

ANNEX 3: Common Risk Assessment – North African Risk Group – Algeria



Member States

The Algeria Risk Group is composed of: Austria, Croatia, France, Greece, Italy, Malta, Portugal, Spain and Slovenia.

Gas Storage Capacity in Member States

	Working gas volume in TWh	Share of capacity in risk group in %
AT	97,64	20,81%
EL	0,00	0,00%
ES	34,09	7,27%
FR	133,85	28,53%
HR	4,77	1,02%
IT	195,20	41,61%
MT	0,00	0,00%
PT	3,57	0,76%
SI	0,00	0,00%
Total	469,13	100,00%

Source: AGSI+, 16.08.2023

Summary of the Common Risk Assessment

The Member States of the Algeria Risk Group are Austria, Croatia, France, Greece, Italy, Malta, Portugal, Spain, and Slovenia, and the Risk Group evaluates shared risks for Algerian gas supply. It covers three interconnections through which gas can be imported from Algeria, and it includes seventeen regasification plants. Those three interconnections are in Spain (Tarifa and Almeria) and Italy (Mazara del Vallo), with a total import capacity of 2,009 GWh/d. While an additional interconnection point in Spain, Tarifa, is fully operational, it lacks booked capacity. LNG imports from Algeria amount to 97 TWh in 2019 and 91 TWh in 2020, accounting for around 17% of total imports.

The Baumgarten interconnection between Austria and Slovakia has the biggest capacity in the area, with about 2,306 GWh/d, and is thus subject for the calculation of the N-1 formula. Due to its importance for supply of Algerian gas in the region, an analogous calculation of the N-1 formula with the Transmed pipeline has been conducted. With a capacity of 1,203.3 GWh/d at its entry point in Mazara del Vallo, it is the largest influx point of gas imports from Algeria. Results for Baumgarten's N-1 standard indicate levels above 100%, dropping from 124% (winter 2022/2023) to 123% (winter 2025/2026). Transmed's N-1 standard shows likewise results above 100%, declining from 131% (winter 2022/2023) to 130% (winter 2025/2026).

The Algeria Risk Group evaluates collective risks related to Algeria and identified five main risks: a total disruption of gas supply from Algeria, a Maghreb-Europe pipeline and MEDGAZ disruption, a Transmed pipeline disruption, liquefaction trains out of service in Algeria, and a total unavailability of gas from Russia (natural gas and LNG). Simulation outcomes cover national demand, LNG facilities, underground storages, interconnections, national production, and potential supply curtailments. Notably, no demand curtailment surfaces in the covered scenario, while infrastructure usage remains under capacities.

While most demand is put on the Spanish LNG facilities due to the transport of significant LNG volumes, they can still manage needed volumes effectively. Still, the main challenge lies in LNG terminals, but the Risk Group demonstrates resilience, even under severe disruptions, mainly due to sufficient and alternative infrastructure, preventing curtailments. In Austrian, gas supply stays balanced. During peak demand, gas flows to neighbours like Italy increase notably. Especially for Italy, Austria plays a crucial role in its gas supply.

Cuts to the Russian gas supply might affect several member states, excluding Spain and Portugal. Changes in the global energy market, affected by the conflict, could lead to shortages. However, the Risk Group's alternative infrastructure, particularly LNG facilities, ensures security against curtailment, even though high LNG volumes are necessary. While price impacts could arise, the overall supply security remains intact.

Although the necessary LNG volume seems to be high, a study provided by IEA shows that these volumes needed are available. The impact of high prices on the Member States, especially Spain, may be relevant but security of supply is ensured.

Description of the System

Croatia

Transport Network

Gas Transport Infrastructure owned by PLINACRO d.o.o. has a total of 2,549 km of transport pipelines, of which:

- 17,66 km of gas pipelines of a maximum operating pressure of 100 bar and nominal diameter of 800 mm
- 952 km of gas pipelines of a maximum operating pressure of 75 bar and the diameter from DN 200 to DN 800 mm
- 1579 km of gas pipelines of a maximum operating pressure of 50 bar and the diameter from DN 80 to DN 500 mm

Gas is transported to the transmission system at input metering stations:

- 2 interconnection measuring stations at the connections with the transmission systems of Slovenia and Hungary
- 6 entry measuring stations at the connections with natural gas production facilities
- 1 entry-exit measuring station at the connection with the Okoli underground gas storage
- 1 entry measuring station at the connection with the LNG Terminal (Omišalj)

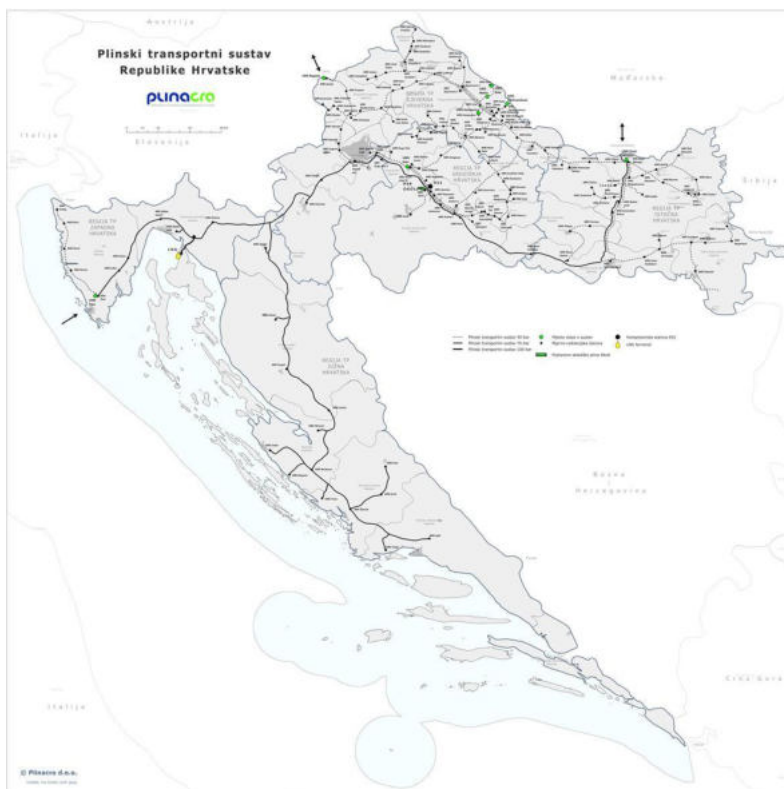


Figure 1: Croatian gas system

Croatia's total import capacity (Hungary, Slovenia and LNG) is 211 GWh/d (GCV 25°C/0°C) and export capacity toward Hungary and Slovenia is 59 GWh/d (GCV 25°C/0°C).

LNG Facilities

The floating LNG terminal is located in Omišalj municipality on the island of Krk and it is operated by LNG HRVATSKA d.o.o. The terminal has started its operation the 1st of January 2021.

The FSRU (Floating Storage Regasification Unit) vessel operates with a maximum regasification capacity of up to 300,000 m³/h, or 2.6 billion m³/annually. This FSRU is equipped with four LNG storage tanks with a total capacity of 140,206 m³ and three LNG regasification units with a maximum technical regasification rate of 451,840 m³/h.

The terminal can accommodate vessels from 3,500 to 265,000 m³.

Storage

There is only one gas storage infrastructure, located at Okoli, Naftaplinska 10, Velika Ludina, that is part of the Underground Gas Storage Ltd., owned by PLINACRO d.o.o.

The working volume of this storage is 5,815 TWh, being the maximum injection capacity 45 GWh/d and the maximum withdrawal capacity 61 GWh/d.

Key data 2019

PRODUCTION	Maximum Production (GWh/d)	27
POWER GENERATION	Installed gas-fired capacity (Mwe)	743
DEMAND	Total 2019 (GWh)	29.332
	Summer (GWh)	10.687
	Winter (GWh)	19.339
	Max. Day (GWh/d)	146
	Min Day (GWh/d)	41

Total 2019

1 Jan 2019 to 31 Dec 2019

Summer

1 Apr 2019 to 30 Sep 2019

Winter

1 Oct 2019 to 31 Mar 2020

France (Not updated since the last version)

Transport Network

The natural gas transmission network is operated by two TSOs: GRTgaz and TEREGA. GRTgaz manages 8,110 km of main network and 24,043 km of regional network. This is more than 85% of the gas transmission network in France. TEREGA manages 650 km of main network and 4,450 km of regional network in the south-west of France, which is around 14% of the country's total network.

France has an entry/exit system with 7 entry/exit points:

- VIP Pirineos (formed by the physical IP Larrau and Biriadou)
- Oltingue
- Jura
- Alveringem
- Taisnieres
- Dunkerque
- Obergailbach

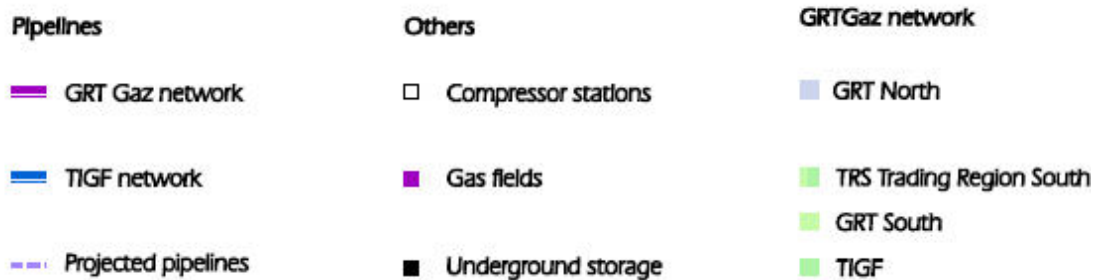


Figure 2: French gas system

Compression Stations

GRTgaz operates twenty-seven compression stations while TERECA operates five.

LNG Facilities

France has four operating LNG terminals:

- Dunkerque LNG
- Montoir-de-Bretagne
- Fos-Cavaou
- Fos-Tonkin

The total regasification capacity is 1,267 GWh/d, having a total maximum inventory of 1,370,000 m³, making France the third-largest LNG capacity holder in Europe.

Underground Storage

France has fifteen gas storage facilities; thirteen of those are operated by Storengy, a subsidiary of ENGIE. Ten of those thirteen sites are aquifers located in the Paris Basin; the remaining three are salt caverns located in the south-east.

The total working volume in France is 134,465 TWh, being the maximum injection capacity 1,220 GWh/d and the maximum withdrawal capacity 2,389 GWh/d.

Key data 2019

PRODUCTION	Maximum Production (GWh/d)	-
POWER GENERATION	Installed gas-fired capacity (Mwe)	12.238
DEMAND	Total 2019 (GWh)	504.423
	Summer (GWh)	161.466
	Winter (GWh)	345.743
	Max. Day (GWh/d)	2.863
	Min Day (GWh/d)	460

Total 2019

1 Jan 2019 to 31 Dec 2019

Summer

1 Apr 2019 to 30 Sep 2019

Winter

1 Oct 2019 to 31 Mar 2020

Greece

Transport Network

The National Natural Gas System (NNGS) transports Natural Gas from the Greek-Bulgarian and Greek-Turkish borders, the Trans Adriatic Pipeline (TAP) as well as from the Liquefied Natural Gas (LNG) terminal located on the island of Revithoussa in the Megara bay, to consumers in the continental Greece.

The network has four entry points: three at the north and north-eastern borders, **Sidirokastro**, **Nea Mesimbria** and **Kipi**, connecting Greece with the Bulgarian and Turkish gas networks, and one in southern Greece, **Agia Triada**, linked to the LNG terminal.

The three pipeline entry points have a total capacity of 171 GWh/d. The Greek-Turkish interconnector at Kipi brings gas mainly from the Middle East and the Caspian region into Greece. The interconnector with Bulgaria (Sidirokastro) allows gas flows from the Russian Federation via Turkish Steam-Bulgaria. The interconnector at Nea Mesimbria brings gas from Azerbaijan through Turkey.

The NNGS consists of:

- The main pipeline with 512 km length and 36 and 30 inches diameter, and the branches of total length of 953.2 km which connect various areas of the country to the main pipeline;
- The Border Meter Stations at Sidirokastron, Nea Mesimbria, and at Kipi near Evros river;
- The LNG Station at Revithoussa;
- The Compression Station at Nea Messimvria, Thessaloniki;
- The Natural Gas Metering and Regulating Stations;
- The Control and Dispatching Centers at Patima Elefsinas and at Nea Mesimvria near Thessaloniki;
- The Operation & Maintenance Centers of Sidirokastron Border Metering Station, Eastern Greece, Northern Greece, Central Greece, Southern Greece and the Peloponnesse;
- The Remote Control & Communications system;
- Two submarine (offshore) pipelines, each one a back-up to the other, of 24 inches diameter each and of 620m and 510m long that connect the Revythoussa LNG Station to the Transmission System.



Figure 3: Greek gas system

Compression Stations

The Transmission System has one Compression station at **Nea Mesimvria**.

LNG Facilities

The biggest natural gas infrastructure of Greece is the **LNG Terminal on Revythoussa** Island. This terminal is the only installation in the NNGS, which can temporarily store up to 225.000 m³ LNG. It consists of:

- Two LNG storage tanks, 65,000 m³ each, and one tank of 95,000 m³
- LNG unloading installations with a maximum rate of 7,250 m³ LNG/h; and LNG gasification installations with a sustained send out rate of 1, 400 m³ LNG/h

Underground Storage

N/A

Key data 2019

PRODUCTION	Maximum Production (GWh/d)	-
POWER GENERATION	Installed gas-fired capacity (Mwe)	4.982
DEMAND	Total 2019 (GWh)	57.407
	Summer (GWh)	26.775
	Winter (GWh)	30.451
	Max. Day (GWh/d)	272
	Min Day (GWh/d)	75

Total 2019

1 Jan 2019 to 31 Dec 2019

Summer

1 Apr 2019 to 30 Sep 2019

Winter

1 Oct 2019 to 31 Mar 2020

Italy

Transport Network

Gas transmission activities in Italy are mainly carried out by Snam Rete Gas S.p.A., that owns and operates approximately 95% of the natural gas transmission network, around 32.683 km of pipeline at 12/2021.

There are six interconnectors:

- Mazara/Transmed
- Gela/Greenstream
- Melendugno/TAP
- Tarvisio/TAG
- Passo Gries/Transitgas
- Gorizia/Slovenia

The combined natural gas import capacity of the six pipeline entry points is 3.827 GWh/d.

All Italy's northern natural gas pipeline interconnectors have physical reverse flow capacity:

- Tarvisio towards Austria
- Gorizia towards Slovenia
- Gries Pass towards Switzerland and Germany

The Italian system has been designed as a perfect entry/exit system and fulfils security of supply requirements in case of disruption of the main entry point.

In order to increase the diversification and to support the security of supply of the Italian system, a new project named "Adriatica Line" is planned. The project consists in a new pipeline of 425 km (DN1200), and a new compressor station of 33 MW to enhance the south-north backbone. The project enables the creation of new transport capacity from new or existing entry points in the Southern Italy.



Figure 4: Italian gas system

Compression Stations

The Italian gas transmission system has thirteen compression stations.

LNG Facilities

Italy also has three operational LNG regasification terminals:

- Adriatic (Cavarzere) offshore LNG
- Panigaglia terminal
- Livorno offshore terminal

The total regasification capacity of the Italian system is 576 GWh/d having a total maximum inventory of 487.100 m³ of LNG.

Two new LNG FSRU will be operative in the next years for additional 220 GWh/d in 2023 and other 220 GWh/d in 2024.

Underground Storage

The maximum commercial aggregated withdrawal capacity of the Italian system is 1.147 GWh/d available on January (month with the maximum available withdrawal capacity).

The main underground storage operator is Stoccaggi Gas Italia (Stogit), with a total capacity of 179,7 TWh of gas storage. The second UGS operator is Edison Stoccaggio, with 9,5 TWh. Stogit is 100% owned by Snam, and Edison Stoccaggio is 100% owned by Edison. Furthermore, there is another storage operator, Italgas Storage S.p.A., that with a capacity estimated in around 10,6 TWh.

Key data 2019

PRODUCTION	Maximum Production (GWh/d)	145
POWER GENERATION	Installed gas-fired capacity (Mwe)	44.522
DEMAND	Total 2019 (GWh)	778.674
	Summer (GWh)	299.454
	Winter (GWh)	461.613
	Max. Day (GWh/d)	3867
	Min Day (GWh/d)	849

Total 2019

1 Jan 2019 to 31 Dec 2019

Summer

1 Apr 2019 to 30 Sep 2019

Winter

1 Oct 2019 to 31 Mar 2020

Malta

Natural gas in Malta is used solely for the generation of electricity and currently constitutes the largest share of Malta's electricity generation mix. The only source of natural gas in Malta is imported LNG. Malta does not have gas distribution networks or any district heating networks and there are no end-use gas customers apart from two electricity producers at the Delimara Power Station. Currently, Malta does not form part of the EU internal gas market as it is not interconnected via a gas pipeline.

Malta's gas infrastructure consists of an LNG facility with import and offloading capability; a Floating Storage Unit (FSU); LNG jetty, pipework and other services; and a regasification facility with ancillary services. The regasification facility provides natural gas to two centrally dispatched electricity generation units. All gas infrastructure is within the Delimara Power Station complex.

Should Malta become interconnected via a gas pipeline, the risk to Malta in the context of regional risk groups would change and the risk to gas security of supply would need to be reassessed.

Transport Network

N/A

Compression Stations

N/A

LNG Facilities

In January 2017, Malta began its gas supply thanks to the new floating storage unit (FSU) and regasification facility at Delimara, which supplies gas to two electricity producers.

The terminal has a total LNG storage capacity of 125,000 m³ while the regasification plant has a maximum send-out capacity of 20 GWh/d.

Since the beginning of its operation in 2017, the Delimara LNG terminal has not received Algerian gas, so it would not be directly affected by a hypothetical curtailment in the Algerian LNG supply.

Up until now, Malta has purchased LNG from the following countries of origin:

- Netherlands
- USA
- Equatorial Guinea
- Egypt
- Trinidad & Tobago
- Peru
- Norway
- Nigeria

From 2017 to 2021, from a regional perspective Malta has sourced its LNG primarily from South America (69%), followed by the United States (16%), Africa (14%) and then Europe (1%).

Underground Storage

N/A

Key data 2021

PRODUCTION	<i>Maximum Production (GWh/d)</i>	
POWER GENERATION	<i>Installed gas-fired capacity (Mwe)</i>	358
DEMAND	<i>Total 2021 (GWh)</i>	2
	<i>Summer (GWh)</i>	1,063.8
	<i>Winter (GWh)</i>	833
	<i>Max. Day (GWh/d)</i>	8.1
	<i>Min Day (GWh/d)</i>	0

Total 2021

1 Jan 2021 to 31 Dec 2021

Summer

1 Apr 2021 to 30 Sep 2021

Winter

1 Oct 2021 to 31 Mar 2021

Portugal

Transport Network

The National Gas Transmission Network (RNTG) consists of main and branch pipelines totaling 1,375 km and 203 pipeline stations. The entire network operates as a single balancing zone and is managed by REN Gasodutos.

The backbone of the system is the main pipeline running through the west of the country between Sines and Valença do Minho, where the main gas consumption points are located, a transit pipeline interconnecting the central zone of the system in the Leiria - Pombal area with the eastern border with Spain, two lines that supply the interior of the country in Beira Interior, and several branches, including the one that supplies the Lisbon area and a connection to the Carriço underground storage facility.

The main entry points in the network include the connection of the Sines LNG terminal, the connection point to the Carriço underground storage facility and the reversible interconnection with the Spanish high-pressure natural gas network:

- **VIP IBERICO** (formed by the physical IP of Campo Maior-Badajoz and Valença do Minho-Tuy, both bi-directional)

The two pipelines have a total import capacity of 144 GWh/d and an export capacity of 80 GWh/d.

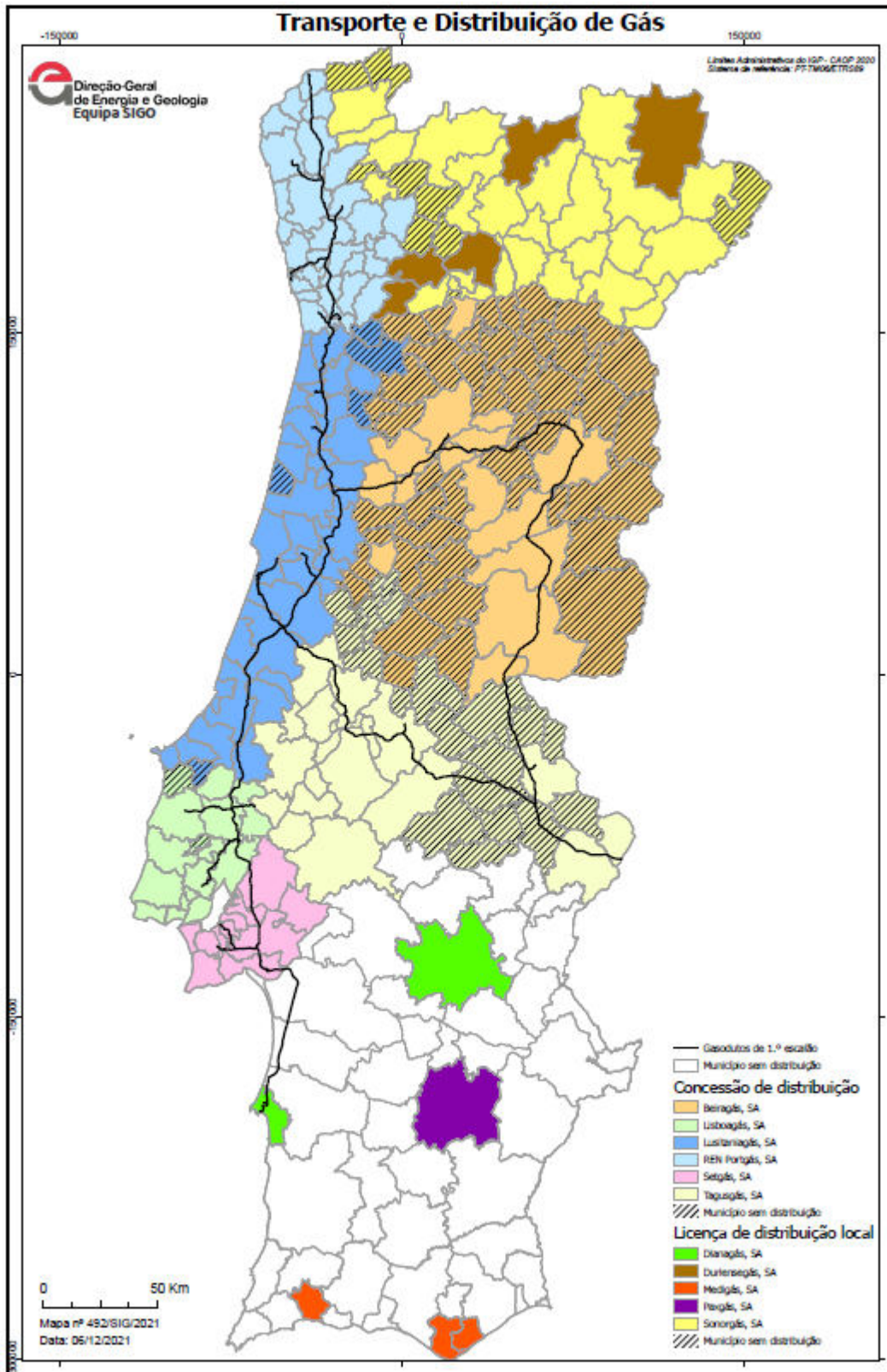


Figure 5: Portuguese gas system

Compression Stations

N/A

LNG Facilities

The **Sines LNG terminal** has three tanks with a combined storage capacity of 390,000 m³. The plant's send-out capacity is 321 GWh/d, but it's limited by the pipeline receiving capacity of 229 GWh/d.

Underground Storage

Portugal has one underground gas storage facility. The **Carrico underground** gas storage has six salt caverns in operation, since the end of 2014, and a maximum working volume of 3,839 GWh (322,600 m³) of gas. It has a nominal withdrawal capacity of 71 GWh/d for storage capacity of less than 60% and 129 GWh/d for storage capacity greater than 60%, and an injection capacity up to 24 GWh/d.

Key data 2019

PRODUCTION	<i>Maximum Production (GWh/d)</i>	-	
POWER GENERATION	<i>Installed gas-fired capacity (Mwe)</i>	3.829	
DEMAND	<i>Total 2019 (GWh)</i>	67.949	Total 2019 1 Jan 2019 to 31 Dec 2019
	<i>Summer (GWh)</i>	34.581	Summer 1 Apr 2019 to 30 Sep 2019
	<i>Winter (GWh)</i>	34.069	Winter 1 Oct 2019 to 31 Mar 2020
	<i>Max. Day (GWh/d)</i>	243	
	<i>Min Day (GWh/d)</i>	80	

Slovenia

Transport Network

The Slovenian gas transmission network consists of 1,195 kilometers of pipelines, 252 metering-control stations and other stations with around 330 measurements points.

The main transmission part of the network includes:

- Parallel pipelines **M1** and **M1/1** from Ceršak to Rogatec,
- Parallel pipelines **M2** and **M2/1** from Rogatec to Vodice,
- Pipeline **M4** from pipeline **M2** to Novo Mesto,
- Pipeline **M3** from Šempeter at Nova Gorica to Vodice.



Figure 6: Slovenian gas system

The Slovenian gas transmission network is connected with the gas transmission networks of Austria, Italy and Croatia at interconnections:

- Šempeter (Italy)
- Rogatec (Croatia)
- Ceršak (Austria)

Slovenia's total import capacity is 175 GWh/d whilst it is able to export up to 94 GWh/d.

Compression Stations

The Slovenian gas system has two compression stations

- Kidričevo
- Ajdovščina

LNG Facilities

N/A

Underground Storage

N/A

Key data 2019

PRODUCTION (GWh)	<i>Maximum Production</i>	0	
POWER GENERATION (MWe)	<i>Installed gas-fired capacity</i>	434	
DEMAND (GWh)	<i>Total 2019</i>	9,666	Total 2019 1 Jan 2019 to 31 Dec 2019
	<i>Summer</i>	3,711	Summer 1 Apr 2019 to 30 Sep 2019
	<i>Winter</i>	5,936	Winter 1 Oct 2019 to 31 Mar 2020
	<i>Max. Day</i>	51	
	<i>Min. Day</i>	12	

Spain

Transport Network

Spain transmission system has around 13,361 Km of natural gas pipelines, owned by Enagás Transporte the main TSO of the Spanish gas system, and by Reganosa which owns 130 Km of the transport network.

The Spanish gas grid is connected with Algeria, Morocco, Portugal and France.

Algerian gas can be imported through two non-bi-directional interconnection points:

- **Maghreb-Europe pipeline** (entry point: Tarifa), via Morocco.
- **Medgaz pipeline** (entry point: Almeria).

The interconnections with France:

- VIP PIRINEOS (Larrau and Irún),

And Portugal:

- VIP IBERICO (Badajoz and Tuy bi-directional)

Spanish's total import capacity via pipeline is 1,087 GWh/d whilst Spain is able to export up to 401 GWh/d.



Figure 7: Spanish gas system

Compression Stations

The Spanish gas system has 19 compression stations.

LNG Facilities

Spain has the largest LNG regasification capacity in the European Union having six operating regasification plants.

- Barcelona
- Cartagena
- Huelva
- BBG
- Sagunto
- Reganosa (owned by REGANOSA, certified as TSO).

They have a total LNG storage capacity of 3,308,680 m³ and a regasification capacity of 1,910 GWh/d.

Underground Storage

Spain has four operating underground gas storages sites. They have a combined working gas capacity of 35,342 TWh, a total injection capacity of 127 GWh/d and a withdrawal capacity of 239 GWh/d.

Three storage facilities are depleted gas fields: **Gaviota** (offshore, Basque Country), **Serrablo** (Huesca) and **Marismas** (Huelva). **Yela** (Guadalajara) is a saline aquifer.

Marismas is owned by a subsidiary of Naturgy, and the other three by Enagás Transporte.

Key Data 2019

PRODUCTION	Maximum Production (GWh/d)	6
POWER GENERATION	Installed gas-fired capacity (Mwe)	30.012
DEMAND	Total 2019 (GWh)	394.509
	Summer (GWh)	190.006
	Winter (GWh)	205.418
	Max. Day (GWh/d)	1637
	Min Day (GWh/d)	714

Total 2019

1 Jan 2019 to 31 Dec 2019

Summer

1 Apr 2019 to 30 Sep 2019

Winter

1 Oct 2019 to 31 Mar 2020

Infrastructure Standard

Preliminary considerations

The infrastructure with the greatest capacity at regional level is the interconnection between Austria and Slovakia, via Baumgarten, with a firm entry capacity of 2,306 GWh/d. Thereby this infrastructure will be considered for the calculation of the N-1 formula at regional level.

The constitution of the risk group is based on the importance of supply of Algerian gas in the region, thus an analogous calculation of the N-1 formula, considering the largest infrastructure that imports gas from Algeria, has also been carried out. This infrastructure is the Transmed pipeline, across the entry point of Mazara del Vallo in Italy: 1,203.3 GWh/d.

Both N-1 formulas are calculated considering different points of the withdrawal capacity curve of underground storages, for different filling levels. Consequently, different results can be obtained for each of the infrastructures. In order to facilitate the assessment, only the most severe combination, for a filling level of 30%¹, is considered below.

Results²

N-1 formula for Baumgarten

Results of the N-1 standard are well above 100%: decreasing from 124% in the winter 2022/2023 to 123% in the winter 2025/2026. In fact, a total disruption of the gas flow through the Baumgarten interconnection took place in winter 2017/2018 during less than 24 hours in specially demanding conditions. Both Austrian and Italian gas systems were able to react swiftly and supply their demand thanks to withdrawal capacity. Moreover, Transmed pipeline also increased significantly its flow during that event.

The main parameters used in the calculation of the N-1 formula are shown in Table 1³.

¹ The results obtained when considering 100% filling level, are available in annex II

² The forecasted demand used for those countries which have not submitted the data gathering is the one considered in the simulation for the peak day (1 in 20).

³ Parameters of the N-1 formula according to paragraph 3 of Annex II of Regulation (EU) 2017/1938.

Table 1: N-1 formula for Baumgarten; winters 2022-2023, 2023-2024, 2024-2025 and 2025-2026

	winter 2022-2023		winter 2023-2024		winter 2024-2025		winter 2025-2026	
	GWh/day	mcm/d	GWh/day	mcm/d	GWh/day	mcm/d	GWh/day	mcm/d
Epm	7.941	683	7.946	683	7.946	683	7.990	687
Tarifa (Spain) *	0	0	0	0	0	0	0	0
Almería (Spain)	338	29	338	29	338	29	338	29
Mazara del Vallo (Italy)	1.227	106	1.227	106	1.227	106	1.227	106
Gela (Italy)	546	47	546	47	546	47	546	47
Passo Gries (Italy)	695	60	695	60	695	60	695	60
Melendugno (Italy)	487	42	487	42	487	42	487	42
Baumgarten (Austria)	2.081	179	2.081	179	2.081	179	2.081	179
Oberkappel (Austria)	246	21	246	21	246	21	246	21
Überackern (Austria)	114	10	114	10	114	10	114	10
Kulata (BG) / Sidirokastron (Greece)	118	10	118	10	118	10	118	10
Kipi (Greece)	49	4	49	4	49	4	49	4
Nea Mesimbria (Greece)	53	5	53	5	53	5	53	5
Dravaszerdahely (Croatia)	78	7	78	7	78	7	78	7
Obergailbach (France)	570	49	570	49	570	49	570	49
Taisnières (France)	770	66	770	66	770	66	770	66
Dunkerque (France)	570	49	570	49	570	49	570	49
Pinče (Slovenia)	0	0	5	0	5	0	49	4
Pm	247	21	247	21	247	21	247	21
Austria	27	2	27	2	27	2	27	2
Croatia	18	2	18	2	18	2	18	2
France	0	0	0	0	0	0	0	0
Greece	0	0	0	0	0	0	0	0
Italy	191	16	191	16	191	16	191	16
Malta	0	0	0	0	0	0	0	0
Portugal	0	0	0	0	0	0	0	0
Spain	11	1,0	11	1,0	11	1,0	11	1,0
Slovenia	0	0	0	0	0	0	0	0
Sm (30 % filled)	4.915	423	4.915	423	4.915	423	4.915	423
Austria	1.083	93	1.083	93	1.083	93	1.083	93
Croatia	61	5	61	5	61	5	61	5
France	1.669	143	1.669	143	1.669	143	1.669	143
Greece	0	0	0	0	0	0	0	0
Italy	1.880	162	1.880	162	1.880	162	1.880	162
Malta	0	0	0	0	0	0	0	0
Portugal	71	6	71	6	71	6	71	6
Spain	152	13	152	13	152	13	152	13
Slovenia	0	0	0	0	0	0	0	0
LNGm	4.456	383	4.457	383	4.457	383	4.457	383
Dunkerque LNG Terminal (France)	520	45	520	45	520	45	520	45
Fos Tonkin LNG Terminal (France)	410	35	410	35	410	35	410	35
Fos Cavaou LNG Terminal (France)								
Montoir de Bretagne LNG Terminal (France)	337	29	337	29	337	29	337	29
Revythoussa LNG Terminal (Greece)	229	20	230	20	230	20	230	20
Adriatic LNG Terminal (Italy)	290	25	290	25	290	25	290	25
Panigaglia LNG Terminal (Italy)	118	10	118	10	118	10	118	10
FSRU OLT Offshore LNG Toscana (Italy)	168	14	168	14	168	14	168	14
Delimara LNG Terminal (Malta)	165	14	165	14	165	14	165	14
Sines LNG Terminal (Portugal)	229	20	229	20	229	20	229	20
Bilbao LNG Terminal (Spain)	223	19	223	19	223	19	223	19
Barcelona LNG Terminal (Spain)	543	47	543	47	543	47	543	47
Cartagena LNG Terminal (Spain)	376	32	376	32	376	32	376	32
Huelva LNG Terminal (Spain)	376	32	376	32	376	32	376	32
Mugardos LNG Terminal (Spain)	115	10	115	10	115	10	115	10
Sagunto LNG Terminal (Spain)	278	24	278	24	278	24	278	24
Krk LNG Terminal (Croatia)	80	7	80	7	80	7	80	7
Im (Baumgarten)	2.081	179	2.081	179	2.081	179	2.081	179
Dmax	12.081	1.039	12.161	1.046	12.183	1.048	12.238	1.052
Austria	588	51	588	51	588	51	588	51
Croatia	159	14	164	14	166	14	169	15
France	3.828	329	3.828	329	3.828	329	3.828	329
Greece	308	26	375	32	391	34	396	34
Italy	4.893	421	4.893	421	4.893	421	4.893	421
Malta	13	1	13	1	13	1	13	1
Portugal	278	24	271	23	262	23	252	22
Spain	1.945	167	1.961	169	1.972	170	2.029	174
Slovenia	68	6	68	6	68	6	68	6
Deff	0	0	0	0	0	0	0	0
% N-1	128%		127%		127%		127%	

N-1 formula for Transmed (Mazara del Vallo)

Results of the N-1 standard are also well above 100%: decreasing from 131% in the winter 2022/2023 to 130% in the winter 2025/2026. In fact, this event is assessed in one of the scenarios considered in chapter 4, as a result of the technical disruption risks, detected in chapter 3.

The main parameters used in the calculation of the N-1 formula are shown in Table 2⁴.

Table 2: N-1 formula for Transmed (Mazara del Vallo); winters 2012-2023, 2023-2024, 2024-2025 and 2025-2026

	winter 2022-2023		winter 2023-2024		winter 2024-2025		winter 2025-2026	
	GWh/day	mcm/d	GWh/day	mcm/d	GWh/day	mcm/d	GWh/day	mcm/d
Epm	7.941	683	7.946	683	7.946	683	7.990	687
<i>Tarifa (Spain) *</i>	0	0	0	0	0	0	0	0
<i>Almería (Spain)</i>	338	29	338	29	338	29	338	29
<i>Mazara del Vallo (Italy)</i>	1.227	106	1.227	106	1.227	106	1.227	106
<i>Gela (Italy)</i>	546	47	546	47	546	47	546	47
<i>Passo Gries (Italy)</i>	695	60	695	60	695	60	695	60
<i>Melendugno (Italy)</i>	487	42	487	42	487	42	487	42
<i>Baumgarten (Austria)</i>	2.081	179	2.081	179	2.081	179	2.081	179
<i>Oberkappel (Austria)</i>	246	21	246	21	246	21	246	21
<i>Überackern (Austria)</i>	114	10	114	10	114	10	114	10
<i>Kulata (BG) / Sidirokastron (Greece)</i>	118	10	118	10	118	10	118	10
<i>Kipi (Greece)</i>	49	4	49	4	49	4	49	4
<i>Nea Mesimbria (Greece)</i>	53	5	53	5	53	5	53	5
<i>Dravaszardahely (Croatia)</i>	78	7	78	7	78	7	78	7
<i>Obergailbach (France)</i>	570	49	570	49	570	49	570	49
<i>Taisnières (France)</i>	770	66	770	66	770	66	770	66
<i>Dunkerque (France)</i>	570	49	570	49	570	49	570	49
<i>Pince (Slovenia)</i>	0	0	5	0	5	0	49	4
Pm	247	21	247	21	247	21	247	21
<i>Austria</i>	27	2	27	2	27	2	27	2
<i>Croatia</i>	18	2	18	2	18	2	18	2
<i>France</i>	0	0	0	0	0	0	0	0
<i>Greece</i>	0	0	0	0	0	0	0	0
<i>Italy</i>	191	16	191	16	191	16	191	16
<i>Malta</i>	0	0	0	0	0	0	0	0
<i>Portugal</i>	0	0	0	0	0	0	0	0
<i>Spain</i>	11	1,0	11	1,0	11	1,0	11	1,0
<i>Slovenia</i>	0	0	0	0	0	0	0	0
Sm (30 % filled)	4.915	423	4.915	423	4.915	423	4.915	423
<i>Austria</i>	1.083	93	1.083	93	1.083	93	1.083	93
<i>Croatia</i>	61	5	61	5	61	5	61	5
<i>France</i>	1.669	143	1.669	143	1.669	143	1.669	143
<i>Greece</i>	0	0	0	0	0	0	0	0
<i>Italy</i>	1.880	162	1.880	162	1.880	162	1.880	162
<i>Malta</i>	0	0	0	0	0	0	0	0
<i>Portugal</i>	71	6	71	6	71	6	71	6
<i>Spain</i>	152	13	152	13	152	13	152	13
<i>Slovenia</i>	0	0	0	0	0	0	0	0
LNGm	4.456	383	4.457	383	4.457	383	4.457	383
<i>Dunkerque LNG Terminal (France)</i>	520	45	520	45	520	45	520	45
<i>Fos Tonkin LNG Terminal (France)</i>	410	35	410	35	410	35	410	35
<i>Fos Cavaou LNG Terminal (France)</i>	337	29	337	29	337	29	337	29
<i>Montoir de Bretagne LNG Terminal (France)</i>	229	20	230	20	230	20	230	20
<i>Reythoussa LNG Terminal (Greece)</i>	290	25	290	25	290	25	290	25
<i>Adriatic LNG Terminal (Italy)</i>	118	10	118	10	118	10	118	10
<i>Panigaglia LNG Terminal (Italy)</i>	168	14	168	14	168	14	168	14
<i>FSRU OLT Offshore LNG Toscana (Italy)</i>	165	14	165	14	165	14	165	14
<i>Delimara LNG Terminal (Malta)</i>	229	20	229	20	229	20	229	20
<i>Sines LNG Terminal (Portugal)</i>	223	19	223	19	223	19	223	19
<i>Bilbao LNG Terminal (Spain)</i>	543	47	543	47	543	47	543	47
<i>Cartagena LNG Terminal (Spain)</i>	376	32	376	32	376	32	376	32
<i>Huelva LNG Terminal (Spain)</i>	376	32	376	32	376	32	376	32
<i>Mugardos LNG Terminal (Spain)</i>	115	10	115	10	115	10	115	10
<i>Sagunto LNG Terminal (Spain)</i>	278	24	278	24	278	24	278	24
<i>Krk LNG Terminal (Croatia)</i>	80	7	80	7	80	7	80	7
Im (Mazara)	1.227	179	1.227	179	1.227	179	1.227	179
Dmax	12.081	1.039	12.161	1.046	12.183	1.048	12.238	1.052
<i>Austria</i>	588	51	588	51	588	51	588	51
<i>Croatia</i>	159	14	164	14	166	14	169	15
<i>France</i>	3.828	329	3.828	329	3.828	329	3.828	329
<i>Greece</i>	308	26	375	32	391	34	396	34
<i>Italy</i>	4.893	421	4.893	421	4.893	421	4.893	421
<i>Malta</i>	13	1	13	1	13	1	13	1
<i>Portugal</i>	278	24	271	23	262	23	252	22
<i>Spain</i>	1.945	167	1.961	169	1.972	170	2.029	174
<i>Slovenia</i>	68	6	68	6	68	6	68	6
Deff	0	0	0	0	0	0	0	0
% N-1	135%		134%		134%		134%	

⁴ Parameters of the N-1 formula according to paragraph 3 of Annex II of Regulation (EU) 2017/1938.