity. Market players have to compete and adapt to the different situations, the growth of contracts without destination clauses or the growth of the LNG fleet.

In any case, long term contracts will continue to play an important role. Many new pre-FID projects are seeking to be approved in the coming years, and financial requirements link the feasibility of projects with some LNG supply certainty, in spite of the increased liquidity of the LNG market.

2.5 LNG pricing

In Asia the most complex pricing methodology establishes an oil-linked reference, which could be complemented by a small share of spot imports. However, unlike Asia natural gas pricing modalities are more varied in Europe e.g. hub-based or oil-linked prices and sometimes both methods are used in the same contract.

Nevertheless, the shale-gas revolution and the liquid trading hubs development, not only in the US but also in Europe, offer more possibilities for players to agree on their LNG pricing formulas. In this context, Asian countries are increasingly diversifying their pricing schemes, not only relying on oil indexed modalities but also indexing their prices to some international well-established gas hubs, like the Henry Hub, or to own local price references.

According to the previous analysis, we observe a significantly growing activity affecting the LNG market, from all points of views: infrastructures, supply, demand, contracts and pricing. This will likely lead to further development of this sector during the next future, even in a global decarbonization context, which wouldn't restrict the LNG trade expansion in the near term.

3 EU LNG MARKETS: FUTURE EVOLUTION

The future of LNG markets in the EU needs to be analysed in light of the global trends presented above. Favourable market conditions should be ensured as imports are expected to rise in the coming years, and as LNG plays a role in the diversification of EU energy mix. Notably the rise of the LNG exporters of LNG presents further new opportunities for EU supply.

3.1 Role of LNG

The increase of LNG imports into Europe in 2018 confirms the role this source is playing. However, the attractiveness of the European market for LNG is driven by market prices: also the competition with pipeline gas and the interaction with Russian imports is particularly important. If European market prices are lower than in other regions, there may not be a case for increased LNG supply to Europe. However, even in a scenario of sustained low LNG due to cheap pipeline gas, LNG contributes to a downwards pressure on prices with a positive impact on the European gas bill.

Access to gas is heterogeneous around Europe. According to the International Energy Agency, around 75% of gas in the European Union is consumed within a competitive liquid market, where gas can be flexibly redirected across borders thanks to bidirectional capacities. However, in some areas in central and southeast Europe, consumers face more difficulties to access liquid gas markets. For example, roughly 80 billion cubic metres (bcm), or 40% of the EU's LNG regasification capacity cannot be accessed by neighbouring states, and some countries still have limited access to alternative sources of supply.

The role played by LNG demand in Europe can thus significantly differ from one country to another, depending mostly on supply characteristics, geographical situation, the capacity of the LNG terminals, level of gas demand and downstream market developments.

3.2 Access conditions

The first European LNG plant was commissioned in Le Havre in 1965, shortly followed by a terminal in Barcelona, Spain (where, in 1969, a LNG unloading, storage and regasification operation took place for the first time). This was the starting point to of a new natural gas supply to Europe, allowing a country far away from significant production regions to access this energy and, later on, allowing Europe to diversify its supply routes and sources.

During the seventies, two more terminals started to operate, one in 1971, in Italy (Panigaglia terminal), and the other in 1972, in France (Fos Tonkin terminal). During the eighties, there were four new terminals, while in the nineties none. It wasn't until the beginning of the 21st century that LNG infrastructures started to grow significantly. Between 2000 and 2010, 11 new terminals entered into operation and from 2010 there were an additional nine.

At the time of writing of this report (beginning 2019), there are **29 LNG regasification terminals in the EU 28**, in commercial operation.

Spain is the country with the highest number of LNG plants, accounting for 7 terminals, followed by France and United Kingdom with 4 each of them. There are 3 terminals in Italy, 2 terminals in Finland and Sweden and 1 terminal in Belgium, Greece, Lithuania, the Netherlands, Malta, Poland and Portugal.

The technical characteristics of the above terminals are very diverse, in terms of regasification capacity, LNG storage, maximum docking capacity or truck loading capacity.

Concerning regasification, the total capacity of EU 28 terminals amounts to 213 bcm/year. As for LNG storage, the total European 28 capacity equates to 10 million of LNG cubic meters.

In terms of docking capacity, the majority of the terminals are already prepared to receive up to Q-Max cargoes (266,000 m³ LNG), although some of them can only receive small to medium ships, up to 75,000 m³ LNG cargoes. The size of the LNG tanker that a terminal can accommodate is already below 500 m³ LNG (Bilbao and Gate)

Most of the terminals are onshore plants with the exception of Porto Levante terminal (Italy) which is an offshore terminal Klaipėda (Lithuania), Toscana (Italy) and Delimara (Malta) are Floating Storage and Regasification Units (FSRU).

As for new LNG services (services that are different from the usual unloading-storage-regasification operation and that were developed at a later stage) the following have emerged:

- **Reloading:** the transfer of LNG from the LNG reservoirs of the terminal into a vessel
- **Transshipment:** the direct (ship-to-ship) or indirect (ship-tank-ship) transfer of LNG from one vessel into another
- **Loading of bunkering ships:** the loading of LNG on bunkering ships which transport LNG in smaller quantities supply to LNG-fuelled ships or LNG bunkering facilities for vessels
- **Truck Loading:** the loading of LNG on tank trucks which transport LNG in smaller quantities

The situation varies from terminal to terminal.

16 terminals offer reloading services. They are located in Belgium, France, Lithuania, the Netherlands, Portugal, Spain and the United Kingdom. The minimum ship size varies from 500 m³ LNG (Gate Terminal) to 70.000 m³ LNG (Isle of Grain). And the range of loading capacity ranges from 1500 m³/hr (Sines) to 9000 m³/hr (Klaipėdos).

Transshipment services in the way of ship-to-ship services are offered only in some LNG terminals, namely Zeebrugge, Montoir-de-Bretagne, Fos Cavaou, Gate Terminal, Barcelona, Cartagena and Isle of Grain. Indeed, in order to offer such services, a LNG terminal needs to have two jetties available. Other LNG terminals (like Dunkerque LNG for instance) offer ship-tank-ship transshipment services.

Small scale LNG services are available at 8 terminals with a minimum ship size varying from 500 m³ (Gate and Bilbao Terminal) to 20.000 m³ (Montoir-de Bretagne).

Truck loading installation can be found in a variety of LNG terminals (15 of them) located in Belgium, France, the Netherlands, Poland, Portugal, Spain and the United Kingdom.

Three LNG terminals located in the same vicinity in North West Europe offer the whole range of services: Zeebrugge, Montoir-de-Bretagne and Gate Terminal.

Concerning the access conditions, most of the terminals have a Regulated Third Party Access Regime in place, while five of them have been granted an exception and have negotiated access conditions (Dunkerque, Gate and the three UK terminals). Another terminal has an “hybrid” access regime (Porto Levante terminal, with both regulated - 20% - and negotiated TPA - 80%) and three of them are not connected to their national transmission networks (1 terminal in Finland and 2 in Sweden). In terms of send-out capacity, 62 % of total capacity is subject to a regulated TPA regime, while 37% is exempted, and only 1% off-grid.

Moreover, a regulated terminal (Montoir-de-Bretagne) has been allowed to market trans-shipment services in a non-regulated manner, provided it does not impact the regulated activities. The commercialization of such trans-shipment services in a non-regulated framework is conditional to the implementation of the following principles:

- With regard to the organization:
 - The creation of a dedicated subsidiary.
- With regard to the practicalities of re-invoicing the costs:
 - 100 % allocation to the trans-shipment services of the additional costs that result from said services.
 - Due allocation of the costs resulting from the mutual use of assets and of the operating costs currently covered by the tariff for utilization of regulated activities using allocation formulas that are objective and auditable
- With regard to operations:
 - Keep the programmed slots untouched.
 - Implementation of modalities for programming.

3.3 Competition between EU terminals at regional level

Competition between LNG terminals can currently be observed at the regional level. It is notably the case for the North-West Europe region, where several terminals, operating under different regimes, are located: Gate, Zeebrugge, Dunkerque, Isle of Grain, and Montoir-de-Bretagne.

The services offered are dependent on the market needs thus may vary from terminal to terminal and from country to country.

It is worth noting that the terminals referred to above in North West Europe (i.e. distant from each other from 3 days at sea or less) that offer the whole range of services are:

- Both new and existing infrastructures
- Many of them have been subjected to subsequent terminal extensions
- Well interconnected with sources and markets
- Not too distant between one another
- They are operated in three different ways: regulated, exempted and regulated with conditions.

One can observe that although they are operated under different regimes, they have developed services that fit market needs. The driving force for such developments being the evolution of the LNG market for Europe.

The competition between terminals can be either beneficial or raise issues. In-depth analysis associating access to LNG terminals and the organisation of the transmission systems is mandatory before getting into the solutions. A sufficient level of integration enables competition to develop on services whilst maintaining supply is widely ensured whereas a fragmented market could lead to the use of terminal according to local gas needs.

It is worth noting that the exempted terminals are among the most recent ones. Exemption principles were introduced in the article 22 of Directive 2003/55/EC and repealed in the article 36 of the Directive 2009/73/EC⁵. This article provides that major new gas infrastructure, i.e. interconnectors, LNG and storage facilities, may, upon request, be exempted, for a defined period of time, from the provisions of Articles 9, 32, 33 and 34 and Article 41(6), (8) and (10) under the following conditions:

- a) the investment must enhance competition in gas supply and enhance security of supply;
- b) the level of risk attached to the investment must be such that the investment would not take place unless an exemption was granted;
- c) the infrastructure must be owned by a natural or legal person which is separate at least in terms of its legal form from the system operators in whose systems that infrastructure will be built;
- d) charges must be levied on users of that infrastructure; and
- e) the exemption must not be detrimental to competition or the effective functioning of the internal market in natural gas, or the efficient functioning of the regulated system to which the infrastructure is connected.

A transparency issue has also emerged around exempted terminals. With regard to exempted LNG terminals, technical information regarding mostly the company organisation or the infrastructure in place is available. This is (mainly) the result of the implementation of the GLE transparency template which is a non-binding, standard way to publish information developed in cooperation between GLE and CEER.

⁵ Directive 2009/73/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in natural gas and repealing Directive 2003/55/EC

However, exempted terminals are not obliged and, as a matter of fact, do not publish some commercial information e.g. tariffs or contracts as they are considered commercially sensitive. which hinders the existence of a true level playing field between LNG terminals. This is particularly the case when in a given area regulated LNG terminals offer the same types of services as the nearby exempted LNG terminals (see above).

Notably transparency is key for the access to LNG terminals. The current GLE LNG Terminals transparency template should be implemented by all LNG terminals in Europe. It is very important that the information is available not only in the national language but also in English.

3.4 Underutilization of LNG terminals. The potential impact on the tariffs methodology

Following the subject of the previous paragraph and taking into consideration the low level utilisation of most European terminals, it is clear that they compete among themselves with different tools.

Underutilisation becomes a real problem when there are no long term bookings that assure the financial viability of the terminal. This is already the case in some terminals, while in others, although the level of utilisation is low, tariff payments still guarantee the income of the terminals. Low bookings may be compensated by “subsidies”, normally through charges supported by final consumers under a justification of competition in the gas market or security of supply.

Justifications behind LNG regasification capacity levels in European countries might differ, but generally the common issue is that installed regasification capacity in Europe is much higher than the demand. In general, if tariffs are set to pay back the terminals with current use only the tariff would make LNG supplies less attractive.

However, closing down excess capacity is not a desired outcome when the terminal plays a relevant role in developing a well-functioning European gas market (diversification of gas supply sources, reduction of gas market concentration). To maintain this relevant contribution of LNG terminals to the well-functioning of the European gas market, there is a need for preventing installed LNG capacity to leave the market; solutions that would imply a decrease of costs or increase of revenues must be found.

To attract more traffic, terminal operators have developed two differentiation strategies for services and/or tariffs. Service differentiation is the proposal of new options like truck loading or ship loading.

Price differentiation (TPA tariffs) between LNG terminals might be more difficult to analyse because of different structures that exist.

Without a clear conclusion on this subject the below facts contribute to the discussions:

- The low level of utilisation of the terminals has pushed the services development but also the tariff decrease, at least, of “marginal services”, could TPA tariffs decrease continue in order to gain market share? And in the case of regulated terminals, who would pay for such a loss of income?
- Low level of revenues in LNG regasification terminals, as in underground storages, in some European countries, have led to include some of these costs into customer’s

fees, justified on grounds of diversification of supply, an increase of competition, etc. (as it is referred in the Lithuanian study case). Is this the solution to maintain current installations working? How does this fit with the cost reflectivity of TPA tariffs general principle?

- LNG Terminals operating in the same region, specifically regulated ones, might compete due to price differentials only. Do we need also cooperation among regulators before approving these tariffs considering the potential impact on neighbouring countries?

3.5 Increase of spot LNG trading

Spot LNG trading has increased in recent years, as new liquefaction projects offer more flexible LNG cargos (FOB deliveries). Long-term demand growth is mainly driven by emerging markets in Asia. In this context, Europe in the last quarter of 2019 is likely to become the price elastic balancing market to LNG especially the more flexible markets (the UK, the Netherlands). However, the LNG trading is mainly made through OTC deals. Service providers (like Platts, ICIS, World Gas Intelligence) elaborate proprietary LNG spot index prices, providing prices transparency to Europe and Asian LNG markets.

In addition to spot cargos, LNG can also be traded in physical hubs in Europe, like Zeebrugge or in the Spanish LNG terminals for all type of services. In other European terminals, like France, it is also possible to buy small LNG quantities for truck loading and bunkering.

In the case of Spain, OTC trading at LNG terminals is higher than the gas traded at the virtual balancing point (PVB), accounting for around 60% of Spanish OTC trade. In 2019, the market operator (MIBGAS) will start offering spot LNG product at the exchange market.

The development of the LNG trading hub, combined with access to physical LNG storage and reloading services, is foreseen by some stakeholders as a way to attract global LNG traders and send reliable price signals to the market. This would facilitate wholesale trading and also increase liquidity in the EU gas market. It could allow optimization of cargoes and freight costs to offer new trading opportunities and provide LNG demand backstop. LNG access to European hubs could be improved via the coordination with transportation systems towards those hubs. Also, on the contrary other parties consider that dedicated hubs for LNG are not a necessary tool for the EU gas market.

The relation between the prices of different European hubs and the reference of the LNG price in the Mediterranean has been analysed in the last winters and shows clear the correlation between Italian and Spanish prices with LNG market, as shown in Figure 5 highlighting the importance of a well-functioning LNG market.

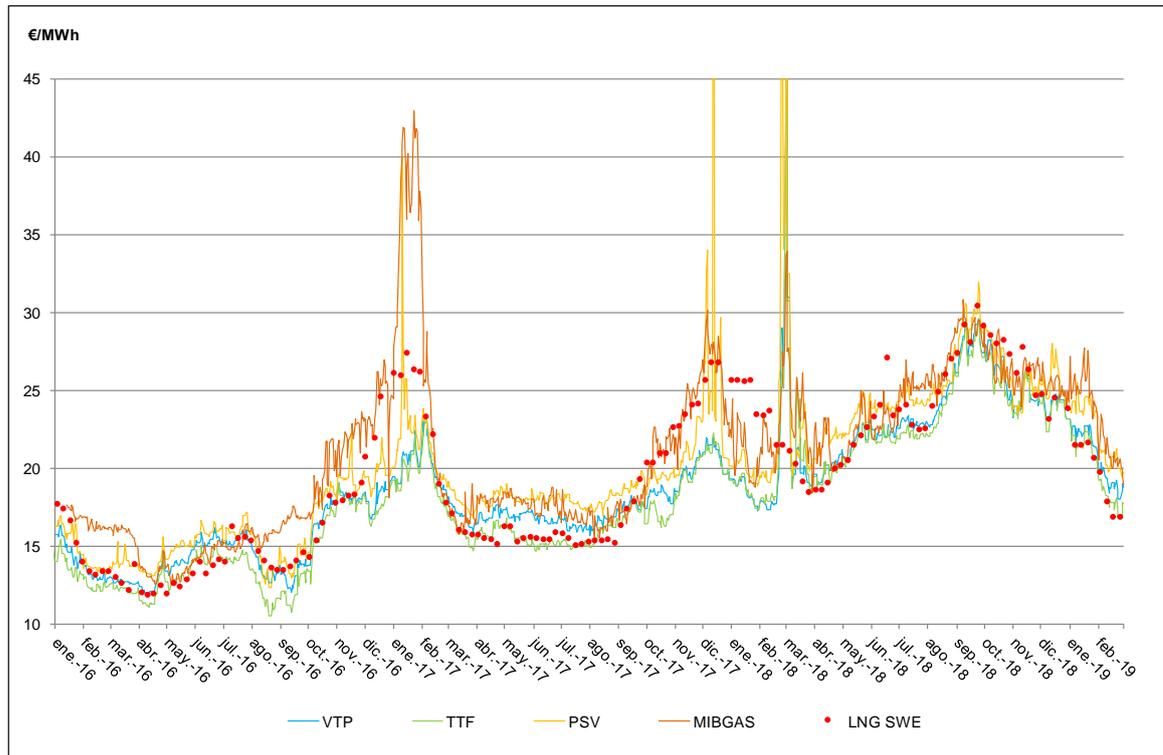


Figure 5: Price comparison between European gas hubs and LNG price indicator in South of Europe

4 INNOVATIVE APPROACHES: CASE STUDIES

In this chapter several cases studies have been collected to show how the adoption of different solutions in diverse situations to address LNG issues identified along with this document. The main aim of both being the adaptation to the changing market conditions and to foster the LNG market.

4.1 The Spanish case: Merging LNG plants. Virtual regasification and storage capacities

4.1.1 Current regulation and motivation for improvement

Spanish LNG terminals are regulated and currently offer a wide variety of services: ships unloading, storage, regasification, ships loading, bunkering, transshipment, cooling-down and trucks loading.

However, under the current regulation the access to some of their main services (unloading, regasification and storage) pivot around only one of them: the regasification service, meaning that when users contract regasification capacity they are also entitled to use unloading and storage services, in a bundled way. The current regulation prevents contracting those services in an unbundled way, in particular, the LNG storage service, which might hinder the use of the capacity that undermines the potential benefits derived from greater flexibility.

Additionally, the capacity is contracted at each LNG terminal. Users, especially traders and smaller shippers, tend to concentrate in particular terminals, where there are more players, more LNG and, as a consequence, more liquidity and opportunities to carry out LNG trading operations. This results in an increase of the use of some terminals to the detriment of the rest, which might cause congestions at the local level making it more difficult the management of the whole gas system.

Moreover, the LNG market in Spain is based on OTC operations. There is a lot of LNG liquidity limited to those terminals with more players. Users with bigger LNG portfolios and capacity contracts in many terminals could have a competitive advantage.

The definition of the main bundled service (unloading – LNG storage - regasification) is different from the way this service is defined in other European LNG terminals, where the service is contracted in relation to the slot allocation instead of the regasification capacity.

Therefore, Spanish regulation needs to be improved, in order to:

- Increase the utilization of the LNG terminals, by offering new ways of contracting services, in a flexible, bundled and unbundled way.
- Reduce entry barriers by offering user-friendly services, more similar to those of other European LNG terminals.
- Ease the management of the gas system and reduce local congestions.
- Pave the path for the emergence of a liquid, transparent and competitive LNG hub, which could even be a European reference for this kind of transactions.
- Simplify and streamline the contracting process.
- And, as a consequence, increase the competition degree in the natural gas sector.

4.1.2 CNMC proposal for a new LNG model

After carrying out an in-depth study of different options, each one with its pros and cons, CNMC (Spanish Regulator) has opted for a kind of “virtual model”, whose main characteristics are summarized below.

One of the main new features of the model is the offer and allocation of virtual LNG storage capacity, putting together the physical capacities of the six operating LNG terminals. This means that once the LNG is downloaded by one user at a particular plant (of his choice), the LNG will be considered to be located in the LNG virtual point, no matter the unloading terminal. Users will not have different LNG stocks associated with the different LNG terminals anymore, but just “a single LNG stock account”, where the balance between entries, exits and trading operations will be registered.

This will increase LNG trading opportunities, as any player will be entitled to trade gas within the LNG virtual point, without caring about the location of the LNG, in contrast to the current situation. In other words, instead of having six different LNG markets, there will be only one LNG hub, with a storage capacity over 23 TWh, increasing liquidity and prospect for an exchange market to thrive.

Users will be able to book and nominate virtual regasification capacity, which means that regasification will not be associated with any particular terminal anymore, but to the regasification capacity of the whole LNG system. This means that users will only have to book and nominate regasification capacity, without specifying the terminal.

These new features of the LNG system will simplify the booking, nomination and balancing processes of storage and regasification services because users will only have to indicate the amount of capacity they want to book or nominate, without any further indication related to the location, and balance their position at just one single point.

Besides that, under the new model users will keep the freedom to choose the unloading/loading LNG plant, by booking slots at the terminal of their choice, according to the availability and following market-based allocation mechanisms in case of congestions.

This will allow users to freely organize and optimize their LNG logistics according to their needs.

The Technical Manager of the System (TMS), ownership unbundled fully independent operator from the supply side activities, will be responsible for managing the whole system. Among other tasks, he will decide which regasification terminals will be used, in order to fulfil the aggregated regasification nominations and accommodate unloading and loading demands from users. In any case, TMS' decisions will always need to follow the security of supply and efficiency criteria, taking into account the available and updated information at each moment to maximize the available capacity .

This will also have positive implications in the management of the whole gas system, carried out by the same agent, the TMS. As this will have the global picture of the gas system (including supply and demand forecasts), he will have the best information to operate the gas system in the most efficient way, optimizing the use of the capacity and reducing the likelihood of congestions in the transmission system. For example, if during one month there are few LNG unloading operations in Northern terminals, the TSM should minimize the production from these terminals and maximize the transmission from the South.

Regarding LNG terminal congestions likelihood, the situation would significantly improve, as users will have no incentive to concentrate in particular LNG plants because they will be able to freely trade LNG independently from the unloading terminal. In any case, there will be mechanisms to solve these congestions in case they arise.

Additionally, the new model the LNG system will offer both unbundled and bundled services, with different tariffs for all of them. Users can choose to use the services in a customized way or to opt for bundled services (or a solution based on a combination of both kind of services) to enjoy greater flexibility.

Concerning bundled products, a set of different services will be offered e.g. for instance: unloading + storage + regasification (uniform in the number of days chosen by the user) + access to the transmission system, or storage + LNG truck loading, etc. Some of these services will be very similar to those offered in other European terminals and, from the technical management of the system point of view, they will contribute to operate the system in a more predictable and efficient way.

Concerning unbundled services, users will enjoy a greater degree of flexibility, as they will be able to contract the services they need in an independent way. Moreover, there will be new services in place, like virtual liquefaction, which will allow users to transfer natural gas (gas) from the current Virtual Trading Point to the LNG hub (liquid). This service will increase the flexibility for users and enhance liquidity in both markets, natural gas and LNG, without any extra-cost in terms of technical operation (virtual reverse flow).

To sum up, the new model will allow users to avoid managing contracts at different terminals and different LNG stock levels, as they will see the six terminal Spanish LNG system as if it was only one LNG terminal. A single access contract will allow users to contract capacity and to operate in a standard way.

4.1.3 Consultation and implementation processes

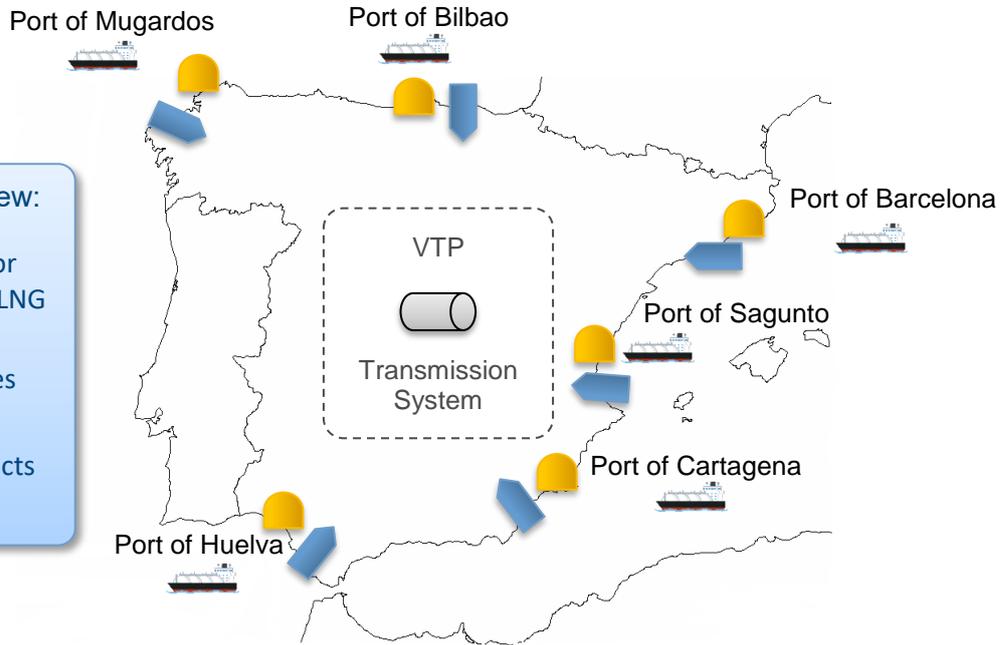
CNMC carried out a public consultation on this matter in 2018 to gather the different player's opinions. These so far have shown a high interest on the issue and the level of participation has been significant.

CNMC has now processed all the information received, with the aim to take into account the remarks made by all stakeholders. This process will help to understand everybody's point of view on the issue and will surely improve the design of the final LNG model.

The model is being incorporated into the Spanish legislation, by means of CNMC Circular (i.e. Balancing and Access regime modification) in line with the standard public consultation procedure. Its expected date of implementation is the beginning of 2020.

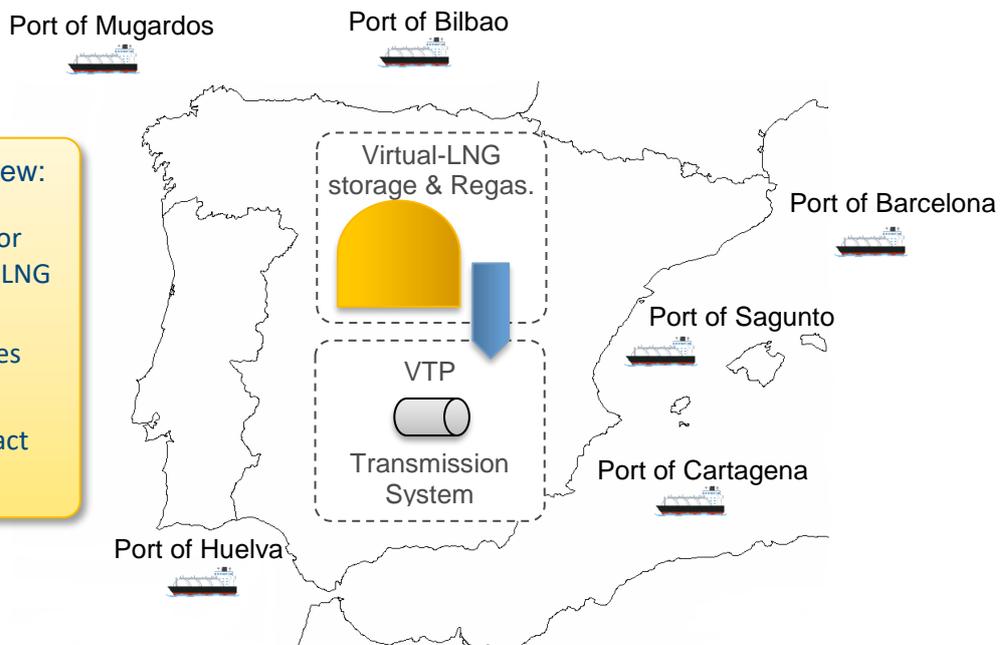
FROM (Current situation):

- From user's point of view:
- 6 different locations for downloading/loading LNG (freedom of choice)
 - 6 LNG stocks / balances
 - 6 LNG markets
 - 6 regasification contracts
 - 6 nominations



TO (New LNG model):

- From user's point of view:
- 6 different locations for downloading/loading LNG (freedom of choice)
 - 1 LNG stocks / balances
 - 1 LNG market
 - 1 regasification contract
 - 1 nomination



4.2 The Italian case: Auction procedures for the allocation of regasification capacity

4.2.1 The infrastructural, regulatory and market context in Italy

The Italian LNG market is characterised, like the rest of the EU LNG markets, by relative abundance of unutilized available regasification capacity. This is because of the significant drop in the demand for gas in Italy and Europe compared to the pre-crisis years. As a result of the cheaper gas imported via pipeline and because of higher prices in the Asian market. After the collapse associated with the economic crisis of 2009, the consumption of gas in the European Union countries has not yet retracted to levels recorded in previous years.

Moreover, the regulatory changes that have been introduced in Italy to implement the guidelines on Congestion Management and the Network Codes on CAM and BAL have made access to cross-border interconnection infrastructures easier and more flexible. In addition to these changes, the LNG market itself went through major changes in the last 15 years, moving away from being a resource constrained in long-term contracts relationship which were linking liquefaction terminals and regasification terminals, to a resource available to move in a global market. To fully exploit the potential that the LNG can offer in terms of flexibility and diversification of the gas system, the Italian regulator has considered necessary to review the existing set of rules to create market-based mechanisms to access the regasification service to favour the formation of clear price signals also in the Italian platform, both to attract LNG where it is necessary, and to allow investments to materialize.

To understand the changes introduced it is useful to have a brief description of what the relevant regulation in place before the introduction of auction mechanisms.

4.2.2. Pre-Auctions rules for the allocation of the regasification capacity

Rules for the allocation of capacity were different according to the duration of the capacity offered (short term vs long term) and according to the type of service offered (continuous vs spot⁶) and the type of terminal (regulated vs exempted).

a) Allocation of Long-Term Capacity (greater than or equal to one year)

The regasification capacity was offered and allocated on an annual basis or for periods longer than a year⁷, within the framework of procedures that took place annually, between the 1st of July and the 1st August of each year for available capacity to be allocated for the following years.

In case of regulated terminals, the access criterion was as follows: in case that the demand of capacity was greater than the available capacity, the regasification company was allocating the capacity primarily to the holders of take or pay contracts signed before 10 August 1998

⁶ The regasification capacity can be offered for two regasification services: continuous and spot. The difference between the two is that the continuous service provides one or more delivery over a predefined period. The date of each single delivery is established on the base of the LNG delivery programs as defined in the access code of the terminal. The spot service is referring to a single delivery to be carried out on a pre-established date identified by the regasification company following the monthly scheduling of the deliveries of the LNG. The availability of spot capacity thus emerges at short notice with respect to the date of unloading, following the programming of all users in the month prior to the delivery date.

⁷ Long-term definition according EU Regulation 715/2009.

and, secondly, to the holders of multiannual and annual importation contracts. If these “priority users” were asking for more regasification capacity than the available one, the capacity was then allocated pro-rata.

The residual⁸ capacity within the exempted terminals was allocated to users who were ready to sign contracts for 5-10 years. Priority allocation was given to users that were: importing gas for their own consumption, contributing to increase the liquidity of the market re-selling their volumes, increasing security of supply through differentiation of the sources, and to users that were different from the incumbent.

b) Allocation of Short-Term Capacity

The rules for the allocation of short-term capacities were the same for regulated and exempted LNG terminals. They were limited to outline high-level framework principles such as transparency, non-discrimination and the need to encourage the use of the terminal to be further detailed in the access code of the terminal. According to the previous provisions the terminals were then responsible of allocating the available:

- continuous capacity through monthly procedures for the period starting from the month following the allocation procedure up to the end of the thermal year;
- spot capacity that was available beyond a certain time limit as defined in the access code of the terminal, was allocated on first come first served basis.

Within the same type of procedures, it was also possible to allocate capacities that users made available. However, the allocation of capacity made available by users was subordinated to the allocation of available capacity.

4.2.3 The introduction of auctions

It became clear that the existing mechanisms for capacity allocation, as described above, were not in line with the criteria of efficiency and flexibility needed in a developed and liquid wholesale gas market. ARERA has therefore decided to introduce changes to respond to the various requests that users and other stakeholders have presented formally and informally. Market-based mechanisms for the allocation of capacities were introduced to overcome allocation procedures based on the priority and pro-rata criteria. The main aspects, were firstly outlined in the consultation document 714/2016/R/GAS and then defined further in the decisions 660/2017/R/GAS, such as: i) the duration of long-term allocations period; ii) the timing of the allocations mechanism; iii) how to organize the auctions; iv) the criteria for the definition of the reserve price.

a) The duration of long-term allocations

The allocation of available capacity was possible only for a period of five years to avoid capacity withholding. It is now possible to allocate capacity for a period of 15 years⁹, in line with the allocation period for capacity at interconnection point on the transmission network.

b) The timing of the allocation procedures

⁸ Non -exempted capacity.

⁹ For periods of one thermal year with effect from 1 October of the same year up to five successive years; and beyond the fifth thermal year also for multi-year periods identified on the basis of procedures contained in the access codes of the terminal.

For the allocation of long-term capacity the timing has been changed in line with the provisions of the CAM NC. The auctions therefore have to take place before 1st July for capacities to be allocated from 1st October of the same year.

The possibility to have coordinated auctions among terminals to avoid the risk of being allocated more capacity than necessary was also assessed. Nonetheless the results of the public consultation showed that terminals did not consider offering homogeneous products i.e. the terminals are not running coordinated auctions. The auctions are run in one single platform, called PAR, but specific to each terminal and managed by the market area manager, called GME, to ensure transparency and non-discrimination.

As far as short-term capacity allocation is concerned changes of the timing were not considered necessary because these procedures were already consistently defined in the regasification codes for flexible regulation.

c) Methods of organizing auctions

It was decided to allocate the capacities at a price and a quantity fixed by an open ascending auction, according to the provisions in Article 17 of EU Regulation no. 459/2017, in line with the allocation mechanisms of capacities at the interconnection points. The ratio behind this choice was the need to ensure that at a given price the offers are entirely accepted thus avoiding the situation of an offer only partially accepted by two or more users. The ascending auction was considered the more appropriate mechanism for the allocation of long-term capacities (i.e. when the regasification capacities can be used over several deliveries), therefore given the discreet nature of the deliveries, the requests must be accepted only if fully satisfied. Otherwise, the users could be allocated capacities that are not in line with their supply needs and with the management of the LNG supply chain.

In the case of the short-term capacity allocation when the request of regasification capacity is associated with a single delivery, the adoption of the pay as bid mechanism appeared to be more efficient.

d) Criteria for the definition of the reserve price

The introduction of auctions will result in prices different from the current tariffs, allowing the emergence of the capacity's market value which could be potentially lower than the tariff. However if the willingness to pay of the users is higher than the reserve price of the auction, but lower than the tariff, a market-based allocation mechanism increases the utilization rate of the terminals to favour a more efficient use of the existing regasification capacity. It also increases the liquidity of the market leading to possible positive effects on the price of wholesale gas. Overall, it was considered that the allocation of the regasification capacity through auctions, should contribute to the reduction of the system's charges deriving from the application of the revenue coverage factor (FC)¹⁰. The calculation of the revenue coverage factor should no longer be based on the tariffs, but on the results of the auctions. In the definition of the reserve price, ARERA distinguished two situations, based on the effects that the allocation of capacity produces on the amount of the revenue coverage factor.

¹⁰ The revenue coverage factor is a charge aimed at ensuring partial coverage of terminal revenues (within the limit of 64% of total reference revenues) in cases of temporary and transitory situations in which the regasification company is unable to allocate an adequate share of the capacities. Therefore, through this charge the gas system contributes to the building of infrastructure that are considered beneficial to the system as a whole and to the community of users in terms of safety, economy and competition. This revenue coverage factor is applied to new LNG terminals only in case they are considered strategic for the system.

A first case is when $FC > 0$. In this case the allocation of capacity at any price higher than zero, will create revenues beneficial to the whole gas system because it will reduce the charges paid as FC increasing the gas volumes available. In this case ARERA will decide the criteria for the definition of the reserve price. The formula of the reserve price is strictly confidential and calculated bearing in mind the time horizon of the allocation, the price of gas and LNG at wholesale level in the EU markets, costs of the regasification service in other European terminals, variable and fixed tariff components associated with regasification and transport services and the possibility of offering the same capacity in subsequent auctions in the event of non-allocation.

A second case is when $FC = 0$: in this case the revenues from the auctions are additional to the revenues coming from the application of the FC hence it seems more appropriate to let the LNG company to define its own reserve price within the threshold of the tariff.

4.2.4 The case of Toscana Terminal (Offshore)

The OLT Offshore LNG Toscana Terminal ("the OLT") consists of the conversion of an LNG carrier into a floating regasification terminal which transforms the liquefied natural gas back to its normal gaseous state. The OLT is permanently anchored to the seabed about 22 km off the coast between Livorno and Pisa, Italy. The OLT has a maximum authorized regasification capacity of 3.75 bcm/year, a *maximum regasification capacity of 15 mcm/day, and a gross storage capacity of 137.500 cubic meters of LNG*. It is linked to the mainland via a pipeline of 29.5 km length. The OLT operation started on 20 December 2013. However, due to low demand on the Italian market, no deliveries by LNG tankers were made at the terminal between 20 December 2013 and 3 September 2014.

Today, almost one year after the introduction of the auctions for capacity allocation, it is possible to assess the results of this new mechanism: OLT has significantly increased its utilization rate, allocating almost its entire capacity for the thermal year 2018/2019¹¹. The increase of its utilization rate has led to a reduction of the costs borne by the system because of the auctions' revenues, the reduction of FC charges, the higher security of supply and diversification of sources.

a) Initial exemption procedure 2019

By Decree of 28 August 2009 the Italian Ministry for Economic Development ("the Ministry") has decided to exempt an offshore LNG terminal to be established by OLT Offshore LNG Toscana S.p.A. from the rules for third-party access and tariff regulation as defined in Articles 18 and 25 (2), (3) and (4) of Directive 2003/55/EC of the European Parliament and of the Council of 26 June 2003 concerning common rules for the internal market in natural gas and repealing Directive 98/30/EC pursuant to Article 22 of Directive 2003/55/EC¹². By letter of 11 December 2009, the Commission requested the Italian authorities to amend the exemption decision, requesting them to impose a condition to the exemption that the exemption will lose validity in case that the terminal is not operational within five years from the Commission approval and no prolongation has been granted by the Commission. This request was implemented by Decree of 21 December 2009.

b) Waiver procedure of OLT request

¹¹ i.e. out of 41 slots 38 have been allocated.

¹² Directive 2003/55/EC has been repealed by Directive 2009/73/EC.

By letter of 14 December 2012 to the Ministry, OLT set out a series of observations on the need for it to waive the exemption granted by the 2009 Decree. By letter of 12 July 2013, OLT then formally expressed its desire to waive the exemption granted by the 2009 Decree. OLT has justified its request because of the negative changes in the international and national gas markets that were not possible to foresee at the moment when the exemption request was submitted. OLT was expecting an increase of the gas demand in Italy and not considering the effect of Fukushima (2011) on the global LNG market that has changed the availability of exporting countries to sign long term contracts.

With a note dated 17 December 2013, the Ministry notified ARERA that OLT has indicated its intention to renounce to the aforementioned exemption.

The Ministry:

- noted that, to date, there is no specific regulation governing how to waive the exemption for new LNG terminals, except for the principle for which from the waiver must not give rise to undue costs for the national natural gas system.
- clarified that, in coherence with the c.d. principle of the *contrarius actus* (according to which the adoption of withdrawal measures must take place in the same manner and with the same procedure used to adopt the act to be withdrawn). Therefore considered opportune to submit OLT's waiver request to the same procedure adopted for the concession, which includes the request of the opinion of the Authority and notification to the European Commission;
- invited the Authority therefore to express its opinion as a matter of urgency on the waiver request presented by OLT within 30 days. Since the Ministry sent the request to the Authority on 20 December 2013, this deadline expired on 19 January 2013.

By Decision 4/2014/I/GAS of 16 January 2014, following the Ministry's request dated 20 December 2013, the ARERA¹³ expressed a favourable opinion on the request by OLT to waive the exemption granted in the 2009 Decree. The reasoning of the regulator was that the competent authority to decide on exemption is the Ministry and the NRA did not have technical argument to oppose the decision of the Ministry.

By Decree of 3 September 2014, the Ministry accepted the request to waive the exemption with effect from 20 December 2013, the date of entry into operation of the LNG terminal. The Decree provided that:

1. The request to waive the exemption for the OLT Offshore LNG Toscana SpA regasification terminal granted by the Decree of the Minister for Economic Development of 28 August 2009 is accepted with effect from 20 December 2013, the date of entry into operation of the regasification terminal, which has been identified as essential and indispensable infrastructure for the national gas system that is capable of contributing significantly to value for money and competition in natural gas supply.

¹³ Formerly AEEGSI.

2. *This waiver must not give rise to undue costs for the natural gas system. To this end, as part of its remit the Authority shall in particular verify the relevance of the costs incurred to construct the terminal and their eligibility, including with reference to similar infrastructure projects. In addition - in order to avoid situations of discrimination between the terminal in question and those that will potentially be designated as strategic infrastructure¹⁴ pursuant to the National Energy Strategy - if the incentives provided for by those measures should, taken together, be less beneficial than what has been granted to the terminal in question, the level of regulatory protection granted to OLT Offshore LNG Toscana SpA shall be adjusted to the provisions made for those items of infrastructure designated in future as being strategic pursuant to the above-mentioned regulatory provisions.*

This Decree was notified to the European Commission on 17 September 2014. By letter of 28 October 2014, the Commission has requested additional information from the Ministry and this resulted in the prolongation of the procedural deadline according to Article 36 (9) Directive 2009/73/EC. The reply to this request for additional information was received on 11 November 2014.

The Commission assessment of the waiver of the exemption under article 36 of Directive 2009/73/EC is fully described in the Commission Decision of 2015¹⁵. In its decision the Commission underlines that fully integrating a previously exempted infrastructure into the regulated system by withdrawing the exemption, in its entire scope and irrevocably is in principle beneficial for the effective functioning of the internal gas market. However, it is necessary, before withdrawing a Commission decision on an exemption, to ascertain that the waiver of the exemption does not risk undermining the effective functioning of the internal market by abusing the exemption regime. In particular, the waiver of an exemption may not have as a consequence a shift of an excessive burden created by the previously exempted infrastructure to the regulated system.

The Commission took note of the fact that it was the same concern of the Ministry and of the Regulator therefore it found that no risk for abusing the exemption regime arose from the waiver of the exemption.

4.3 The Belgian case. Adapting infrastructures and services to an evolving market

4.3.1 The Belgian liberalisation process

If we compare the various elements of the gas value chain, in Belgium:

- There is no national production, so the gas needs to be purchased on the international gas market (European but also outside of Europe as it is the case for LNG).
- With regard to the activities related to the high pressure network, these were the national transportation, the transit (transportation across the country from border to border), storage activities, LNG terminalling and Hub services). Those were performed by different parties as is presented hereafter.
- The gas supply was a matter solely addressed by the incumbent.

In the liberalisation process the following steps were made in order to open the access to the Belgian gas market:

- The first Code of Conduct was introduced in April 2003 by the way of a Royal Decree.

¹⁴ Under the Prime Ministerial Decree referred to in Article 3 of Legislative Decree No 93/2011.

¹⁵ <http://ec.europa.eu/transparency/regdoc/rep/3/2015/EN/3-2015-72-EN-F1-1.PDF>

- The first transportation model was developed in 2004 in order to implement the above Royal Decree.
- The first extension of the Zeebrugge LNG terminal took place under regulated regime, with the first Capacity Subscription Agreements entered into by three different terminal users (among which Distrigas). It was the first time since 1987 that different gas companies had access to the LNG terminal.
- The zee platform was created thereby opening the access to the zee hub from any entry point in the Zeebrugge area without obligation reserve transit capacity. Accessing the zee hub was therefore also possible from the LNG Terminal.
- The Zeebrugge LNG terminal was kept under Fluxys control and Fluxys created a specific subsidiary to commercialize/operate the terminal: Fluxys LNG SA
- The transit (border to border transportation) business was transferred to Fluxys.
- The gas law as adapted in order to open Loenhout gas storage to all market players.

However, the need for a further improvement in the functioning of the Belgian gas market quickly became necessary and in February 2007, a new project was started in order to establish a new market model based on a new Code of Conduct (COC II).

The project took a little less than four years to get finalized:

- 1 year pre-consultation, design and modelling
- 1 year market consultation, feedback and remodelling
- 2 years red tape

4.3.2 The current regulatory framework

At the end of this lengthy process, this project resulted in a new Entry/Exit market model with daily balancing and the creation of a virtual trading place ZTP based on the principles and rules of the new version of the Code of Conduct for transmission, storage and LNG which is described in the Royal Decree dated December 23, 2010 (241 articles). It has been in force ever since (with a few amendments).

All the LNG activities in Zeebrugge have been operated and developed by Fluxys LNG in accordance with the above Code of Conduct.

This Royal decree of December 23, 2010 organizes the regulation of the LNG terminal in Zeebrugge in the framework of three regulatory documents:

- the Standard LNG agreement
- the Access code for LNG
- the LNG – program

The above documents are developed by the operator of the LNG Terminal and, after a comprehensive process of public consultation whereby all stakeholders are given the opportunity to comment the proposed document, they were approved by the NRA.

The standard LNG agreement defines all contractual provisions that will be applicable once the user of the LNG terminal reserves LNG services. Having entered into said agreement, a user of the LNG terminal can send subscription confirmation notice to Fluxys LNG and thereby reserving firm LNG services. The Code of Conduct makes it possible to draft one standard agreement per type of services.

The Access Code for LNG details the services that are available at the Zeebrugge LNG Terminal and the operating procedures that are to be followed in conjunction with the relevant service that a specific user has reserved.

The LNG-program gives an overview, in a customer-friendly way, of the LNG infrastructure in Zeebrugge, of the terminal model in place and of all the services offered at the terminal.

4.3.3 Zeebrugge terminal

The LNG terminal in Zeebrugge was been constructed in 1986 and has been in operation since 1987. It was developed in the framework of a long-term LNG supply contract whereby the incumbent Distrigas has been purchasing LNG from the Algerian producer Sonatrach.

This terminal located in North West Europe is an existing infrastructure. It has access to interconnected sources and markets and can accommodate all sizes of LNG vessel (from 2000 m³ to the Q-Max LNG tankers of 266.000 m³). Also as it is connected to the high-pressure transportation system of Fluxys Belgium, the LNG unloaded in Zeebrugge can easily access liquids hubs (Zeebrugge but also other hubs) as it can be transported to the United Kingdom (via the Belgium-UK Interconnector), the Netherlands, Germany, the Grand-Duchy of Luxembourg and France, and from there to any other market in Europe.

The LNG infrastructure in Zeebrugge currently has an annual throughput capacity of 9 billion m³(n) of natural gas. Following an open season conducted in 2003, this entire primary capacity was allocated on a long-term (up to 20 years) ship-or-pay basis that was commercialized by means of slots.

Under such slots, terminal users can:

- arrive and berth their LNG vessel within a defined window,
- use a basic storage capacity of 140 000 m³ LNG, linearly decreasing over 40 tides,
- use a basic send-out capacity of 4 200 MWh/h during the abovementioned 40 tides.

Occasionally, capacity is made available for LNG services on the primary market. In addition, LNG services can be traded on the secondary market. These LNG services are available to terminal users and other parties having signed the required contractual agreements.

It has been continuously developed. The various developments took place based on market evolutions, being new infrastructure or new services, depending on the requirements of the LNG market participants.

In terms of new infrastructure, the following took place since the liberalization of the Belgian gas market:

- A fourth tank with a capacity up to 141 500 m³ LNG has been added in the framework of the first extension of the LNG terminal.
- A second jetty has been built enabling LNG transfer between two LNG tankers and adding flexibility in the way the terminal is operated
- A fifth tank with a capacity up to 180 000 m³ LNG and its associated compressors being finalized in the framework of long-term LNG trans-shipment agreement enabling LNG to be unloaded, stored and reloaded onto another LNG tanker at a later stage.
- The construction of a second truck loading station in support of the future development of LNG as fuel for industry and heavy-duty transport via ships and trucks

Of course, these new infrastructures are the result of the additional regulated services that have been developed by Fluxys LNG. Those services include all the basic services and the complementary services (Transfer of LNG in storage, Electronic data platform (including electronic booking system, Secondary market platform, Data publication, LNG lending, Quality adjustment services, Truck approval and Ship approval)

At the start of the liberalization process, the LNG Terminal was an important infrastructure in the gas supply of the country, both in terms of volumes in terms of access to different sources and security of supply. In addition, it was operated in a way that enabled the incumbent to enjoy the full flexibility that such an infrastructure could offer. Implementing TPA to such infrastructure was therefore important in the opening of the Belgian gas market. In addition, it was owned and operated by a subsidiary of the same group that owned the incumbent gas supplier.

In the first phase (in 2003) new shippers were able to book capacity at the terminal following a scheme that maximized the total available capacity.

The Code of Conduct defined in encompasses LNG in a new market model. It was written in a philosophy that gave the regulated operators (transport, storage and LNG) the flexibility to develop new products/services and offered simplicity to the shippers in a way they could reserve different products/services.

As the market liberalization evolved so did the needs of the various market participants. Under the Code of Conduct new services developed by the operator required amendments to the various regulatory documents. The way the above three standard regulatory documents are organized make it easier to make new services available to the market more quickly.

As a result, Belgium has one regulated LNG terminal operated by an unbundled operator. It offers market based defined services. Its regulation takes place at the national level (neither regional, nor European) providing pragmatic stability. The new projects are developed via merchant approach which t is based on customers' need. The regulated services are available on a long term and stable basis but also on a short-term basis at competitive tariffs.

4.4 The Lithuanian case. LNG as a source of competition with pipeline gas and diversification of supply

On 16 July 2013 the Law on Liquefied Natural Gas Terminal of the Republic of Lithuania (hereinafter – Law on LNG terminal) came into force and established general principles for operation of the LNG terminal in Lithuania. The LNG terminal “Independence” in Klaipėda has started to operate in November 2014 and created conditions for access to other national markets, and for diversification of natural gas supply sources, allowing greater competition and downwards pressure on prices. Also, with the commissioning of the LNG terminal, Lithuania meets N-1 rule.

To ensure the proper functioning of the LNG terminal the pricing scheme setting the security of supply model, as provided in the Law on the LNG terminal, was established and approved by the European Commission.

The regulatory framework of the LNG terminal pricing has contributed to the establishment of a level playing field in terms of infrastructure costs for both LNG and pipeline gas – to participate in the wholesale gas market and to compete with each other under the same conditions. This is particularly important in the so called isolated natural gas markets in Lithuanian and other Baltic countries, as it serves as the precondition for the competitive natural gas market to evolve.

4.4.1 The principles for LNG regasification prices

As for LNG terminal activities, the national energy regulatory authority, National Commission for Energy Control and Prices of the Republic of Lithuania (hereinafter – NCC)¹⁶ regulates LNG regasification price and LNG reloading price. NCC sets the allowable revenues level for each regulated activity. This is calculated as the sum of economically based cost and consists of CAPEX (including cost of depreciation using straight line method and ROI) as well as OPEX (including such costs as repair and maintenance cost, administrative cost, wages and other operational costs). The allowed revenues level is divided by forecasted annual consumption capacity (for regasification) or forecasted loading amount of LNG (for reloading) to calculate the price cap¹⁷. The price cap for reloading service remains constant for a five years regulatory period, while the LNG regasification price cap is adjusted once a year subject to the change in the inflation rate, consumption capacities, investments by LNG terminal operator as agreed with NCC or deviation by LNG terminal operator from the indicators determined in the methodology (reloading revenues, ROI, depreciation, revenue deviations due to rate of exchange).

The LNG regasification price consists of a variable and a fixed part, which are calculated by the LNG terminal operator and approved by NCC. The variable part should be covered by the users of the LNG terminal and depends on the regasified LNG quantity. Currently NCC determines only the main principles for setting the variable part of regasification price: the variable part should be calculated taking into account the development of the regional natural gas market, the possibilities of ensuring diversified supply of natural gas and applying the principle of comparative analysis according to the prices of other LNG terminals. The specific methodology for calculating the variable part is determined by the LNG terminal operator AB “Klaipėdos nafta” and evaluates the differences of transmission prices in different entry points¹⁸.

The fixed part of the regasification price is calculated by subtracting the variable component revenues from the total allowed revenues. The fixed part is included into the security of supply component paid by all Lithuanian natural gas customers.

Revenues from reloading services are taken into account when setting the regasification price cap, i.e. total allowed revenues are reduced by revenues from reloading service.

¹⁶ From 1st of July 2019 according to Law on Energy of the Republic of Lithuania National Commission for Energy Control and Prices of the Republic of Lithuania will be renamed to Energy Regulatory Council (ERC).

¹⁷ From 2020 NCC will be setting the allowed revenues levels for LNG regasification and LNG reloading services instead of price caps.

¹⁸ Differences in Klaipėda entry point (connection to LNG terminal) and Kotlovka entry point (connection to Belarus) are evaluated.

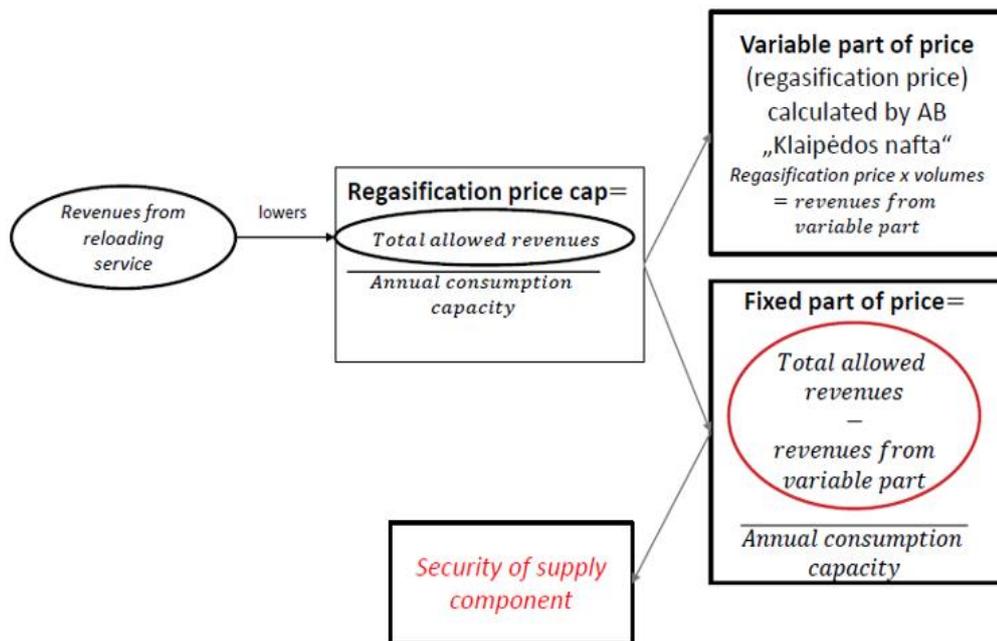


Figure 6. LNG regasification pricing scheme

4.4.2 The security of supply model

The LNG terminal related costs, i.e. fixed part of regasification price, resemble the security of supply component. The costs, included into the security of supply component, are predicted in the Law on the LNG terminal. The security of supply component costs consists of:

- LNG terminal infrastructure and operating costs (part of the LNG terminal operator AB "Klaipėdos nafta");
- Costs of the designated supplier UAB "Lietuvos energijos tiekimas" related to the mandatory quantity;
- Administrative costs incurred by the transmission system operator (TSO) AB "Amber Grid".

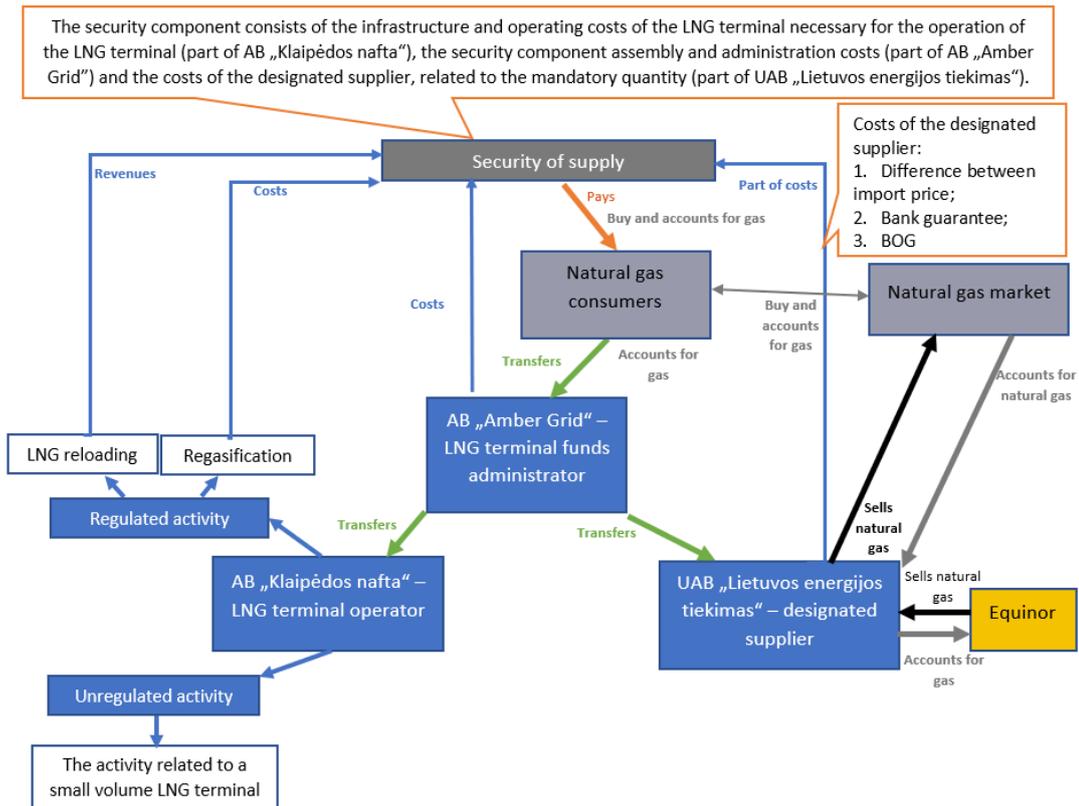


Figure 7. Security of supply model

4.4.3 Supply costs of the designated supplier

In order to ensure uninterrupted operations of the LNG terminal, the Law on the LNG terminal has foreseen the role of the designated supplier – the natural gas supply company which imports the mandatory quantity of LNG necessary for technical condition of LNG terminal. On 10th of February 2014, UAB “LITGAS”¹⁹ was approved as the designated supplier following public competition. The security of supply component recognized the specific costs of the designated supplier, which are not incurred by other supply companies: LNG purchase costs which exceed the average import price²⁰ of gas to Lithuania, bank guarantee for the supply of mandatory quantity, and technological losses incurred by the designated supplier in the LNG terminal, which exceed technological losses incurred by other users of the LNG terminal (hereinafter – BOG).

4.4.4 Administrative costs incurred by the TSO

Administrative costs include operational costs (personnel, legal and administrative costs) incurred by the TSO while administrating the funds of the security of supply component – collecting the funds from the natural gas consumers and transferring them to the LNG terminal operator and designated supplier.

¹⁹ Since the 1st of January 2019 UAB “Lietuvos energijos tiekimas” and UAB “LITGAS” have merged, therefore, UAB “Lietuvos energijos tiekimas” acts as a designated supplier after this reorganization.

²⁰ The average import price of natural gas excludes the natural gas purchase costs incurred by the designated supplier and the costs of natural gas import which is not consumed for energy needs.

4.4.5 LNG impact to natural gas market

The LNG terminal “Independence” in Klaipėda has contributed to the diversification of natural gas supply sources in Lithuania and all Baltic region, since, before the start of operation of the LNG terminal, Lithuania and other Baltic countries depended on one gas supplier. Most importantly, the LNG terminal has put downwards pressure on prices for Russian gas with a positive impact on the gas bill. In particular, the LNG terminal has had a positive impact on the average import price of natural gas in Lithuania, as there is visible convergence in prices for natural gas, comparing average import price in Lithuania to TTF and Gaspool pricing.

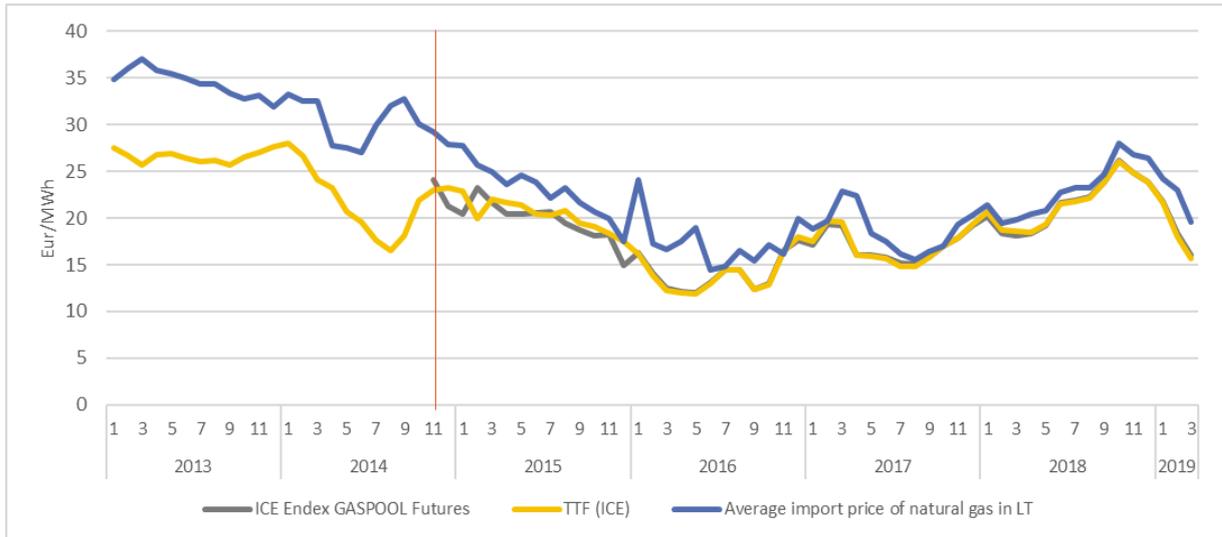


Figure 8. Natural gas prices in TTF and Gaspool natural gas hubs and average import price of natural gas in Lithuania²¹ in January 2013 – March 2019, €/MWh.

The utilization levels of the LNG terminal in Klaipėda (in terms of regasified gas), since the beginning of commercial operations, have evolved from 13% in 2015 to 26% in 2019 (forecast), with a maximum utilization rate of 35% in 2016.

4.4.6 Practical example of calculation of LNG regasification prices

The Methodology for establishing LNG regasification prices, approved on 19th of November 2018, evaluates the differences in natural gas transmission prices for different entry points²² considering yearly/quarterly/monthly/daily forecasted booked transmission capacities and transmission prices in each entry point (provided by TSO), as well as each booked yearly/quarterly/monthly/daily transmission capacity to overall transmission capacities ratio (forecasted by the LNG terminal operator).

The figure below provides the data evaluated in calculation of variable part of LNG regasification price for 2019.

Factor	Value
Annual to overall forecasted booked transmission capacities ratio	0,08

²¹ Natural gas purchase costs of gas purchased by AB Achema and UAB Kauno termofikacijos elektrinė for their own purposes are not evaluated.

²² Differences in Klaipėda entry point (connection to LNG terminal) and Kotlovka entry point (connection to Belarus) are evaluated.

Quarterly to overall forecasted booked transmission capacities ratio	0,64
Monthly to overall forecasted booked transmission capacities ratio	0,13
Daily to overall forecasted booked transmission capacities ratio	0,15
Average transmission price for annual capacity unit in Kotlovka entry point (€/MWh/d/y)	43,46
Average transmission price for quarterly capacity unit in Kotlovka entry point (€/MWh/d/y)	13,58
Average transmission price for monthly capacity unit in Kotlovka entry point (€/MWh/d/y)	5,44
Average transmission price for daily capacity unit in Kotlovka entry point (€/MWh/d/y)	0,27
Average transmission price for annual capacity unit in Klaipėda entry point (€/MWh/d/y)	9,56
Average transmission price for quarterly capacity unit in Klaipėda entry point (€/MWh/d/y)	2,99
Average transmission price for monthly capacity unit in Klaipėda entry point (€/MWh/d/y)	1,20
Average transmission price for daily capacity unit in Klaipėda entry point (€/MWh/d/y)	0,06

Figure 9. Data for calculation of variable part of LNG regasification price for 2019

After determination of the data provided above, the variable part of regasification price is established in such way, that the natural gas supply company would pay the same sum of natural gas transmission price and LNG regasification price in both Klaipėda and Kotlovka entry points:

$$P_{variable} = 0,08 \times \frac{(43,46-9,56)}{365} + 0,64 \times \frac{(13,58-2,99)}{91} + 0,13 \times \frac{(5,44-1,2)}{30} + 0,15 \times (0,27 - 0,06) = 0,13 \text{ €/MWh}$$

Taking into consideration the allowed revenue level for regasification service for 2019, established by NCC (66 555 625 €) and forecasted annual consumption capacity (167 683 045 kWh/d/y), the fixed part of LNG regasification price was calculated:

$$P_{fixed} = \frac{66\,555\,625 - 0,13 \times 8\,375\,000}{167\,683,045} = 390,42 \frac{\text{€}}{(\text{MWh}/\text{d}/\text{y})}$$

The variable part (0,13 €/MWh) is paid by LNG terminal users for the regasified LNG, while the fixed part (390,42 €/(MWh/day/year)) is included in the security of supply component.

5 IDENTIFIED WAYS TO FOSTER A MARKET FOR LNG IN EUROPE

5.1 Developing shared analysis on the future role for GNL in energy transition

LNG provides an alternative in terms of gas supply, and allows diversification of imports provided they are economically profitable. It is therefore by essence an important element of a competitive gas market which might lead to increased competition on the wholesale gas market.

Not only is the volume of LNG traded both at a European and international level growing, but also the number of players is increasing daily. This constitutes a positive context and opportunity for a much more liquid and flexible LNG market to arise globally. Nevertheless, the LNG sector is driven by economic consideration. The place of the EU in this competitive market will likely be a result of price differentials between different importing areas (and shipping costs). European consumers will benefit from LNG if it comes at a lower cost than pipeline gas imports. To enable LNG to play a role in EU security of supply, competition and diversification, it is essential that LNG supplies can reach all parts of Europe.

As a result, developing the analysis on the place that LNG can play in the energy transition for the European Union is needed to establish a shared vision of current challenges to ensure both sustainability and security of supply.

5.2 Developing price references in all parts of the European market

Improving transparency, liquidity and competition are the core ideas of the development of the European gas markets. Price discovery is crucial when contending with other world regions for obtaining gas, especially in scarcity situations.

Nevertheless, concerning reliable and well-established price references, the situation in Europe is heterogeneous. Well-functioning gas hubs exist, that offer clear and strong enough price references to attract LNG in these market areas when needed (TTF and NBP for instance). However other countries are still struggling to develop their hubs. The ACER Gas Market Monitoring Report points out the increasing liquidity of some hubs but stresses the difficulties in Central and South-East Europe, are having to develop price references.

Without clear price references in those areas who haven't those yet, neither LNG nor pipeline gas suppliers will have sufficient information for price discovering to allow gas to flow from the cheapest areas to the more expensive ones, neither in the medium term nor in the short term.

Implementing the gas target model all over Europe is thus essential to provide price signals to appeal to LNG when needed.

Moreover, the traditional indexation of the long term LNG contracts to oil (derivatives) is being substituted, specifically for spot trading with hub reference price or index. This could also be used in the future for long term contract indexation.

5.3 Opportunity of disclosing LNG prices

The LNG market is shifting, spot market trade is increasing all over the World, and trading and optimization activities are fundamental to gain flexibility in the gas supply chain.

In a globalized LNG market, geographical destination flexibility, shorter contract duration and spot price indexation are also required to deal with fast changing market forces. The situation in the market with an increase in spot contracting, complexity in LNG pricing and downstream liberalization is favouring spot price indexation and risk management activities.

In Asia, spot indexed physical transactions (JKM) have proven to be a good solution for spot trading. Swaps have increased in recent years and other financial derivatives have given traders the ability to develop a financial position related to global spot LNG. This is built on price assessments by price reporting agencies or other third-parties.

If JKM or other indexes sharing LNG real prices are available in different market areas, it could also be suitable for long term transactions. On top of that, indexes and derivatives should be an effective tool for LNG price formation, supporting price transparency.

Reporting agencies establishing price benchmarks, have been fundamental to commoditize LNG in Asia, giving the market a new means of hedging as well as a range of public data on prices. It is a possibility that Platts, Argus, ICIS and others develop new references for new tradable products. At the same time, new marketplaces for spot physical LNG trade might appear.

5.4 Flexibility of LNG contract and spot trading expansion

The gas market has evolved from a situation where LNG volumes were just supplied under long term contracts, with restrictive destination clauses, to a more flexible context, where supplies can be agreed not only by means of long-term contracts but also by short term contracts, and even on spot basis.

An evolution of the global LNG market benefiting from the spot price transparency and contract flexibility would probably boost the market dynamics more than the increased liquidity on European hubs over the past decade.

In this context, CEER welcomes any addressed market development to make it easier for LNG to come to Europe. In particular, it would be helpful if LNG contract clauses were less rigid so that it could be possible for deliveries to better respond to price signals.

The availability in the market of new sources of supply is key to increase global liquidity. In this context, streamlining LNG spot trade through standardisation of Sales and Purchase Agreement, for instance, would allow more trades.

All of this would allow more market players to reach to a particular market following prices signals more quickly. .

5.5 Regional streamlining of gas infrastructures – Access and utilisation efficiency.

Having more LNG unloaded in the coast, following attractive hub prices in some spots, is not sufficient to benefit all European consumers.

There are two basic preconditions to reach all areas:

- Access from the LNG regasification terminals to final consumers.
- Gas prices reference in all areas of Europe (see chapter 5.2).

The assessment of infrastructures use is a key topic. On one hand, ensuring sufficient infrastructures is a prerequisite for a fluid gas circulation and on the other over-investment should be avoided. This is because of the risk of stranded costs that lead to an increased price for consumers and reduced competitiveness for LNG. The opportunity of development of new infrastructures should be assessed thoroughly, given significant potential exists in the optimisation of existing infrastructures at the light of existing terminals utilization rate.

Furthermore, LNG infrastructures should also be assessed in light of their potential to contribute to the stability and security of supply of the overall energy system as well as for the energy transition, as they are a potential element for the development of storage. A balanced approach should be adopted between addressing short term needs and preparing for the future.

Despite recent remarkable investment efforts in several regions, discrepancies in access rules to the gas networks and procedures in the different countries could still pose difficulties for traders to cross borders. Harmonised access regimes at the regional level such as TPA tariffs, could foster LNG trade.

5.6 Developing new services and maximising users choices

Europe could attract more LNG in the medium term, mainly due to a growing worldwide (over) supply of LNG in the medium term. On the demand side this is possible given the expected decrease in indigenous gas production (in the Netherlands and the UK) and the approaching expiry date of long-term contracts.

Having both regulated and exempted LNG terminals in Europe, we notice that both types of operators are developing additional services such as cargo reloading, bunkering, truck loading, transshipment or additional send out flexibility.

In order for the LNG regasification terminals to continue to be useful and have their services booked by shippers and to foster a good utilisation rate, it is convenient to offer new types of services that fit market needs. As a result of such developments, different users would eventually book the required new services, thereby increasing the number of market participants for a given market, hence increasing competition in that market.

From the terminal side, offering both, bundled and unbundled services to widen the user's choice and the development of new services adapted to the user's needs will facilitate LNG future evolution in Europe (small scale services, i.e. bunkering). In maritime transport, the recent decision of IMO to implement a global cap on sulphur emissions by 2020 is opening new opportunities for LNG as a marine fuel and several terminal operators worldwide are developing bunkering services.

Owing to competition between LNG terminals it is in their commercial interest to meet market demands, especially concerning new services. LNG operators need to adapt to changing market conditions and with regard to regulated terminals regulators should seek to ensure that there are no undue barriers to its development.

5.7 Regulatory coordination

From a regulators point of view, the current situation of underutilisation of many European LNG terminals and the threat that it might pose in terms of investment recovery, calls for re-examining current regulatory principles and regulations in place. The Italian and Spanish cases show how market evolution has forced regulators to adopt drastic changes in the regulatory regime to accommodate new realities while the Belgian case shows how a given regulatory regime does not hinder the operator to develop new services on a rather simple and efficient way. Additionally the Lithuanian case study shows how effectively they can simultaneously improve security of supply and competition in the country, thanks to LNG, once the economic regime has been Taylor-made for the situation.

Hence, having a rather rigid (sometimes outdated) regulatory regime could prevent the development of new services required by the market.

An adaptation of some current regulatory regimes might be required in order to react more promptly to the rapidly changing Global LNG market that is facilitating the development of new services. Adaptation is also required to ensure that an equal level playing field is available for both sources of gas – LNG gas and pipeline gas – to participate in the wholesale gas market. In such case, we need to move to Dynamic regulation that is independent and uses a pragmatic approach and avoids complexities that would otherwise create barriers to entry.

An example is the Lithuanian regasification very low access tariff. It is justified on the grounds of the selected technical solution (FSRU) and the purpose to foster diversification of sources that contributed to the establishment of equal conditions for LNG gas to compete with pipeline gas. However the tariff doesn't fulfil the cost reflectivity principle established in the Tariff Network Code (not applicable in this case to LNG infrastructures). In any case, principles of regulation might be at the service of market development, in order to get more important gains for the final consumer

Another way is to consider a cost-allocation methodology that includes all the benefits provided by the gas infrastructures and that tries to allocate the costs to all the beneficiaries. For example, in some emergent or illiquid markets, LNG terminals provide benefits like Security of Supply, market integration, increasing competition or decarbonisation which may justify keeping them working even if underutilised. Hence, it could be justified to go beyond the cost-recovery principle solely based on capacity bookings paid by shippers and to associate other beneficiaries. Identifying the benefits is not an easy task, in particular for existing infrastructure, and a clear and transparent methodology consulted with stakeholders would have to be defined, ensuring however that strict rules on transparency and non-discrimination are applied²³.

It is worth noting that if there is indeed competition between terminals on a regional level in the EU the competition takes place sometimes between terminals under different regimes (see the above example of the three terminals in North West Europe) and other times among regulated ones (Iberian Example).

Some terminals might in that context encounter a more disadvantageous situation than others, as they are obliged to comply with some requirements while others are not, like tariffs disclosure. Adapting and coordinating the various regulatory requirements might be an answer to that.

²³ The Tariff NC allows a discount for LNG in case of security of supply issues. This approach could be applied at national level (in this case the different beneficiaries could be different types of costumers) and/or in an ITC (in this case the different beneficiaries could be the customers of the different TSOs). See also, CEER, Regulatory Challenges for a Sustainable Gas Sector, Public Consultation Paper, 22 March 2019, Ref. C18-RGS-03-03.

6 CONCLUSIONS

- As shown in the case studies, flexibility allows quicker response and adaptation to changing market conditions considering the peculiarities and particular circumstances of each country, that contribute to the development of the LNG sector in the European Union. Consequently, CEER does not identify a need for additional regulation of LNG terminals at European level.
- The importance of LNG will grow in the near future, helping Europe diversify its sources of gas as a transition fuel towards full decarbonisation. As a result, developing the analysis on the role LNG can play in the energy transition for the European Union is needed to establish a shared vision of current challenges for ensuring both sustainability and security of supply.
- In any case, LNG must not be considered only as a source of diversification and security of supply at a European level but also as a relevant additional source of competition for the European gas market.
- CEER believes that attracting LNG to come into Europe could be further enhanced with the development of price references, where these have not developed yet, to send reliable price signals to the market where LNG is valued most.
- CEER welcomes any market development that facilitates LNG's arrival in Europe, such as supply contract clauses flexibilisation, so that cargoes can respond to market and price signals in the short term. Also, a certain level of flexibility on the upstream part of the chain is welcomed where possible developing greater convergence in the global gas market trading arrangements to help short term arbitrages.
- In Europe, we observe different approaches which are evolving in order to nurture the opportunities that LNG offers to their national markets. The development of new services, the way the terminals are regulated (or not), the eventual adaptation of rules and concepts must follow market needs and innovation principles.
- Regulatory regimes should ensure that there are no undue barriers to LNG market development. This may require regulations to adapt quickly to changing conditions. An evolution to "Dynamic regulation" could provide the necessary tools to provide such adaptation.
- Common regulatory principles that might apply to transmission networks need to be re-examined in light of the needs of LNG market development, taking into account the specificity of LNG and the regional markets it serves.
- Further coordination of regulators, mainly regarding transparency about changes on access regimes conditions, may be advisable at the regional level to grant both predictability and opportunity to adapt to the changing conditions for any party.
- The opportunity of development of new LNG infrastructures should be assessed thoroughly, as there is a significant potential for optimisation of existing infrastructures at the light of the current utilisation rate.
- Despite recent remarkable investment efforts in several regions, discrepancies in access rules to the gas networks and procedures still pose difficulties for traders to cross borders.
- The implementation of the Gas Target Model all over Europe is still essential to provide price signals to attract LNG to the region when needed.

Annex 1 – List of abbreviations

Term	Definition
ACER	The Agency for the Cooperation of Energy Regulators
CEER	Council of European Energy Regulators
CNMC	Spanish Regulatory Authority
EC	European Commission
FID	Final Investment Decision
FLNG	Floating Liquefaction Plant
FSRU	Floating Storage and Regasification Units
GLE	Gas LNG Europe
LNG	Liquefied natural gas
LSO	LNG System Operator
NCC	Lithuanian Regulatory Authority
NRA	National Regulatory Authority
rTPA	Regulated Third Party Access
SoS	Security of Supply
SSO	Storage System Operator
TSO	Transmission System Operator
TPA	Tonnes of LNG per annum

About CEER

The Council of European Energy Regulators (CEER) is the voice of Europe's national energy regulators. CEER's Members and Observers comprise 39 national energy regulatory authorities (NRAs) from across Europe.

CEER is legally established as a not-for-profit association under Belgian law, with a small Secretariat based in Brussels to assist the organisation.

CEER supports its NRA members/observers in their responsibilities, sharing experience and developing regulatory capacity and best practices. It does so by facilitating expert working group meetings, hosting workshops and events, supporting the development and publication of regulatory papers, and through an in-house Training Academy. Through CEER, European NRAs cooperate and develop common position papers, advice and forward-thinking recommendations to improve the electricity and gas markets for the benefit of consumers and businesses.

In terms of policy, CEER actively promotes an investment friendly, harmonised regulatory environment and the consistent application of existing EU legislation. A key objective of CEER is to facilitate the creation of a single, competitive, efficient and sustainable Internal Energy Market in Europe that works in the consumer interest.

Specifically, CEER deals with a range of energy regulatory issues including wholesale and retail markets; consumer issues; distribution networks; smart grids; flexibility; sustainability; and international cooperation.

CEER wishes to thank in particular the following regulatory experts for their work in preparing this report: Rocío Prieto, Yves Poncelet, Mónica Ferreiro, Agustín Alonso, Aurora Rossodivita, Lina Karpavičiūtė.

More information at www.ceer.eu.