# The Spanish Gas System

## Report 2022

enagas GTS

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Some published data are subject to change, as they are provisional data at the close of this report. In the event of any discrepancy, the SL-ATR information prevails.

# A system that consolidates security of supply

The Spanish Gas System operated normally in 2022 with **100% availability 24 hours a day, every day of the year, in an exceptional year marked by the conflict between Russia and Ukraine.**

The Spanish system has been consolidated in 2022 as a benchmark in security of supply in Europe and worldwide due to its privileged location and robust infrastructure network. In an environment of high volatility in international energy markets, the Spanish Gas System has enjoyed a high diversification of supply - with 19 different origins of supply in 2022 - thanks to the regasification terminals, which position Spain as a strategic entry point for liquefied natural gas (LNG) within Europe.

In this regard, in 2022 the Technical System Operator has operated a System characterised by levels of filling, both of LNG storage tanks at regasification terminals (+80%) and underground storage (+90%), much higher than in previous years. The System broke records in the number of unloading and loading *slots* at the regasification terminal, as well as LNG storage.

The loading of LNG carriers from Spanish terminals has increased by 45% compared to the previous year. Many of them have been sent to neighbouring countries, such as Italy and Germany, with the aim of contributing to European security of supply.

Spain has also sent gas to the rest of Europe via international connections. In particular, the interconnection with France operated at maximum capacity in many periods of the year and broke all-time records.

As of 1 November, as a measure of solidarity with Europe, included in the Government's 'More Energy Security Plan', the capacity of the Irun interconnection was increased by 66% in the Spain-France direction, from approximately 2 to 3.5 bcm. This has meant an increase in the total flow capacity from Spain to France through the two existing interconnections, Irún and Larrau, which add up to a total maximum capacity of around 8.5 bcm per year.

In total, through interconnections with France and Portugal, exports have reached 41 TWh, the highest figure since 2016.

The total volume of gas transported in the System, i.e. the sum of demand plus exports and LNG refuelling, has increased by 4.4% with respect to 2021, driven by the growth in exports and by the increase of more than 50% in the demand for gas for electricity generation, which stood at 2010 values. This growth has been due to lower hydro and with cogeneration, and highlights the role of natural gas in power generation as a back-up energy for renewables.

The Spanish Gas System has received gas from 19 different origins in 2022, thanks to its six regasification terminals, which position Spain as a **strategic entry point for European LNG**

The changes in the behaviour of gas demand - with decreases in industrial consumption and changes in its locations - together with the cessation of the entry of gas through Tarifa, have required the Spanish Gas System to adapt to an investment in internal gas transport flows. From the traditional south-north direction, there has been a shift to a flow of gas from the north to the consumption areas in the south of the country. This has posed a major challenge for the System, which has been addressed while maintaining full normal operations.

# Key figures

Remember the **2021 key data in** this **summary video**

**97%**
**Unloading slots** allocated until 2037

**19**
**Countries supplying** to the System

**+33%**
**Unloadings** of LNG vs. 2021

**+48%**
**Regasification terminal production** vs. 2021

**37,197**
**Trucks loaded**

**96%**
**Average contracting** of LNG storage

**+157%**
**Export** by VIP Pyrenees vs. 2021

**+53%**
**Increased demand** for electricity generation vs. 2021

**94%**
**Filling level of underground storage facilities** as at 1 November

**50**
**Participating shippers** in capacity auctions

**+69%**
**Truck destinations** vs. 2021

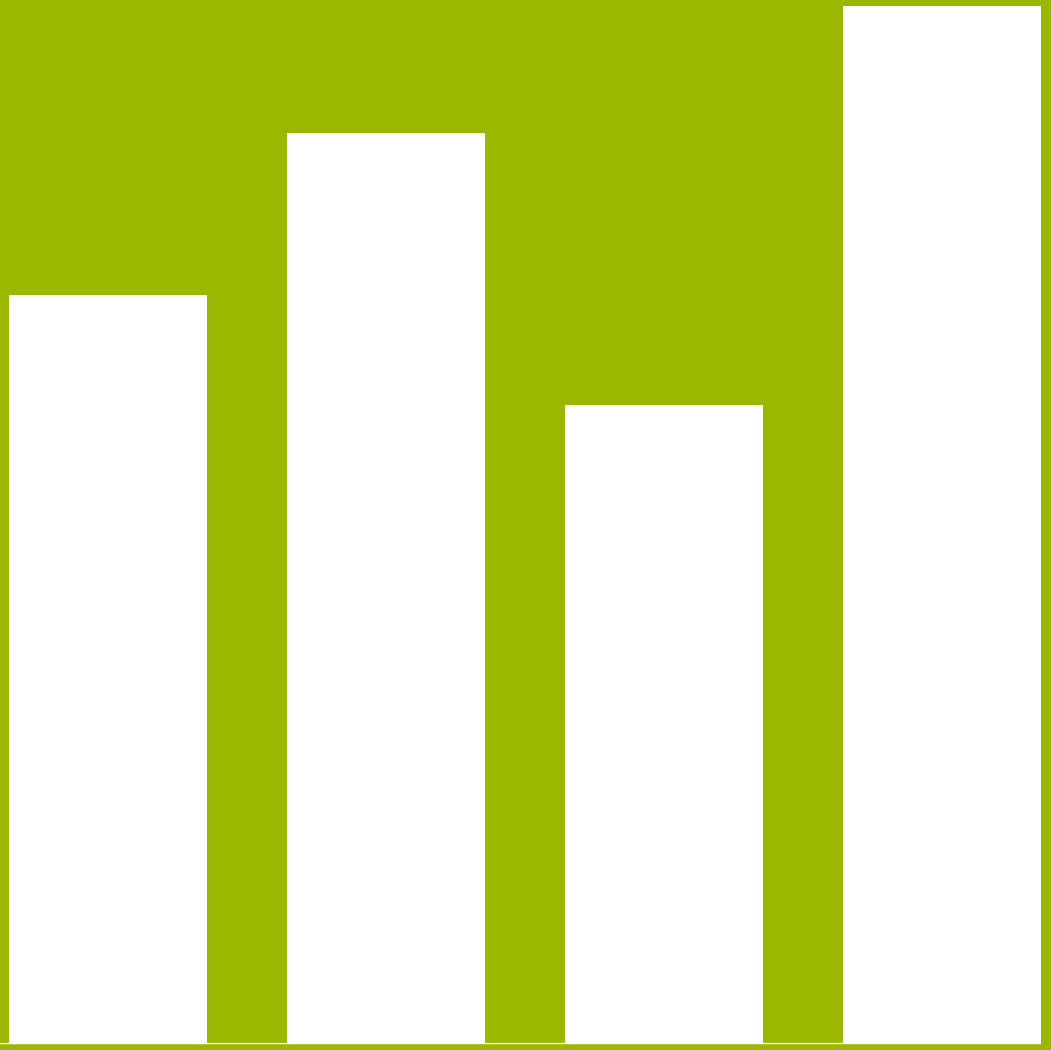
**804 GWh/day**
**All-time record** of daily electricity demand

**New regulation** for the creation of the new system of GoOs

**+90%**
**Total exports** vs. 2021 (**+45%** LNG loads and **+130%** IC exports)

# 1 Demand

**Domestic gas demand reached 364.4 TWh.** Household, business and industrial consumption has decreased, while **demand for electricity generation has increased by almost 53%,** the highest since 2010.



# Key figures

Total natural gas consumption in 2022 reached 364.4 TWh, 3.7% less than in 2021, due to lower conventional consumption (-21.4%) partly offset by increased gas demand for power generation (+52.7%).

Conventional demand, for household, commercial and industrial consumption, has decreased by 21.4% compared to the previous year, totalling 226.4. This decrease is mainly due to lower industrial consumption.

Gas demand for power generation has increased by 52.7% versus 2021, to 138.0 TWh, the highest value since 2010. This growth has been due to lower hydro and with cogeneration, and highlights the role of natural gas in power generation as a back-up energy for renewables.

**364.4 TWh**

**National gas demand in 2022**

**+52.7%**

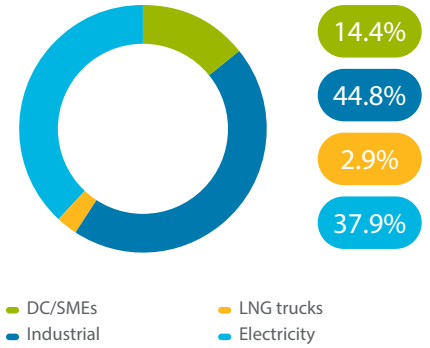
**Increase in gas demand**
for electricity generation vs. 2021

## Annual natural gas demand

*TWh*

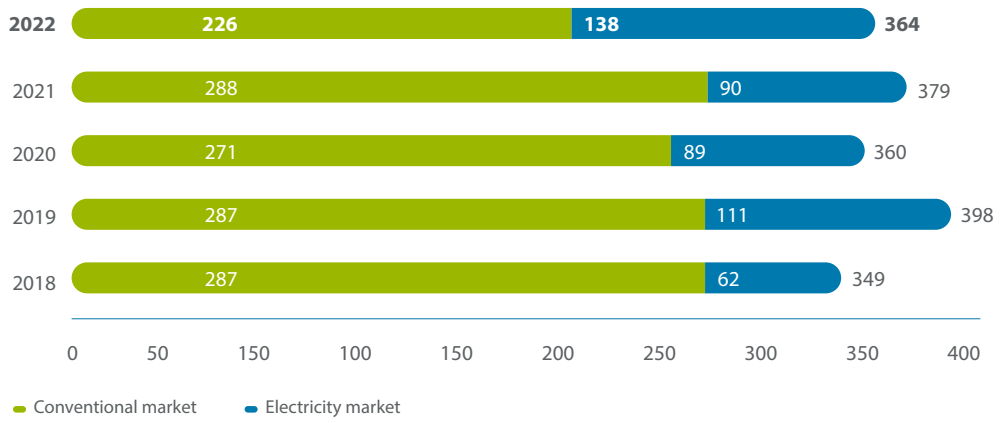
| | 2021 | 2022 | | 2022 vs. 2021 |
|---|---|---|---|---|
| | Actual | Year end | TWh | % |
| **Conventional** | **288.1** | **226.4** | **-61.7** | **-21.4%** |
| C/D + SMEs | 60.5 | **52.3** | -8.2 | -13.5% |
| Industrial | 213.1 | **163.4** | -49.7 | -23.3% |
| LNG trucks | 14.5 | **10.7** | -3.8 | -26.4% |
| **Electricity service** | **90.4** | **138.0** | **47.6** | **+52.7%** |
| **Total national demand** | **378.5** | **364.4** | **-14.1** | **-3.7%** |

## Natural gas demand in 2022



## Annual evolution of natural gas demand

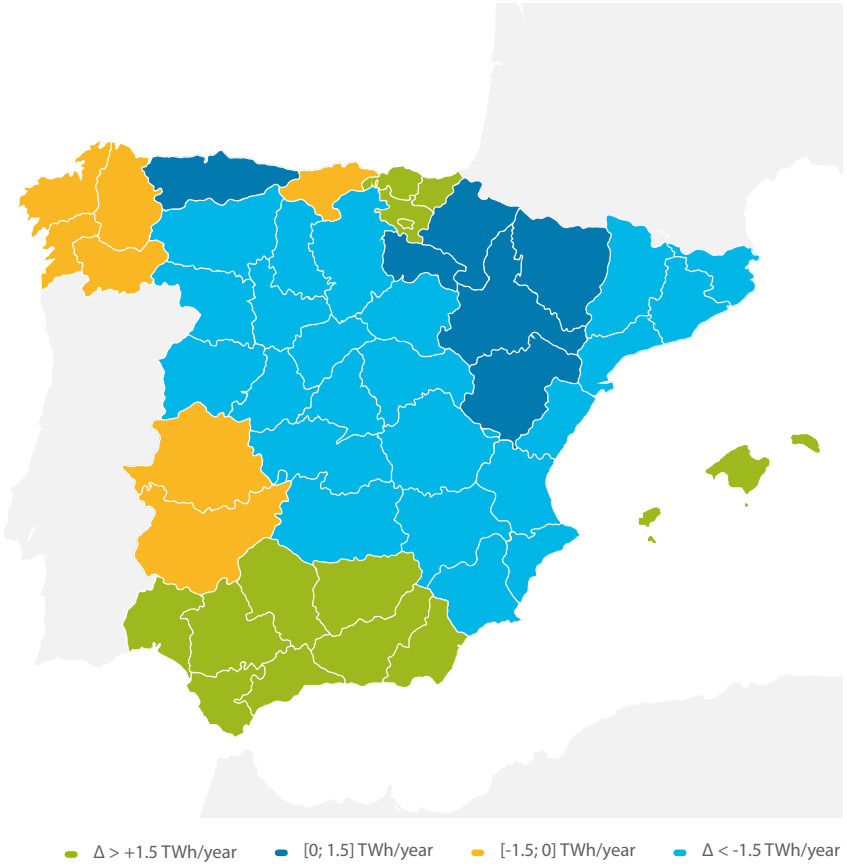
*TWh/year*




The Autonomous Communities that reported the highest consumption of natural gas in 2022 were Catalonia, Andalusia, Valencia and the Basque Country. Between them they account for almost half of the total consumption of natural gas in Spain.

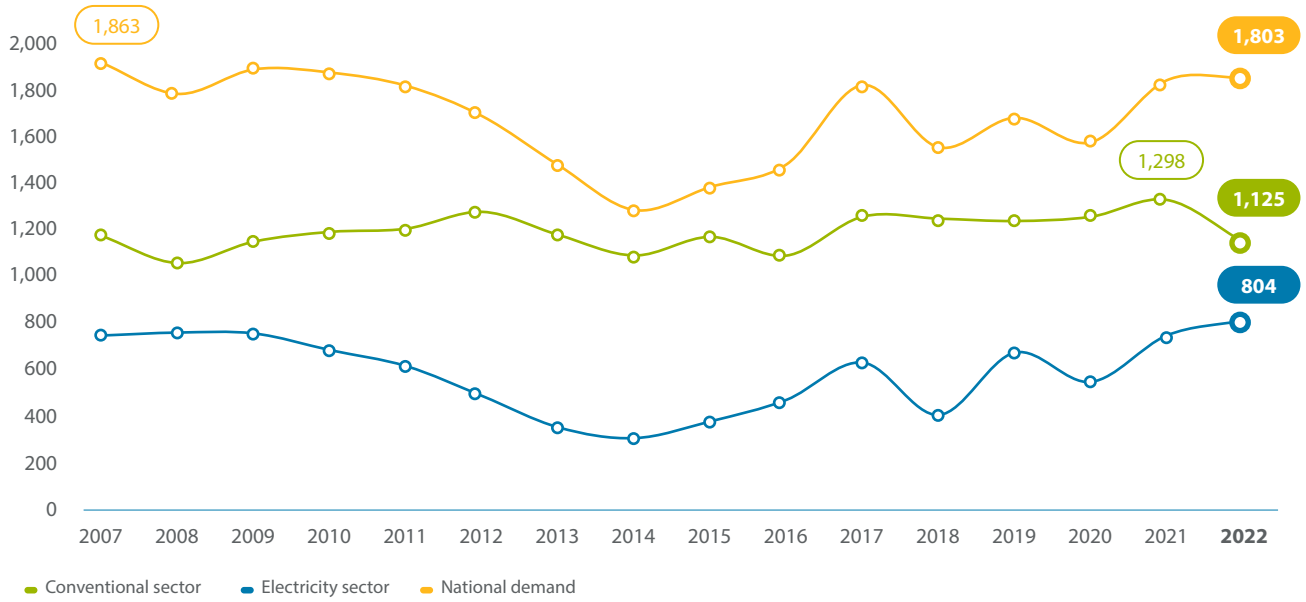
Gas demand in Catalonia, Andalusia, the Valencian Community and the Basque Country **account for more than half of the total consumption** in Spain

## Total emission gas demand by communities (2022 vs. 2021)



## Evolution of annual demand peaks

*GWh/day*




Daily peaks reached in 2022 were:

- **Total national demand:** 1,803 GWh/day (18 January)
- **Conventional demand:** 1,125 GWh/day (17 January)
- **Electricity sector demand:** 804 GWh/day (13 July) All-time record.

## 804 GWh/day

**All-time record of daily electricity demand,** reached on 13 July 2022

# Conventional demand for gas

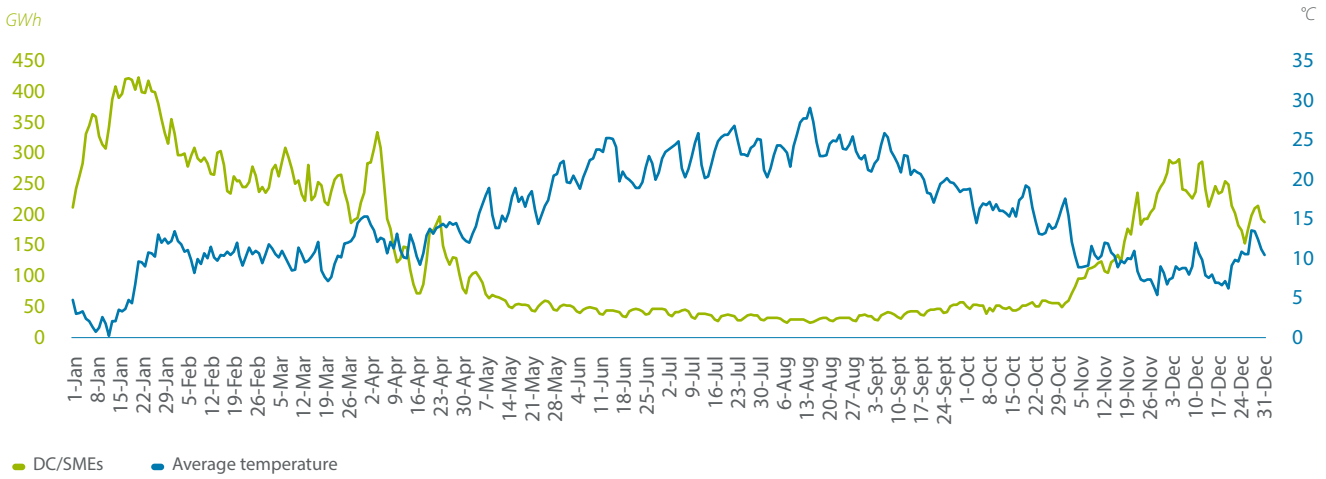
Throughout 2022, the conventional sector recorded 226.4 TWh, 21.4% lower compared to the previous year.

This decline has been widespread in both the domestic-commercial and SME sector and in the industrial segment with figures of -13.5% and -23.3%, respectively, compared to 2021. Adjusted for the effects of labour and temperature, the decline in conventional demand fell -18.6% compared to the previous year.

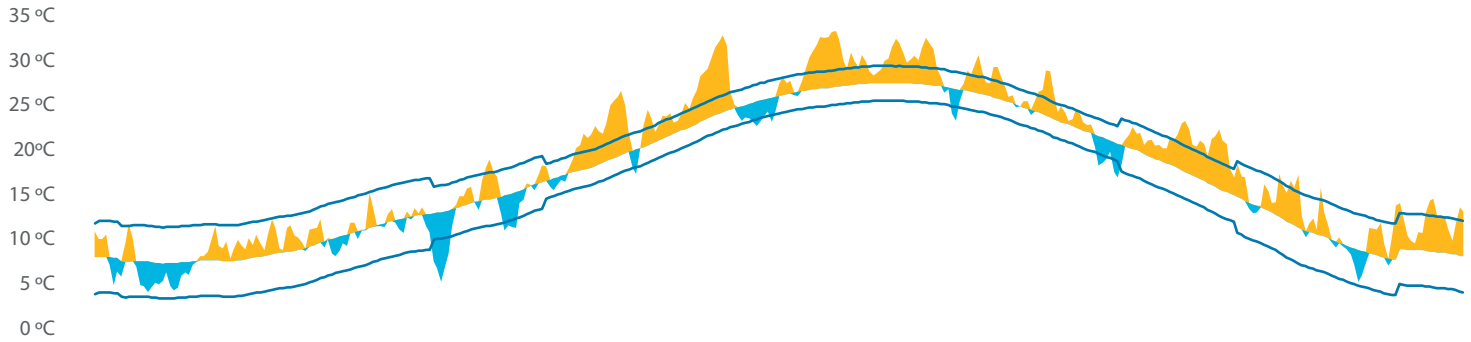
## Domestic-commercial and SMEs

In 2022, demand for natural gas in the domestic-commercial and SME market fell by -8.2 TWh (-13.5%) compared to the previous year. This figure was mainly due to the effect of temperatures, which were warmer than in 2021.

### Domestic demand - Domestic-commercial and SME sector



## Reference temperature of the Gas System




| Cold/hot rating | Jan-'22 | Feb-'22 | Mar-'22 | Apr-'22 | May-'22 | June-'22 | July-'22 | Aug-'22 | Sep-'22 | Oct-'22 | Nov-'22 | Dec-'22 | **2022** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Σ ºC for excess | 17.82 | 43.88 | 15.75 | 21.91 | 71.55 | 70.27 | 74.70 | 67.59 | 29.83 | 84.99 | 50.51 | 89.46 | 638.27 |
| Σ ºC by default | -35.15 | -0.25 | -14.52 | -49.61 | -11.30 | -16.28 | -3.31 | -7.60 | -16.75 | -1.84 | -4.10 | -9.55 | -170.25 |
| Variation | -17.34 | 43.63 | 1.24 | -27.69 | 60.24 | 53.99 | 71.39 | 60.00 | 13.08 | 83.15 | 46.41 | 79.92 | **468.02** |

# Industrial demand

Gas consumption in the industrial sector recorded 163.4 TWh in 2022, down 49.7 TWh compared to 2021. This decline in gas demand for the industrial market has been generalised across all sectors.

The evolution of industrial demand, as depicted in the graph on the next page on the evolution of the Large Industrial Gas Consumers Index (IGIG[1]) has been downward, intensifying in the second half of the year.

163.4 TWh

**Gas consumption in the industrial sector**
in 2022

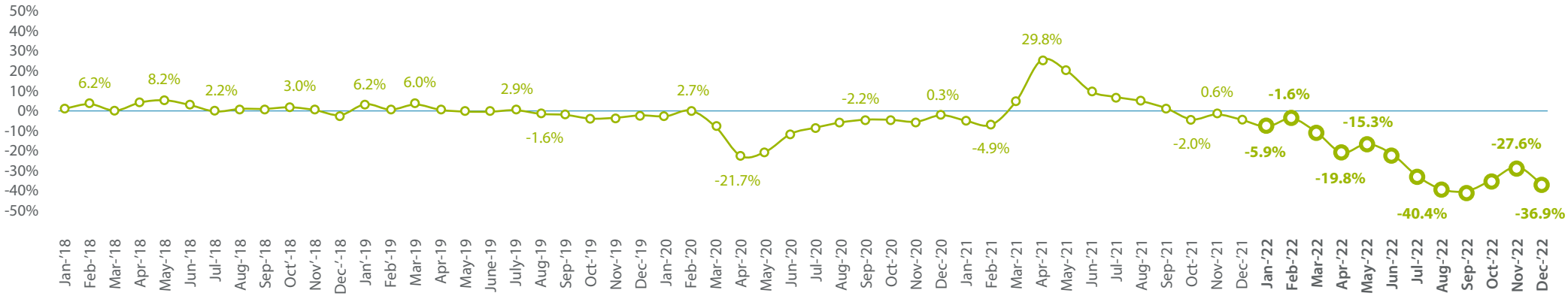
## Annual consumption of natural gas by industrial sector

*TWh/year*

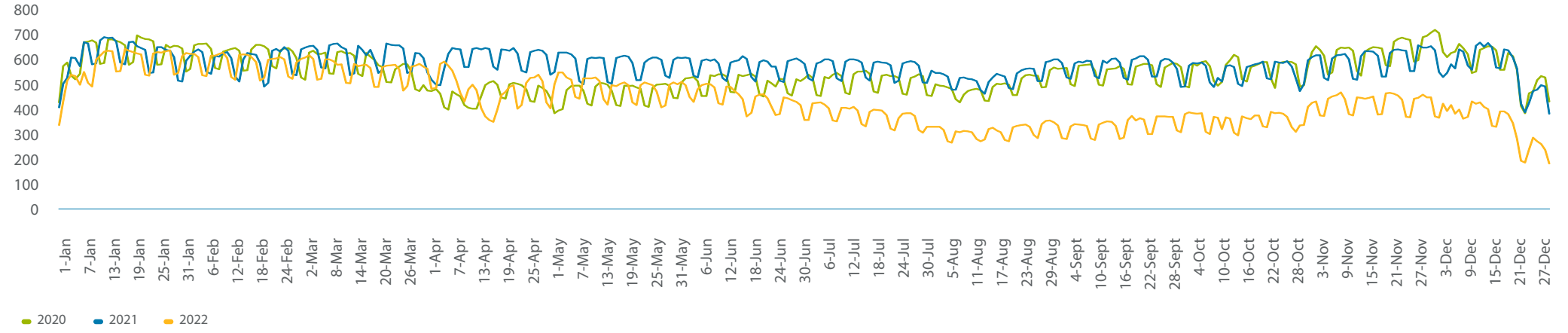
| | 2022 | % 2022 vs. 2021 |
|---|---|---|
| Agri-food | **18.7** | -15.63% |
| Construction | **21.5** | -19.54% |
| Electricity | **19.7** | -29.50% |
| Metallurgy | **13.7** | -11.12% |
| Paper | **12.5** | -21.46% |
| Chemistry/Pharmaceuticals | **22.1** | -21.61% |
| Refining | **23.0** | -40.96% |
| Other industry | **15.9** | -19.13% |
| Services | **12.0** | -9.96% |
| Textile | **1.6** | -24.72% |

[1] The Large Industrial Gas Consumers Index (IGIG), which began to be published by the Technical Manager of the System in 2015, shows the evolution of gas consumption of the main gas-consuming industries for the ten most intensive industrial sectors in the use of this fuel.

## Large Gas Consumers Index Evolution



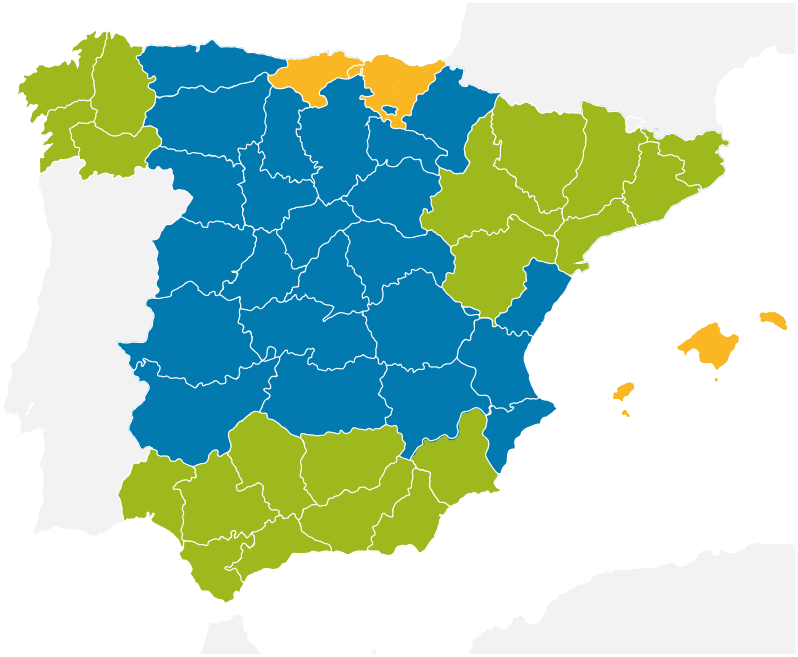

## Daily industrial demand



# Trucks

Gas consumption by LNG trucks decreased to 10.7 TWh/year in 2022 (37,197 trucks loaded), a decrease of 3.8 TWh/year compared to 2021. Barcelona was the busiest loading plant, followed by Huelva and Cartagena. By autonomous region, the largest decreases were in Castilla y León (-1.19 TWh/year), and Andalusia (-1.05 TWh/year).

## Annual demand for trucks by community (2022 vs. 2021)




**→ Mugardos**

1.1 TWh/year
3.7 thousand loadings
**29%** $F_{ut}$

**→ Huelva**

2.3 TWh/year
8.0 thousand loadings
**36%** $F_{ut}$

**→ Cartagena**

2.1 TWh/year
7.6 thousand loadings
**34%** $F_{ut}$

**→ Barcelona**

2.4 TWh/year
8.3 thousand loadings
**37%** $F_{ut}$

**→ Sagunto**

1.7 TWh/year
6.0 thousand loadings
**45%** $F_{ut}$

**→ Bilbao**

1.0 TWh/year
3.5 thousand loadings
**57%** $F_{ut}$

10.7 TWh/year
**Gas consumption by LNG trucks**

37,197
**Loaded trucks**

$F_{ut}$: Usage factor.

# National and international presence of LNG trucks

In 2022, 69 more satellite plant destinations have been supplied with gas than in 2021. In addition to the national territory, the Spanish Gas System has supplied trucks to 35 destinations abroad.

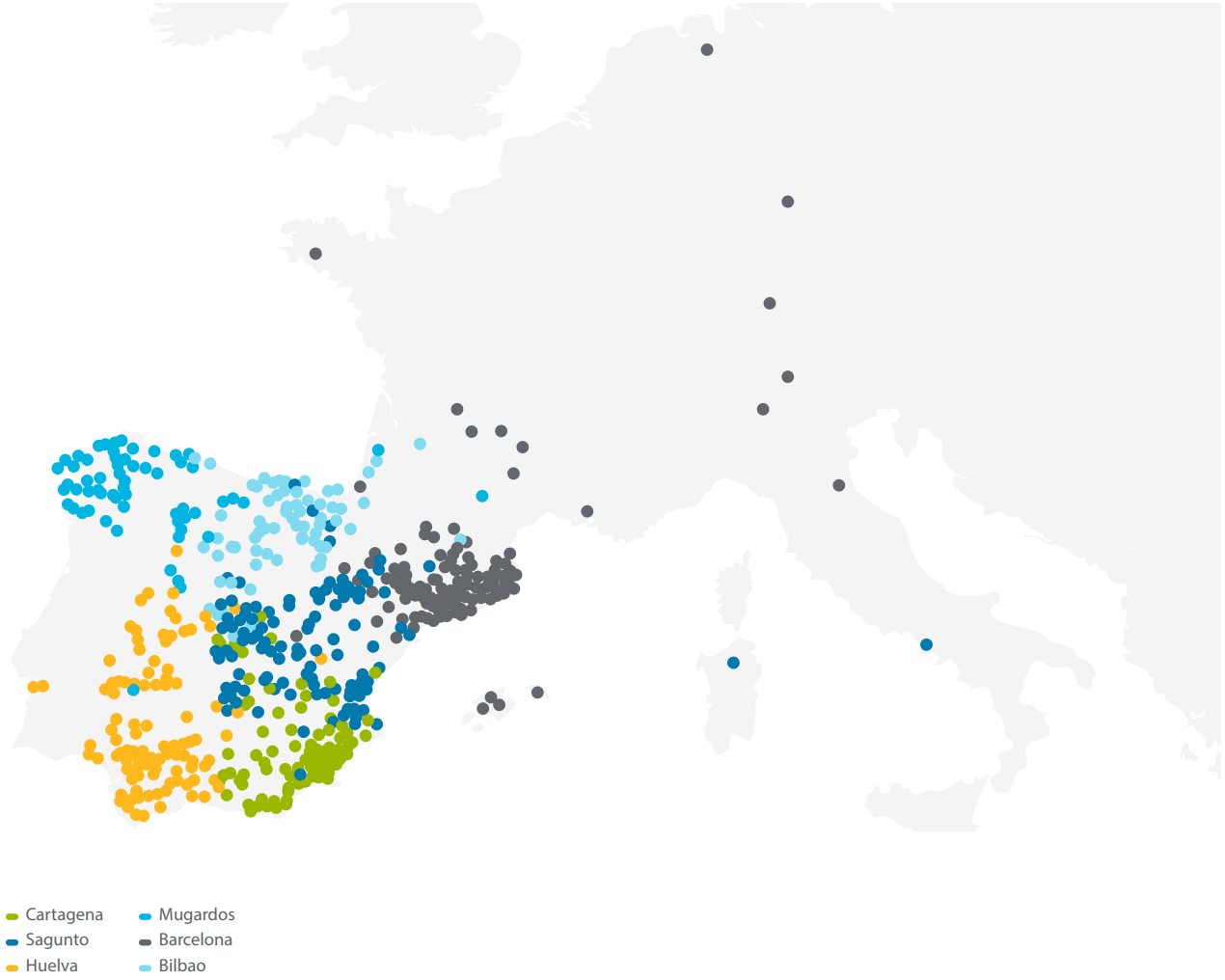
+69

**Increase in satellite plant destinations** that have consumed gas vs. 2021

35

**Destinations abroad** with consumption

## Tank destinations by regasification terminal



# Gas demand for transportation

The demand for natural gas in the transport sector has maintained an increase in consumption during 2022 as in previous years, reaching 3.6 TWh/year.

## Land transportation

The monitored annual consumption of NGV in Spain has posted an increase of 12% compared to 2021 to reach 3.2 TWh/year (1 truck + 2.2 TWh pipeline). In 2022, the autonomous communities with the highest consumption of natural gas for land transport were the Community of Madrid and Catalonia.

## Maritime transport

Over the course of 2022, 0.4[1] TWh/year has been supplied for maritime transport, of which 0.14 TWh corresponds to bunkering supplies made in 54 pipe-to-ship (PTS[2]) and 0.2 TWh corresponds to LNG bunkering in 16 ship-to-ship (STS[3]) operations from supply barges. The remaining 0.075 TWh/year were supplied by LNG trucks, with 200 truck unloadings to vessels in truck-to-ship (TTS[4]) and multi-truck-to-ship (MTTS[5]) operations.

3.6 TWh/year

**Gas demand in the transport sector**

+12%

**Increase in annual gas vehicle consumption** (vs. 2021)

0.4 TWh/year

**Gas supply for maritime transport,** according to data provided by Gasnam

[1] Information on STS and PTS operations provided by Gasnam.
[2] PTS supplies are made directly from by connecting flexible hoses from either small or large-scale LNG terminals.
[3] If the LNG supply is carried out by another vessel, this is an STS operation.
[4] The TTS process is based on the supply of LNG to the ship from a tanker truck that is placed on the quay where the ship is berthed.
[5] When several trucks are involved in the same LNG refuelling operation simultaneously, the process is called MTTS.

# Gas demand for the electricity sector

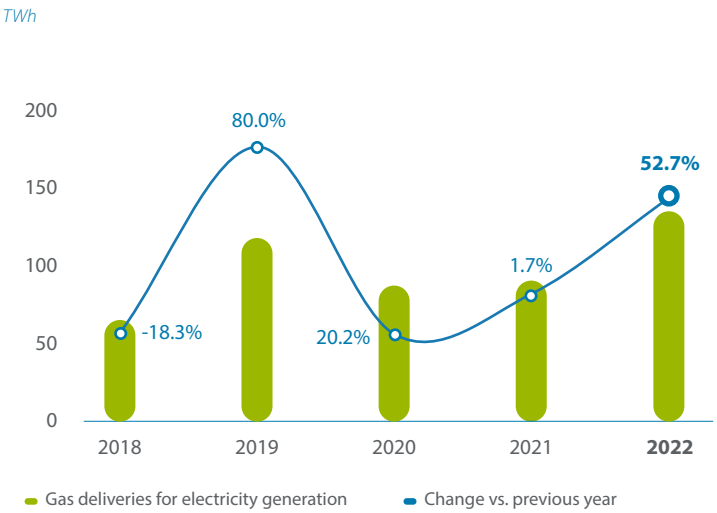
In 2022, gas deliveries to the electricity sector reached 138.0 TWh, the highest value since 2010. This figure is 52.7% higher than in 2021 due to the concurrence of three factors: low hydro generation, low cogeneration and high electricity exports.

Spain's electricity generation fleet has increased its installed renewable power capacity in 2022, with 1.1 GW of wind and 3.7 MW of solar photovoltaic power more in both cases than last year.

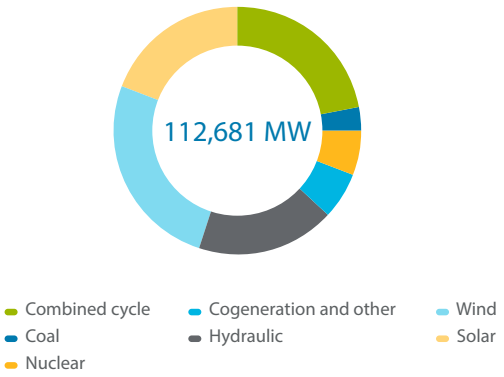
138.0 TWh

**Gas deliveries for electricity generation** (+52.7% vs. 2021), the highest value since 2010

## Gas deliveries for electricity generation




## Mainland installed electrical power (31 Dec 2022)




Source: REE.

Gas deliveries to the electricity sector have reached the highest value since 2010 due to the concurrence of three factors: **low hydro generation, low cogeneration** and **high electricity exports**

The demand for electricity in Spain, according to year-end data, fell by 2.9% in 2022 compared to the previous year.

The technologies providing the greatest demand coverage were natural gas and wind, both with 23%, followed by nuclear with 21%.

The most significant variations have been (in order of magnitude):

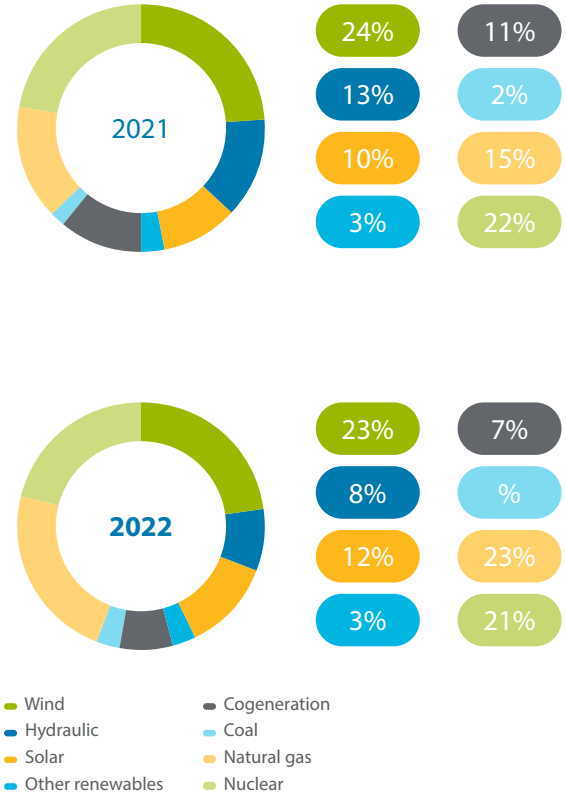
- **Significant increase in electricity exports.** In 2022, the system exported 19.8 TWh of energy, while Spain has historically been an importer.
- **Significant reduction in hydro generation,** with a decrease of 10.6 TWh compared to the previous year.
- **Decline in cogeneration,** with production of 8 TWh less than in 2021.

## Balance of annual electricity

*TWh (e)*

| | 2021 | 2022 | Δ 2022 vs 2021 |
|---|---|---|---|
| **Electricity demand** | **242.5** | **235.5** | **-3%** |
| Wind | 59.2 | **59.8** | 1% |
| Hydraulic | 32.3 | **21.6** | -33% |
| Solar | 25.2 | **31.4** | 24% |
| Other renewables | 7.6 | **7.1** | -6% |
| CHP (cogeneration) | 26.0 | **17.7** | -32% |
| Thermal gap | 42.5 | **68.2** | 60% |
| Coal | 4.9 | **7.7** | 56% |
| Gas | 37.6 | **60.6** | 61% |
| % gas in TG | 88% | **89%** | |
| Nuclear | 54.0 | **56.0** | 4% |
| International balances | 0.9 import | **-19.8 export** | ≤ 100% |

Source: REE.




19.8 TWh

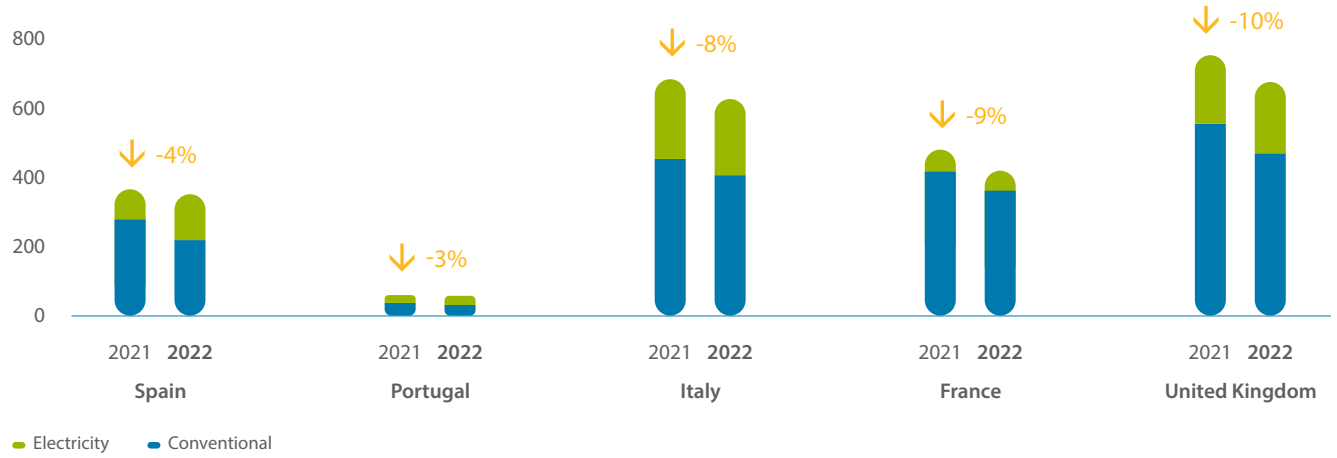
**Electricity exports to other countries** (historically, Spain has been an importing country)

# European comparison of natural gas demand

Total demand for natural gas fell in all countries and, in general, more than in Spain.

## Total natural gas demand by country (variation 2022 vs. 2021)

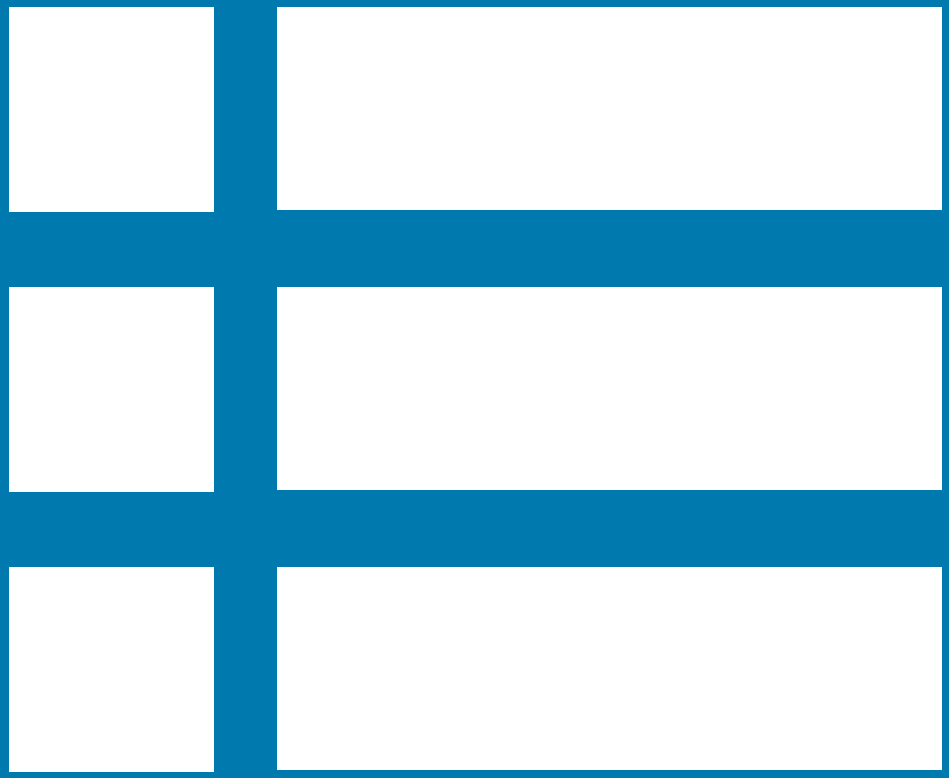
*TWh*




Source: REN, GRT Gaz, TIGF and National Grid.

# 2 Operation and security of supply

The Spanish Gas System operated normally in 2022. **Availability, both technical and commercial, has been 100%, 24 hours a day, every day**, always guaranteeing supply to all consumers.



# Continuity, quality and security of supply

In 2022, the Technical Manager of the System has continued to guarantee the continuity, quality and security of supply, under the principles of objectivity, transparency and non-discrimination; seeking the correct operation of the System with criteria of effectiveness, efficiency, better customer service and the correct coordination between access points, storage, transport and distribution.

At the European level, Russia's invasion of Ukraine, which began on 24 February 2022, has brought about a paradigm shift in the energy context. This conflict has put the EU's energy security at risk, highlighting the vulnerability of external energy dependence in terms of prices, confidence and availability of supply.

Since the beginning of the conflict, gas supplies to Europe from Russia have been reduced from 40% to 7%, mainly due to developments in the Nordstream pipeline, the reduction of flows through Ukraine and Belarus, and the ban on imports of gas from Russia by certain countries.

As a consequence, 11 countries declared the "Early Warning" crisis level , as defined in the European Regulation (EU) 1938/2017, namely: Italy (26 February 2022), Latvia (9 March 2022), Germany and Austria (30 March 2022), Croatia (25 April 2022), Finland (6 May 2022), Estonia (18 May 2022), Denmark and the Netherlands (20 June 2022), Sweden (21 June 2022), and Slovenia (11 July 2022). Germany went a step further from the "Early Warning" crisis level it had declared on 30 March 2022, subsequently declaring the "Alert" level (23 June 2022).

This new context has mobilised an unprecedented amount of work in European energy policy, both in terms of the pace of approval of new regulations and the scope of the measures. Of the EU regulatory developments addressed in 2022, the following can be highlighted due to their relevance and impact on the security of supply of natural gas:

- Regulation (EU) 2022/1032 amending Regulation (EU) 2017/1938. This Regulation establishes the obligation by each Member State to reach a filling level of 80% in underground storage by 1 November 2022. From 2023 onwards, this filling level should reach 90%. In the case of Spain, part of the obligation on 1 November can be constituted in the form of LNG in the tanks of the regasification terminals.

- Regulation (EU) 2022/1369. Introduces a voluntary 15% reduction in demand between August 2022 and March 2023 compared to the average of the last 5 years. This reduction will become mandatory in the event of a declaration of an EU "Alert" by the Council. Reductions may be less if a number of conditions are met:

  - Countries that are not connected to other Member States (MS) are not obliged to apply the reduction.
  - Member States may apply for an exemption of the volume of gas consumed as raw materials.
  - Member States may limit demand reduction by a value equivalent to the surplus of gas that Member States have in storage on 1 August compared to the target value of Regulation (EU) 1938/2017.
  - Member States may request a reduction in the obligation by a percentage of 8%, i.e. from 15% to 7%, if they demonstrate that their interconnection capacity with other Member States is less than 50% of their registered demand in 2021.

- There is an additional exception for Member States facing a crisis in the electricity system.

→ Regulation (EU) 2022/2576. It introduces a reinforcement of solidarity through better coordination of gas purchases, reliable price references and cross-border gas exchanges:

- Creation of a joint platform for coordinated gas purchases, gaining bargaining power and improving purchasing conditions.
- Incorporation of critical consumption for electricity generation (in the case of Spain, approximately 600 GWh/d) as protected customers by virtue of solidarity.
- Extension of solidarity mechanisms to countries with LNG plants (previously, solidarity mechanisms were limited to bilateral agreements between neighbouring countries connected by pipeline).
- In addition:
  - Creation of a secondary market trading platform for LNG and underground storage.
  - Increased transparency for LNG plants and underground storage.
  - Improvements in congestion management in transmission infrastructures.
  - Introduction of demand reduction measures for protected customers.

→ Regulation (EU) 2022/2576. It establishes a temporary market correction mechanism for trading orders in TTF derivatives and derivatives linked to other virtual exchange points, in order to limit episodes of excessively high gas prices in the European Union that do not reflect world market prices.

At national level, and in this environment of high volatility in international energy markets, the Spanish Gas System has enjoyed a high level of supply diversification. Spain has received natural gas from 19 different origins thanks to the regasification terminals, which position our country as a strategic entry point for LNG within Europe.

In addition, Spain has contributed to the security of supply of the rest of Europe by sending gas, both through interconnections and by reloading LNG carriers to other European countries.

Exports through interconnections with France have broken historical records, exceeding 35 TWh. In total, through interconnections with France and Portugal, exports have reached 41 TWh, the highest figure since 2016.

The loading of LNG carriers from Spanish terminals has increased by 45% compared to the previous year. Many of them have been destined for other EU countries, such as Italy or Germany.

Natural gas levels in underground storage facilities ended the year above 90% and regasification terminals above 80%, in both cases higher than in the previous year.

On the other hand, in 2022, a total of 338 LNG unloadings were carried out at the Spanish regasification terminals as a whole, 84 more than in 2021.

**41 TWh**

**Exports** via interconnections with France and Portugal (highest since 2016)

**+90%**

**Natural gas levels** in underground storage by the end of 2022

## Operating Notes

Four Operating Notes have been published throughout 2022, in the following order:

- Temperature drop (31/03/2022).
- Situation of exceptional operation -level 2 - Unavailability of the Mugardos Plant due to an incident in Reganosa's transmission network (02/06/2022 - 04/06/2022).
- Exceptional operation situation -level 0- Incident in Enagás transmission network between positions i019-Santiago and i018-Rois (15/07/2022 - 17/07/2022).
- Exceptional operating situation - level 0 - High levels of stocks in the regasification terminal tanks (17/10/2022 - 25/11/2022).

**The Spanish Gas System operated normally in 2022.** Availability, both commercial and technical, has been 100%, 24 hours a day, every day of the year, always guaranteeing supply to all consumers.

# Authorisation and access to the Gas System

In 2022, new users have joined the Gas System Facilities Access Framework Contract and the Balancing Portfolio Framework Contract. Thus, as of 31 December 2022:

239

**Users adhered** to the Framework Agreement for access to the Spanish Gas System Facilities.

225

**Users adhered** to the Balancing Portfolio Framework Contract. All of them have the Balancing portfolio in PVB, 184 have the Balancing portfolio in TVB and 185 have the Balancing portfolio in AVB.

178

**Authorised companies** in the Framework Contract for Access to the Spanish Gas System Facilities and in the three Balancing Portfolios (PVB, TVB and AVB).

27

**Balancing Portfolio Groupings** in place: 15 are in PVB, 6 in AVB and 6 in TVB. 50 subjects are part of the groupings.

+1,200

**Active users** in the SL-ATR Logistics System.

# User satisfaction

As in previous years, at the end of the year, the Technical System Operator made a brief survey available to Gas System agents to evaluate the efficiency of the TSO's actions in relation to the assistance provided and the quality of the information communicated.

This survey consisted of two sections:

- Section I:
  - Third party access to the System's facilities
  - Balancing of users and of the system
  - Operation of the System
- Section II:
  - General aspects

The evaluations and considerations in both sections will help to improve the attention and service offered by the TSO to the different agents in the System.

The survey was launched on 10 October 2022 and was completed by 15 November via computer, mobile or tablet.

The results have been processed by a company expert in this type of questionnaire, which has guaranteed its anonymity.

The survey was open to shippers, direct market consumers (DMCs), transporters, distributors, service providers and marketplace platforms and had a participation rate of 32%

The customer service score for the processes carried out by the TSO was 8.8, with almost all processes rated above 8.

Based on the results and comments gathered through the survey, the TSO draws up a customer service plan that includes action lines with achievable goals in the short to medium term.

The TSO will monitor the achievement of the defined action lines in order to improve customer service.

8.8

**Customer Service Score**
of TSO processes

For further details on customer service, please see our reports by clicking here.

# NG and LNG supplies

In 2022, natural gas supplies reached 446,550 GWh.

For the fourth consecutive year, supplies in the form of liquefied natural gas (LNG) have exceeded those of natural gas (NG). The entry of LNG has accounted for 71% of the gas supply for the Spanish Gas System. In 2022, natural gas has been received from 19 different origins, with the United States leading the way.

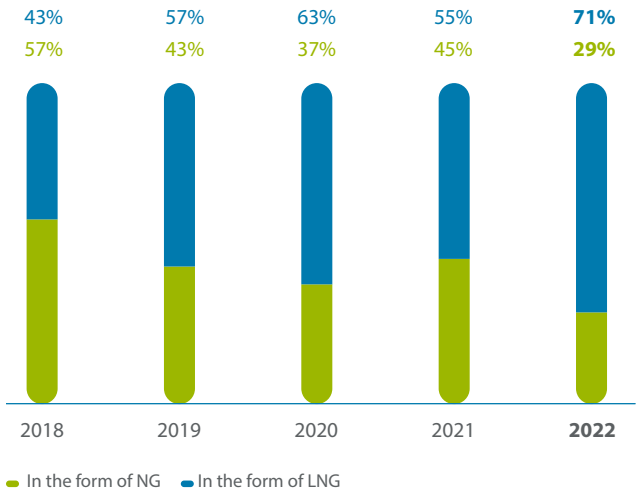
The LNG unloaded in 2022 was up 16% year on year. All terminals have experienced an increase in the number of unloadings.

## Inputs to the Spanish Gas System

Inputs in the form of NG accounted for 127,657 GWh.

LNG supply, meanwhile, reached 318,893 GWh. The plants in which the greatest growth in gas unloaded was recorded were those of Sagunto and Cartagena.

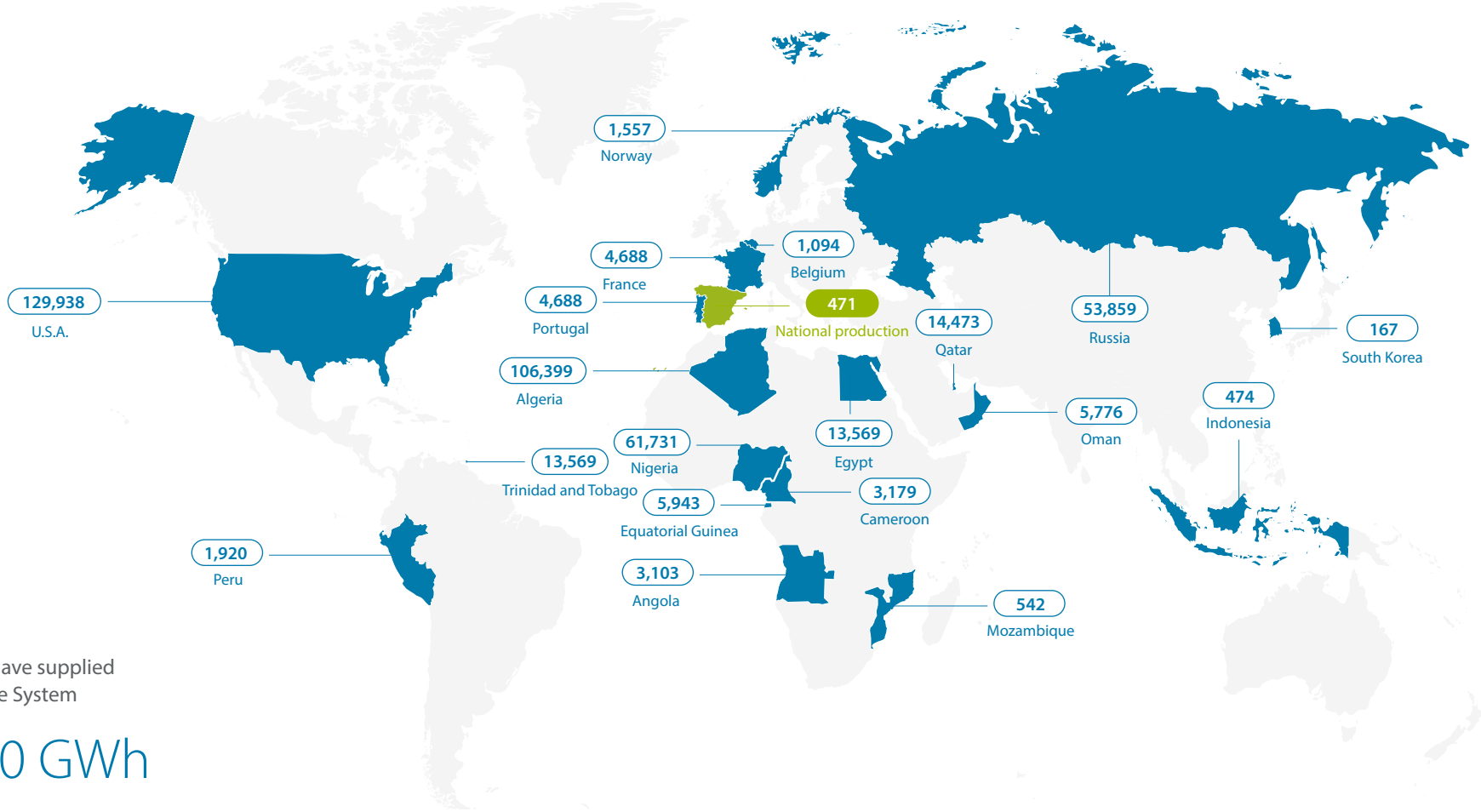
**Supplies evolution**




For the fourth consecutive year, **supplies** in the form of **liquefied natural gas (LNG) have exceeded those of natural gas (NG)**

## Origin of supplies

*GWh*




19

**Countries** that have supplied natural gas to the System

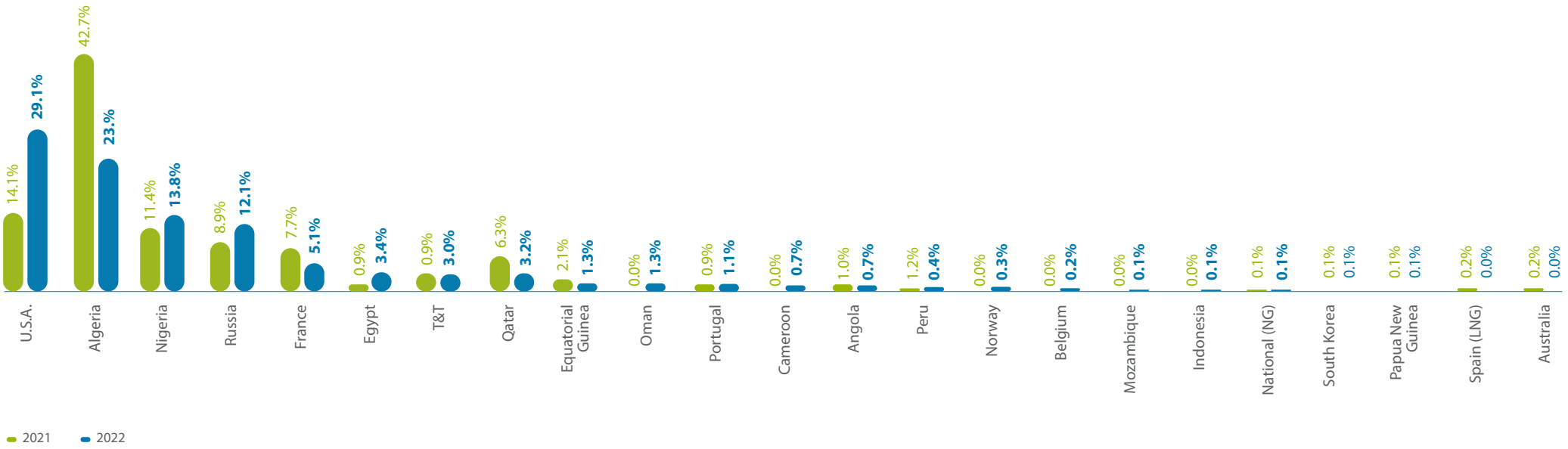
446,550 GWh

**Total supplies**
of natural gas

In the supply portfolio, the USA has for the first time been the main supplier of the Spanish gas system, accounting for practically 29% of supplies in 2022, followed by Algeria, with 24%.

New sources of supply include Mozambique, Indonesia and South Korea.

## Supplies evolution



## Number of LNG vessel unloadings

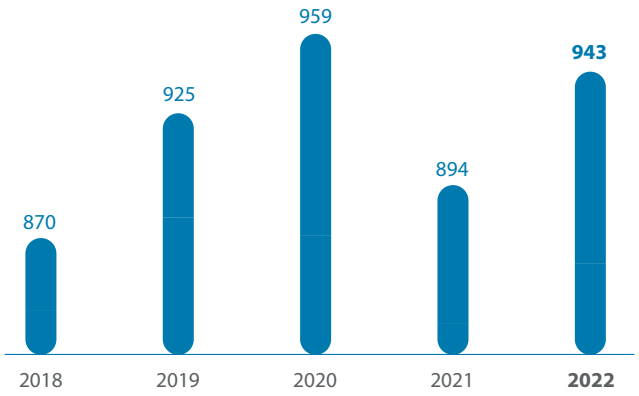
| | 2021 | 2022 |
|---|---|---|
| Barcelona Plant | 47 | **58** |
| Huelva Plant | 52 | **68** |
| Cartagena Plant | 44 | **61** |
| Bilbao Plant | 49 | **65** |
| Sagunto Plant | 38 | **58** |
| Mugardos Plant | 24 | **28** |
| **Total** | **254** | **338** |

338

**Vessels unloaded**
in the System (**+33%** vs. 2021)

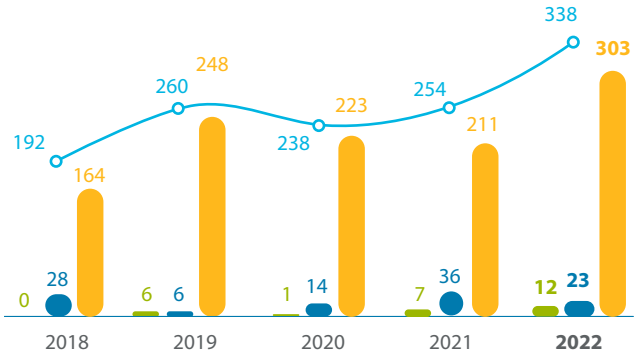
## Average volume: Unloaded LNG

*∑ GWh total vessels / Total no. of vessels*




As for the average volume unloaded per vessel in 2022, the figure reached 943 GWh, slightly higher than in 2021.

## Evolution of the number of vessels unloaded




- Small vessels
- Medium-sized vessels
- Large vessels
- Total vessels

# Unloadings by origin and regasification terminals

In 2022, each regasification terminal has received gas from at least three different countries, which has helped to strengthen the security of the System. The terminal with the highest number of downloads was Huelva, followed by Bilbao and Cartagena. By origin, the USA and Nigeria have received the highest number of loads, with 139 and 65 methane trucks respectively.

3

**Minimum number of countries** from which an LNG terminal has received gas

## Unloading by origins and regasification terminals

*Number of unloadings*

| | Angola | Algeria | Belgsium | Cameroon | South Korea | Egypt | United States | France | Equatorial Guinea | Indonesia | Mozambique | Nigeria | Norway | Oman | Peru | Qatar | Russia | Trinidad | **Total** | Average size unloaded (GWh) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Barcelona | | 5 | 1 | | | 4 | 17 | 1 | | | | 10 | | 1 | | 14 | 2 | 3 | **58** | 917 |
| Huelva | | | | 1 | 1 | 2 | 35 | | | | | 18 | | 1 | 1 | | 5 | 4 | **68** | 921 |
| Cartagena | | 1 | | | | 8 | 24 | | 1 | | | 18 | 1 | | | 2 | 4 | 2 | **61** | 920 |
| Bilbao | 2 | | | | | 1 | 24 | | 4 | 1 | 1 | 5 | 1 | 1 | 1 | | 20 | 4 | **65** | 994 |
| Sagunto | 1 | 1 | | 2 | | 2 | 31 | | 1 | | | 10 | | 3 | | 1 | 4 | 2 | **58** | 962 |
| Mugardos | | | | | | | 9 | | | | | 4 | | | | | 15 | | **28** | 950 |
| **Total** | **3** | **7** | **1** | **3** | **1** | **7** | **140** | **1** | **6** | **1** | **1** | **65** | **2** | **6** | **2** | **17** | **50** | **15** | **338** | **943** |
| Average size unloaded (GWh) | 1,034 | 778 | 1,094 | 1,060 | 167 | 885 | 928 | 1,068 | 990 | 474 | 542 | 950 | 778 | 963 | 960 | 851 | 1,077 | 905 | 943 | |

# Natural gas connections

The supply in the form of NG in 2020 has accumulated almost 128 TWh.

## International connections

*GWh*

| | 2021 | | | 2022 | | |
|---|---|---|---|---|---|---|
| | Balance | Inputs | Outputs | **Balance** | **Inputs** | **Outputs** |
| IC North African | 154,565 | 154,565 | - | **99,070** | **100,952** | **1,882** |
| VIP Pyrenees | 17,146 | 30,922 | 13,775 | **-13,824** | **21,546** | **35,370** |
| VIP Iberia | -1,426 | 3,560 | 4,986 | **-1,185** | **4,688** | **5,873** |
| National | 487 | 487 | - | **471** | **471** | **-** |
| **Total** | **170,773** | **189,534** | **18,761** | **84,533** | **127,657** | **43,125** |

128 TWh

**Supply**
in the form of NG

# Regasification terminals

Spain continues to lead Europe in terms of the number of LNG infrastructures and LNG vaporisation and storage capacity.

The facilities maintain their characteristics and technical capabilities. The Spanish Gas System has a total of 25 storage tanks, with eight berths and a capacity for methane trucks of up to 270,000 $m^3$.

**Spain is the European country with the most LNG terminals,** vaporisation capacity and LNG storage capacity

## Single Tank Model

2022 was the second full year in which the pooled tank model has been in place. This has made commercial management easier for users and provided greater flexibility and liquidity to the Spanish regasification terminal system.

### Technical characteristics of the regasification terminals

| | | LNG storage | | Truck loading capacity | Berths | |
|---|---|---|---|---|---|---|
| Regasification terminal | Maximum vaporisation capacity ($Nm^3/h$) | No. of tanks | $m^3$ LNG | GWh/day | No. of berths | $m^3$ LNG |
| Barcelona | 1,950,000 | 6 | 760,000 | 15 | 2 | 266,000 |
| Huelva | 1,350,000 | 5 | 619,500 | 15 | 1 | 175,000 |
| Cartagena | 1,350,000 | 5 | 587,000 | 15 | 2 | 266,000 |
| Bilbao | 800,000 | 3 | 450,000 | 5 | 1 | 270,000 |
| Sagunto | 1,000,000 | 4 | 600,000 | 11 | 1 | 266,000 |
| Mugardos | 412,800 | 2 | 300,000 | 11 | 1 | 266,000 |
| **Total** | **6,862,800** | **25** | **3,316,500** | **71** | **8** | **Up to 270,000** |

# Production at regasification terminals

In 2022, inflows from regasification terminals to the System have increased by 48% compared to 2021. All LNG terminals have experienced an increase in this respect.

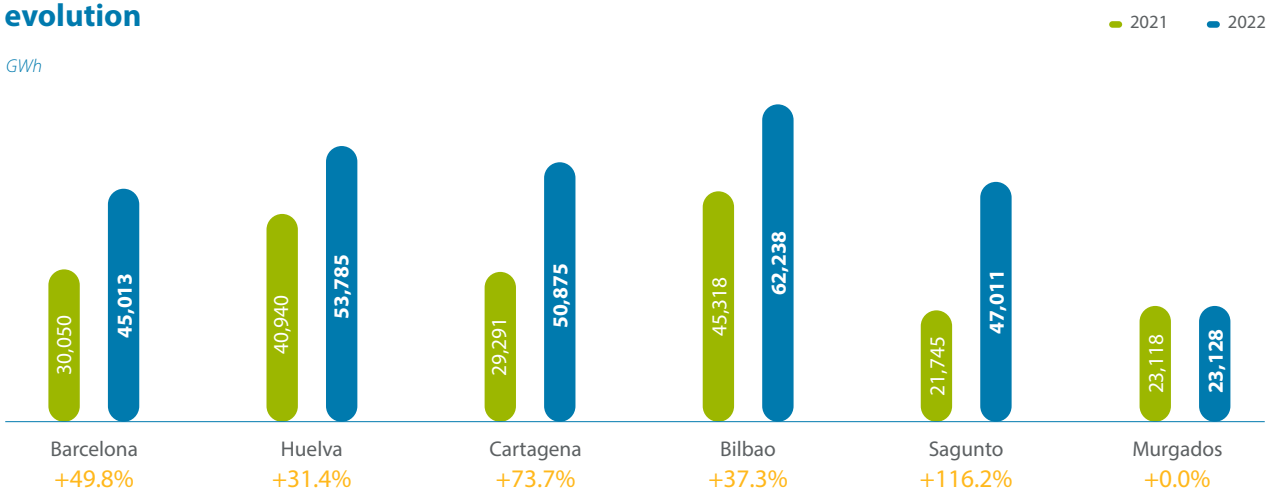
Average daily production at the regasification terminals reached 773 GWh/day, up 48% year on year, and average contracting was 859 GWh/day, up 53% on 2021.

In terms of stocks in tanks, the annual average has been 68%, occasionally reaching 92%.

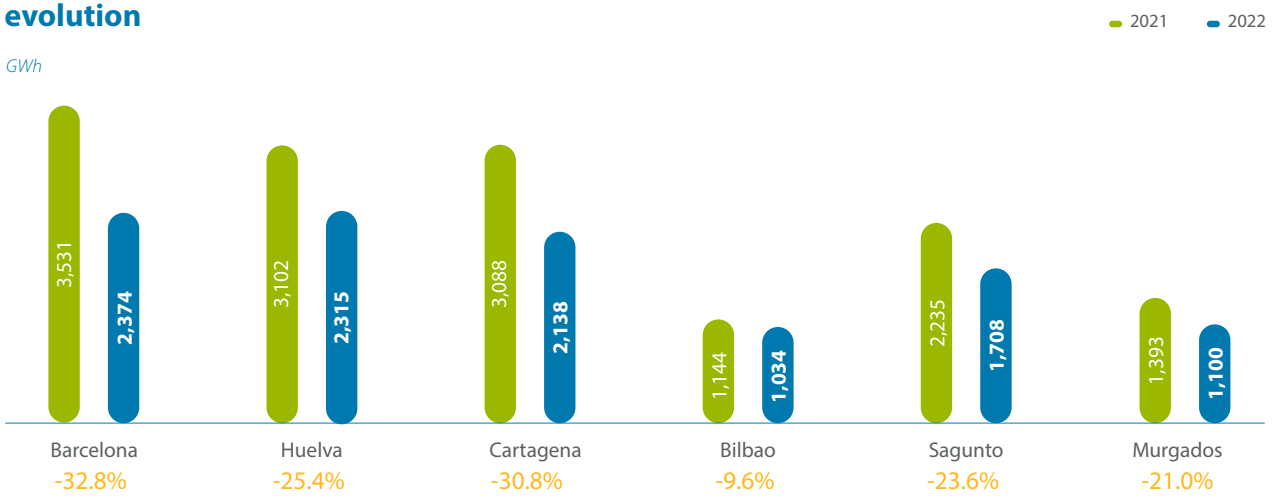
Truck loads fell by 26.4%, with decreases recorded at all regasification terminals.

In 2022, the average use of contracting capacity has risen to 90%.

## Regasification evolution




## Truck loading evolution



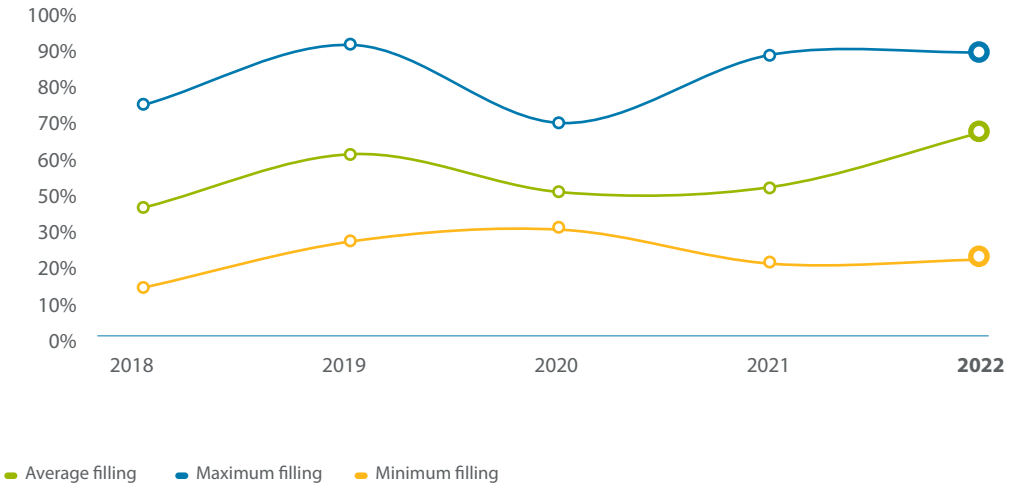

**773 GWh/d**

**Average daily production** in 2021 of the regasification terminals (**+48%** vs. 2021)

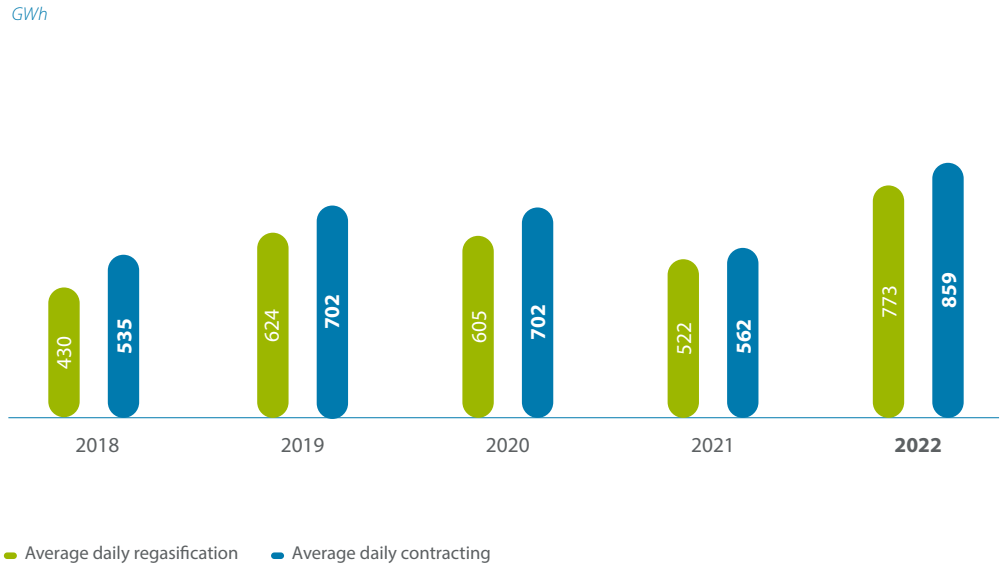
**48%**

**Increased inflows** to the System from LNG terminals

## Evolution of total stocks in tanks

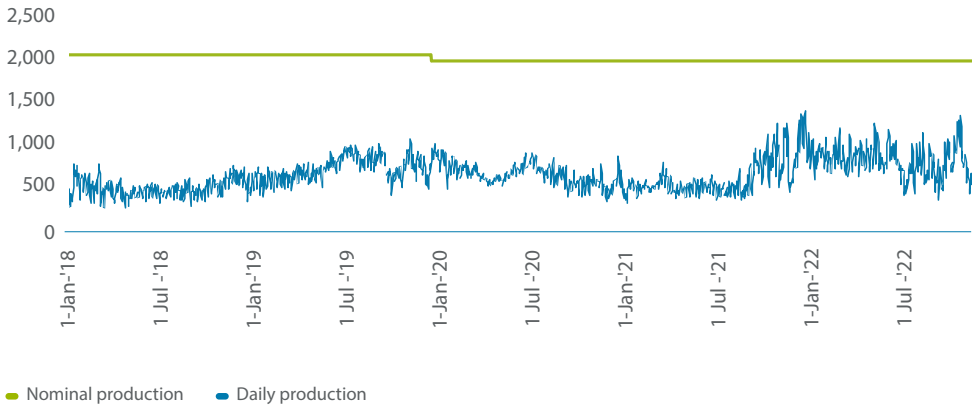



## Evolution of average regasification and contracting in the plants



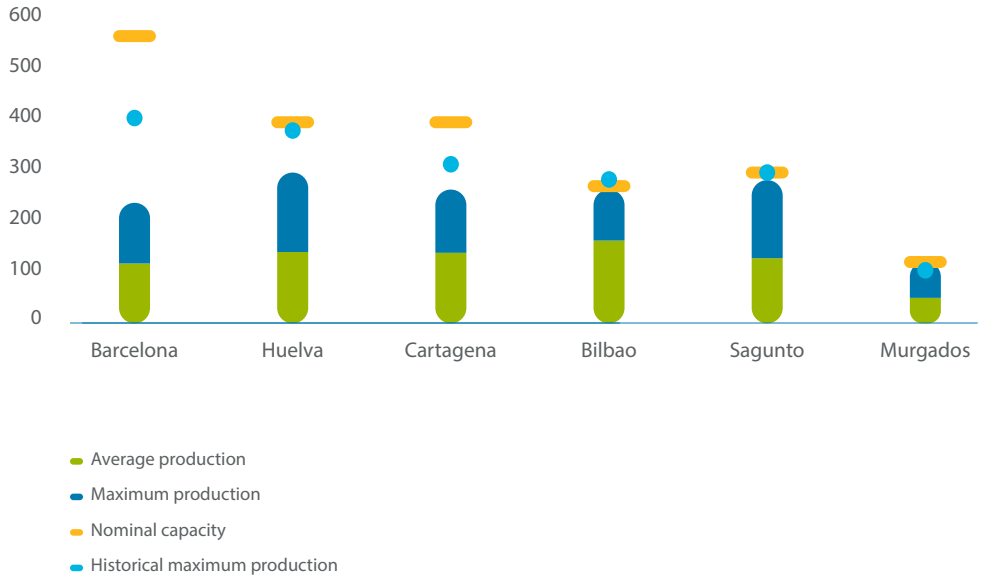
## Nominal and daily production evolution

*GWh*




## Productions and capacities by regasification terminals

*GWh/d*




Consult the evolution of nominal, daily average production and the productions and capacities by regasification terminals in the **annex** of this chapter in the downloadable information, by clicking here.

# Vessel loading at regasification terminals

LNG ship loading at regasification terminals has increased by 45% in 2022 compared to 2021. Many of these outflows have been directed towards neighbouring countries in order to contribute to the security of energy supply to the rest of Europe.

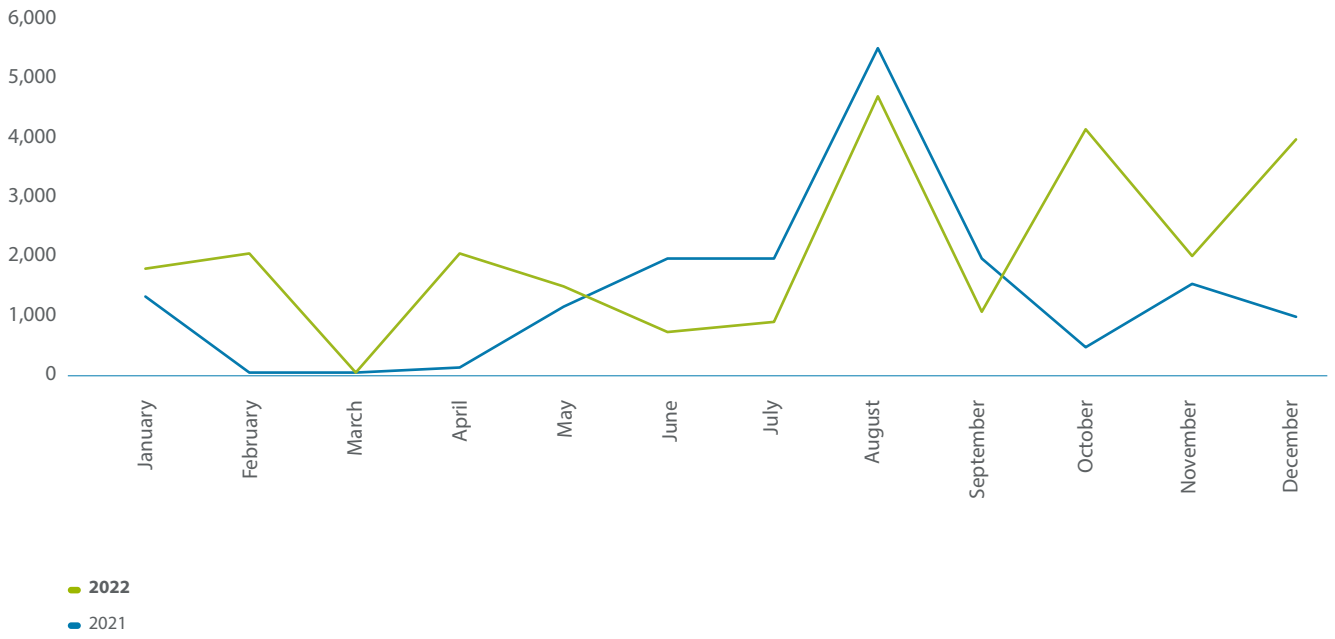
All LNG terminals have experienced an increase in this regard, with the Sagunto Terminal having loaded the largest volume in 2022.

+45%

**LNG loaded** on vessels vs. 2021

## LNG loaded on vessels

*GWh*



# Truck loading at regasification terminals

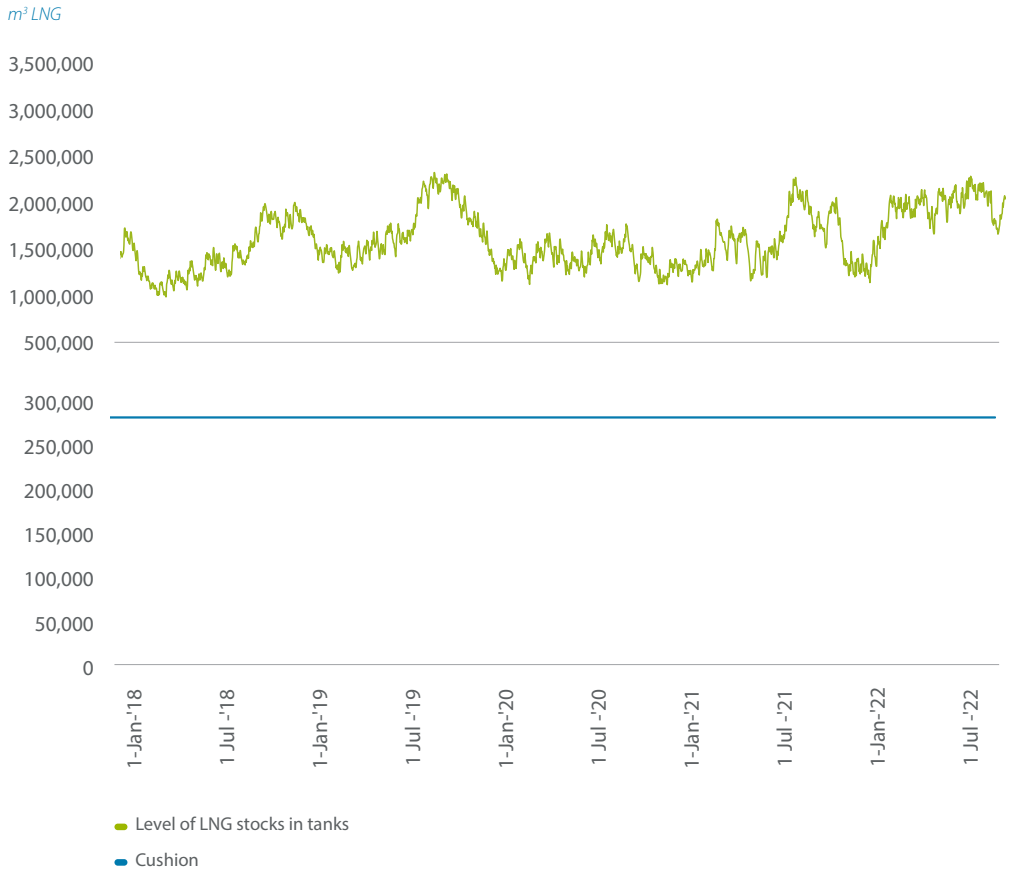
In 2022, the volume of trucks managed was 10,666 GWh, 26.4% less than in 2021, breaking the upward trend in demand for this service. The most notable decrease was observed at the Barcelona Terminal, with a 32.8% less than in 2021.

## Truck loading

| | 2021 | 2022 | | | |
|---|---|---|---|---|---|
| Regasification terminal | Total GWh | Total GWh | Δ o/2021 | Max. daily GWh/day | Δ o/2021 |
| Barcelona | 3,531 | **2,374** | **-32.8%** | **14** | **-8.5%** |
| Huelva | 3,102 | **2,315** | **-25.4%** | **12** | **-24.2%** |
| Cartagena | 3,088 | **2,138** | **-30.8%** | **14** | **+2.7%** |
| Bilbao | 1,144 | **1,034** | **-9.6%** | **5** | **-3.6%** |
| Sagunto | 2,235 | **1,708** | **-23.6%** | **10** | **+0.4%** |
| Mugardos | 1,393 | **1,100** | **-21.0%** | **7** | **-0.4%** |
| **Total** | **14,493** | **10,668** | **-26.4%** | **62** | **-** |

# Regasification terminal stock

## Stock evolution




For average tank stock levels, please refer to **Annex** of this chapter in the downloadable information by clicking here.

# International connections

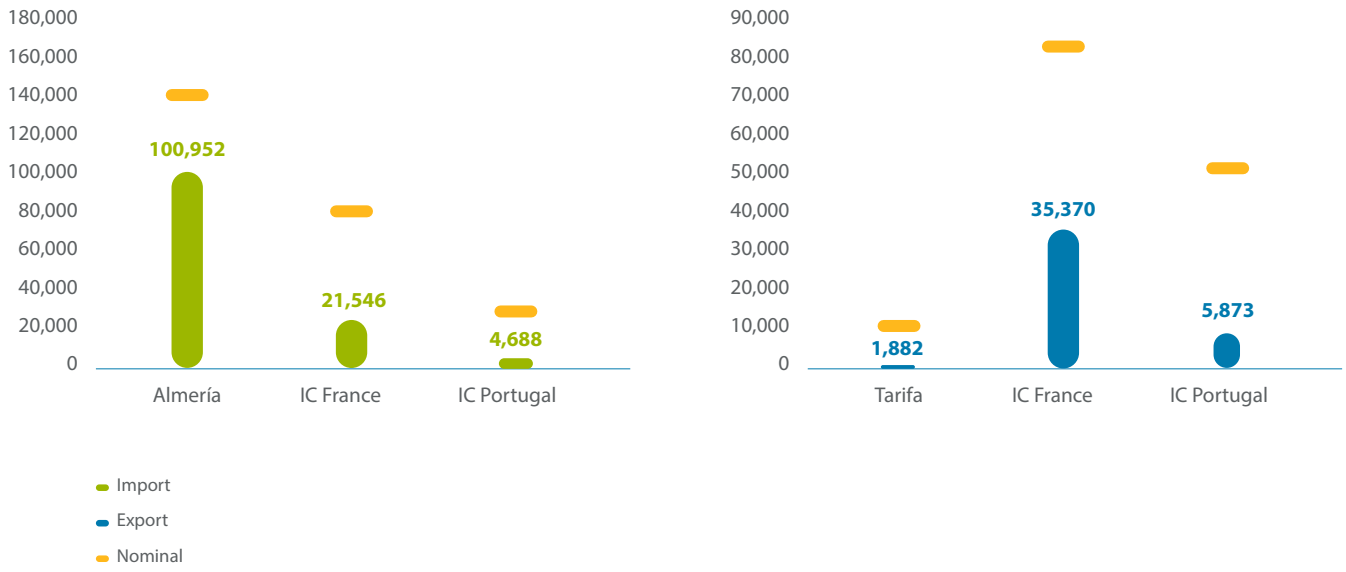
In 2022, the Gas System received 127,186 GWh of natural gas through international connections. Exports amounted to 43,125 GWh, 130% higher than the previous year.

Exports through interconnections with France have broken historical records, exceeding 35 TWh. In total, through interconnections with France and Portugal, exports have reached 41 TWh, the highest figure since 2016.

In Tarifa, exports started from 28 June 2022. In Almeria, higher quantities have been recorded throughout the year than in 2021.

## Commercial movements

*GWh*




43,125 GWh

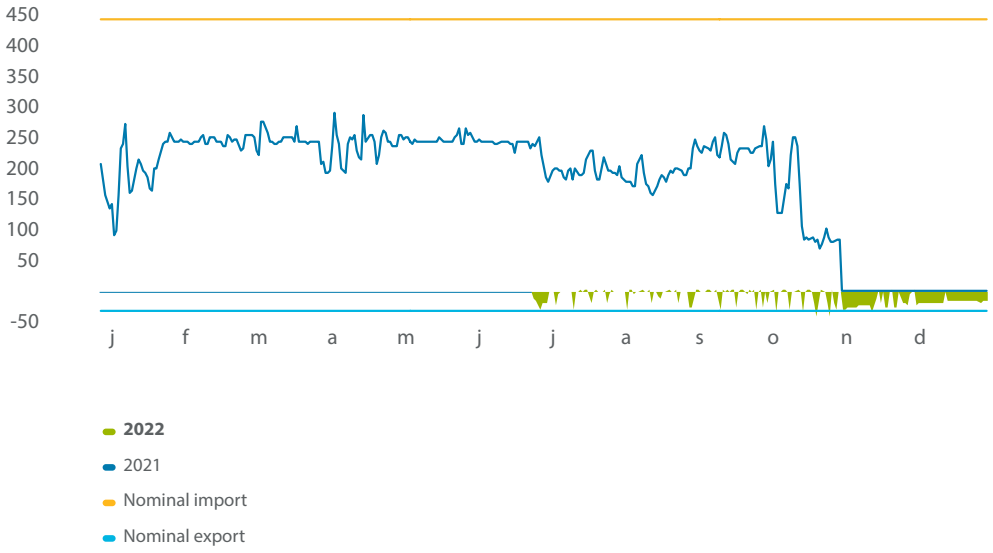
**Natural gas exports**
through international connections
**(+130%** vs. 2021)

# International connections with North Africa

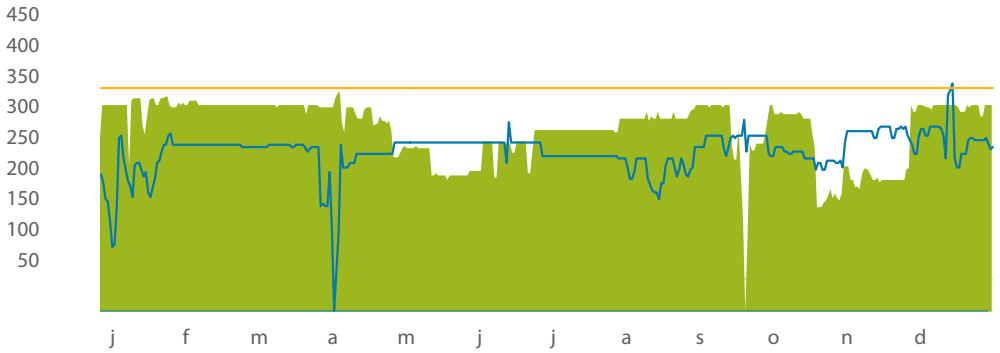
## Physical movements

*GWh / day*

### Inputs via IC Tarifa



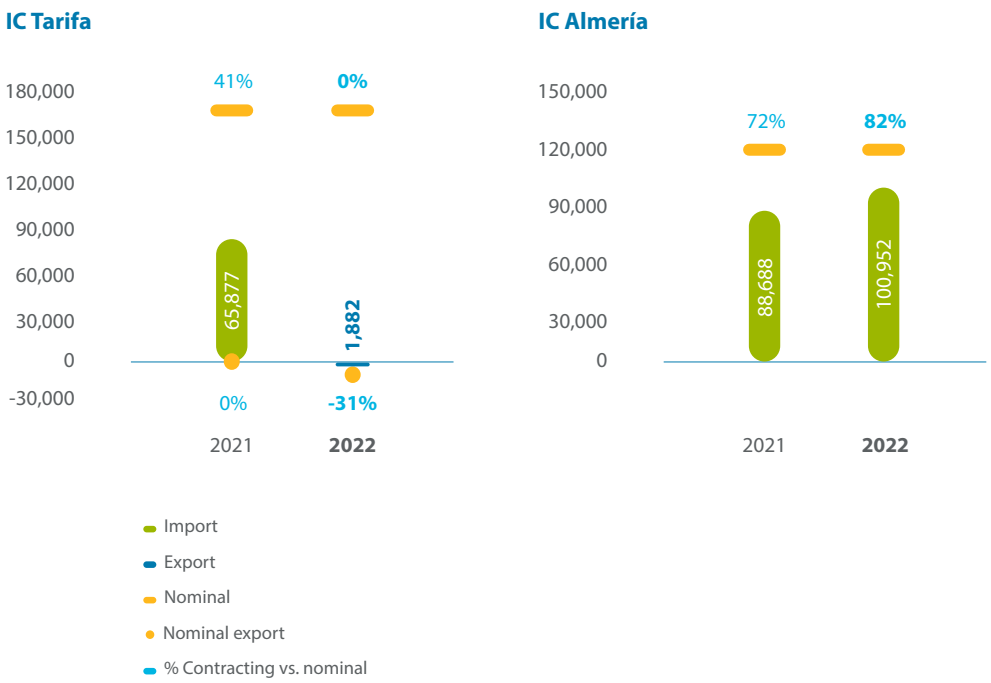

### Inputs via IC Almería



In 2022, imports through the Tarifa international connection reached 1,882 GWh. Gas imported through the Almería international connection amounted to 100,952 GWh.

## Commercial movements

*GWh/year*




# International connections with France

In 2022, natural gas imports via international connections with France have fallen by 30%. However, through this interconnection exports increased by 157% over 2021.

As of 1 November, and depending on various operational conditions, the export capacity at the Irún interconnection point was increased to a total nominal export capacity of 265 GWh/d via the VIP.

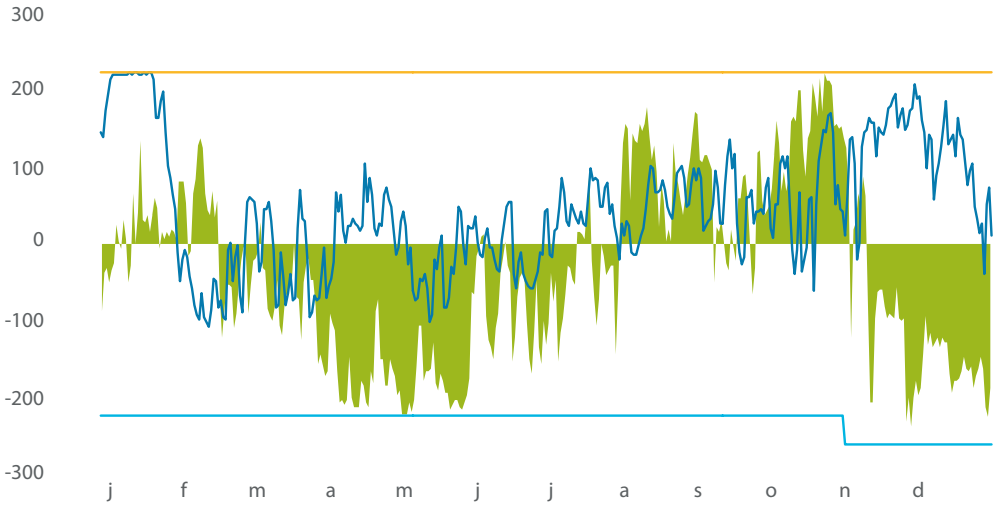
+157%

**Increase in exports**
through the interconnection with France (vs. 2021)

## Physical movements
## IC France

*GWh / day*

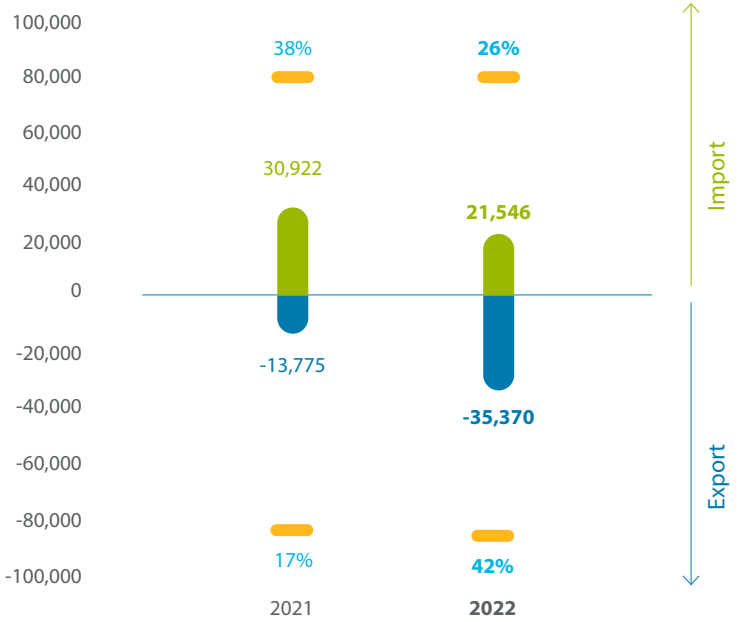
*Balance = Import - Export*




- **2022**
- 2021
- Nominal import
- Nominal export

## Trade movements
## IC France

*GWh/year*




- Import
- Export
- Nominal export
- % utilisation

# International connections with Portugal

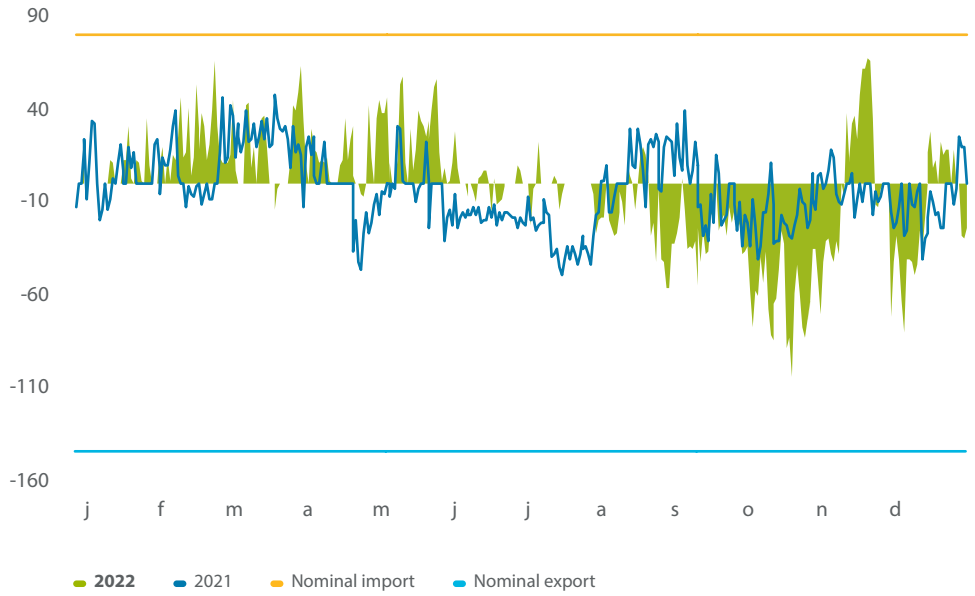
Exports through international connections with Portugal amounted to 5,873 GWh in 2022, up 17.8% on 2021.

Imports have increased by 31.7% compared to 2021, reaching 4,688 GWh in 2022.

## Physical movements IC Portugal balance

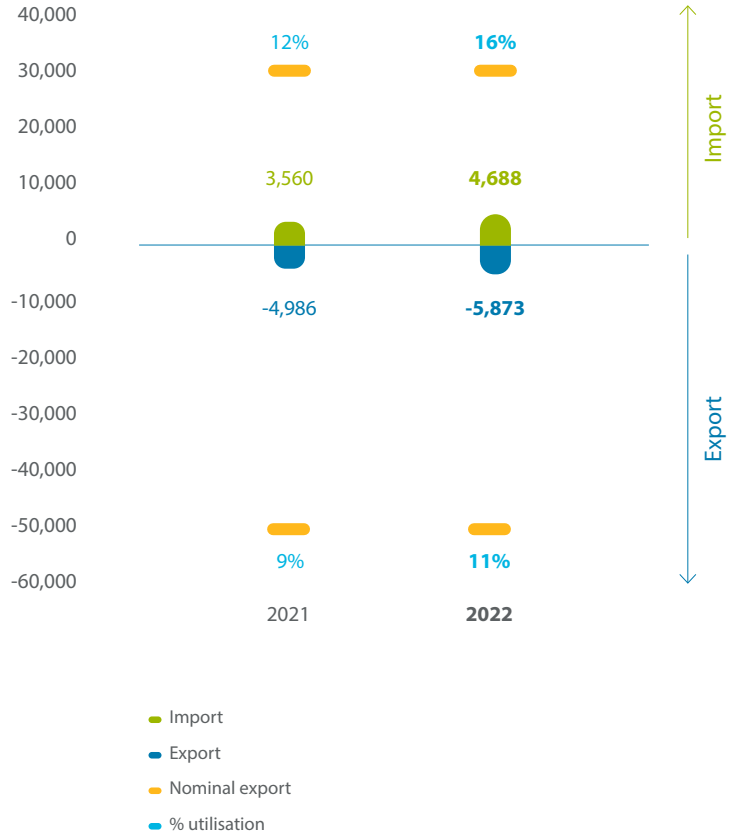
*GWh / day*

*Balance = Import - Export*




## Trade movements IC Portugal

*GWh/year*



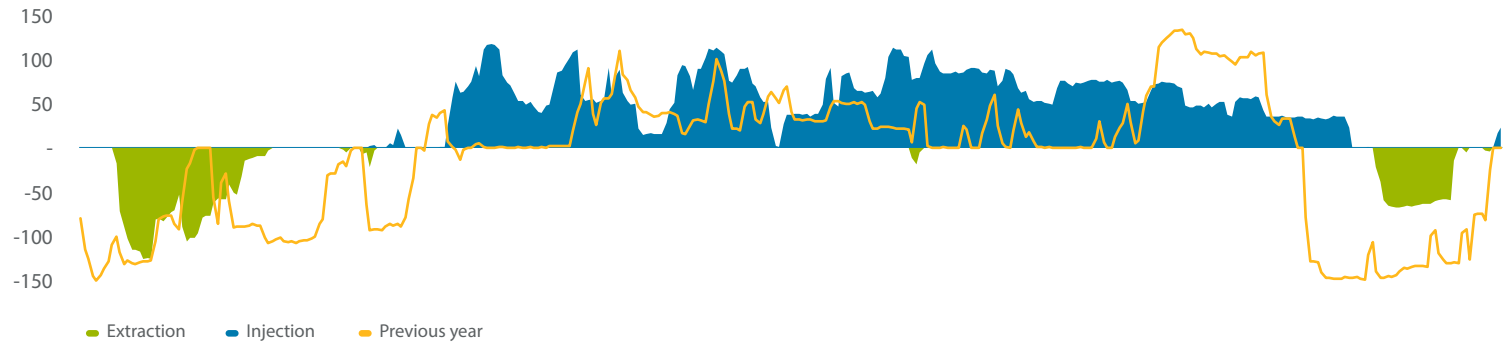
# Underground storage facilities

Gas injected during 2022 amounted to 14,289 GWh. Extraction, on the other hand, was 3,978 GWh.

Of the EU regulatory developments addressed in 2022, Regulation (EU) 2022/1032 amending Regulation (EU) 2017/1938 stands out with regard to underground storage. This Regulation establishes the obligation for each Member State to reach a filling level of 80% in underground storage by 1 November 2022. Spain exceeded this target and reached a fill level of 94% on that day.

## Extraction/injection in storage

*GWh / day*

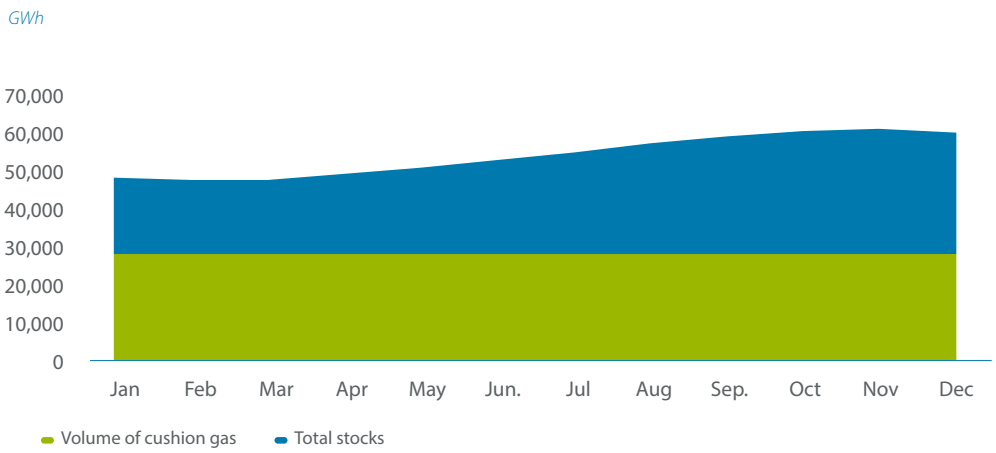



94%

**Filling level** of storage facilities in Spain on 1 November (level required by EU regulations): 80%)

| | 2021 | **2022** | Δ o/2021 |
|---|---|---|---|
| Injection | 8,041 | **14,289** | 78% |
| Extraction | 12,724 | **3,978** | -69% |

## Stocks in underground gas storages




61,802 GWh

**Final stocks**
in underground storage

## Full management of underground storage facilities

| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Working capacity | *GWh* | 34,910 | 34,910 | 34,910 | 35,342 | 35,342 | 35,342 | 35,342 | 35,342 | 35,342 | 35,342 | 35,342 | 35,342 |
| Volume of cushion gas | *GWh* | 28,793 | 28,793 | 28,793 | 28,793 | 28,793 | 28,793 | 28,793 | 28,793 | 28,793 | 28,793 | 28,793 | 28,793 |
| **Initial stocks** | ***GWh*** | **51,543** | **49,556** | **48,851** | **48,851** | **50,569** | **52,279** | **54,416** | **56,385** | **58,902** | **60,793** | **62,249** | **62,910** |
| Injection (net) | *GWh/month* | 0 | 0 | 46 | 1,791 | 1,711 | 2,136 | 1,970 | 2,570 | 1,913 | 1,678 | 721 | 38 |
| Average daily injection | *GWh/day* | 0 | 0 | 0 | 60 | 55 | 71 | 64 | 83 | 64 | 54 | 24 | 1 |
| Extraction (gross) | *GWh/month* | 1,986 | 705 | 46 | 0 | 0 | 0 | 0 | 35 | 0 | 0 | 59 | 1,147 |
| Average daily extraction | *GWh/day* | 64 | 25 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 37 |
| **End stocks** | ***GWh*** | **49,556** | **48,851** | **48,851** | **50,569** | **52,279** | **54,416** | **56,385** | **58,902** | **60,793** | **62,249** | **62,910** | **61,802** |

# Gas transmission

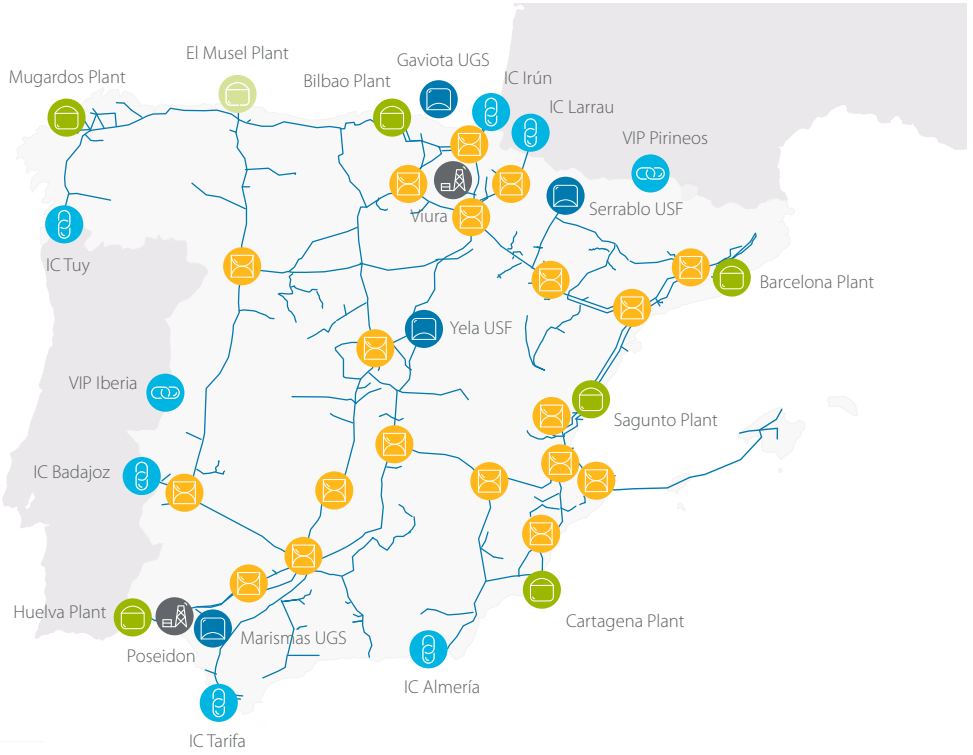
In 2022, the Spanish Gas System remained with the same infrastructures as the previous year.

The Gas System had 11,369 km of primary transport pipelines at the end of 2022, and a total of 13,361 km, including secondary pipelines.

11,369 km

**Primary transmission pipelines (13,361 km,** including secondary ones)

## Transmission infrastructure

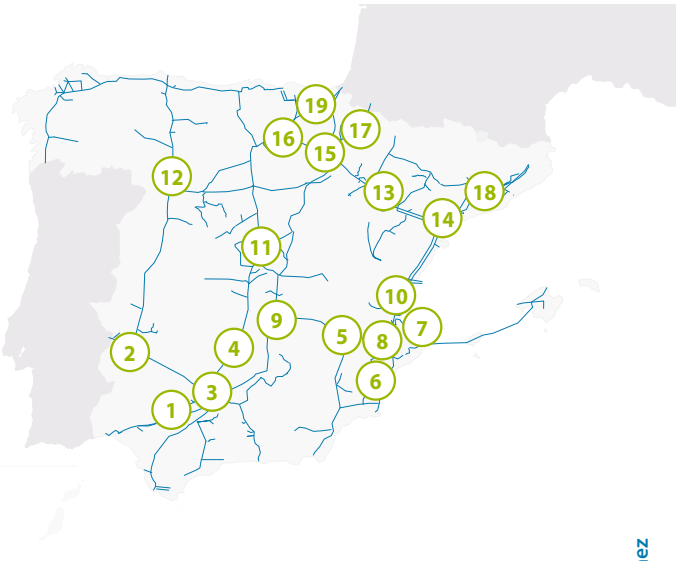



* In final phase of administrative processing.

# Compressor stations

The gas pipeline network has nineteen compressor stations, as well as transport centres, regulation and measurement stations and connection points to the network. They allow the correct primary distribution of gas throughout national territory and provide security of supply of natural gas even in situations of peak demand.

## Compressor stations




1. Seville CS
2. Almendralejo CS
3. Córdoba CS
4. Almodóvar CS
5. Chinchilla CS
6. Crevillente CS
7. Denia CS
8. Montesa CS
9. Alcázar CS
10. Paterna CS
11. Algete CS
12. Coreses CS
13. Zaragoza CS
14. Tivissa CS
15. Villar de Arnedo CS
16. Haro CS
17. Navarra CS
18. Bañeras CS
19. Euskadour CS

## Average emission gas quality

| | Barcelona | Huelva | Cartagena | Bilbao | Sagunto | Mugardos | Aznalcázar Gas Field | Viura Gas Field | Valdemingómez | Portugal Connection | France Connection | Tarifa | Almería |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Molar fractions %** | | | | | | | | | | | | | |
| Nitrogen ($N_2$) | 0.163 | 0.103 | 0.134 | 0.115 | 0.089 | 0.148 | 1.172 | 1.401 | 0.759 | 0.148 | 0.567 | 1.224 | 1.002 |
| Carbon dioxide ($CO_2$) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.200 | 0.050 | 1.467 | 0.042 | 0.808 | 1.440 | 1.874 |
| **Gas quality** | | | | | | | | | | | | | |
| H.C.V. [KWh/m³(n)] | 11.630 | 11.616 | 11.635 | 11.546 | 11.590 | 11.580 | 11.417 | 11.689 | 10.861 | 11.603 | 11.603 | 11.562 | 11.618 |
| H.C.V. [MJ/m³(n)] | 41.869 | 41.817 | 41.885 | 41.567 | 41.723 | 41.686 | 41.102 | 42.080 | 39.098 | 41.772 | 41.770 | 41.622 | 41.826 |
| Relative density | 0.588 | 0.586 | 0.588 | 0.583 | 0.585 | 0.585 | 0.590 | 0.605 | 0.573 | 0.587 | 0.604 | 0.619 | 0.626 |

# 3 Markets

The Spanish system has experienced a **significant increase in demand for gas storage services** as a result of the conflict between Russia and Ukraine. Prices in the main European hubs, moreover, have recorded hitherto unprecedented increases and volatility.

# Brief general analysis

2022 has been a challenging year for the entire energy sector in Europe.

The Russian-Ukrainian conflict triggered uncertainty in the security of energy supply in Europe. Spain, due to its geographical location and thanks to its robust gas infrastructure network, has been able to cope with this normally, acting in solidarity with neighbouring countries.

Specifically, the Spanish Gas System has contributed to the guarantee of gas supply to the rest of Europe with a significant increase in LNG loading operations carried out and with a significant increase in exports to France.

The high demand for gas storage services has had a direct impact on an increase in the contracting of gas storage slots for LNG truck unloading and storage services in LNG truck and underground storage.

Moreover, since the beginning of the conflict, and more intensely since July, prices in the main hubs of the world's major trading hubs reflected the energy crisis derived from this war, with significant increases and volatility not recorded previously.

# Capacity purchasing

The most noteworthy aspects of 2022 in the field of capacity purchasing are the following.

There has been strong market interest in capacity purchasing in the Spanish System, especially in the slots for LNG loading and unloading, underground storage capacity and LNG storage capacity at TVB, reaching record figures.

The interest in unloading slots, one of the services that has always been among the favourites of the System's users, has soared in 2022, resulting in auction premiums never seen since the entry into force of Circular 8/2019. Specifically, in 2022, the historical maximum allocation premium has been reached; over €7 M/slot and premiums have been recorded for the first time in all years offered in the annual 15-year process.

Regarding the loading slots, which in recent years had been of a more residual nature, there has been a very significant increase in contracting compared to previous year. The number of operations contracted in 2022 has grown by more than 100% compared to 2021, and for the first time premiums have even been paid in the allocation of this type of services. There has also been a significant increase in the number of LNG loadings destined for other EU countries, such as Italy and Germany.

Since the beginning of the Russian-Ukrainian conflict, **the number of LNG loadings destined for other EU countries,** such as Italy or Germany, **has increased** significantly

This high level of purchasing slots in the System has led to a high demand for LNG storage capacity from users. This has resulted, especially from May onwards, in an average service uptake of 96%, which has even reached 100% on many days during the period.

In the quarterly and monthly auctions held in the latter part of the year, up to 20 rounds were necessary, reaching premiums of up to 17 times the toll. The daily auctions were also marked by recurrent and in some cases very high premiums.

As a consequence of the significant increase in demand for the LNG storage service, the contracting of aggregated services has increased in both unloading+storage+regasification aggregates and storage+regasification aggregates.

Similarly, the situation caused by the conflict between Russia and Ukraine has led to the development of regulations aimed at reinforcing security of supply and the filling of European underground storage facilities. In the Spanish system, this also led to an increase in the contracting of underground storage capacity of 11% on average compared to the previous year. Since October, the total capacity contracted has reached more than 95%.

Another noteworthy event in 2022 is the start of the flow of gas exports to Morocco in June. For the first time, outbound capacity was offered through the Tarifa International Connection, and since then, stable export contracts have been maintained through this point.

With regard to the truck loading service, high levels of contracting continued to be recorded at the Bilbao, Barcelona and Sagunto terminals, although in general there was less competitive pressure in these auctions than in previous years. In the latter part of 2022, the resolution on the detailed procedures for the development of congestion management and anti-capacity hoarding mechanisms in the System entered into force. This allows regasification terminals, where the truck loading service is congested, to offer the capacity contracted but not used by users and to do so on a daily horizon.

Another noteworthy aspect of capacity purchasing in 2022 has been the growing interest of users in virtual liquefaction procurement. This is a new service, introduced in the Gas System with the Access Circular published in December 2019. Given the growing market interest and at the request of the industry, the nominal capacity of the service was increased from 4 to 10 GWh/day in November 2022. Even with this increase, contracting reached 100% of nominal capacity in November and December.

Finally, as a milestone of the year, it is also worth mentioning that in the latter part of 2022 the organised secondary capacity market was launched. This development complements the existing secondary market, which only allowed bilateral trading of capacity previously purchased in the primary market. In this way, the organised market was created with the clear aim of making the secondary capacity market accessible to all users. This marketplace performs matchmaking automatically in a completely anonymous way, based on the purchase and sale offers entered by the different users for truck loading services and unloading slots. Other services are expected to be added throughout 2023.

96%

**Average contracting of LNG storage capacity,** which has reached 100% on many days of the year

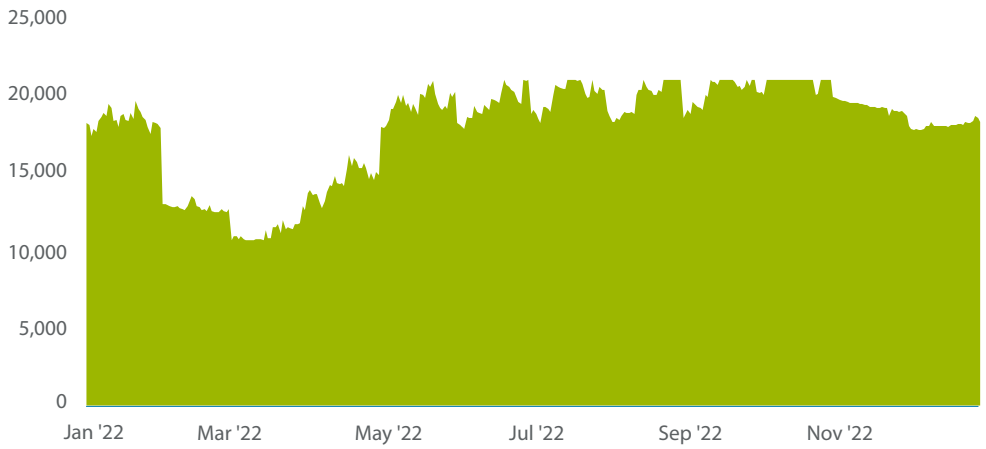
95%

**Contracting the total capacity underground storage** from October

# Regasification terminal procurement

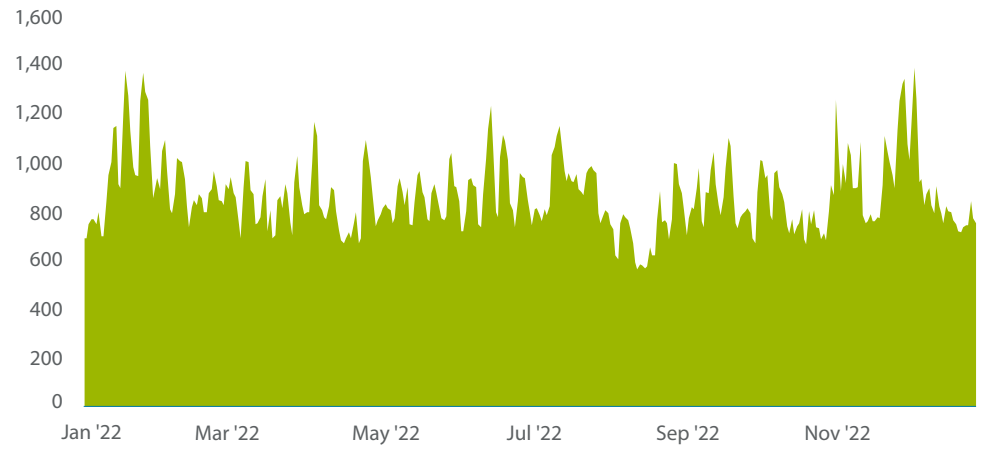
## Contracting of LNG storage capacity

*GWh/day*




## Contracting of regasification

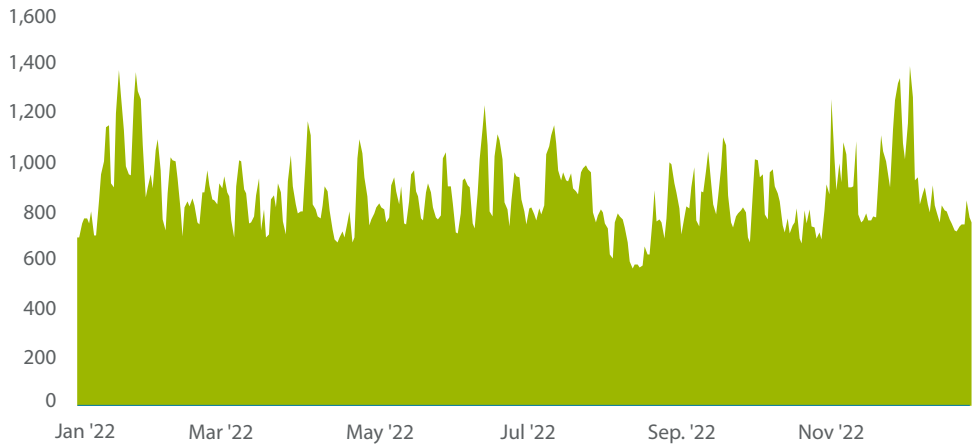
*GWh/day*




The interest in the LNG storage service resulted in a high level of LNG storage contracting, reaching 100% of the nominal capacity in several periods of the year.

## Contracting PVB access from TVB

*GWh/day*



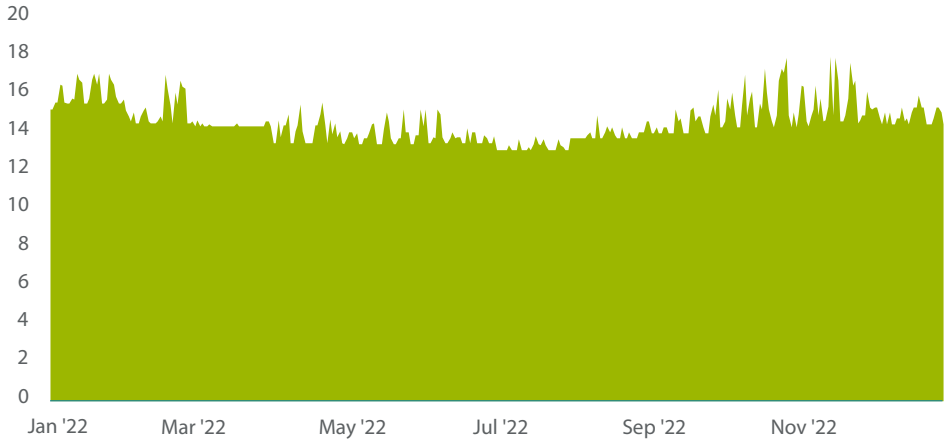

## Tank loading procurement by terminal

*GWh/day*

As in previous years, the tank loading service has recorded high levels of contracting, especially at the Barcelona, Bilbao and Sagunto terminals, where 100% of the nominal capacity of the service was reached.

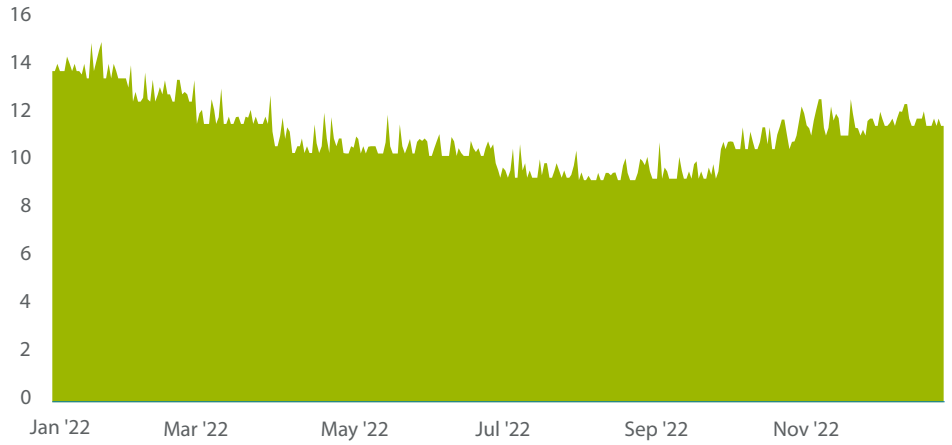
### Barcelona Plant

*GWh/day*



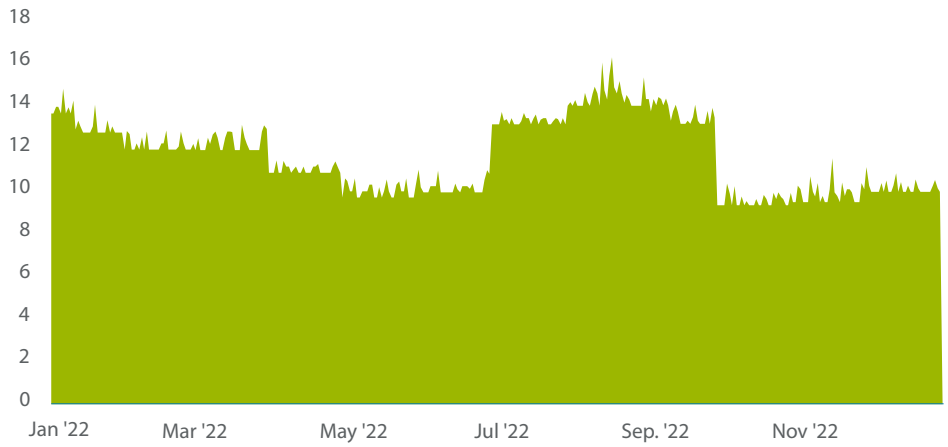

### Cartagena Plant

*GWh/day*



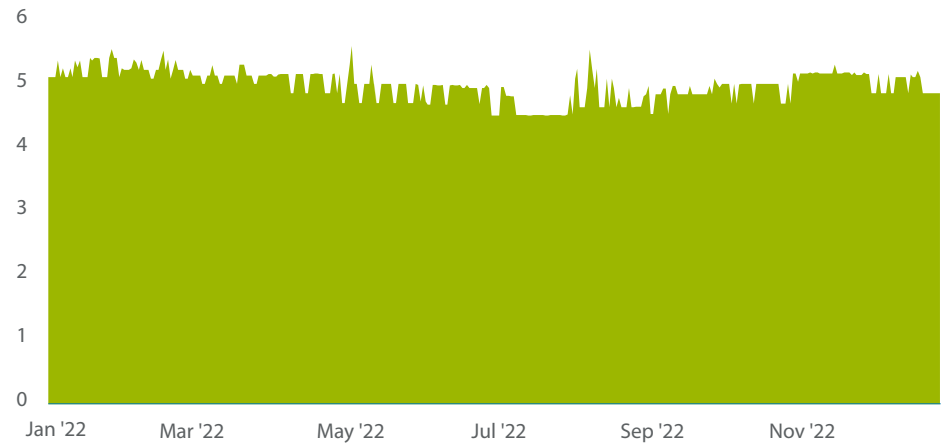
## Huelva Plant

*GWh/day*



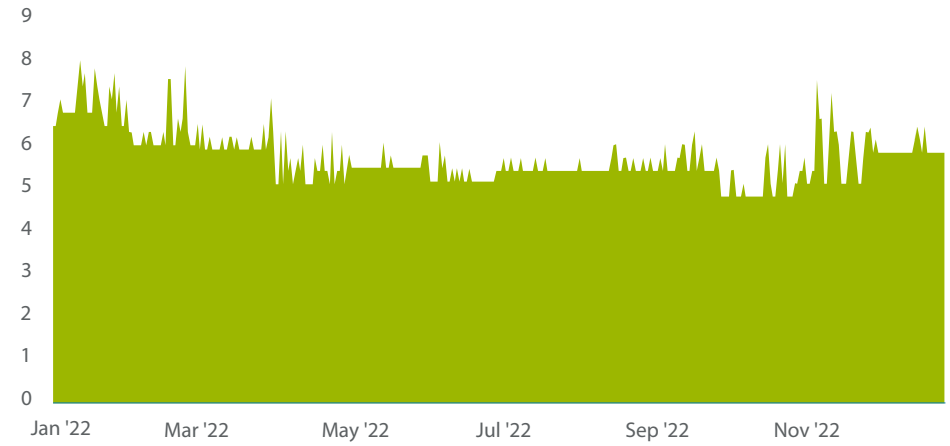

## Bilbao Plant

*GWh/day*



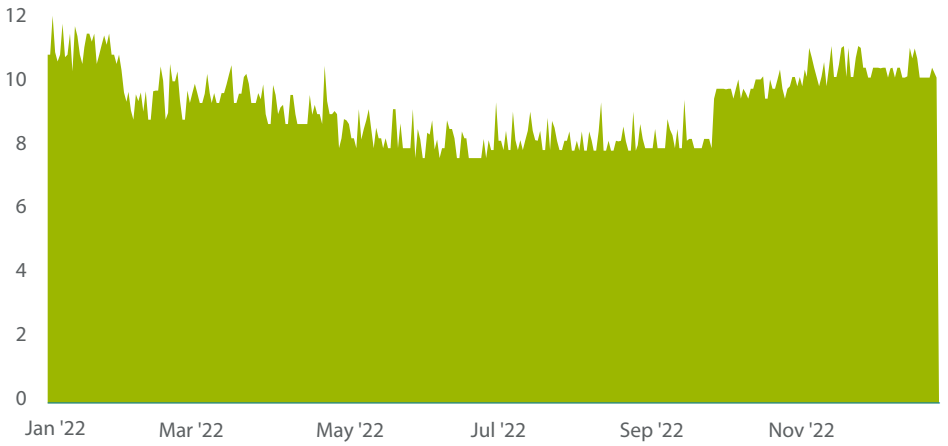

## Mugardos Plant

*GWh/day*



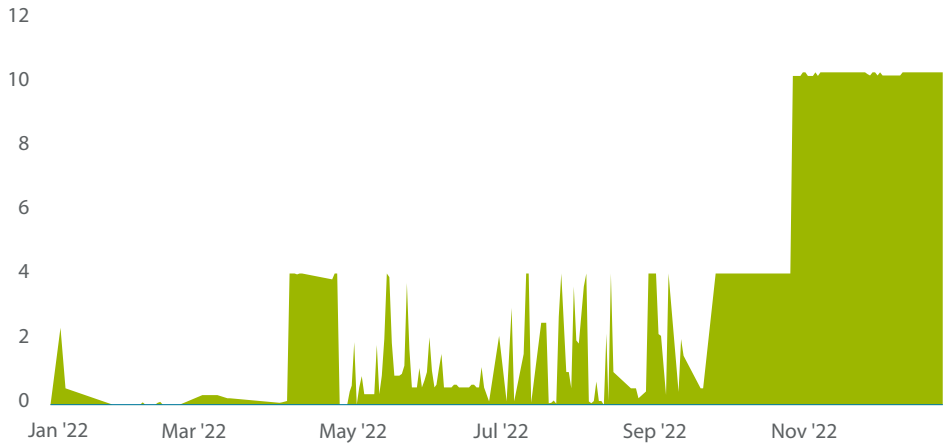

## Sagunto Plant

*GWh/day*



## Virtual liquefaction contracting

*GWh/day*




The increase in virtual liquefaction contracting from November onwards is motivated by the increase in the nominal capacity of the service.

# Procurement by international connections

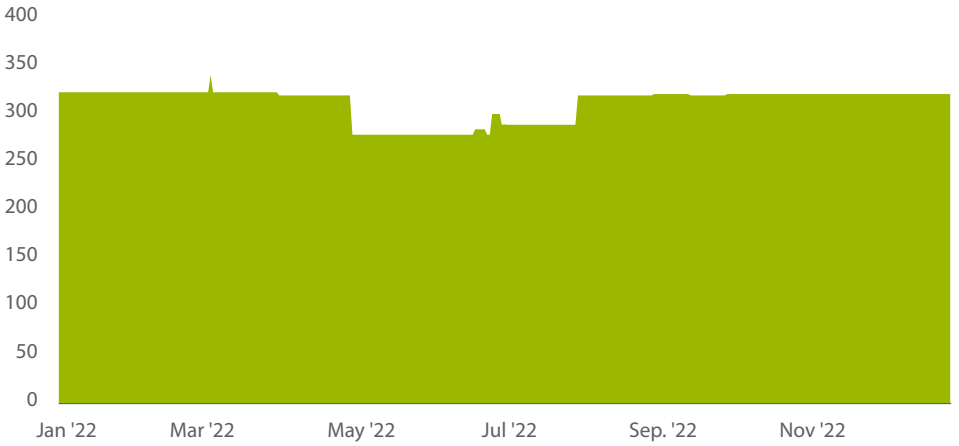
## International connections with North Africa

*GWh*

| | Import | | | | | |
|---|---|---|---|---|---|---|
| | 2021 | | | 2022 | | |
| | Nominal | Contracted | % Contracted capacity | Nominal | Contracted | % Contracted capacity |
| Tarifa | 162,060 | 75,548 | 47% | 162,060 | 0 | - |
| Almería | 112,128 | 95,440 | 85% | 123,370 | 111,419 | 90% |

## Imports via the international connection at Almeria

*GWh/day*



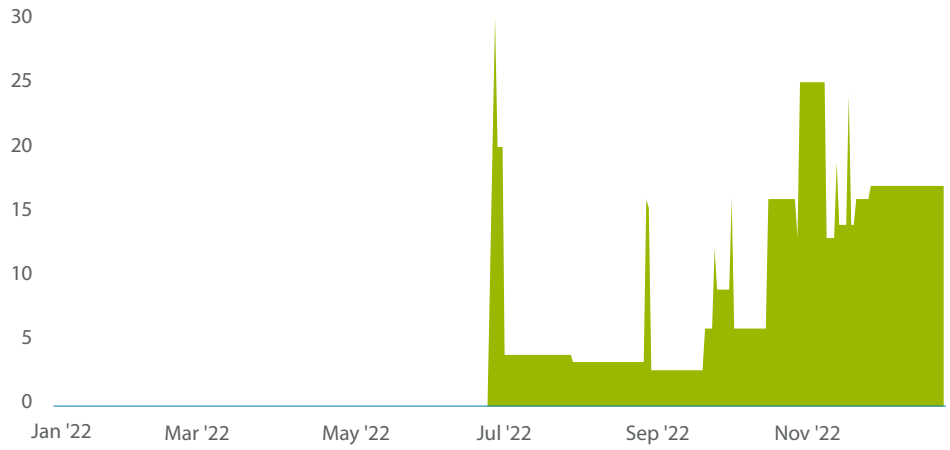

In 2022, no new incoming contracts have been registered in Tarifa.

*GWh*

| | Export | | | | | |
|---|---|---|---|---|---|---|
| | 2021 | | | 2022 | | |
| | Nominal | Contracted | % Contracted capacity | Nominal | Contracted | % Contracted capacity |
| Tarifa | - | - | - | 5,984 | 1,900 | 32% |

## Exports via the international connection at Tarifa

*GWh/day*




From June 2022 the export service was offered by Tarifa.

## International connections with France

*GWh*

| | VIP Pyrenees | | | | | |
|---|---|---|---|---|---|---|
| | 2021 | | | 2022 | | |
| | Nominal | Contracted | % Contracted capacity | Nominal | Contracted | % Contracted capacity |
| Import | 82,125 | 71,388 | 87% | 82,125 | 76,251 | 93% |
| Export | 82,125 | 46,635 | 57% | 82,125 | 73,684 | 90% |

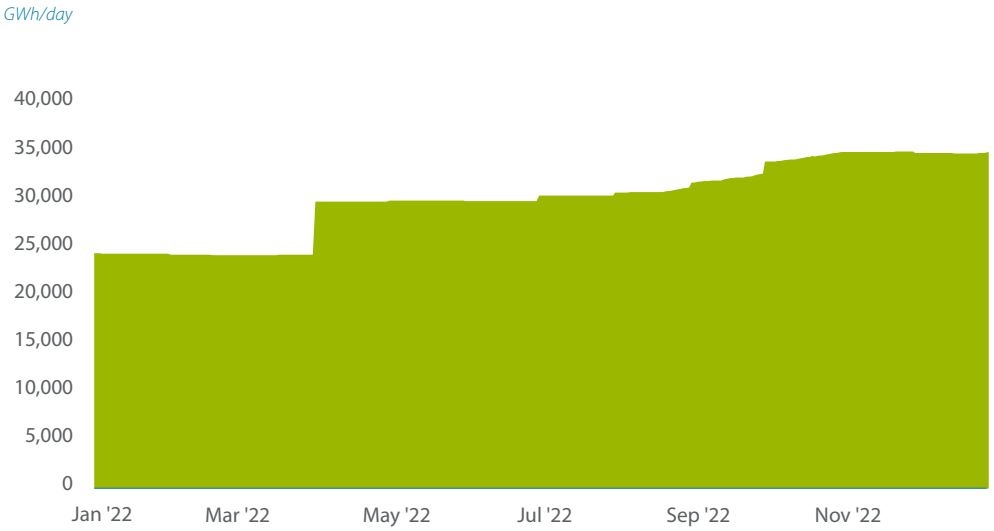
From 1 November 2022 and subject to various operational constraints, the nominal export capacity of VIP Pyrenees is increased by up to 40 GWh/day as a contribution to Europe's energy security.

## International connections with Portugal

*GWh*

| | VIP Iberia | | | | | |
|---|---|---|---|---|---|---|
| | 2021 | | | 2022 | | |
| | Nominal | Contracted | % Contracted capacity | Nominal | Contracted | % Contracted capacity |
| Import | 29,276 | 4,656 | 16% | 29,276 | 6,467 | 22% |
| Export | 52,697 | 6,311 | 12% | 52,697 | 6,839 | 13% |

# Underground storage contracting




In 2022, contracting in underground storage was higher than in 2021.
From November onwards, it reached almost 100% of available capacity as a result of the filling milestones foreseen in the current regulations.

100 %

**Contracting capacity** in underground storage almost reached

# Services offered through auctions

Capacity auctions are a mechanism for allocating capacity in the facilities of the Spanish Gas System.

The following 2022 figures are worth noting:

+147,000

**Capacity auctions** held.

+600

**Slots and more than 200 TWh** for the other services offered.

37

**Record number of rounds at auction**, which meant an auction duration of 4 days.

50

**Shippers** that have participated in an auction process.

For further details on the auctions of slots, please refer to **Annex 1** of this chapter in the downloadable information by clicking here.

For further details on auctions that do not involve slots, please refer to **Annex 2** of this chapter in the downloadable information by clicking here.

## Unloading slots allocated in annual procedures

- In the annual unloading slots auction, the number of requests received in relation to supply was 35% higher than the previous year.
- The offer of slots for the first three years was 120% higher than the supply in the 2021 process.
- The allocation of slots for the 15 years on offer was 97%, with 100% for the first year.

100%

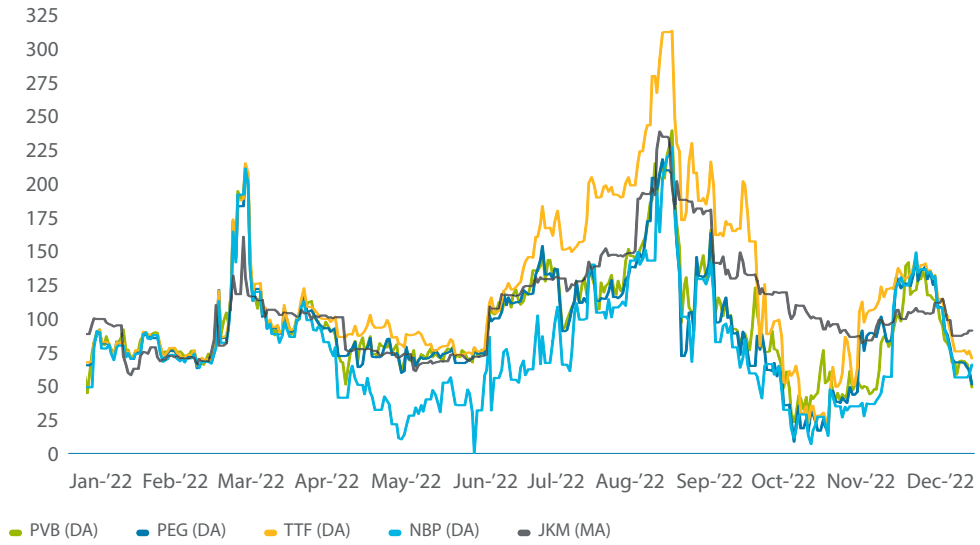
**Slots allocated** for the first year
**(97%** for the 15 years offered)

For more details on the allocation of unloading slots, please refer to **Annex 2** of this chapter in the downloadable information by clicking here

# International situation

### Evolution of prices in the main European hubs and JKM

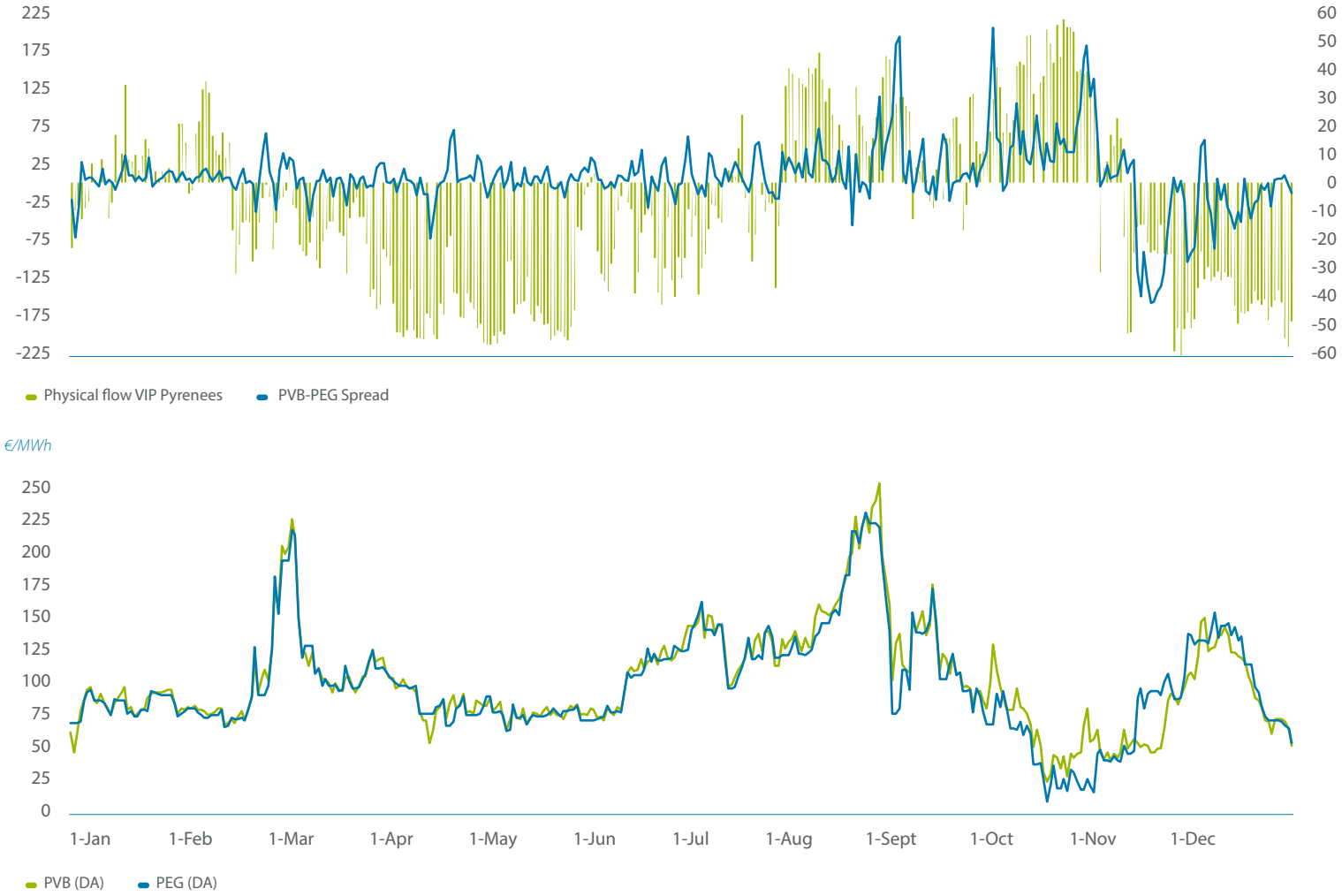
*€/MWh*



The energy crisis resulting from Russia's invasion of Ukraine has contributed to record high prices in gas markets in 2022 and sustained high volatility over time. The prices of the different European hubs have reflected the different exposures to their dependence on Russian gas, which has led to a decoupling between the different markets to identify three distinct price groups. On the one hand, and in descending order of price level, the Netherlands (TTF), Germany (THE) and Italy (PSV); on the other hand, the United Kingdom, and finally Spain (PVB) and France (PEG).

It is worth noting the operation of the interconnection with France, which is shown in the graph below. A total of 35.4 TWh was exported in 2022 compared to 13.8 TWh exported in 2021. The direction of flows in the interconnection have responded to the 2022 price spread between the Spanish PVB and the French PEG, also conditioned by the different operating models in the Spanish LNG terminals - TVB model - and French LNG ones.

## Operation of the interconnection with France and spread between PVB and PEG



# The role of the TSO in the Organised Market

The participation of the TSO in the Market is necessary to achieve a safe Gas System and an efficient, advanced and competent operation, and is supported by Law 8/2015, which recognised the Technical System Operator (TSO) as a participant in the Organised Gas Market.

As established in the Balancing Circular 2/2020, the TSO is responsible for maintaining the transmission network of the Gas System within the normal operating limits by means of the so-called balancing actions in PVB and the management of imbalances in TVB and AVB.

In addition, according to Order IET/2736/2015, of 17 December, which establishes the tolls and fees associated with third-party access to gas facilities and the remuneration of regulated activities for 2016, the operating gas paid for by the System must be acquired by the TSO of the System on the Organised Gas Market.

## Balancing actions in PVB

Action by means of balancing actions is an operation that the TSO must carry out in the Organised Market when it estimates that the expected gas stock in the transmission network at the end of the day is going to move away from the band of optimal values for operational functioning -green band-, with the aim of returning the stock to that band.

- **Sell-balance actions:** when the stock is expected to end up in the upper warning band - upper red band.
- **Buy-balance actions:** when the stock is expected to end up in the lower warning band - lower red band.

Subsequent to the balancing actions executed by the TSO, it is expected that users will tend to buy or sell in opposition/adjustment to the TSO balancing action (without regulatory obligation), to offset the effect on the stock.

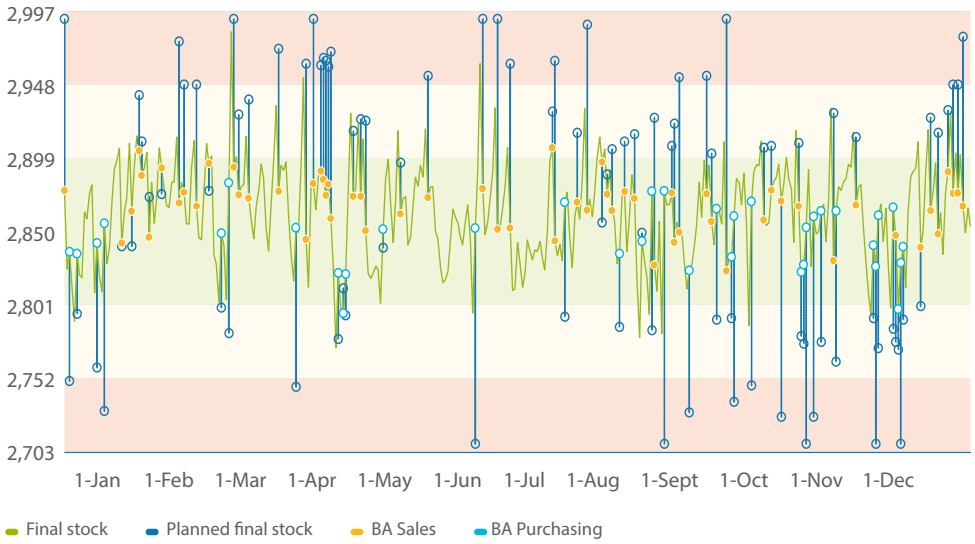
The economic charges resulting from these balancing actions, together with the users' imbalances, are subsequently settled by the TSO.

The following figure illustrates the time distribution of balancing actions throughout the year and the evolution of the System's status, indicating the days on which the TSO went to the Organised Market.

The participation of the TSO in the Market is necessary to achieve a **secure Gas System and an efficient, advanced and competent operation,** and it is supported by Law 8/2015

## Balancing actions and evolution of the state of the System

*GWh*




The following tables summarise the balancing actions that have been necessary to address during 2022 by the TSO, in 26% of the total days of the year, in compliance with the regulation in force:

## Purchasing

| | |
|---|---|
| Balancing actions | 35 |
| Quantity (MWh) | 1,449,594 |
| Cost (€M) | 174.13 |

## Sales

| | |
|---|---|
| Balancing actions | 60 |
| Quantity (MWh) | 3,478,088 |
| Cost (€M) | 313.06 |

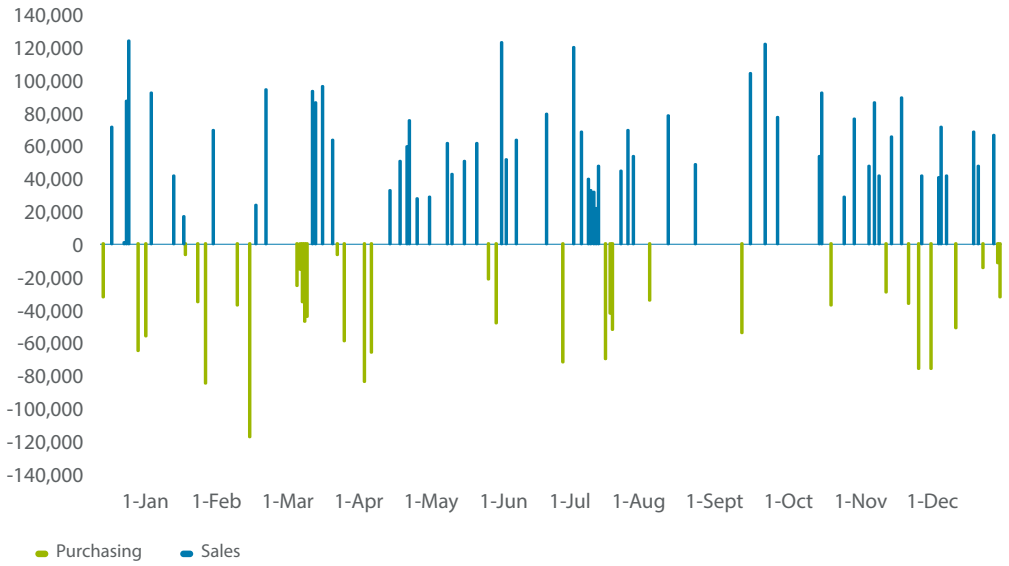
A total of 60 sales actions have been carried out during 2022. In 58 cases, these actions have ensured that the final stock of the day ended within the indifference band and only 2 ended outside it. With regard to the purchasing actions, 35 were carried out, of which 33 ended the day within the indifference band and 2 ended the day outside it.

Completion outside the indifference band in the two cases of sales and in the two cases of purchasing is generally related to the mismatch of the users' nominations to the quantities purchased and sold during the balancing actions process.

The volume traded in the sales actions was 3,748.1 GWh, with an associated amount of €313.1 M. In the case of purchasing actions, the volume was 1,449.6 GWh, with an associated amount of €174.1 M.

## Volume of balancing actions

*MWh*




# Management of imbalances in TVB and AVB

The management of imbalances in terminals and underground storage facilities began from 1 October 2021 with the entry into force of CNMC Circular 2/2020.

According to this regulation, the TSO will manage imbalances in the market when:

- the imbalance of a user at TVB or AVB is positive and there is insufficient storage capacity available at the facility
- rights acquired by a third party or the normal operation of the infrastructure are put at risk
- the user has not provided sufficient guarantees
- the imbalance in TVB or AVB of a user is negative

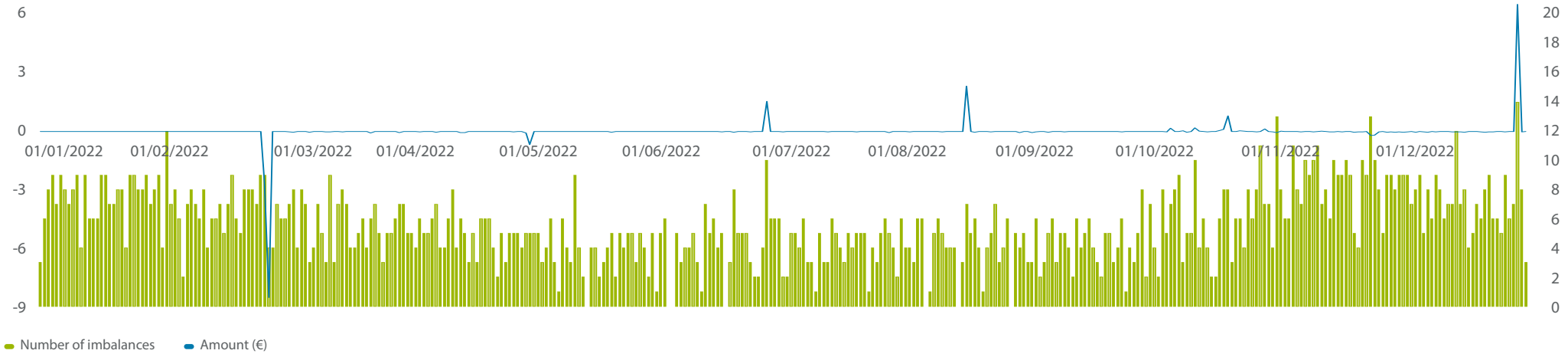
The TSO may offer the market the net value of the set of imbalances of the users of the gas day in the balancing area in TVB, in AVB or in both, for their assignment or acquisition.

In 2022, 20 sell imbalances were managed for a volume of 294.1 GWh and an associated amount of €18.3 M. In regards to purchasing, 140 imbalances were managed with a volume of 201.4 GWh and an associated amount of €21.7 M.

The following graph shows the economic impact of specific one-off imbalances in 2022.

## Imbalances in TVB and AVB and their economic impact

*€M*




The following tables summarise the management of imbalances that have been necessary to be addressed by the TSO in compliance with the regulation in force during 2022.

## Purchasing

| | |
|---|---|
| Managing imbalances | 140 |
| Quantity (MWh) | 201,385 |
| Cost (€M) | 21.71 |

## Sales

| | |
|---|---|
| Managing imbalances | 20 |
| Quantity (MWh) | 294,059 |
| Cost (€M) | 18.27 |

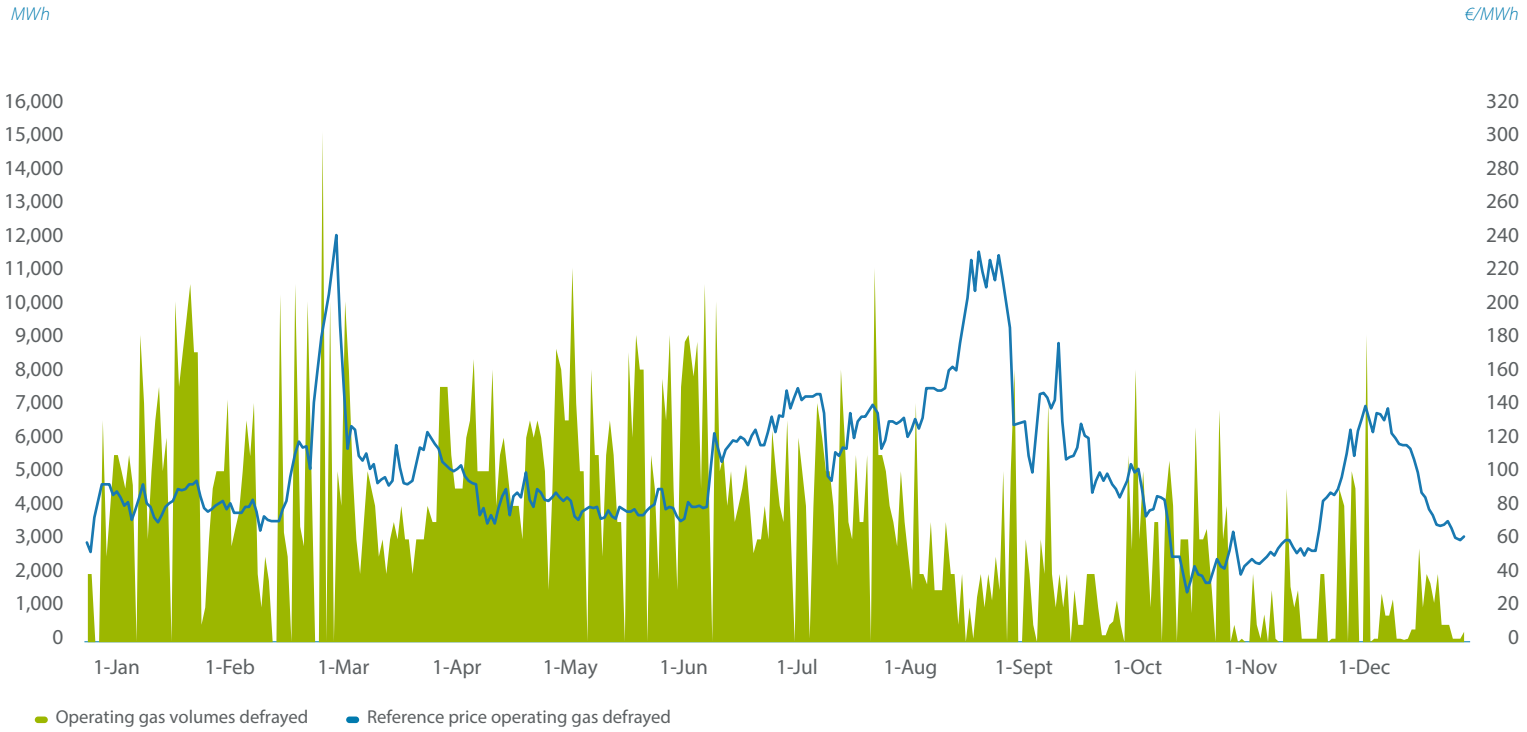
# Operating gas

Under current legislation, during 2022 the TSO acquired 1,305 MWh of operating gas on the Organised Market at an average price of €101.27/MWh.

1,305 GWh

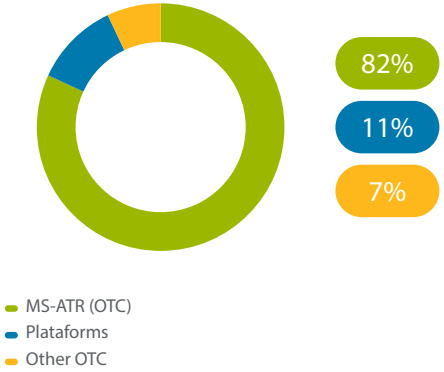
**Operating gas**
purchased on the Organised Market

## Volume and price of operating gas



# MS-ATR. Enagás TSO OTC Platform

## Percentage of trading volume

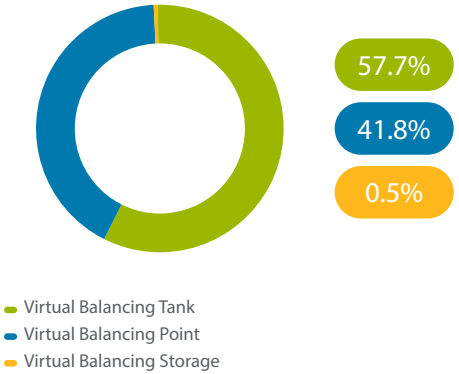



In 2022, 231,915 bilateral OTC transactions were recorded on the MS-ATR platform belonging to the TSO, representing a recorded volume of 914,519 GWh. Compared to the previous year, the number of transactions increased by 3.3%. However, reduced by transactions at TVB (regasification terminals), the volume traded has decreased by 3.0%.

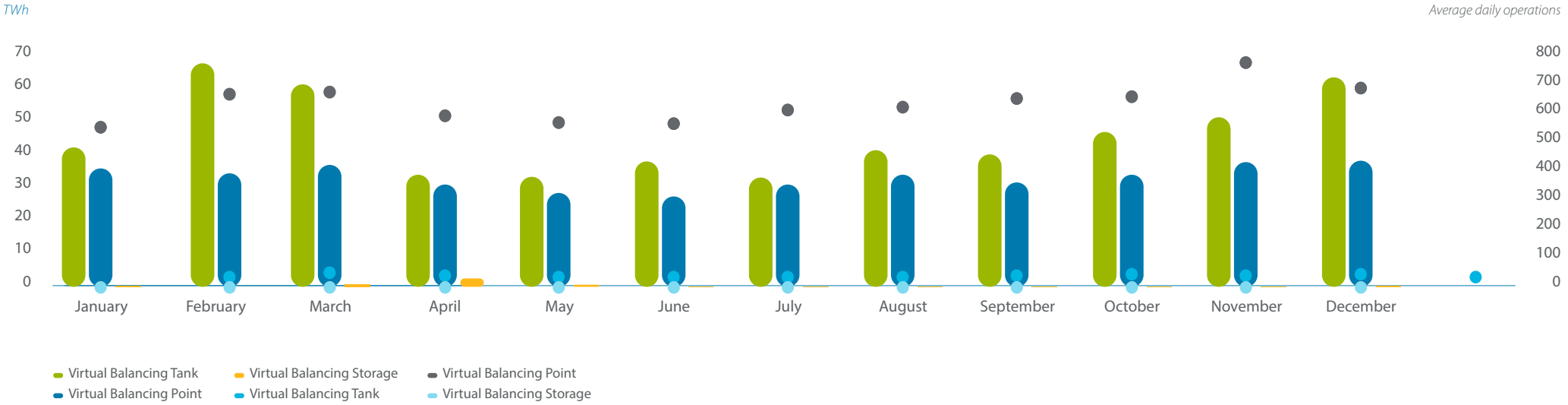
It should be noted that the volume recorded in PVB was 381,990 GWh, 108% of the System's total demand.

In the case of TVB, the record of transactions totalled 527,724 GWh, representing 161% of the total annual volume unloaded at terminals.

## Bilateral transactions



## Traded volume and number of operations




381,990 GWh

**Volume registered in PVB**
(**108%** of the total demand of the System)

527,724 GWh

**Transactions in TVB**
(**161%** of the total annual volume unloaded at terminals)

# Guarantees in the Gas System

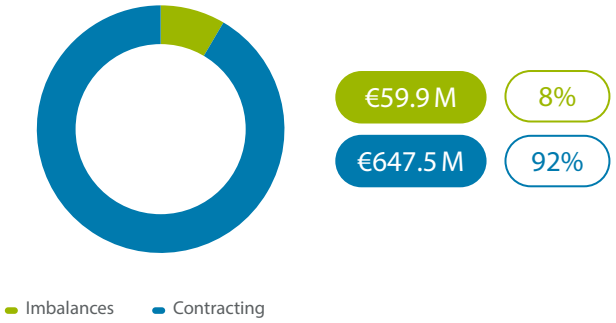
**The Spanish Gas System establishes a system of guarantees for users to meet their obligations to pay service contract toll and royalty invoices and imbalance surcharges in accordance with the provisions of the CNMC, ensuring that the System is reliable and economically secure.**

The calculation and management of guarantees in contracting and imbalance activities are carried out by the Technical Manager of the System and are notified to the affected user and to the Guarantees Manager.

The average guarantees retained in 2022 amount to a total of €707.4 M for the imbalance and contracting activities, and are broken down as shown in the graph.

Guarantees enable the System to be **reliable and economically secure.** They are calculated and managed by the TSO, in accordance with the provisions of the CNMC, and are notified to the affected user and to the Guarantees Manager

## Average retained guarantee




## Guarantees for imbalances

CNMC Circular 2/2020 establishing the natural gas balancing rules imposes a guarantee scheme to cover the risk of non-payment of imbalance surcharges.

Users with a balance sheet portfolio must have collateral to cover their level of risk, which takes into account both the user's operational situation and its net debit or credit position with respect to imbalance surcharges.

## Most relevant indicators of guarantees for imbalances

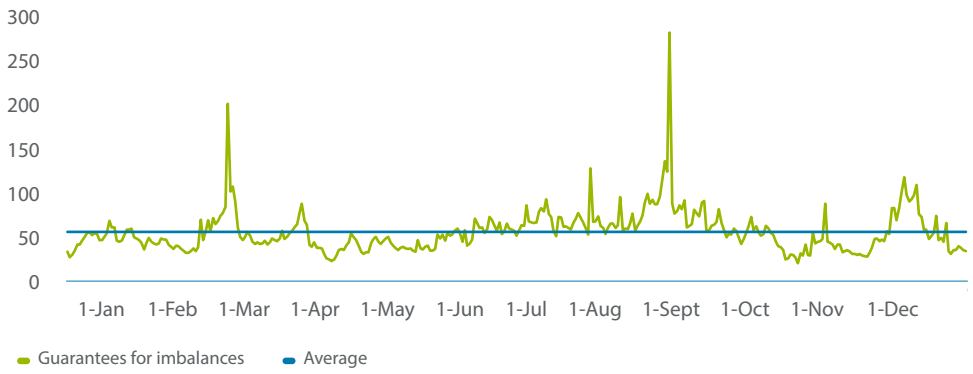
€271.1 M
Maximum guarantees

€26.6 M
Minimum guarantees

€59.9 M
Average guarantees

## Guarantees for imbalances

*€ million*




# Guarantees for capacity contracting

CNMC Circular 8/2019, which establishes the methodology and conditions for access and capacity allocation in the natural gas system, imposes a system of guarantees to cover possible non-payment of tolls and fees for capacity contracts.

The availability of guarantees is a prerequisite for requesting capacity, submitting a bid for an auction and concluding capacity contracts.

## Most relevant indicators of guarantees for capacity contracting

€928.7 M
Maximum guarantees

€516.4 M
Minimum guarantees

€647.5 M
Average guarantees

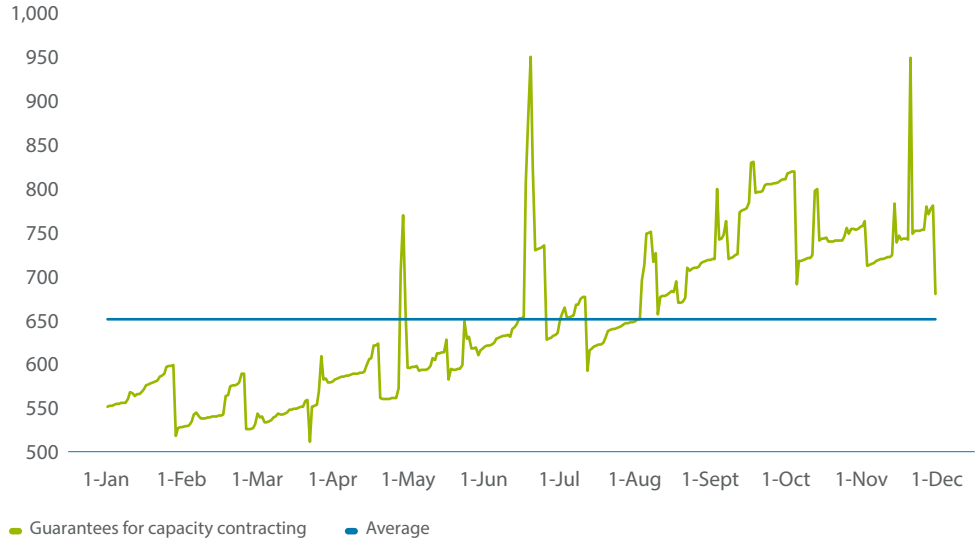
## Average guarantees for capacity contracting for services

| | |
|---|---|
| €57.4 M | 9% |
| €59.6 M | 9% |
| €33.3 M | 5% |
| €298.3 M | 46% |
| €198.8 M | 31% |

- LNG storage
- Underground storage
- Vessel contracting
- Distribution
- Others

## Guarantees for capacity contracting

*€ million*




The **availability of guarantees is a prerequisite** for requesting capacity, submitting a bid for an auction and concluding capacity contracts

# Enforcement of guarantees

The aforementioned CNMC Circulars 8/2019 and 2/2020 establish the enforcement of previously withheld guarantees in the event of non-compliance with payment obligations both for tolls and fees for contracted access services and for imbalance surcharges.

In 2022 and specifically at the beginning of the year, there were the highest number of enforcements carried out, coinciding also with the period when several companies were disqualified or requested voluntary deregistration.

In this regard, the System Technical Operator is responsible for requesting the Guarantees Manager to enforce guarantees in accordance with the regulations in force in order to recover the amounts owed in the imbalance and contracting activities.

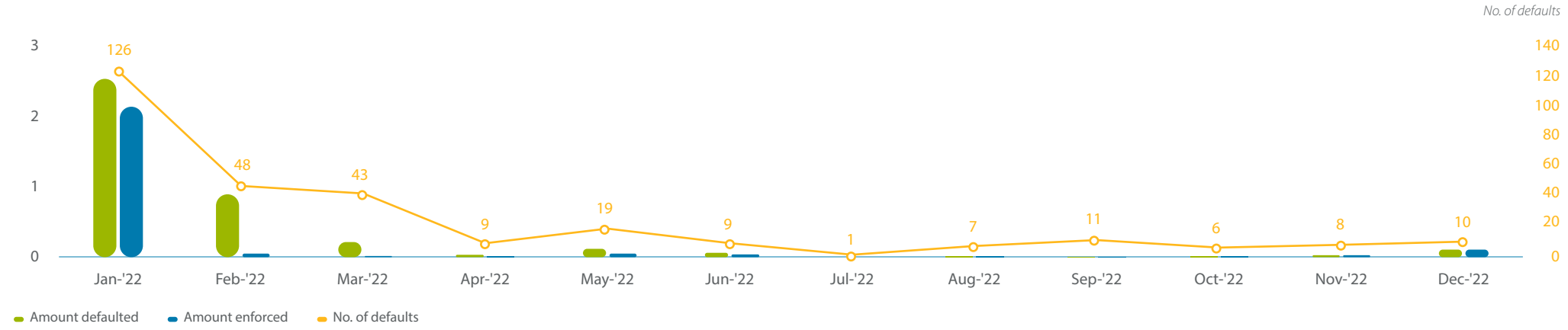
## Most relevant indicators on defaults and guarantee enforcement

| 297 | €4.1 M | €2.5 M |
|---|---|---|
| Number of defaults | Total amount defaulted | Guarantees enforced |

The following figure summarises, in monthly detail, the number of defaults, the amount unpaid and the amount enforced in 2022.

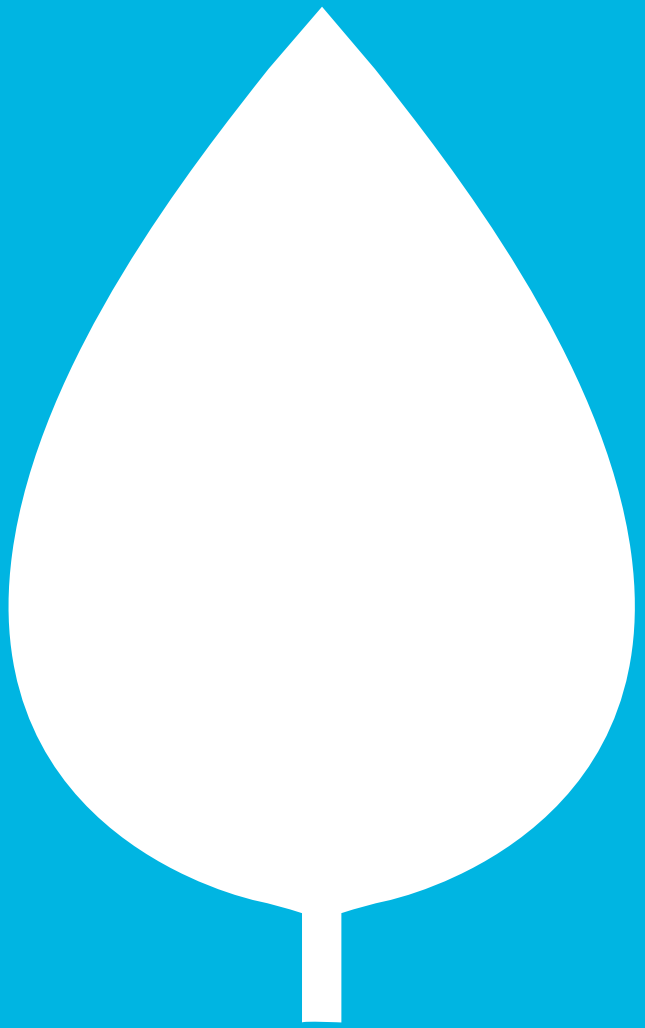
## Defaults and enforcement of guarantees

*€ million*



# 4 Renewable gases

In 2022, the development of the **new Guarantees of Origin System** for renewable gases started, which will allow the issuance of these guarantees from March 2023. The year was also marked by the publication of the **REPowerEU**Plan, the European Commission's strategy for **Europe's energy autonomy and the drive towards decarbonisation**.



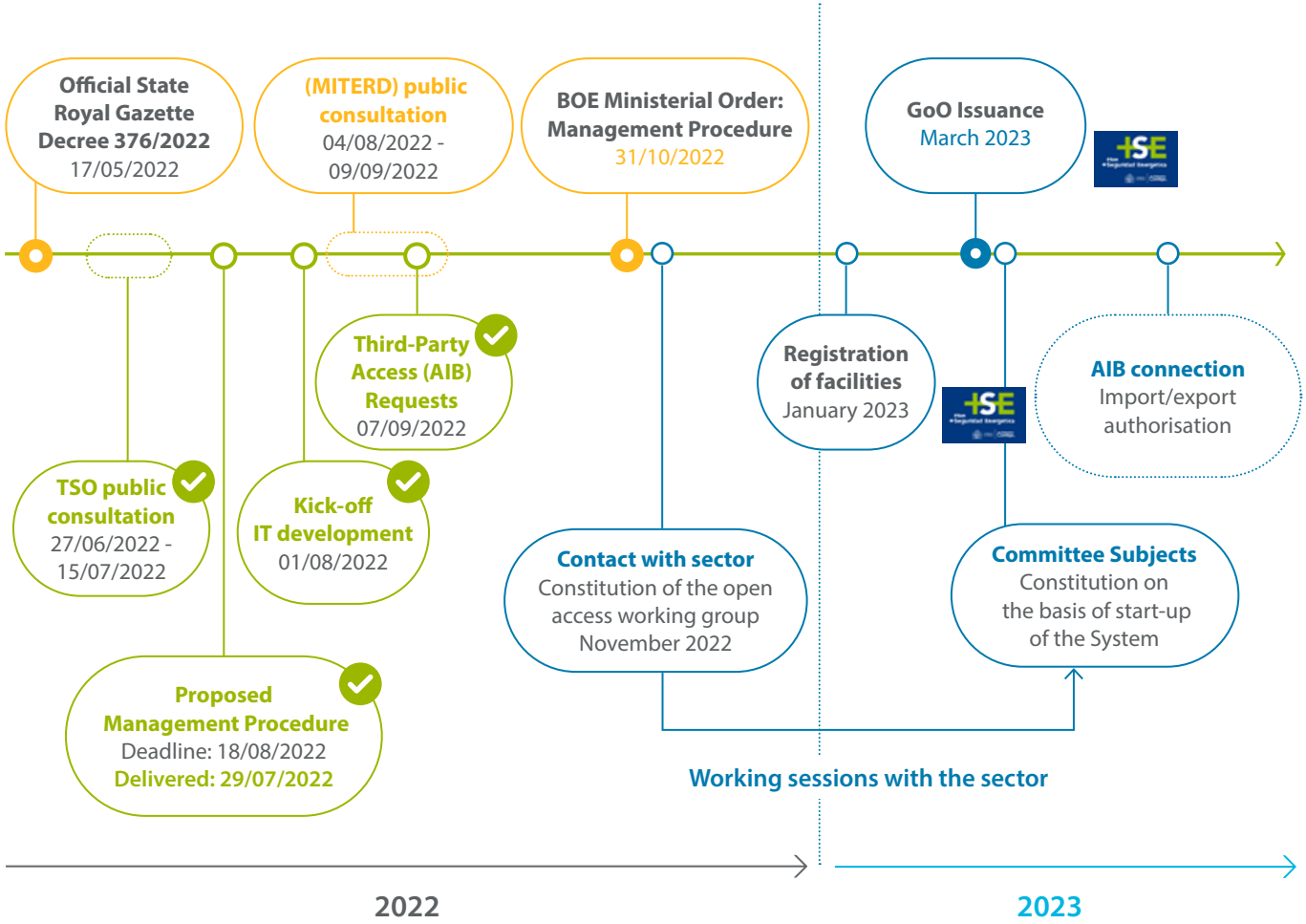
# Guarantees of Origin

2022 saw the start of the new system of Guarantees of Origin (GoO) for renewable gases. In May, the Government published Royal Decree 376/2022 in the Official State Gazette (BOE), which included, among other things, the main characteristics and functionalities of this system. It also temporarily designated the Technical System Operator (TSO) as the entity responsible, -while the Ministry for Ecological Transition and the Demographic Challenge does not have the human and material resources to carry out its functions-, and established the milestones and deadlines for its start-up.

The GoO System will be available for biogas, biomethane and renewable hydrogen, as well as for any gas of renewable origin to be defined in the future by the Secretary of State for Energy. In addition, it will cover any type of logistics: injection into the gas system, injection into isolated pipelines, off-grid logistics of liquefied or compressed gases and even self-consumption of renewable gases.

A GoO corresponds to the net production of 1 MWh of renewable gases and is an unalterable electronic document with a unique identification number and a number of attributes as the guarantee changes account and status (issuance, transfer, import and export, redemption, revocation and expiry).

## Main milestones and deadlines for the implementation of the GoO System



# Proposed management procedure

In compliance with the RD, the TSO submitted a proposal for a management procedure on 29 July, one month in advance of the stipulated date, and following a preliminary consultation process on a voluntary basis, in order to gather comments from agents involved in the new system.

In addition to this voluntary prior consultation, two workshops were held, one explanatory and the other to resolve doubts, in which more than 500 agents from 144 different companies from 7 countries participated, both from the gas sector and from outside the sector (producers, auditors, certifying bodies, end consumers and energy departments of the autonomous communities).

The consultation received 28 formal responses, with 72 general comments and 253 proposed amendments, allowing for improvements and building a consistent and coordinated management procedure with the sector. This coordination has been highly appreciated and is a good practice applied in the process of developing the new system.

Once the proposed management procedure had been submitted to the Ministry of Ecological Transition and Demographic Challenge, the Ministry carried out its public consultation between 4 August and 9 September. The Management Procedure was finally published on 31 October by Order TED/1026/2022. The publication of this Ministerial Order opened the way to the six-month deadline for the implementation of the new System.

# Other milestones in the process

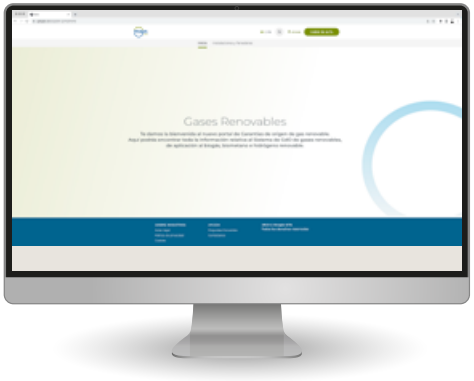
Also in October, and ahead of the publication of the Ministerial Order, the +SE Plan (More Energy Security) established a double milestone for the implementation of the GoO System, as this project is considered a priority by Europe:

- **January 2023:** registration of production facilities and holders enabled
- **March 2023:** enabling functionality for issuing guarantees of origin

In parallel to the IT developments, and as a precursor to the GoO System Subjects Committee established by Royal Decree 376, the TSO has established a working group open to the entire renewable gases sector. This group reports periodically on the developments carried out, in order to comply with the principles of transparency, objectivity, efficiency in management and non-discrimination between subjects required of it as the responsible entity.

In addition, to speed up the development of the import and export functionalities of guarantees of origin, the TSO has formalised its membership of the AIB (Association of Issuing Bodies), through whose platform international transfers will be managed. The connection to the AIB platform is planned for 2023. Similarly, the TSO is holding meetings with the CNMC for the connection of the electricity guarantees of origin platform with the new guarantee of origin platform for renewable gases.

In March 2023, Enagás GTS is scheduled to issue GoO to the facilities registered in the platform www.gdogas.es



# Registration of facilities and holders

In January 2023, the registration of facilities and holders via the **www.gdogas.es** platform.

A GoO holder can be any company or organisation that is registered on the platform. The application for user registration will be made through the GoO platform, by filling in a form that is electronically signed by the primary user. When the responsible entity (TSO) verifies that everything is in order, it will be registered on the platform by providing it with a GoO annotation account. This user can then request the creation of further consultation or operation profiles for their company (secondary users).

On the other hand, registration of a facility may be carried out by the operator of the facility or by a third party operator. It must first be registered on the GoO platform. The registration form will ask for general information about the facility, the technology, process and production points and the necessary measurement elements.

Both a single production device and a group of facilities, irrespective of ownership, that are part of an integrated process and are located in a single complex, on adjacent plots, or where they are in different geographical locations, but the integration of the process can be demonstrated, may be registered. The grouping of different devices under a common name presupposes that none of the sub-processes is entitled to issue GoO.

Once all the information has been filled in, the producer must request an auditing company on the platform, from the list of those accredited by ENAC, to carry out the initial audit of the facility. Subsequently, the producer will upload the documentation to the platform and will await confirmation of the final registration by the responsible entity, which will check that all the documentation is correct.

## Roles on the platform

There are four roles on the platform:

- **Producer.** Must have at least one production facility. It is a type of holder that will be able to transfer, export, import, and is the role to which GoOs will be issued.
- **Supplier of renewable gases.** This is a type of GoO account holder that performs supply functions for renewable gases. It may transfer, export, import and redeem GoO, both by supply and by consumption point, in the Gas System.
- **End consumer.** It is the one that registers as a holder and manages its GoO directly, without the intermediation of the shipper that supplies it with energy. A consumer may consume renewable gases while remaining outside the GoO System, provided that they delegate the GoO redemption to their energy supplier.

  Any holder of a consumption point of the Gas System (with remote measurement or without), a consumer of renewable gases for bunkering or consumption of vehicular gas, a network operator of the Gas System for self-consumption related to this activity or a consumer of a consumption point outside the Gas System, which may be an off-grid consumption point (whether or not it is a destination for LNG tanks), or a consumption point of an isolated pipeline, may be registered as a consumer.
- **Intermediaries or traders.** It is a holder that does not register as a producer, supplier or consumer, so its functionalities will be limited to the transfer, import and export of GoOs.

**4** **Types of roles** in the GoO System platform.

## Platform functionalities

The platform functionalities include: issuance, transfer, import and export, redemption, revocation and expiry.

A GoO is valid for transfer, export or redemption up to twelve months from the last energy production that gave rise to the guarantee. Subsequently, it is valid for redemption only.

Regarding export/import, only those GoOs whose parameters are compatible with those issued by the GoO System in Spain, and which include the attributes that the system has defined as mandatory, may be imported. For example, imports of hydrogen GoO are only accepted if they are of renewable origin and those guarantees indicate whether or not they have benefited from support schemes.

Redemption is the process by which the guarantee is associated with consumption. A redeemed GoO will be used for statistical purposes only. Redemption can be by point of consumption or supply portfolio.

Revoked GoOs are those which, as a result of an inspection, audit or complaint, it is determined should not have been issued. In such a case, it may be revoked and will not be used for any purpose.

Lastly, 18 months after the production of the energy giving rise to it, any GoO that has not been redeemed or revoked will expire and will be used only for statistical purposes.

For more information on the GoO click here or access the platform GoO System platform. You can also request information at the mailbox GDO_GTS@enagas.es

# Path towards decarbonisation

In 2022, the REPowerEU Plan was published, which is the European Commission's strategy to reduce Europe's dependence on Russian fossil fuels by 2030 and accelerate the transition.

Among the main measures of this plan is an increase in energy savings and energy efficiency, including a target to reduce gas and oil demand in Europe by 5% in the short term, as well as an increase in the binding energy efficiency target set out in the 'Fit for 55' package by 2030, from 9% to 13%.

On the other hand, REPowerEU is committed to increasing the renewable energy target set in the 'Fit for 55' plan for 2030 from 40% to 45%. In this regard it introduces a strong push for the development of renewable gases, including a biomethane production target of 35 bcm in Europe by 2030, as well as a target of 10 million tonnes of domestic renewable hydrogen production and a further 10 million tonnes of imports from countries outside Europe.

As a result of this plan, in 2022 the Spanish government published two royal decree-laws that promote the injection of renewable gases into the Spanish Gas System.

First, RDL 6/2022 of 29 March, which introduces the concept of a direct line for the injection of renewable gases into the Gas System and the need for a binding report from the TSO for its development.

And second, RDL 14/22 of 1 August, which establishes that producers of renewable gases wishing to connect to a transmission or distribution network will send the transporter or distributor an application for connection to the network, indicating the injection flows and pressures and gas quality. As long as there is no specific connection management procedure for renewable gas generation plants (to be developed by the Comisión Nacional de los Mercados y la Competencia -CNMC-), the transporter or distributor will have a period of forty working days to reply to the request.

# Downloads

In this section you can download much of the graphic content of Enagás GTS published in this report, as well as the annexes referred to in chapters 2 and 3 in editable format (Excel).

- 1 Demand
- 2 Operation and security of supply
  - **Appendix.** Breakdown of regasification terminals
- 3 Markets
  - **Annex 1.** Results of auctions
  - **Annex 2.** Allocation of *unloading* slots

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