WINTER OUTLOOK

2019/2020

CONTENTS

FOREWORD

The French natural gas transmission network offers several entry and exit points (cross-border interconnections, LNG terminals, underground storage facilities), giving its users a choice between various supply combinations.

Since 1st November 2018, the TRF has become the new contractual framework for the French transmission network. It is built to a model that combines judicious investments in terms of infrastructure with contractual mechanisms which facilitate the management of the network's residual bottlenecks.

A **balanced supply management** is required for the smooth running of the gas system in winter.

The French operators, GRTgaz and Teréga, must ensure the **safety, efficiency** and **balance coverage** of their networks at all times (1). In accordance with their obligations, the GRTgaz and Teréga networks must have the necessary infrastructures to assure continuity in the transportation of gas, including in the event of a so-called P2 cold peak (2).

In this context, GRTgaz and Teréga produce an annual **Winter Outlook** in order to verify compliance with these obligations and share their analysis of the coming winter with the market. The Winter Outlook is an exercise that makes it possible to assess the balance coverage for the French zone and downstream of the network bottlenecks for different gas demand scenarios and supply schemes.

The Winter Outlook 2019-2020 is the 2nd edition to be published that incorporates the provisions made as part of the creation of the TRF on 1st November 2018.

(1) French Energy Code, Article L431-3
(2) P2 peak, i.e. gas demand at an extremely low temperature for a maximum period of three days, likely to occur statistically once every fifty years (ref.: French Energy Code, Article R121-8).

CHAPTER

01

PEAK BALANCE COVERAGE

MARKETABLE CAPACITIES

SUBSCRIBED CAPACITIES

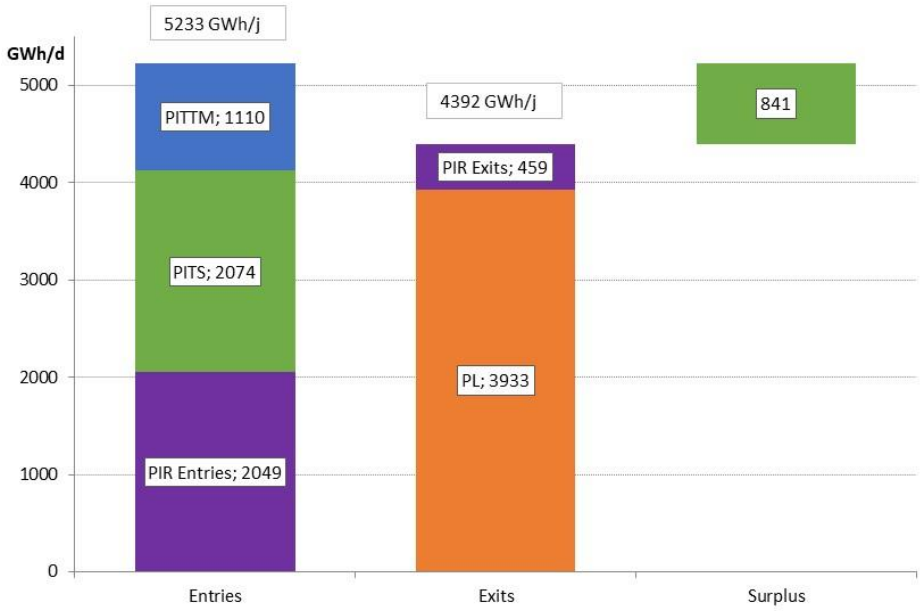
MARKETABLE CAPACITIES

The assessment of peak marketable capacities makes it possible to check that the public service obligations during a cold spell with a 2% risk (1) are ensured.

The **marketable capacities** approach for next winter includes the firm entry capacities made available by the TSOs to PIRs and PITTMs, the underground storage subscribed capacities and the PIR exit subscribed capacities.

841 GWh/d

The margin observed at the 2% risk cold peak taking into account the entry marketable capacities (PIR + PITTM), subscriptions to the storage facilities(PITS) (2) and exit subscribed capacities (PIR) (3).



The balance result for winter 2019-2020 is a surplus at a cold peak 2% risk.

This exercise is a theoretical approach that does not predict the actual use of network entry and exit points, especially for PITTMs.

Indeed, the PIR and PITTM facilities have never yet reached maximum usage of all firm capacities at most points, and never simultaneously.

(1) P2 peak, i.e. gas demand at an extremely low temperature for a maximum period of three days, likely to occur statistically once every fifty years (ref.: French Energy Code, Article R121-8).

(2) Draw-off rate at 45% of usable volume.

(3) The Pirineos and Oltingue PIRs are considered to be outgoing.

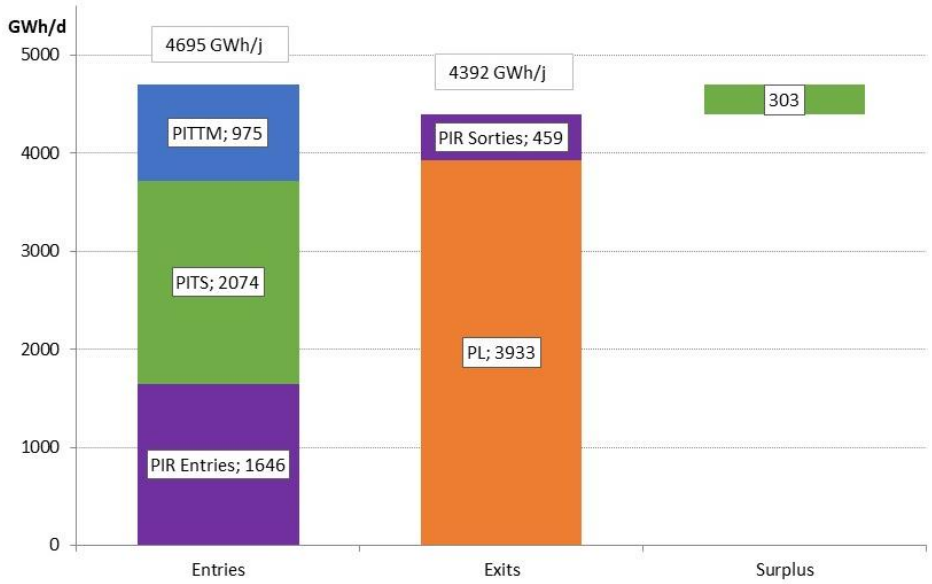
SUBSCRIBED CAPACITIES

The **subscribed capacities** reflect shippers' intentions in terms of supply with an optimal use of the capacities they have subscribed.

This approach includes the PIR and PITTM firm subscribed capacity (entry and exit) and the storage facility subscribed capacities for next winter.

303 GWh/d

The margin observed at the 2% risk cold peak taking into account the entry and exit subscribed capacities
(PIR (1) + PITTM + PITS (2))



Full use of subscribed capacities, assuming availability of gas in storage at the PITTMs, gives a margin of 303 GWh/d. For the record, the Winter Outlook 2018-2019 referenced a margin of 447 GWh/d for a 2% risk cold peak. The reduction in the margin is mainly caused by a decrease in the PIRs entry capacity subscriptions and in the PITS peaks capacities.

This margin of 303 GWh/d remains however positive and gives the system flexibility, allowing shippers to make decisions on their supplies including during the P2 peak. This margin remains relative, the real balance result at the peak will depend on the gas in stock at the PITTMs and on the actual use of the subscribed capacities at each point which will be decided on a daily basis by the shippers.

(1) The Pirineos and Oltingue PIRs are considered to be outgoing.

(2) Draw-off rate at 45% of usable volume.

CHAPTER

02

SCENARIO ASSESSMENT FOR WINTER 2019/2020

PRINCIPLE

SCENARIOS EXAMINED

ASSUMPTIONS ADOPTED

RESULTS

PRINCIPLE

The reasoning in cold peak capacities is not enough to assess the overall balance coverage for the winter and in particular the balance between the various sources of supply considering the possible infringement of bottlenecks in the network .

In addition, the TSOs decided to make several projections on winters with varied gas demand levels.

The TSOs have voluntarily chosen to consider supply scenarios in a North-South direction (historical scenarios). Under this configuration, flows can also approach East to West bottlenecks depending on LNG supplies, as has been observed in the winter of 2018-2019. The limits S1 and EO2 have thus been integrated into the modeling tool.

This exercise assesses the supply requirements for the French balance and downstream the limits NS1, NS2, NS3, NS4, EO2 and S1 of the network, as illustrated below, considering entries mainly on the Northern PIRs. More precisely, the studied scenarios prioritize the use of North PIRs, up to the saturation of the North-South limits if necessary, to identify not only the supply needs for the French balance but also the potential needs specifically located downstream each limit.

SCENARIOS EXAMINED

Saturations approach

North → South

East → West

3 winter gas scenarios

A volume gas demand up to

343 TWh

➢ Methodology

On each winter day, we test the supply scheme in order to saturate the network if necessary, until one or more of its bottlenecks are reached. The contractual points are deployed in the following order:

- setting of exit PIRs: Oltingue, Jura, Pirineos,
- basic PITTM deployment,
- maximizing entries through the PIRs within the limit of the upstream balance of each limit,
- closing the French balance through the withdrawal from storage facilities in coherence with the different limits.

This approach, maximizing the entries through the PIRs, represents a minimal utilization of the storages to cover the French balance and to avoid congestions while preserving the stocks as far as possible.

The expected result is the additional gas needed to cover the French balance or the downstream limits balance. It can be translated into additional LNG entries, or entries or exits reduction on the PIRs considered as exits in the simulations.

➢ Gas demand scenarios

3 winter scenarios (gas winter from 1st November to 31st March) were created on the basis of historical winters with different profiles and gas demand volumes:

- **Cold winter 2% risk volume**: simulation of a 2% risk cold winter corresponding to a total gas demand of **343TWh**.
- **Cold winter with 3-day P2 cold peak**: simulation of a relatively cold winter based on the winter of 2011-2012 and including a period of 3 consecutive days at the P2 peak corresponding to a total gas demand of **339 TWh**.
- **Recent winter**: winter 2017-18 showing the highest demand of the last three winters, with cold episodes from February, with a total gas demand of **333 TWh**.

Each of these scenarios includes the same combined gas cycle's demand assumptions, namely an average consumption of 250 GWh/d corresponding to a level historically attained or exceeded 10% of the time.

ASSUMPTIONS ADOPTED

LNG
uniform flow
3 scenarios

Exit PIRs
2 hypothesis in accordance with the 2 LNG scenarios

Storage facilities

122 TWh considered at 01/11, i.e. 95% of the subscribed volume

Entry PIRs at their maximum capacity

➢ **LNG scenario:**

3 uniform output scenarios at the PITTM are examined:

- **"No LNG"**
- **"Mini LNG"** : a constant flow of 220 GWh/d over the winter, divided in 65% on Fos, 20% on Montoir and 15% on DK LNG. This scenario is built from the lowest average winter levels observed over the last five years.
- **"Mini LNG +":** a constant flow of 300 GWh/d over the winter. The previous scenario is increased by 80 GWh/d to compensate a stronger assumption taken on the exit PIRs.

➢ **Pirineos, Oltingue and Jura exits:**

The PIRs Oltingue and Pirineos are considered exit points throughout the winter, at different levels depending on the scenario:

- "No LNG" and "Mini LNG": Oltingue at the subscribed capacity (240 GWh / d) and Pirineos at the firm marketable capacity (165 GWh / d).
- "Mini LNG +": maximizing exits at the level of total marketable capacity (i.e. 260 GWh/d for Oltingue and 225 GWh/d for Pirineos).

The Jura PIR is set at the level of the subscribed capacity.

➢ **Contribution of the storage facilities:**

A fill level of **122 TWh** as of 1st November, or 95% of the subscribed volume is considered.
In the projections, the storage facilities are used in proportion to their characteristics and in an optimised way to ensure maximised use of the volume at the end of winter. In early winter, when the scenario permits, the use of storage facilities is configured to maintain sufficient peak withdrawal capacity until the month of February.

➢ **PIR entry contribution:**

Network entry PIRs are located in the North upstream of the North-South bottlenecks. They are used, if the upstream balance allows it, at their maximum capacities, marketable or subscribed (2 variants). For Dunkerque, only the assumption of marketable capacity is used.

RESULTS

Entry PIRs
Marketable Capacities

PIR and PITS capacities are sufficient to cover the French balance on a cold winter…

… but **a punctual LNG need** is required for daily coverage in the event of a cold peak

➢ **Marketable Capacities**

Projections using entry PIRs up to their **marketable capacities** show that there is no additional supply requirement for the French balance coverage or the network bottlenecks' downstream balance coverage, irrespective of the LNG supply, and this despite maximised exits at Oltingue and Pirineos and cold winters.

A limited need for LNG appears in the winter scenario with peak P2; this is not a need in relation to the French balance coverage for the season but a punctual need for daily coverage on the coldest days, as described in chapter 01.

This requirement, without localization constraints, can be translated into additional LNG flows, and / or enties or a reduction of exits on the PIRs considered as exits in the simulations.

Additional supply of gas for French balance

LNG Scenario	Mini LNG+ (46 TWh)	Mini LNG (33 TWh)	No LNG (0 TWh)
Cold Winter 2% risk	0 TWh	0 TWh	0 TWh
Winter with 3d P2	0 TWh	0 TWh	2 TWh
Winter 2017/18	**0 TWh**	**0 TWh**	**0 TWh**

As a reminder, the volumes indicated have been evaluated on the basis of structuring assumptions concerning the use of the PIRs and storage facilities, formulated in relation to the objective of the exercise. These simulations are not representative of the actual use of the various contractual points that will be monitored throughout the winter (monitoring).

RESULTS

Entry PIRs
Subscribed Capacities

✓ **"No LNG " scenario :**

LNG needed to cover the French balance during winter without localization constraints if downstream stocks are preserved

✓ **Scenarios "Mini LNG" et "Mini LNG+" :**

Punctual LNG need for daily coverage in the event of a cold peak

➢ **Subscribed Capacities**

On the other hand, the projections limited to **subscribed capacities** for entry PIRs show that cold winters with maximized exits to Switzerland and Spain require additional entries.

- Cold winters without LNG require additional volumes to cover the French balance. This need for the France balance will also cover the need downstream of the bottlenecks, provided that the downstream storage is preserved until the end of the winter.
  This requirement, without localization constraints, can be translated into additional LNG flows, and / or entries or a reduction of exits on the PIRs considered as exits, or an increase in subscriptions at the entries.
  However, this additional supply must be targeted in time depending on the storage and consumption levels. If it arrives too late, the stock downstream NS4 (PITS Lussagnet) could not be preserved until the end of winter; and the gas supply should then be directed downstream of this limit, resulting in LNG emissions at Fos and / or entries via Pirineos.
  However, this supply need remains below or close to the LNG supplies observed in previous years.
- In the "Mini LNG" and "Mini LNG+" scenarios, additional inputs are needed from time to time to cover the daily peaks on the coldest days. This contribution can be made at any point in the network without localization constraints.

Additional supply of gas for French balance

LNG Scenario	Mini LNG+ (46 TWh)	Mini LNG (33 TWh)	No LNG (0 TWh)
Cold Winter 2% risk	0 TWh	0 TWh	30 TWh
Winter with 3d P2	2 TWh	2 TWh	27 TWh
Winter 2017/18	**0 TWh**	**0 TWh**	**22 TWh**

CHAPTER

03

CONCLUSIONS

KEY MESSAGES

KEY MESSAGES

Good level of subscription of storage capacity and a high fill rate

Supply of LNG required for the French balance coverage in the event of a cold winter or cold peak

Use of TRF mechanisms for the day-to-day management of the bottlenecks.

GRTgaz and Terega publish an indicator that reflects the level of strain on stocks downstream of the network bottlenecks.

GRTgaz and Terega have **no particular alert** to give at the beginning of this winter.

Indeed, the **capacities offered to the shippers as well as their subscription levels** for the winter of 2019-2020 (for all points) **are sufficient to cover the supply for French consumers in the event of a cold peak,** even if the shipping customers decide to maximise their use of the subscribed exit capacities to Switzerland and Spain.

The good level of subscription of storage capacity and a high fill rate, with a stock of 127,7 TWh on 31/10/2019, i.e. 99,2% of the subscribed volume, give the French transmission network more flexibility and strengthen the security of supply.

A good stock management is nevertheless necessary throughout the winter in order to guarantee sufficient withdrawal capacities in the event of a cold peak and to preserve stock downstream of the bottlenecks, especially downstream NS4, until the end of winter.

Projections show that a minimal supply of **LNG** and/or additional subscriptions at entry points are necessary to **cover the balance** for cold winter scenarios or in the event of a spike in gas demand, while maximizing the exits. Maximizing exits to their marketable capacities does not induce supply-localization constraints as long as downstream stocks are preserved.

The mechanisms defined as part of the TRF, in particular that of the **Locational Spread**, must resolve the occasional situations, throughout the winter, when bottlenecks are reached (see Appendix 3).

The monitoring of stocks downstream of the bottlenecks in a North-South flow pattern will monitor the stock level of the storage facilities, thus allowing to decide on a possible use of the Flow Commitment mechanism.

A downstream stock monitoring indicator will be issued to the market throughout the winter on the two TSOs' respective websites.

CHAPTER

04

APPENDICES

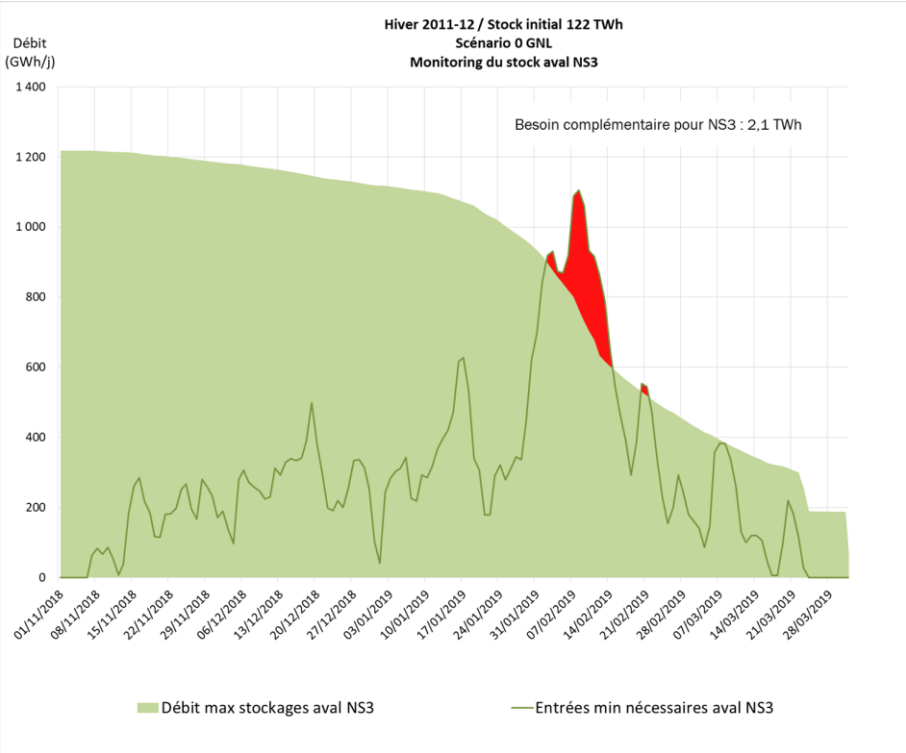
Appendix 1
Monitoring of downstream stocks

The Winter Outlook results provide an indication of the capacity of the gas system to deal with different scenarios throughout the entire winter.

To deal with this problem, short term mechanisms have been implemented in accordance with the TRF. The monitoring of stocks downstream of the bottlenecks, presented to the market during work on the TRF, makes it possible to examine the balancing coverage and the management of the bottlenecks.

The monitoring of downstream stocks, for each network bottleneck and each day of winter, consists of comparing the projected level of gas in storage downstream of the bottleneck to a minimum level required to guarantee a given scenario. If the projected stock is less than the minimum stock, the TSOs can trigger a preventive mechanism to guarantee the need for gas downstream of the bottleneck in that scenario.

The minimum stock necessary downstream of the bottlenecks is defined in such a way that each day of the winter, the storage facilities are in a position to produce the quantities that cover the chosen scenario. These quantities correspond to the capacity of the transits across the bottleneck and the downstream bottleneck entries (LNG if there is any in the scenario) to supply all downstream gas demands and exits in the chosen scenario. This minimum necessary flow rate is then compared to the flow rate available in the downstream storage facilities, taking growth factors into account. Before each winter, the minimum required volume of downstream stock is thus determined in order to cover the chosen scenario.



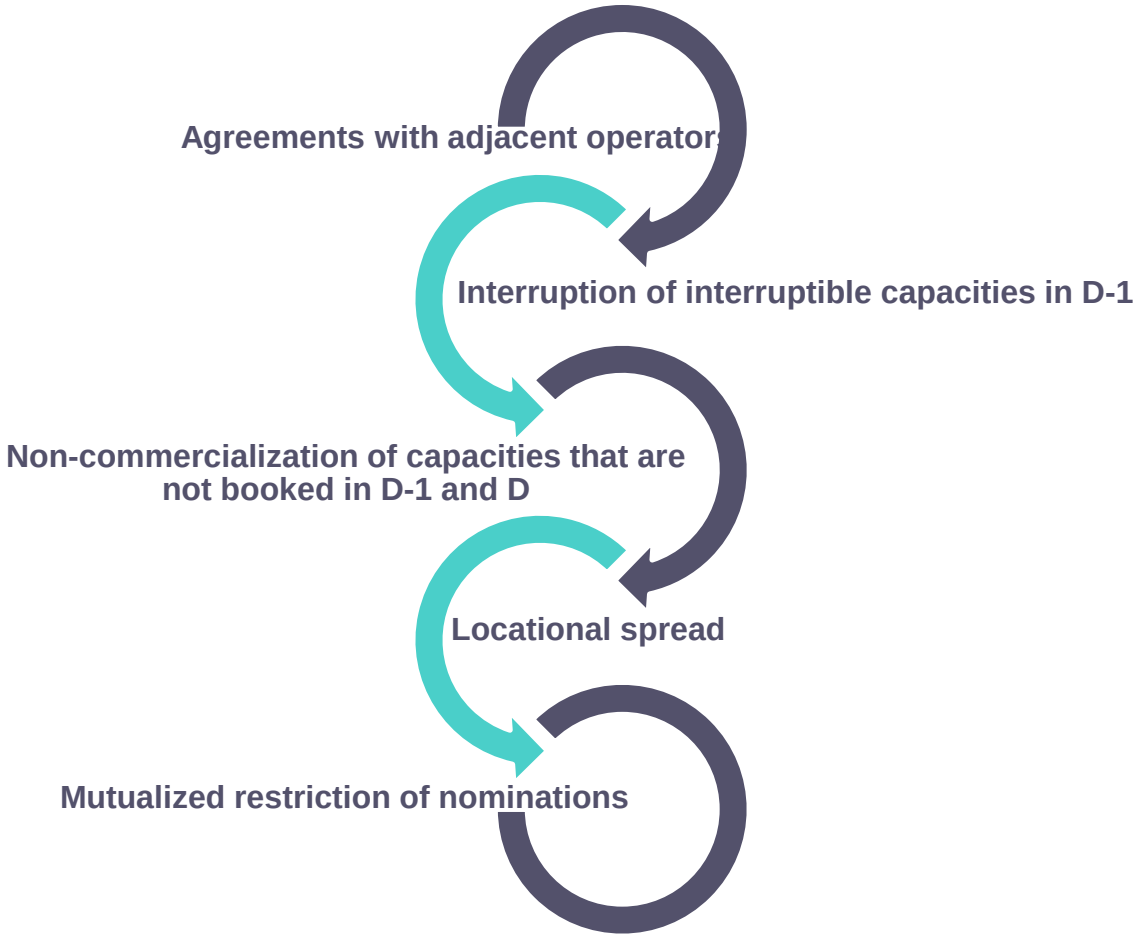
Thus, each day of the winter, the TSOs monitor the growth of the stocks located downstream of the bottleneck and carry out a projection of this stock for the remainder of the winter in the scenario to be covered.

The aim is to check that on each day in winter, the storage facilities are able to supply the required minimum flow rate for the scenario downstream of the bottlenecks. Otherwise, the question arises of triggering and sizing a flow commitment as the identified risk period approaches.

Appendix 2
Note on TRF mechanisms

The **Trading Region France**, or **TRF** has been launched as a new market area with effect from 1st November 2018.
The TRF market area amalgamates the Nord GEP and TRS market areas, in order to offer a single market price in France. It incorporates the operating principles of the TRS with a single point of entry/exit, a single gas exchange point (GEP) and two balancing zones (GRTgaz and Teréga).

Completion of the Val de Saône (GRTgaz) and Gascogne-Midi (Teréga) projects, implemented as part of the single market, does not, however, result in a perfect merger of the two market areas, and **residual network bottlenecks** may remain in the network.
A joint study between Teréga, GRTgaz and various market stakeholders has been carried out as part of the gas Consultation to define the contractual mechanisms required for the smooth running of the TRF. The contractual mechanisms approved by a resolution of the CRE on October 26, 2017 are as follows:

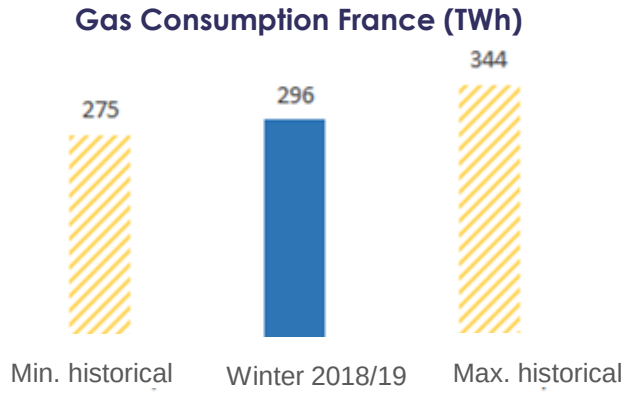


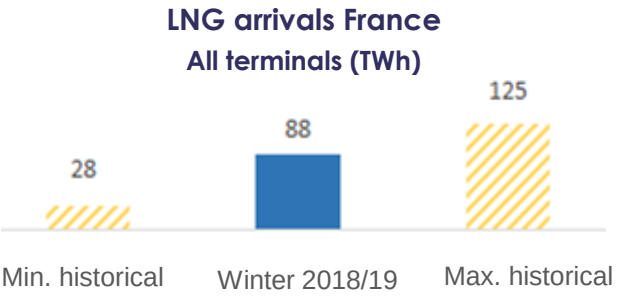
Appendix 3
Feedback on winter 2018-2019

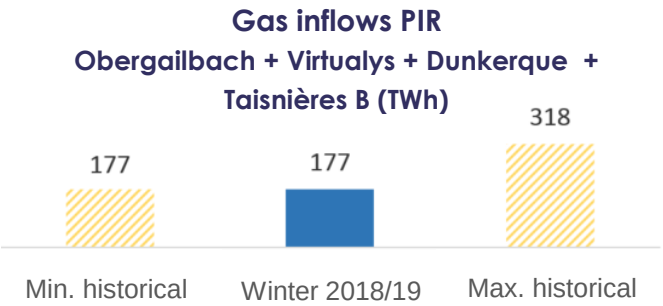
Key observations on Winter 2018-2019

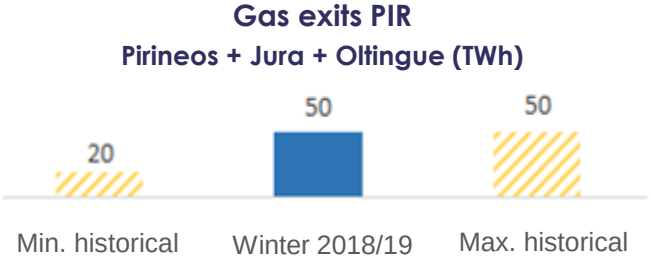
The first winter in zone TRF went according to expectations and without any particular warning. The network did not experience any tension for the supply of gas, due to the almost complete filling of gas storages, significant LNG emissions throughout the season allowing a good geographic distribution of the sources supply, and also mild weather conditions.

In this context, there were only 2 days of congestion during winter (days in red published in the Vigilance Outlook), that were managed using the planned mechanisms (see Appendix 2) and without having to resort to localized spread.
Consumption during 2018-2019 winter was lower than previous winters, reaching **296 TWh**. The winter peak was also limited, hitting a maximum daily consumption of **2,775 GWh** on January 24, 2019, compared to a peak of 3,253 GWh the previous winter.
The volume in storage at 31/10/2018 reached **124 TWh** out of 129 TWh marketable, i.e. **96%**. And, at the end of the winter, on 31/03/2019, the volume was at **37 TWh** out of 129 TWh marketable, i.e. **29%**.
LNG arrivals on the 3 terminals were very important with an overall contribution of **88 TWh,** making this winter the second highest in terms of volume after winter 2010/2011, in the last 10 years.
As a balance result, the use of the North PIRs was the lowest of the last 10 years, while the exit PIRs (Oltingue, Jura, Pirineos) had the largest flows in the last 10 years, specially due to the important outflows to Spain via Pirineos

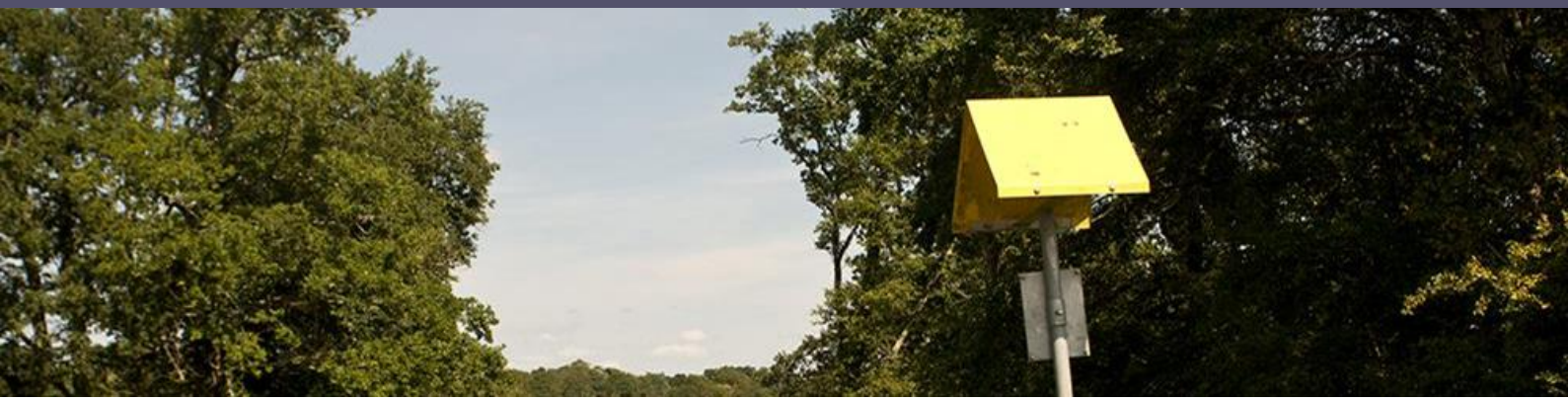








Note: historical data from 2010 and net flows for the PIRs.



GRTgaz

TEREGA