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CEER Report

The influence of new LNG terminals on the future EU energy market

Liquified Natural Gas Workstream of Gas Working Group

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Council of European Energy Regulators asbl
Cours Saint-Michel 30a, Box F – 1040 Brussels, Belgium
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INFORMATION PAGE

Abstract

This document seeks to support discussions related to the influence of new Liquified Natural Gas (LNG) terminals on the future European Union (EU) energy market. It is based on the analysis of LNG import, storage and existing regasification capacities, the recently commissioned ones as well as those planned for the coming years, including capacity increases in existing terminals and new LNG projects, both onshore and/or Floating Storage Regasification Units (FSRUs), in order to have an overall vision of the evolution of this key activity and its potential impact on the EU internal energy market.

Target Audience

Madrid Forum, European Commission, national regulatory authorities, Member States, energy suppliers, traders, gas consumers, gas industry, consumer groups, LNG terminals and other network operators, academics, and other interested parties.

Keywords

Liquefied natural gas; LNG; new LNG terminals; security of gas supply to the EU; energy transition; internal gas market; competition.

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

- Liquefied Natural Gas Small-Scale Services in the European Union, CEER, June 2022.
- How to Foster LNG Markets in Europe, CEER, July 2019.
- Removing LNG barriers on gas markets, CEER, December 2017.
- Removing barriers to LNG and to gas storage product innovation, CEER, October 2016.
- The role of LNG to improve security of supply, CEER, February 2016.
- Status Review on monitoring access to LNG terminals in 2009-2013, CEER, September 2014.
- Monitoring Report on Implementation of the Transparency Template in the European LNG Terminals, CEER, December 2013.
- Status Review and evaluation of access regimes at LNG terminals in the EU, CEER, March 2013.

External Documents

- Communication from the Commission to the European Parliament, the European Council, the Council, the European economic and social committee, and the committee of the regions on the REPowerEU Plan, European Commission, May 2022.
- 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.
- 2023 Market Monitoring Report. European gas market trends and price drivers, ACER, October 2023.
- 2023 World LNG report, International Gas Union, July 2023.
- Council Regulation (EU) 2022/2576, of 19 December 2022, enhancing solidarity through better coordination of gas purchases, reliable price benchmarks and exchanges of gas across borders, The Council of the EU, December 2022.

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EXECUTIVE SUMMARY

Background

In the current worldwide energy context, LNG is called to play a growingly important role, becoming a critical source of security of supply and competitiveness. The efforts to replace Russian gas supplies, reduce European dependency and increase the resilience of Europe's gas system are driving the EU to maximise the use of existing LNG infrastructure and add new LNG import capacity. This has placed Europe as the second-largest importing region in the world as the continent is becoming a firm LNG consumer and no longer a balancing market for the commodity.

Objectives and Contents of the Document

This report aims to support discussions related to the influence of new LNG capacity on the future EU energy market. It is based on the analysis of several factors including LNG imports, existing storage and regasification capacities, recently commissioned and future storage and regasification capacities, as well as capacity increases in existing terminals and new LNG projects, both onshore and/or FSRUs. It provides an overall view of the evolution of LNG activity and its potential impact on the EU internal energy market.

The scope of analysis for potential impacts of new LNG projects encompasses both security of supply and competitiveness.

Brief Summary of the Conclusions

The observed increase in LNG capacity is fully in line with the European Commission's (EC) REPowerEU Plan target that aims to phase out EU dependence on fossil fuels from Russia before 2030. The new LNG infrastructure will help diversify Europe's energy sources by reducing its dependency all the while widening the range of potential suppliers and market opportunities. The new LNG capacity will not only contribute to the security of supply of the host EU countries, but also to the neighbouring countries and therefore support a more resilient EU gas system.

Most of the new LNG capacity will be exempted from regulated Third Party Access (rTPA), which means that instead of dealing with the issue as an exemption, new LNG capacity will, in fact, "become the rule." This is due to the exceptional energy context which Europe is faced with. The procedure allows for the ramp up of new infrastructure needed to replace the main natural gas supply shortfall in the shortest possible time. Regulators will therefore have to guarantee that the rules applicable to new LNG capacity, regulated or exempted, are transparent, non-discriminatory, and objective, as the current healthy competition in European markets will be strongly conditioned by the way these strategic new entry capacities are allocated.

LNG terminals are vastly different from transmission pipelines, and they are managed and used in various ways depending on the rules of each country. Standardisation of services and products at EU level would be neither advisable nor feasible. Member States (MS) should therefore have enough flexibility and freedom to choose the most appropriate services, access, and allocation rules.

Regulators should receive sufficient powers to supervise LNG System Operators (LSOs) and users' activities related to LNG, especially in the current context where LNG is playing a critical role and can have an important impact on the EU natural gas market.

1 Introduction

In the current complex energy context, with EU countries committed to an ambitious decarbonisation process, affected by soaring prices and post-pandemic volatility and their impact on our economy, and heavily marked by the Russian invasion of Ukraine since February 2022, LNG is poised to play a significant role. It is increasingly being considered as a critical source for ensuring security of supply and competitiveness within the European energy market.

The EC's REPowerEU Plan states that one of the two pillars to eliminate Europe's dependency on Russian fossil fuels is the diversification of supply, in particular, by means of higher LNG imports which could amount to 50 bcm/year of additional natural gas supply to the EU. Furthermore, the EU Energy Platform has been set up for the voluntary common purchase of LNG (as well as natural gas and hydrogen). Additionally, it is assumed that, once the ongoing Projects of Common Interest (PCI) and Projects of Mutual Interest (PMI) are implemented, all MS will have access to at least three gas sources or to the global LNG market. The EC also recognises that there will be a need for additional investments to expand existing LNG terminals or build new ones on top of the reinforcement of networks.

Council regulation 2022/2576, enhancing solidarity through better coordination of gas purchases, reliable price benchmarks and exchanges of gas across borders, recognises the significant role of LNG in times of emergency and changes in gas flows from Russian pipeline gas. In consequence, it frontloads the hydrogen and decarbonised gas market package, establishing enhanced transparency requirements and an organised market that facilitates secondary trade of capacity for LNG facilities, in order to optimise and maximise the use of the EU's LNG infrastructures.

In short, efforts to replace Russian gas supplies, reduce European dependency and increase the resilience of our gas system are driving the EU to maximise the use of existing LNG infrastructures and, in many cases, to add new LNG import capacity.

Never has Europe deployed such a significant amount of new LNG import capacity in such a brief period of time. The exceptional circumstances and urgent necessity have compelled governments, regulators, transmission system operators, investors, and others, to mobilise a variety of necessary resources to minimise the impact of the sudden shift from the previously historical natural gas sources supplying the EU. Had Europe not reacted with such short notice, significant damage would have been inflicted to the economy and to the well-being of European citizens.

In response to these extraordinary circumstances and needs, special solutions have been and are being implemented. The conventional onshore terminal concept is no longer considered as the only or primary way for increasing LNG import capacity to Europe. This would normally require lengthy commissioning periods and MS have also resorted to other useful and quicker solutions.

In addition to increasing the capacity of existing LNG terminals, many countries are opting to connect FSRUs to their energy networks. This is achieved through various solutions: new terminals that are either fully owned by LSO or under lease agreements, shorter- or longer-term projects, terminals with permanent locations expected to be moved to a different location within the country or even conceived to be replaced by a hydrogen/ammonia ready onshore terminal in the future.

Regarding access conditions, capacity allocation and congestion management mechanisms, there exists a wide range of approaches. These range from fully regulated access terminals to fully exempted ones, throughout hybrid access regimes, capacity allocations by means of auctions, open seasons, first-come-first-served (FCFS), etc.

In this context, CEER considered it appropriate to undertake the task of analysing LNG import, storage and regasification existing capacities, including those that have recently been commissioned as well as planned capacities. This encompasses capacity increases in existing terminals and new LNG projects, both onshore and/or FSRU, in order to have a comprehensive vision of the evolution of this key activity and the potential impact on the EU internal energy market.

Additionally, regulators were invited to *"analyse and report to the Forum on the new developments on the EU LNG market, including the significant increase of LNG imports and its impacts on the existing regulatory framework"* during the thirty-seventh Madrid Forum meeting held in May 2023.

This deliverable takes into consideration the importance of LNG in the context of the current energy crisis, capacity allocation mechanisms as well as access conditions and their influence on the European Energy Market. The analysis also incorporates newly available information on gas prices and examines their correlation with recent and future developments in European LNG terminals.

2 LNG markets outlook

Although the primary goal of this report is to assess the influence of new LNG terminals on the future EU energy market, it is 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 keeps growing year after year. Only fifteen years ago in 2007, the number of LNG-importing countries (18) represented less than half the current number (45).

Demand - side	Supply - side
45 LNG importing countries *(13 in EU)* **+ 1** new LNG importing country since 2021 *(El Salvador)*	**20** LNG exporting *countries* **0** new LNG exporting countries since 2021
1 068 Mt regasification capacity **+ 16.9 Mt** since 2021	**476 Mt** liquefaction capacity **+ 14.9 Mt** since 2021
Largest consumers: Mt, (% share): ○ Japan: 72.2 Mt (18.5%) ○ China: 63.6 Mt (16.3 %) ○ South Korea: 47.2 Mt (12.1 %) ○ France: 24.8 Mt (6.4%) ○ Taiwan: 20 Mt (5.1 %)	Largest producers: Mt, (% share): ○ Qatar: 79.0 Mt (20.3 %) ○ Australia: 78.5 Mt (20.2 %) ○ USA: 75.4 Mt (19.4 %) ○ Malaysia: 27.6 Mt (7.1 %) ○ Russia: 20.8 Mt (5.3 %)
389.2 Mt Global trade *(120 Mt in Europe = 31 % share)* **+ 16.9 Mt** *(+ 4.5 %)* since 2021	

Table 1. Key figures of international LNG sector from 2022. Mt = Millions of tons.

Source: GIIGNL Annual report 2023

The LNG gas trade is growing all around the world. In fact, it increased by 4.5% in 2022 (compared to 2021). The main reasons, besides being a competitive energy source in countries that are both distant from suppliers and have difficulties accessing production sources through pipeline interconnections, are that LNG serves as: 1) a security of supply option for markets with insufficient pipeline connections; 2) diversification; and/or 3) a reliable backup solution for electricity generation from renewable sources.

LNG trade has been growing at varying rates during the last three decades. After a steady growth during the 1990s, the first decade of the 2000s saw a sharp increase, especially towards the end of the period.

Since 2021, LNG has become a firm energy supply for Europe, with LNG imports from the United States of America (USA) replacing Russian pipeline gas. In 2022, LNG imports to Europe increased by 60% compared to 2021 to reach 120 Mt while in comparison imports to Asia fell by 8% to 252 Mt in 2022.

The below Sankey diagram summarises the main 2022 figures from the LNG sector at international level.

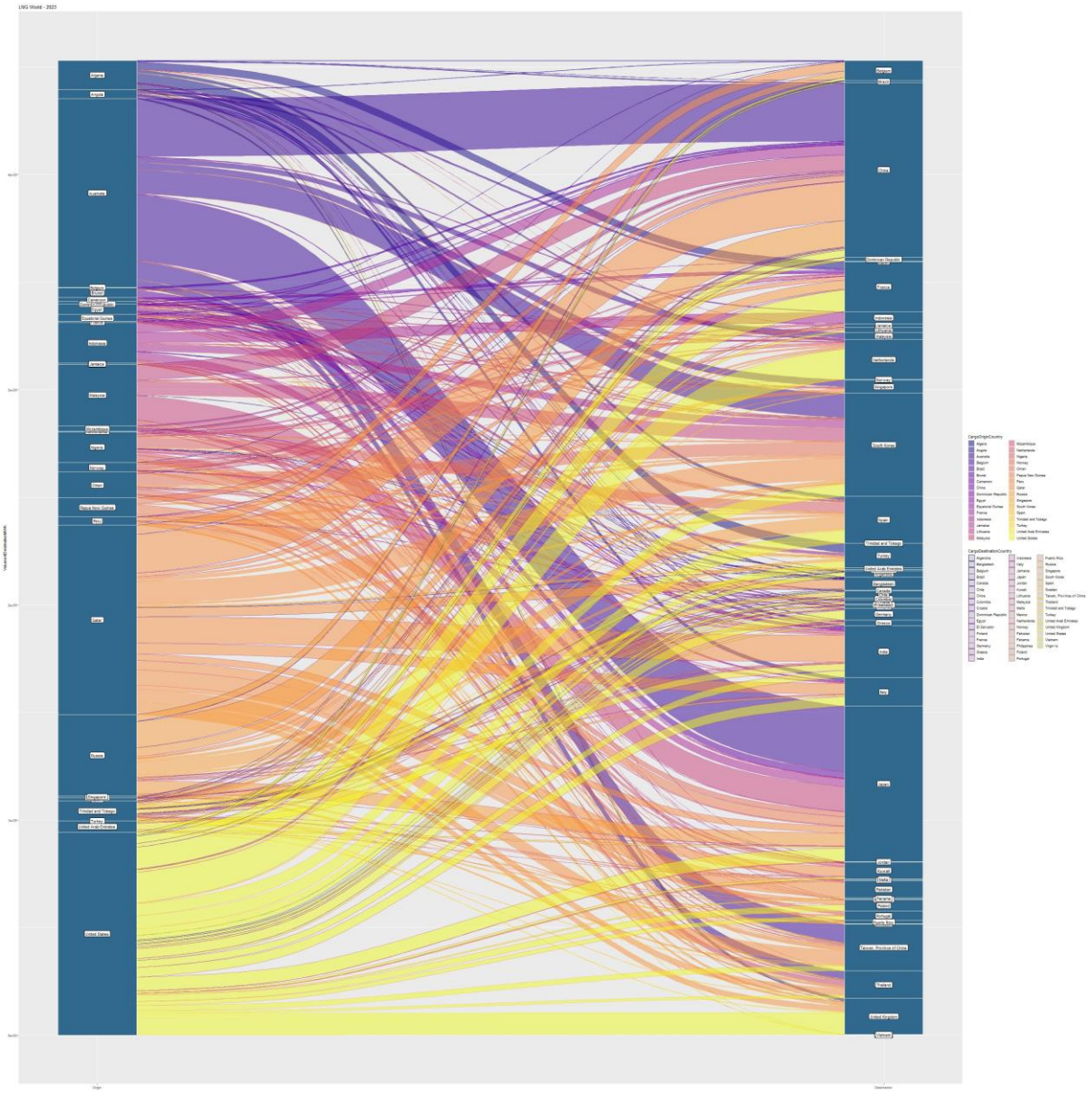


Figure 1. Sankey diagram of international LNG flows.

Source: GIIGNL Annual report 2023

2.2 Demand side outlook

There has been a significant expansion of the regasification capacity at world level during the last years, and this trend is expected to continue in the near future.

At the end of 2022, global regasification capacity reached 1 068 Mtpa. During that year, nine new regasification terminals with a total capacity of 23.4 Mtpa started commercial operations. Two of these facilities were commissioned in Europe and five in Asia. China, where two new LNG terminals were commissioned, only accounted for 8 Mt of the total regasification capacity two decades ago. China is now the second largest market in the world in terms of capacity.

In terms of import by regions, Asia is the largest consumer, concentrating almost two-thirds of imports in 2022 and home to four of the five largest LNG-importing countries. In particular, Japan is and has historically been the primary LNG consumer, accounting for almost 18.5% of the global demand. Although with slightly decreasing imports (-2.9%), Japan remains the first LNG importing country (72.16 Mt, 2022), both in terms of infrastructure and imported gas.

Nevertheless, the market has significantly evolved in the last years, mainly due to ever-growing Chinese demand. China is ranked second with 16.3% of global gas demand and, although its imports decreased by 20.1% in 2022, it is and will probably remain one of the main drivers of LNG demand in the future. This is to a large degree due to the country's environmental policies, which favour natural gas consumption to other more pollutant sources like coal. South Korean imports slightly increased in 2022 (+0.6%). In any case and due to its price sensitivity, Asia decreased its imports of LNG as prices increased.

In America, El Salvador became the 45th importer of LNG, with a relatively modest 0.27 Mt via the FSRU-based Acajutla LNG terminal (3 Mtpa).

Global LNG trade has increased by 4.5%, reaching 389 Mtpa in 2022. Overall during 2022, net LNG imports into Europe increased by 44.7 Mt, up by 60% compared to 2021. As a result, Europe now represents 31% of global LNG imports, becoming the second largest LNG importing region in the world, while Asia Pacific still retains the first place as the largest importer. Among European countries, France entered the top five of importing countries by doubling its imported volumes (24.75 Mt in 2022), representing 6.4% of total LNG imports. In fact, all LNG-importing European countries have registered significant surges during 2022, Belgium being the country that experienced the highest relative import increase (+ 141.4%).

These increases are fundamentally due to the fact that European countries are trying to reduce their exposure to Russian gas. For Europe, the global LNG market has proven to be a reliable alternative to the shortfall of pipeline gas. Security of supply is and will become even more reliant on LNG. It is therefore crucial that LNG infrastructure is ready and that the LNG market remains liquid and transparent so as to facilitate access to the European market.

2.3 Supply side outlook

In 2022, almost 15 Mt of new liquefaction capacity was added to the global LNG production market, which represents an increase of 3.2% and a final capacity of 476.5Mt. Additionally, three Final Investment Decisions (FIDs) were taken in 2022, for a total capacity of around 26 Mt per year:

- 10.4 Mt. Corpus Christi Stage 3 liquefaction project in the United States;
- 13.3 Mt. First phase of the Plaquemines LNG in the United States;
- 2 Mt. FLNG facility in Malaysia.

In Europe, the only large-scale liquefaction plant is located in Norway. It was commissioned in 2008 and represents just 0.7% of global production capacity. It resumed its operations in June 2022, after having suffered a fire in September 2020.

LNG supply currently comes from 20 different countries. The LNG production structure has significantly evolved during the last decades and is expected to continue to change in the future. During the last year, however, the number of exporting countries remained the same.

The highest production took place in Qatar, Australia, and the USA. These three countries accounted for 60% of global LNG production. Qatar has historically been the most important supplier, accounting for 20.3 % of global exports and exporting 79 Mt in 2022. Nevertheless, Australia exports reached 78.5 Mt (the same volume as in the previous year), remarkably close to the exports of Qatar.

Also, remarkably close to these figures, the USA was the third largest exporter of LNG in 2022 with a volume of 75.44 Mt representing an increase of 12.6% compared to 2021. This significant growth is the result of the ramp up of Train 6 of the Sabine Pass liquefaction project and the commissioning of Calcasieu Pass. The USA has become one of the main LNG suppliers to Europe, accounting for 69% of deliveries in 2022, while 24% of the LNG went to Asia and 6% to other countries on the American continent.

3 New EU LNG capacity projects

3.1 Reference scenario: existing terminals on 1 January 2022

Table 1 shows a list of the existing LNG terminals in the EU[1] detailing, among others, the main technical data about the projects, namely the regasification and LNG storage capacity, as well as the number of jetties. The information refers to the technical characteristics of the terminals on 1 January 2022 and this data is considered as the departure reference scenario for the analysis.

As it can be seen in the reference scenario, LNG storage capacity amounts to 7,7 Mcm of LNG and the regasification capacity to 5 624 GWh/day[2]. Considering that, in 2021, EU27 gas consumption reached 4 418 TWh[3], regasification capacity would be sufficient to supply up to 47% of gas demand. As for storage capacity, LNG tanks would be able to supply European gas demand for up to four days, in both cases, considering the average daily demand[4].

Concerning docking capacity, most of the terminals are already prepared to receive up to Q-Max cargoes (266 000 m^3 LNG), although some of them can only receive small to medium ships (up to 75 000 m^3 LNG cargoes).

Regarding the deployment of LNG terminals across the EU, the below figure indicates that during the last decades, new LNG plants have been commissioned in a progressive and smooth manner based on the needs of each country. These needs were mainly linked to the

[1] UK information has also been included in the table but not in the analysis, which refers only to EU27.

[2] UK terminals are not included in these figures, nor is El Musel LNG terminal as, by 1 January 2022, this terminal was still mothballed.

[3] Eurostat. Supply, transformation and consumption of gas statistics. Inland consumption of gas.

[4] In 2022, natural gas demand was reduced by 13,8% and, in consequence, the regasification and LNG storage capacities increased in relative terms, to 54% and 5 days respectively.

evolution of natural gas demand and, in many cases, they were also related to competitiveness and security of supply. Most of the projects (15 out of 24) were built as big onshore LNG terminals[5], with LNG storage capacities above 200,000 m^3. The other projects represented medium-sized LNG terminals, both onshore and FSRUs, with LNG storage capacities between 50,000 and 200,000 m^3. Finally, some projects made up small LNG terminals not connected to the natural gas grid, with storage capacities below 50 000 m^3 of LNG.

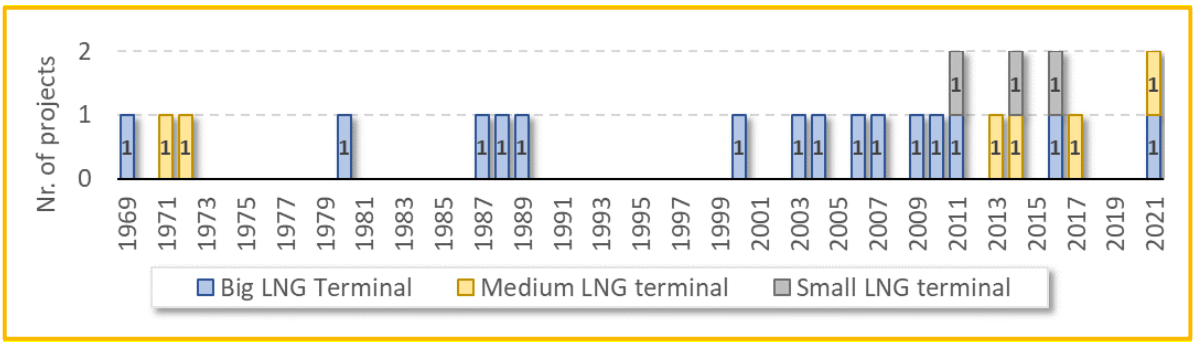


Figure 2. Number of commissioned LNG terminals, according to size and commissioning dates.

Source: Based on information provided by NRAs and GIE publications.

Concerning access conditions, most of the terminals have a rTPA regime in place, while two of them have been granted an exemption and have negotiated access conditions (Dunkerque and Gate). Another terminal has a “hybrid” access regime (Porto Levante terminal, with both regulated – 29% – and negotiated TPA – 71%. Three terminals are not connected to their national transmission networks (one terminal in Finland and two in Sweden; the three of them are small LNG terminals). In terms of send-out capacity, 79 % of total capacity is subject to a rTPA regime, while only 21% is exempted.

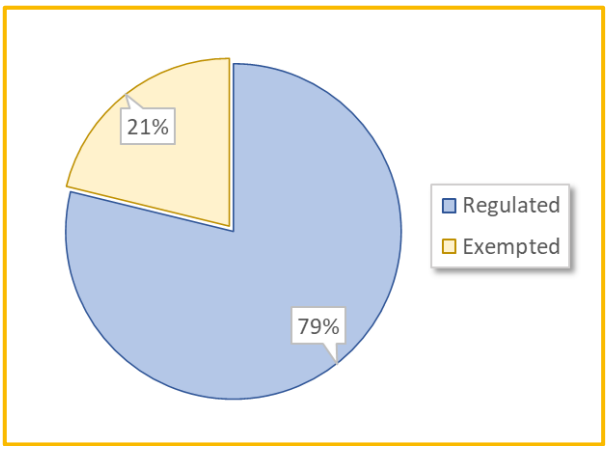


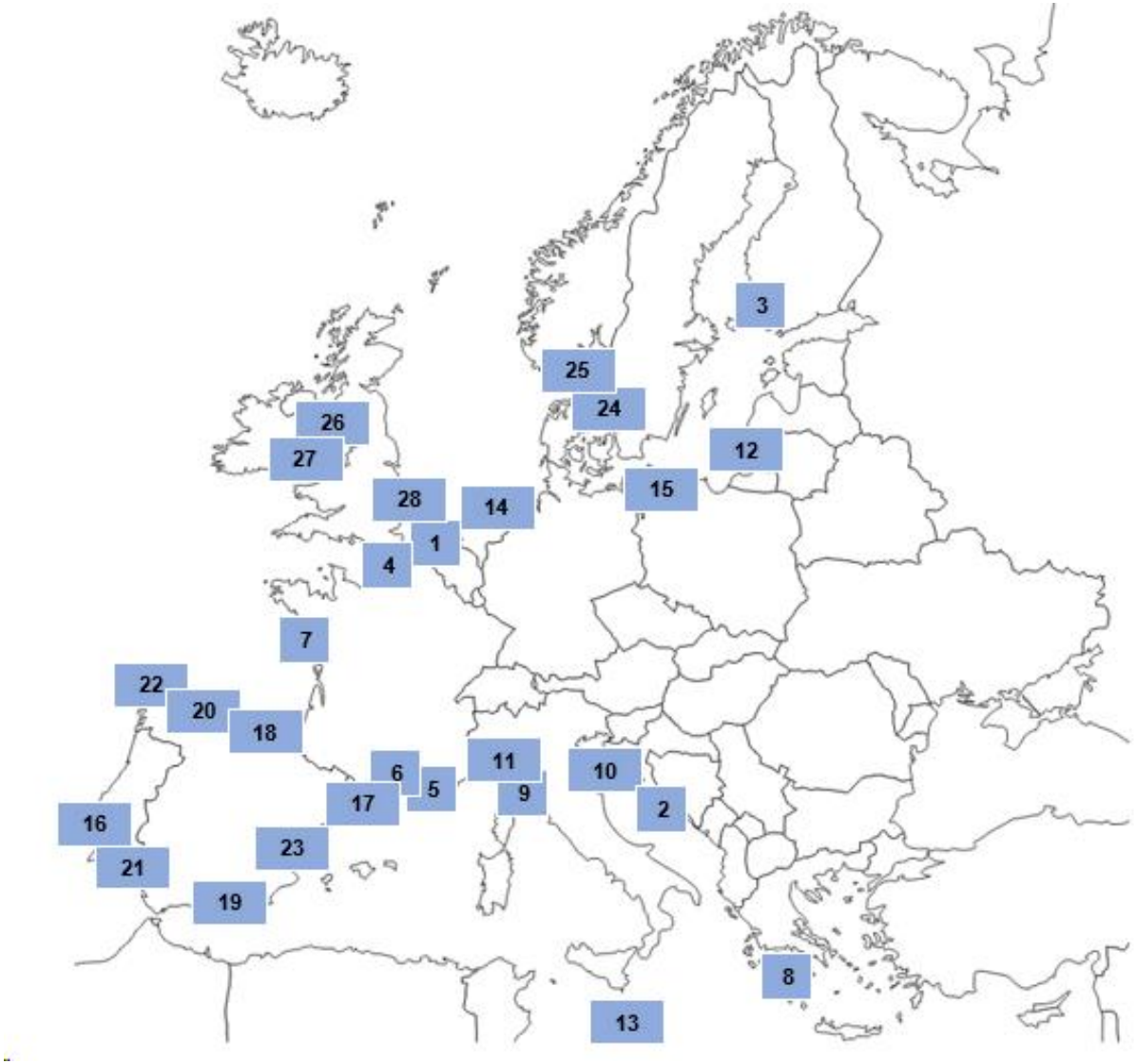
Figure 3. Percentage of regasification capacity with regulated or exempted access regimes. Source: CEER.

[5] With the exception of the Porto Levante (Rovigo) LNG terminal (Italy), which is an offshore gravity-based terminal.

Country	Nr	Terminals	Operator	Type	TPA Regime	CAM	LNG storage (m^3 LNG)	Regasification (GWh/day)	Regasification (bcm/y)	Max. Dock. (m^3 LNG)	Nr. of jetties	Year of Start-up
Belgium	1	Zeebrugge	Fluxys LNG	Onshore	Regulated	OS & FCFS	566 000	541	14,8	266 000	2	1987
Croatia	1	Krk Island	LNG Croatia	FSRU	Regulated	FCFS	140 000	86	2,6	265 000	1	2021
Finland	1	Pori	Gasum LNG Oy	Onshore	Off - grid	Pro rata	30 000	-	-	18 000	1	2016
France	4	Dunkerque	Dunkerque LNG (Fluxys)	Onshore	Exempted	OS & FCFS	600 000	520	13,0	267 000	1	2016
		Fos Cavau	Fosmax LNG (Elengy)	Onshore	Regulated		330 000	274	8,5	267 000	1	2010
		Fos Tonkin	Elengy	Onshore	Regulated		80 000	48	1,5	75 000	1	1972
		Montoir-de-Bretagne	Elengy	Onshore	Regulated		360 000	337	10,0	267 000	2	1980
Greece	1	Revithoussa	Desfa	Onshore	Regulated	Auctions	225 000	223	7,0	260 000	1	2000
Italy	3	Toscana (Livorno)	OLT Offshore LNG Toscana	FSRU	Regulated	Auctions	137 500	165	3,6	180 000	1	2013
		Porto Levante (Rovigo)	Adriatic LNG	Offshore	Hybrid (71% exemp., 29% reg.)		250 000	229	9,0	152 000	1	2009
		Panigaglia	Snam	Onshore	Regulated		100 000	120	3,4	70 000	1	1971
Lithuania	1	Klaipėda	Klaipėdos Nafta (KN)	FSRU	Regulated	OS	170 000	122	4,0	160 000	1	2014
Malta	1	Delimara	ElectroGas Malta	FSU	Regulated	Direct	125 000	23	0,7		1	2017
Netherlands	1	Gate (Rotterdam)	Gate Terminal	Onshore	Exempted	OS	540 000	509	12,0	266 000	3	2011
Poland	1	Świnoujście	Gaz System	Onshore	Regulated	OS	320 000	191	6,2	217 351	1	2016
Portugal	1	Sines	REN Atlântico	Onshore	Regulated	Auctions	390 000	321	7,6	216 000	1	2004
Spain	7	Barcelona	Enagás	Onshore	Regulated	Auctions	760 000	544	17,1	266 000	2	1969
		Bilbao	BBG	Onshore	Regulated		450 000	223	7,0	270 000	1	2003
		Cartagena	Enagás	Onshore	Regulated		587 000	377	11,8	266 000	2	1989
		El Musel	Enagás &Reganosa	Onshore	Regulated		300 000	223	7,0	266 000	1	2023
		Huelva	Enagás	Onshore	Regulated		619 500	377	11,8	175 000	1	1988
		Mugardos	Reganosa	Onshore	Regulated		300 000	115	3,6	266 000	1	2007
		Sagunto	Enagás	Onshore	Regulated		600 000	279	8,8	267 000	1	2006
Sweden	2	Lysekil	Gasum LNG Oy	Onshore	Off - grid	n.a.	30 000	-	-	n.a.	1	2014
		Nysahamn LNG	Gasum LNG Oy	Onshore	Off - grid		20 000	-	-	n.a.	1	2011
United Kingdom	3	Dragon	Dragon LNG	Onshore	Exempted	Auctions	320 000	252	7,6	217 500	1	2009
		Grain LNG	National Grid	Onshore	Exempted		1 000 000	645	19,5	266 000	2	2005
		South Hook	South Hook LNG Terminal	Onshore	Exempted		775 000	650	21,0	267 000	2	2009

TOTAL UE27 on 1 January 2022 (24 terminals)**:**	**7 730 000** m^3 LNG	**5 624** GWh/d	**164** bcm/y

Table 2. European LNG terminals on 1 January 2022. Source: Based on information provided by NRAs and GIE publications.



	Existing LNG terminals *(By 1st Jan. 2022)*	Regasif. cap. (GWh/day)	LNG storage (m^3 LNG)
1	Zeebrugge (BE)	541	566 000
2	Krk Island - FSRU (HR)	86	140 000
3	Pori (FI)	-	30 000
4	Dunkerque (FR)	520	600 000
5	Fos Cavau (FR)	274	330 000
6	Fos Tonkin (FR)	48	80 000
7	Montoir-de-Bretagne (FR)	337	360 000
8	Revithoussa (EL)	223	225 000
9	Toscana (Livorno) - FSRU (IT)	165	137 500
10	Porto Levante (Rovigo) (IT)	229	250 000
11	Panigaglia (IT)	120	100 000
12	Klaipėda - FSRU (LT)	122	170 000
13	Delimara - FSU (MT)	23	125 000
14	Gate (Rotterdam) (NL)	509	540 000
15	Świnoujście (PL)	191	320 000
16	Sines (PT)	321	390 000
17	Barcelona (ES)	544	760 000
18	Bilbao (ES)	223	450 000
19	Cartagena (ES)	377	587 000
20	El Musel *(Mothballed until 2023)* (ES)	223	300 000
21	Huelva (ES)	377	619 500
22	Mugardos (ES)	115	300 000
23	Sagunto (ES)	279	600 000
24	Lysekil (SE)	-	30 000
25	Nysahamn LNG (SE)	-	20 000
26	Dragon (UK)	252	320 000
27	Grain LNG (UK)	645	1 000 000
28	South Hook (UK)	650	775 000

Figure 4. Map of existing LNG terminals on 1January 2022. Source: based on information provided by NRAs and GIE publications.

3.2 New LNG projects operational as of 1 January 2022

3.2.1 Description

Table 2 shows a list of new and foreseen importing LNG projects in the EU, detailing their main technical data. It includes the expansion of existing LNG terminals capacity as well as the commissioning of new LNG terminals, both onshore plants and FSRUs.

The information refers to new commissioned projects or those expected as of 1 January 2022, distinguishing between different phases: already in operation, in construction or in planning/designing phase.

In terms of deployment of new LNG capacity over the coming years and according to the following figure, their commissioning will be done in a novel way. As it can be seen, there is an unprecedent concentration of new projects to add new LNG storage and regasification capacity to Europe over the next five years. The majority of these projects are either new FSRUs (16 projects) or expansions of existing LNG terminals (11 projects). There are also four onshore conventional plants, one having already been commissioned in 2023[6], another one foreseen for 2026 and two others that have no specific starting date.

Concerning the expansion projects of existing terminals, an increase of regasification capacity is expected, which on average amounts to 77 GWh/d. The increased capacity is expected between the interval of 10 and 160 GWh/d.

In relation to the new FSRU projects, the size of these projects are homogeneous as they are based on the same technology, and the technical features are heavily conditioned by the space of the vessels where the storage and regasification units are located. For the sake of simplicity, a representative project could be a terminal of 150,000 m3 of LNG and 150 GWh/d of storage and regasification capacity, respectively. The most significant deviation from these values would be mainly due to the addition of complementary floating and storage units (FSUs) and/or onshore regasification facilities.

As far as new onshore LNG terminals, the capacity provided would in theory be greater, however there is not much information about the technical characteristics of these projects as most of them are still at a conceptual or design phase.

This sudden increase in new projects is the direct consequence of the need to react to the extraordinary circumstances of the energy sector, mainly derived from the invasion of Ukraine by Russia, which compromised the natural gas security of supply and the economy of the EU. Nevertheless, given the urgency to substitute a significant part of conventional natural gas supplies coming from Russia via pipelines with alternative gas sources, it seemed unrealistic to do so by means of conventional solutions. Building new interconnection pipelines, additional underground storages, or new conventional onshore LNG terminals would have been difficult due to lengthy development timelines.

[6] El Musel LNG plant (Spain), which was already built but mothballed during some years.

Therefore, apart from exploring the possibility of maximising the entries of natural gas coming through pipeline from different origins (e.g. Norway, Algeria), European countries have opted for other solutions: increasing the capacity of some of the existing LNG terminals; use of already built but mothballed LNG terminals; and connecting new FSRUs to their gas networks. The first two solutions only apply to countries who already have this kind of LNG terminal. This may not be the case for all of them, however FSRUs are a more accessible option for any coastal country[7].

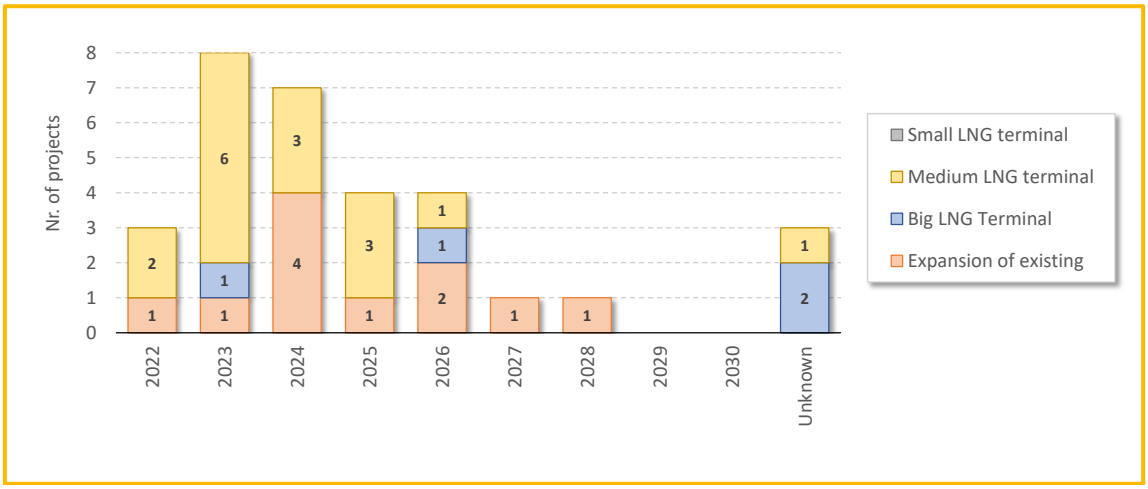
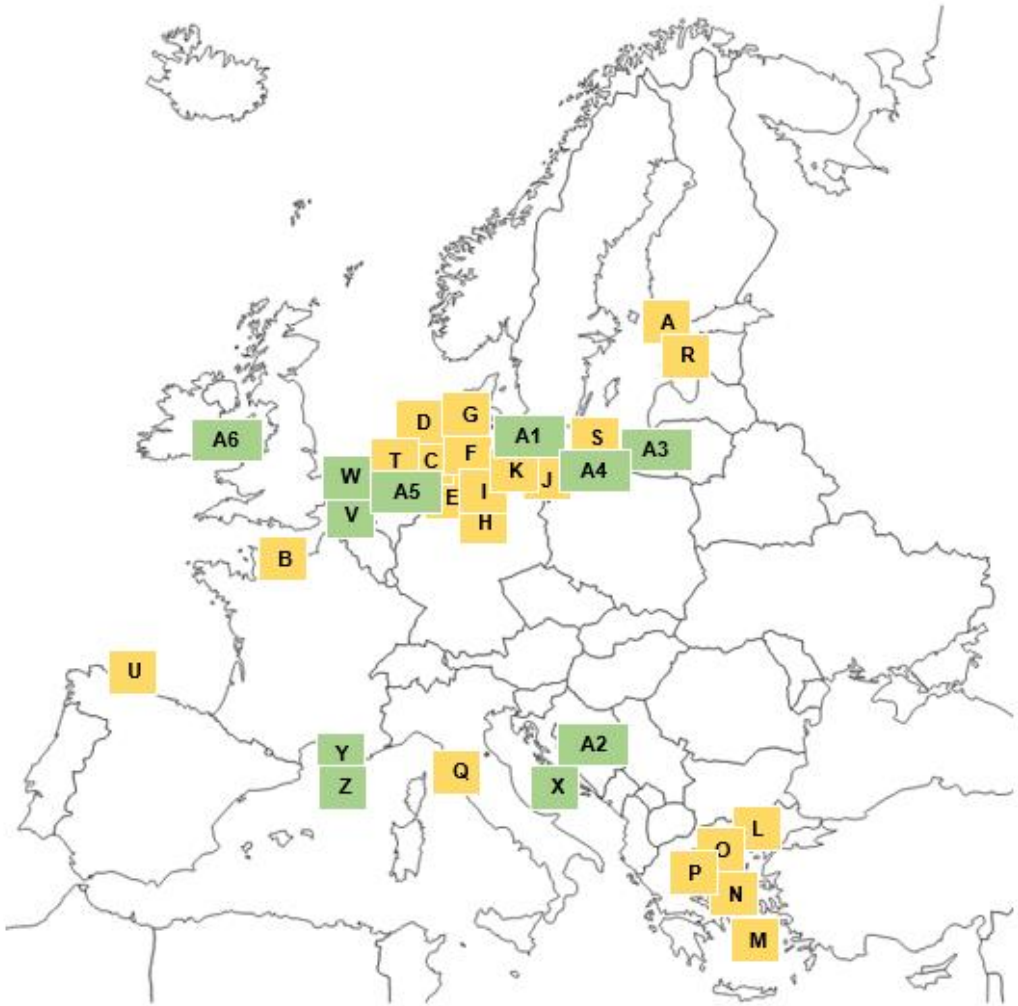


Figure 5. Number of new commissioned LNG projects, according to size and foreseen dates.

Source: Based on information provided by NRAs and GIE publications.

[7] In fact, some countries are considering the option to "share" an FSRU, instead of opting to have their own terminal, as a more efficient solution in economic terms.



	New LNG terminals	Additional regasification (GWh/day)	Additional LNG storage (m^3 LNG)	Start - up
A	Inkoo - FSRU (FI)	140	148 806	Jan. 2023
B	Cape Ann - FSRU (FR)	150	142 750	Oct. 2023
C	Wilhelmshaven -FSRU (DE)	116	170 000	Dec. 2022
D	Wilhelmshaven -FSRU (DE)	n.a.	138 000	Q1. 2024
E	Wilhelmshaven (DE)	n.a.	n.a.	n.a.
F	Brunsbüttel - FSRU (DE)	50	170 000	Mar. 2023
G	Brunsbüttel (DE)	n.a.	n.a.	n.a.
H	Stade - FSRU (DE)	n.a.	174 000	Q1. 2024
I	Stade (DE)	n.a.	n.a.	2027
J	Deutsche Ostsee (Lubmin) - FSRU (DE)	156	176 230	Jan. 2023
K	D. Ostsee (Lubmin/Mukran) - FSRU (DE)	242	174 000	Dec. 2023
L	Alexandroupolis - FSRU (EL)	175	153 500	Jan. 2023
M	Dioriga - FSRU (EL)	132	135 000	Mar. 2025
N	Volos - FSRU (EL)	165	150 000	Dec. 2025
O	Thrace - FSRU (EL)	190	170 000	Dec. 2025
P	Thessaloniki - FSRU (EL)	153	250 000	Dec. 2026
Q	Piombino - FSRU (IT)	137	167 818	Jul. 2023
R	Paldiski - FSRU (EE)	n.a.	n.a.	n.a.
S	Gdańsk - FSRU (PL)	195	170 000	2028
T	EemsEnergyTerminal - FSRU (NL)	346	180 000	Sep. 2022
U	Musel (ES)	223	300 000	Jul 2023

	Expansion of existing LNG terminals *(From 1st January 2022)*	Additional regasification (GWh/day)	Additional LNG storage (m^3 LNG)	Start - up
V	Zeebrugge (BE)	128	-	2024
W	Zeebrugge (BE)	55	-	2026
X	Krk Island - FSRU (HR)	100	-	Oct. 2025
Y	Fos Cavaou (FR)	36	-	2023
Z	Fos Cavaou (FR)	10	-	2024
A1	Deutsche Ostsee (Murkan) – FSRU (DE)	34		Oct. 2024
A2	Porto Levante (Rovigo) - Offshore (IT)	60	-	2022
A3	Klaipėda - FSRU (LT)	40	-	2027
A4	Świnoujście (PL)	63	180 000	2024
A5	Gate (NL)	127	180 000	Oct. 2026
A6	Grain LNG (UK)	159	174 000	Jul. 2025

Figure 6. Map of new LNG projects. Source: based on information provided by NRAs and GIE publications.

Country	Nr	Project	Expansion /New	Promoter	Type	TPA Regime	Additional LNG storage (m^3 LNG)	Additional regasification (GWh/day)	Start-up	CAM	Duration
Belgium	2	Zeebrugge	Expansion	Fluxys LNG	Onshore	Regulated	-	128	2024	Open Season and FCFS	-
		Zeebrugge	Expansion	Fluxys LNG	Onshore	Regulated	-	55	2026	Open Season and FCFS	-
Croatia	1	Krk Island	Expansion	LNG Croatia	FSRU	Regulated	-	100	Oct. 2025	FCFS	17,6 years
Finland	1	Inkoo	New	Floating LNG Terminal Finland Oy	FSRU	Regulated	148 806	140	Jan. 2023	Pro rata	n.a.
France	3	Fos Cavaou	Expansion	Fosmax LNG	Onshore	Regulated	-	36	Oct. 2023	Open Season and FCFS	-
		Fos Cavaou	Expansion	Fosmax LNG	Onshore	Regulated	-	10	2024	Open Season and FCFS	-
		Cape Ann	New	TotalEnergies LNG Services France (TELSF)	FSRU	Exempted (50%)	142 750	150	Oct. 2023	Open Season (for non-exempted)	5
Germany	10	Wilhelmshaven	New	Deutsche Energy Terminal (DET)	FSRU	Restricted TPA until 03/2024	170 000	116	Dec. 2022	- Maximum 90% on long-term (FCFS) - Minimum 10% year ahead or non-yearly (Auctions)	10
		Wilhelmshaven	New	Tree Energy Solution (TES)	FSRU	Regulated	138 000	n.a.	Q1. 2024		Until onshore terminal is in operation
		Wilhelmshaven	New	Deutsche Grüngas Energieversorgung GmbH (DGGEV)	Onshore	Proceedings for possible exemption underway	n.a.	n.a.	n.a.		-
		Brunsbüttel	New	Deutsche Energy Terminal (DET)	FSRU	Restricted TPA until 03/2024	170 000	50	Mar. 2023		Until onshore terminal is in operation
		Brunsbüttel	New	German LNG Terminal GmbH	Onshore	Exempted	n.a.	n.a.	n.a.		15
		Stade	New	Hanseatic Energy Hub GmbH	FSRU	Regulated	174 000	n.a.	Q4 2023 / Q1. 2024		Until onshore terminal is in operation

Country	Nr	Project	Expansion /New	Promoter	Type	TPA Regime	Additional LNG storage (m^3 LNG)	Additional regasification (GWh/day)	Start-up	CAM	Duration
		Stade	New	Hanseatic Energy Hub GmbH	Onshore	Exempted	n.a.	n.a.	2027		25
		Deutsche Ostsee (Lubmin)	New	Deutsche ReGas	FSRU	Exempted	176 230	156	Jan. 2023		
		Deutsche Ostsee (Lubmin/Mukran)	Expansion	Deutsche ReGas	FSRU	Exempted	174 000	242	Dec. 2023		20
		Deutsche Ostsee (Mukran)	Expansion	Deutsche ReGas	FSRU	Exempted		34	Oct. 2024		
Greece	5	Alexandroupolis	New	Gastrade	FSRU	Exempted	153 500	175	Jan. 2023	Market mechanisms (for unreserved as long-term capacity)	25
		Dioriga	New	Dioriga Gas	FSRU	Exempted	135 000	132	Mar. 2025	n.a.	50
		Volos	New	Mediterranean Gas	FSRU	Exempted	150 000	165	Dec. 2025	n.a.	50
		Thrace	New	Gastrade	FSRU	Exempted	170 000	190	Dec. 2025	n.a.	50
		Thessaloniki	New	Elpedison	FSRU	Exempted	250 000	153	Dec. 2026	n.a.	50
Italy (*)	2	Porto Levante (Rovigo)	Expansion	Adriatic LNG	Offshore	Hybrid (71% exemp. 29% reg.)	-	60	2022	Auctions	-
		Piombino	New	FSRU Italia	FSRU	Regulated	167 818	137	Jul. 2023	Auctions	20
Lithuania	1	Klaipėda	Expansion	Klaipėdos Nafta (KN)	FSRU	Regulated	-	40	2027	Open Season	17
Estonia	1	Paldiski	New	Elering AS	FSRU	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Poland	2	Świnoujście	Expansion	Gaz System	Onshore	Regulated	180 000	63	2024	Open Season	-
		Gdańsk	New	Gaz System	FSRU	Regulated	170 000	195	2028	Open Season	15
Netherlands	2	Gate	Expansion	Gate Terminal	Onshore	Exempted	180 000	127	Oct. 2026	n.a.	-
		EemsEnergyTerminal	New	EemsEnergy Terminal	FSRU	Exempted	180 000	346	Sep. 2022	n.a.	5
Spain	1	Musel	New	Enagás	Onshore	Regulated	300 000	223	Jul 2023	Open Season	-
United Kingdom	1	Grain LNG	Expansion	National Grid	Onshore	Exempted	174 000	159	Jul. 2025	Auction	-

Table 3. New LNG projects since 1 January 2022. Source: Based on information provided by NRAs and GIE publications.
(*) An additional FSRU project could be considered at the coast of Ravenna, which would have the same features as the Piombino project.

3.2.2 Access conditions

From the access point of view, it draws the attention the change of trend of the access conditions to the new capacities in relation to those applied in the existing LNG terminals. As it can be seen in the next figure, more than half of the new regasification capacities, 55% have been granted an exemption and only 45% of them are offered under regulated Third Party Access regimes, while in the case of the existing LNG terminals 79% of the capacities have regulated TPA.

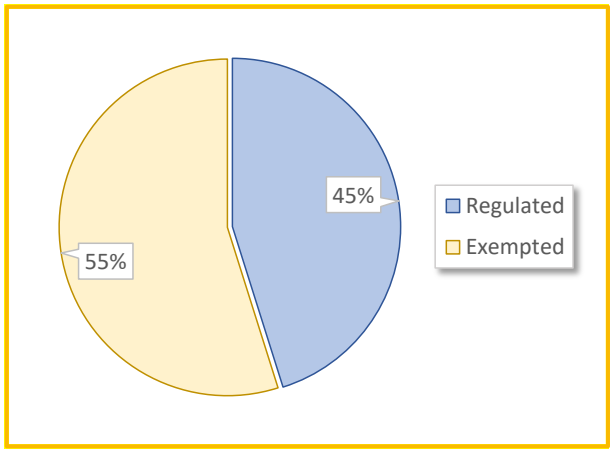


Figure 7. Percentage of new regasification capacity with regulated or exempted access regimes. Source: CEER

Concerning the capacity allocation mechanisms, as it occurs in the existing LNG terminals a wide range of approaches are considered: capacity allocations by means of auctions, open seasons, subscription windows, first come first serve, pro-rata, direct allocation to the promoters of the projects in the case of some exempted capacities or a combination of several of these.

Market based mechanisms are the most common way to allocate capacity, either through open seasons, with non-binding and subsequent binding phases, open subscription windows or auctions (Belgian, French, Greek, Dutch, Polish and Spanish terminals, and German terminals for short term capacity). In Belgium and France priority is given to bids requesting the higher volumes of capacity over the longer timespan, which means to those who maximize the net present value of the bookings for the terminal operator. In most cases regulated tariffs set by NRA's are considered as the reserve price in the allocation procedures and shippers will have to pay the tariff in force when the service is provided, apart from the premium (as the case may be), meaning that these bear the risk of tariff changes. In Italy and Spain, capacity is offered through regular auction processes (yearly, monthly, and intra-monthly) and it is granted to the most competitive bids.

Capacity is directly booked by the promoters of the projects only in a few cases. This is the case for half of the capacity of Le Havre terminal, while the remaining 50% will be offered to other different third parties by means of an open season process, in a comparable way to how it is done for regulated terminals.

With respect to the FCFS mechanism, it is also used as the primary allocation procedure in some terminals (Krk Island, German terminals), while in other cases, when applied, it is used to assign the remaining capacities after other primary allocations, such as auction windows, until the next process takes place (Zeebrugge, French and Spanish terminals). In fact, from mid-2022, France has moved from a FCFS mechanism for short-term/spot available capacities to an auction mechanism, with the intention to prevent capacity hoarding for speculative purposes and to allocate capacity at market value (using the regulated tariff as a reserve price). In Germany, if the initial demand for long term capacity (more than one year) exceeds the offer, capacity is allocated on a pro-rata basis.

Some terminals give priority to the allocation of long-term capacities, and short-term products are only offered in case there is remaining free capacity (Krk Island, Zeebrugge, Inkoo). Conversely, for many other LNG plants there is a reservation of capacity to be offered in the short term (German and Spanish terminals) in a comparable way as it is done at the pipeline interconnections. In both cases, the amount of capacity reserved for the short term reaches 10%, with come particularities: for the Spanish terminals, the capacity set aside for the short term is released every month and it is offered to the market for month M+2, while for German terminals the short term capacity refers to less than one year capacities, and initially it can only be booked by those users who have not been allocated with long term capacity.

Regarding Congestion Management Procedures (CMPs), there is also a diversity of mechanisms in place in the EU LNG terminals, as it happens with CAM, which affects also to the new capacities.

Apart from being entitled to sell the capacity on the secondary market, the most used mechanism is the use it or lose it principle, although it is applied in different ways in the different terminals.

At the Spanish LNG terminals, different CMPs apply to the distinct services, except for the surrender mechanism, which applies to all of them. The regasification service is affected by the long-term Use-It-or-Lose-It (UIOLI) mechanism, while the oversubscription and buyback procedure apply to the LNG storage. As far as loading and unloading slots are concerned, there is another mechanism in place, which penalizes users who book capacity but do not use it and do not release it or make it available to other users (either through the secondary market or the surrender mechanism) well in advance. Penalties are related to the notice period: the later the communication, the greater the penalty.

The reservation of part of the capacity to be offered in the short-term could also be considered as some sort of congestion management procedure, as the main purpose is to make sure that there is always *last-minute* capacity available for the market, especially if this is combined with some mechanism to prioritize the allocation of part of this capacity to users who haven't booked capacity yet in previous processes.

In many other terminals (France) capacity holders have the obligation to release the slots that they do not intend to use. They must inform sufficiently in advance their intention to do so, and the LSO is the one offering the capacity to the market again, normally through market-based mechanisms. In many cases it is the capacity holder who bears the risk of recovering the original price paid for the capacity.

When congestions are related to logistical issues, such as the coincidence or superposition of slot dates, many terminals offer the opportunity to the affected agents to solve it between them, trying to reach an agreement on a suitable solution technically feasible and not affecting previous third parties' capacity rights (Croatian, Finland, and Spanish terminals).

3.2.3 Services provided

As it has already pointed out by CEER in previous occasions[8], there are many factors that influence the way how LNG services develop and organise in the different LNG terminals, such as the evolution of the gas sector development in each country, level of interconnection with other markets, national political decisions, different choices concerning access regimes, market structure, etc. In fact, some terminals were built to allow some countries, far away from natural gas sources, to access this energy, others have been installed, even in very mature gas markets, with the intention to diversify supply origins, or for economic or logistic reasons, and some of them have been built specifically to supply a local or particular demand (i.e. an off-grid industrial zone). At present, among all these factors, the new LNG projects are fundamentally related to security of supply targets.

In any case, concerning the type of services by means of which the new capacities are offered to the market, CEER does not perceive significant changes related to the existing situation. That means, services are similar, and capacities are offered through both, bundled and unbundled services. In particular, the most extended practice for all the terminals, either regulated or exempted, is to offer the bundled ship unloading + LNG storage + regasification (send out) service. This includes the three activities that constitute the essence of an LNG terminal, which is to allow LNG ships to berth and unload, to convert the LNG into natural gas and to inject this gas into the pipeline network, eventually accommodating the send-out rate to the consumption using a temporary LNG storage (buffer) at the terminal.

Besides this typical bundled service (unloading + storage + regasification) and some others, most of the terminals offer also unbundled services, either to add more flexibility to the main bundled service or as additional and independent services. In general terms, it can be said that there are two kinds of unbundled services: those more standardized, which are offered in many plants, like regasification, storage, unloading, and those more atypical services, exclusively offered in particular terminals. In the first case, even if there is not any doubt about the nature of the services (from the physical point of view – i.e. additional storage capacity refers to the possibility to store a higher quantity of LNG inside terminal' tanks) the conditions can significantly differ from one terminal or country to another. As an example, additional send-out or storage capacity in some terminals can be reserved on a daily basis, while in others they can only be reserved on annual basis.

In consequence, even though some services are similar, users willing to operate at European LNG terminals must enter into the particular regulation, conditions, and details of each case, as they may differ significantly.

3.2.4 FSRUs insight

FSRUs facilities can either be newbuilt or proceed from the conversion of existing LNG vessels (frequently at the end of their operational life). In both cases, they take less time to be built

[8] See the "Related documents" section of this report.

than new onshore LNG terminals and they are less capital-intensive, especially in the latter case[9]. Moreover, they have less constraints and challenges to face in terms of land needs and environmental requirements.

Additionally, FSRUs are versatile and flexible assets, as they can be used either as regular carriers (except for a few non-propelled units), or as LNG storage and regasification terminals, according to the market needs and demand for one or another type of service. In fact, both uses potentially compete between them, and depending on the LNG charter transportation rates and the FSRUs lease prices, the motivation to use it as one or another infrastructure can change over time. They can also be moved whenever and wherever needed, and the process to get them connected to the gas networks takes months, instead of years, as it happens in the case of the construction of new onshore LNG terminals.

FSRUs also have many disadvantages with respect to onshore plants, such as higher operating costs and generally lower storage and regasification capacities, as these are constrained by the size of the vessel. Nevertheless, in the abovementioned supply context, the advantages - mainly the faster and easier commissioning of the projects with respect to onshore terminals - have prevailed over the disadvantages and Member States have made use of this solution to deal with the situation in an effective manner.

According to the International Gas Union (IGU) data, by April 2023 there were 45 FSRUs and 8 FSUs active at world level (10 of which operating in Europe). This represents 8% of the active LNG vessels at world level (668 units). Moreover, at present there are four LNG carriers which are in the process of being converted into FSRUs and an additional newbuilt FSRU vessel is under construction, to be delivered in 2026.

In most cases FSRUs are the property of shipowner companies and almost half of them are in the hands of four of these: Excelerate Energy, Hoegh, New fortress Energy and BW. So, one of the most common ways to access these facilities is through lease agreements with the owners for a specific period of time and, sometimes, option to purchase conditions are also negotiated. In other cases, users opt to directly acquire the terminal, which may be a less costly option if the intention is to use the FSRU for a long time.

4 Impact of the new LNG on the EU energy market

In light of the previous considerations, new LNG capacities are having and will likely have in the future an impact on the EU energy market. In the following sections an analysis is offered about the impact of the increased LNG capacity on security of supply and competition. Before discussing these topics in detail, it is useful to briefly recall the economics of LNG trading.

LNG would likely bring more flexibility to the gas markets, as LNG is not specifically linked to a route, as it happens with gas traded via pipeline. There is not a “hold up problem” for LNG terminals, which has both a positive and a negative side; in the case of FSRUs there is neither asset specificity, as they can be easily repurposed into vessel ships or moved to a different location.

However, such flexibility has two sides: the positive side is that, if there is excess supply, there is less risk of stranded costs, but LNG prices will reflect marginal global prices, so in case of

[9] Nevertheless, it must be noted that, according to world macroeconomic context and last year’s inflation rates, the costs associated to the commissioning of one of these infrastructures has significantly increased.

supply shortages, importers might have to pay a large premium to the price in order to attract LNG. As it happened in the past, LNG routes, for which destination clauses are much less common than years ago, often follow the highest willingness to pay. This implies that, in terms of security of supply, LNG terminals are a useful asset. Nevertheless, it is not clear yet if there might be completely able to fully substitute formerly piped Russian gas and even in that case if there is a premium in the price paid by consumers.

4.1 Impact on the security of supply

The first and most remarkable effect is related to the security of supply. As it has already been pointed out, the new capacities have been and still are being rapidly commissioned to cope with a major threat to the EU energy market, derived from the shortfall of natural gas supplies coming from Russia. Shifting from pipeline supplies to supplies coming in the form of LNG will help Europe to diversify its supply sources, by reducing its dependence on the former main supplier, while widening the range of potential suppliers and market opportunities.

According to the information available, by the end of 2023 there will be 55 bcm/y of additional regasification capacity, along with 1,63 Mcm of additional LNG storage capacity. As it can be observed in the next figure, in the following years, the new planned infrastructures will potentially increase the EU regasification capacity by 22 bcm/y (within 2024), 18 bcm/y (within 2025) and 11 bcm/y (within 2026). These figures will lead to an additional import capacity in the form of LNG of 106 bcm/y and an additional LNG storage capacity of 3,16 Mcm by 2027 [10].

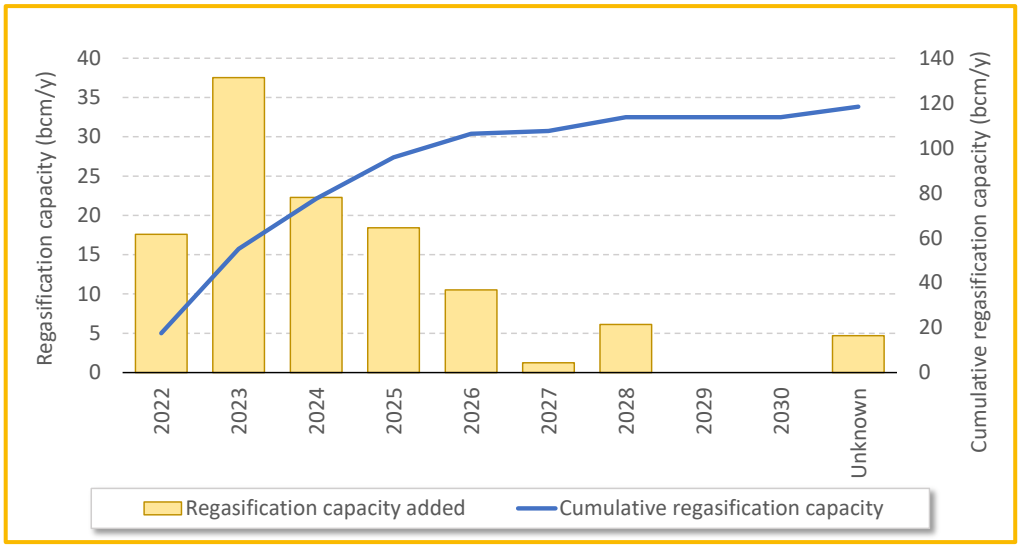


Figure 8. Additional regasification[11] capacity evolution in the EU. Source: CEER.

[10] These figures should be considered approximate, as there are still some uncertainties about the characteristics of the new projects. Furthermore, totals don't include the capacities of three of the new planned onshore LNG terminals, because there isn't much information about the technical characteristics and the timeframe of the projects, as most of them are on a conceptual or design phase. In any case, it has also to be considered that some of the onshore projects would be conceived to replace some of the FSRUs.

[11] For new FSRU projects with no information about the regasification capacity available, a 150 GWh/d value has been assumed, given the similarities among such projects. Nevertheless, as it is not the case for the new onshore projects, no assumption has been made and their regasification capacity has not been added in this figure (conservative approach).

In relation to the existing LNG terminals (at the beginning of 2022), these values mean an increase of 65% of the existing regasification capacity and a 41% increase of the LNG storage capacity.

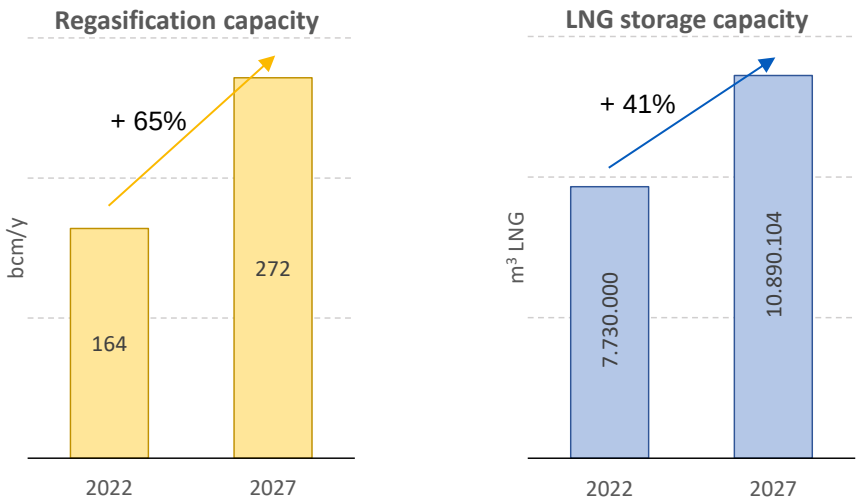


Figure 9. Regasification and LNG storage capacity addition by 2027. Source: CEER.

This increase in LNG capacity is in line with the EC REPowerEU Plan target related to phasing out EU dependence on fossil fuels from Russia well before 2030. It establishes as one of the two pillars addressed to this target the diversification of gas supplies, in particular via higher LNG imports. As it is stated in this plan[12], apart from the short-term preparedness measures related to LNG infrastructures, namely increasing the use of existing terminals, the new LNG projects will contribute to the mid-term (until 2027) targets. In fact, considering that the Russian natural gas imports in 2021 increased to 155 bcm and represented a share of 45%, the new LNG infrastructures foreseen for the coming years, could replace up to 2/3 of them by themselves (assuming a 100% use of the terminals).

Moreover, it has to be taken into account that the plan doesn't rely only on LNG but on other measures and options to reduce the dependence on Russian gas, such as those related to the progressive electrification of some final uses (e.g. heating, by means of heat pumps, replacing natural gas boilers), energy efficiency measures leading to natural gas savings or increasing the production and use of domestic sustainable biomethane or renewable hydrogen to directly substitute natural gas consumption. In fact, the plan quantifies in 60 bcm the impact of the measures related with the diversification of natural gas supplies, which according to the previous analysis, could be covered by the increase of the existing LNG infrastructures utilization and the commissioning of the new projects.

In any case it must be kept in mind that, in the long term, the underlying target of the Green Deal is reaching the carbon neutrality by 2050, which entails a progressive reduction of the fossil fuels consumption. In this sense, the most cost-efficient way to satisfy the need for new natural gas infrastructures, would be the increase of the capacity at existing terminals,

[12] Commission staff working document on implementing the REPowerEU action plan: investment needs, hydrogen accelerator and achieving the bio-methane targets. Accompanying the document REPowerEU Plan. COM (2022) 230 final.

optimizing the use of the complementary and partially depreciated assets (for example the LNG tanks), and the use of FSRUs, which after being used during the necessary period of time, can be easily released to the market and used again in another location, or even as a LNG carrier itself. This would avoid the stranded assets problem that would emerge as demand gradually reduces, in particular when lease agreements have been reached.

From the European Union perspective, it has also to be noted that LNG infrastructures contribute not only to the security of supply of the host countries, but also to the neighbouring countries and, therefore, to the European reliability. As it is actually the case for some of the projects, e.g. Estonia and Latvia have been working towards establishing a shared LNG crisis supply mechanism or Finland-Estonian Memorandum of understanding to implement a regional FSRU, new LNG infrastructures should be designed keeping in mind this idea, because it will lead to much more efficient technical solutions, avoid over investments and make viable some of the projects that, if conceived unilaterally by one particular Member State, they might not make any sense.

4.2 Impact on competition

Increasing LNG capacity is generally considered to have a positive effect on competition by increasing supply possibilities for MS and Europe. However, concerns may arise regarding the large share of new capacities that are under exemption regimes, diverse CAMs applied in different terminals and transparency issues.

According to the analysis, more than half of the new capacities (55%) are either exempted from third-party access regime or will be, which means that something conceived to be an exemption is, in fact, *"becoming the rule"*. Furthermore, while all these exemptions must comply with the general principles established in Article 36 of the Gas Directive, specific conditions are granted on a case-by-case basis, which are heterogeneous and diverse across Europe. In CEER's view, once the exemption is granted it is also crucial to make sure that the conditions under which this was approved are correctly followed. It is particularly important that the application of congestion management mechanisms is followed diligently in order to ensure that terminals are used in line with European market needs as much as possible.

It must be noted that the framework in which many of the exemptions have been granted has undoubtedly been influenced by security of supply issues previously mentioned in this report. In other words, for many countries, exemptions were the fastest and most efficient way to commission the new infrastructure needed to substitute the Russian-piped natural gas shortfall in record times, thereby minimising the potential impact on their economies.

Concerning CAMs, the analysis shows that new LNG capacities are being offered through a wide range of mechanisms: auctions, open seasons, subscription windows, FCFS, pro-rata, direct allocation to the promoters of the projects in the case of some exempted capacities or a combination of these mechanisms.

In order to estimate the effect of different access regimes on competition in EU markets for new LNG terminal capacities, it is important to assess the relevant market from various perspectives as the conclusions might differ. Specifically, if the relevant market is considered to be the entire European gas market, it is likely that different regimes, especially if they are market-based, would not have a significant impact on competition. Additionally, exemption regimes and the provision of long-term capacity allocations in new terminals could have a

positive effect on security of supply, which is the primary objective of increasing LNG capacity, as it has been stated in the previous chapter.

On the other hand, if the relevant market is considered to be comprised of new LNG capacity, a large share of capacity being under exemption could restrict competitors' ability to import LNG if their access to capacity is extremely limited. Additionally, how users will benefit from exemptions is another relevant factor to consider. In case they are the same companies that used to import piped gas from Russia, this could result in a simple substitution effect, with no significant change in terms of current competition but a potential restriction of future competition opportunities.

Whatever the case, CEER believes that market-based mechanisms should be the preferable option to allocate capacity, as they are considered the most effective way to assign scarce resources, especially in situations where the demand for capacity exceeds the offer, as could be the case for many new projects. Nevertheless, if this is not the case and some projects are not expected to be congested, other allocation mechanisms, such as FCFS could also be appropriate, specifically in the short term.

Market-based mechanisms such as auctions or open season processes are already being applied in many terminals and often lead to extra income because of the premia above reference tariffs in the case of excess demand for capacity. CEER believes that this additional income should not result in extra revenue for infrastructure owner but should be passed on to consumers.

In addition to the different services provided at existing and new terminals and the aforementioned heterogeneous conditions granted to projects exempted from third-party access, this diversity of allocation mechanisms, could, on one hand, cause some difficulties for users to fully understand the regulatory rules and access conditions applicable in each case. This is particularly relevant for new terminals, which could potentially hinder the development of competition. A possible solution is to apply some standardisation and homogenisation criteria for the definition of capacity products at LNG terminals and for the establishment of allocation mechanisms. This approach has been successfully applied in natural gas transmission interconnections.

However, LNG terminals are different from transmission pipelines, and they are managed and used in various ways depending on the supply context and specific national or regional conditions. While in some cases LNG terminals are responsible for providing most of the demand supplying both base and peak demands, in other cases, pipelines play a primary role. In such instances, LNG plants are mainly considered as complementary infrastructure, supplying a less significant portion of consumption to cover peak-demand situations, increase security of supply and diversification opportunities, and foster competition.

Additionally, unlike transmission pipelines, where gas flow is the only service provided, LNG terminals provide a broad range of services that are interdependent. For example, berthing/unloading, send-out/regasification and LNG storage capacities are intrinsically interlinked and contingent on each other. Regasification depends on the existence of stored LNG, while sufficient free space in the tanks is also necessary for unloading the next cargo. Therefore, the total LNG storage capacity remarkably influences the ability to offer different kind of services. While some LNG plants primarily provide bundled unload-storage-regasification products with limited flexibility in daily regasification rates for each cargo, others,

for example those with higher storage/regasification ratios, can more readily offer unbundled products, allowing users to customise the services they require.

The abovementioned roles could have shifted or could currently be evolving in countries where LNG did not previously play a significant role but where terminals are now becoming crucial infrastructure.

CEER considers that the standardisation of LNG services and products at EU level would be neither advisable nor currently feasible. MS should have enough flexibility and freedom to choose the most appropriate regulation access rules based on their specific circumstances. Additionally, they should have the possibility to adapt to a changing environment.

Therefore, bearing in mind the importance of simultaneously combining both factors, regulatory flexibility and clarity/stability/simplicity for the users, regulators must always guarantee that the rules applicable to new LNG capacities, whether regulated or exempted, are set in a transparent manner and are based on principles of non-discrimination and objectivity. The objective is to maintain the best suitable framework to ensure a competitive environment at European level. These pillars traditionally serve as the foundations for the allocation of capacity at natural gas interconnections and must now also be considered essential for new LNG infrastructure. The healthy competition that currently exists in Europe will be strongly conditioned by the way these strategic new entry capacities are allocated.

However, the tight deadlines managed throughout the commissioning of the new infrastructure could have raised some transparency issues, as some of the relevant information may not have been made available to the market sufficiently in advance of the capacity allocation processes. Nevertheless, once the uncertainty and more convoluted periods are over, it is important that transparency principles are fully respected by both regulated and exempted terminals, as this is vital for guaranteeing a proper competitive climate. Moreover, CEER very much welcomes the Council Regulation (EU) 2022/2576, in relation to the enhanced transparency requirements, as a previous step to the new provisions foreseen for this purpose in the decarbonisation package.

Transparent (in a proper and timely manner), objective and non-discriminatory (user-friendly) access rules to the new LNG infrastructure must also be accompanied by complementary measures that help to improve the competitive behaviour of users, in addition to contributing to security of supply. These measures include the entitlement and the ease to trade capacity at secondary markets, reserving capacity for short-term products, and establishing congestion management rules and anti-hoarding mechanisms.

CEER considers it important that users are entitled with the right to trade the capacity in the secondary market. Two main options would be possible for this purpose: bilateral trading or trading through organised markets. The second option has been less used and developed than the first one in the case of capacity services, unlike commodity products such as natural gas or LNG. This may be due to the complexities in implementing such a market for the services offered at the LNG terminals, which is far from being a standard product. These services have many attributes including quantity, duration, starting and end dates, and potential flexibilities. Nevertheless, establishing capacity markets alongside bilateral options or even simple bulletin boards would be advisable, as they are considered to be useful tools that facilitate and enhance trade opportunities for users and ultimately benefit final consumers. In conclusion, CEER welcomes the provisions foreseen for this purpose in the decarbonisation package.

In any case, it is important to bear in mind that secondary capacity trades should be considered as a flexibility tool for users, who could use them to optimise their booked capacity portfolio when necessary. For example, they can reduce their costs by releasing part of the unused capacity in case of changing supply or demand conditions. Nonetheless, the trade of capacity in the secondary market should be used neither for speculative purposes nor to obtain additional profits, as it may lead to higher supply costs to the detriment of final consumers. Therefore, the efficiency of CMPs is of paramount importance.

Long-term capacity allocations on new terminals will likely have a positive effect on security of supply, which is the main objective of increasing LNG capacity. Nevertheless, due to the current dynamic nature of the global LNG market, it is advisable that in any regulatory access regime, a significant part of the capacity is reserved for different timeframes, specifically for the short term. This ensures that these facilities can serve as balancing tools for the European market, influencing price levels. From CEER's perspective, establishing the right balance between the need for both long-term and short-term products, by means of allocating part of these capacities through short-term products in competitive processes) would be advisable. This could have a positive impact from a competition point of view as it reduces the risk of hoarding by primary long-term capacity holders, facilitates access to the capacity for new entrants and smaller players, and allows users to adapt to changing market conditions in the short term.

Moreover, congestion management rules for new and existing LNG terminal capacities are crucial, as they discourage users to hoard or to speculate with capacities during periods of scarcity. Regulators should also ensure that these mechanisms are implemented rigorously, regardless of the access regime in place, whether regulated or exempted, and ensuring proper application and active supervision of their implementation. In the case of exempted capacities, according to the preconditions for granting an exemption under Article 36 of the European Gas Directive, NRAs shall require that congestion management rules include the obligation to offer unused capacity on the market and that users of the infrastructure be entitled to trade their contracted capacities on the secondary market.

It is also important to point out that regulators need to have sufficient powers to supervise LSOs and users in their LNG-related activities, especially in the current context where LNG is set to become such an important gas source.

5 Conclusions

In this chapter, the key messages of this study are summarised according to distinct topics.

General considerations

In recent years, there has been a significant expansion of regasification capacity worldwide and this trend is expected to continue given that demand and competition for LNG is growing.

During 2022, net LNG imports in Europe increased by 60% compared to 2021, representing nearly one third of global LNG imports, making Europe the second largest importing region in the world. This significant increase is linked to efforts to reduce the dependency and increase the resilience of Europe's gas system, which are driving the EU to maximise the use of existing LNG infrastructure and, in many cases, to add new LNG import capacity.

In the current energy context, LNG is called to play a more important role in Europe and is qualifying as a critical source of security of supply and competitiveness for the European energy market. Security of supply in Europe is and will be increasingly based on LNG. It is therefore crucial that LNG infrastructure is ready, and that the LNG market remains liquid and transparent so as to facilitate access to the European market.

Europe is becoming a firm LNG consumer and no longer a balancing market for the commodity.

About new LNG capacities

During the last decades, the commissioning of new LNG plants in the EU was done in an incremental and smooth manner, but this tendency has radically changed. Since 2022, there has been an unprecedent deployment of new LNG projects – mostly FSRUs or expansions of existing LNG terminal capacity. This trend is foreseen to continue in the coming years.

In the current context, the benefits of FSRU technology, including faster and easier project commissioning compared to onshore terminals, have outweighed its drawbacks. MS have broadly used this solution to effectively address the urgency at hand.

A wide range of approaches are considered for the allocation of new capacities, including auctions, open seasons, subscription windows, FCFS, pro-rata, direct allocation to promoters for certain exempted capacities or a combination of these approaches. In the case of CMPs, various mechanisms are foreseen, with the UIOLI principle being the most prevalent.

Services are or will be remarkably similar to existing terminals, offering both bundled and unbundled services. The most common practice for all terminals, whether regulated or exempted, is to offer bundled services encompassing unloading, storage, and regasification. However, the specific conditions may vary significantly from one terminal or country to another.

Security of supply

New capacity has been and is continuing to be rapidly commissioned to cope with the significant threat posed to the EU energy market by the shortfall in natural gas supplies coming from Russia. The increase in LNG capacity is in line with the EC's REPowerEU Plan target that aims to phase out the EU's dependency on fossil fuels from Russia before 2030.

The new LNG infrastructure foreseen for the coming years has the potential to replace up to two-thirds of the imported Russian pipeline gas (2021 amount).

Shifting from pipeline natural gas to LNG supplies will help to diversify Europe's energy sources by reducing its dependence on its former primary supplier, while broadening the range of potential suppliers and market opportunities.

In the long term, the European Green Deal's main target of reaching carbon neutrality by 2050 requires a sharp reduction in fossil fuel demand. In this context, the most cost-efficient way to satisfy the temporary need for new natural gas infrastructure during the transition phase could be increasing capacity at existing terminals, optimising the use of partially depreciated assets, such as LNG tanks, and using FSRUs that can be easily released into the market – thereby minimising the issue of stranded assets, particularly when lease agreements have been concluded.

The new LNG capacity will not only contribute to the security of supply of the host EU countries, but also of neighbouring countries, thereby increasing the resilience of the EU gas system as a whole.

Access regimes

55% of the new capacity will be exempted from rTPA regimes. This means that instead of dealing with the issue as an exemption, the new LNG capacity will, in fact, "become the rule." Conditions are granted on a case-by-case basis and are heterogeneous and diverse across Europe. The procedure allows for the ramp up of new infrastructure needed to replace the main natural gas supply shortfall in the shortest possible time.

In any case, regulators must always guarantee that the rules applicable to new LNG capacity, regulated or exempted, are transparent, non-discriminatory, and objective. Regarding exemptions, in CEER's view, it is crucial to ensure that the conditions under which the exemption is granted are correctly monitored, requiring active supervision.

Capacity Allocation Mechanisms (CAMs)

The current healthy competition in the European market will be strongly conditioned by the way this new strategic entry capacity is allocated.

New LNG capacity is being offered through a wide range of mechanisms. In CEER's opinion, market-based mechanisms should be the preferred option in order to assign capacity where demand exceeds supply. If congestion is not expected, other allocation mechanisms, such as FCFS could also be appropriate.

In many cases, market-based mechanisms are already leading to extra income due to auction premia. CEER believes that this extra income should not result in extra revenue for the infrastructure but should be passed on to consumers.

Long term capacity allocation will likely have a positive effect on security of supply, which is the main objective of such an increase in LNG capacity. Nevertheless, due to the changing circumstances that normally surround the global LNG market, it is advisable that in any regulatory access regime, a significant part of the capacity is reserved for different timeframes, specifically for the short-term.

Services provided

LNG terminals are vastly different from transmission pipelines, and they are managed and used in distinct ways, depending on the particular rules of each country. In consequence, services significantly differ from one terminal to another.

CEER considers that standardisation of LNG services and products at EU level would be neither advisable nor feasible. MS should have enough flexibility and freedom to choose the most appropriate services, access, and allocation rules, based on non-discrimination, transparency, and objectivity principles.

Congestion Management Procedures (CMPs) and secondary markets

Transparent (in a proper and timely manner), objective and non-discriminatory (user friendly) access rules to new LNG infrastructure must also be accompanied by complementary measures that help improve the competitive behaviour of users. These measures can include facilitating trade capacity on secondary markets, reserving capacity for short-term products and establishing CMPs.

CMP rules are crucial in discouraging users from hoarding or speculating with capacity during periods of scarce resources. Regulators should ensure that they are implemented in all cases, regardless of the access regime in place. Adequate application and active supervision of their implementation should also be established.

CEER emphasises the importance of granting users the right to trade capacity on the secondary market. In any case, secondary capacity trades should be considered as a flexibility tool for users, and the trade of capacity on secondary markets should not be used for speculative purposes or obtaining extra profits as it may lead to higher supply costs to the detriment of final consumers.

Regulators

Regulators should receive sufficient powers to supervise LSOs and other users in their LNG-related activities. This is especially important in the current context, where LNG plays a critical role and can significantly impact the EU natural gas market.

Annex 1 – List of Abbreviations

Term	Definition
Bcm	Billions of cubic meters ($\cdot 10^9$ m^3)
CAM	Capacity Allocation Mechanisms
CEER	Council of European Energy Regulators
FID	Final investment decision
FSRU	Floating Storage and Regasification Unit
FSU	Floating and Storage Unit
LNG	Liquefied natural gas
LSO	LNG System Operator(s)
Mcm	Millions of cubic meters
Mt	Millions of tonnes
MS	Member State(s)
NRA	National Regulatory Authority
PCI	Project of Common Interest
PMI	Project of Mutual Interest
rTPA	Regulated Third Party Access
SoS	Security of Supply
TSO	Transmission System Operator
UIOLI	Use it or lose it

Annex 2 – About CEER

The Council of European Energy Regulators (CEER) is the voice of Europe's national energy regulators. CEER's members and observers comprise 36 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.

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More information is available at www.ceer.eu.