WINTER OUTLOOK

2018/2019

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 spell (2).

In doing so, 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 patterns.

The publication of the Winter Outlook 2018-2019, 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 spell, 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

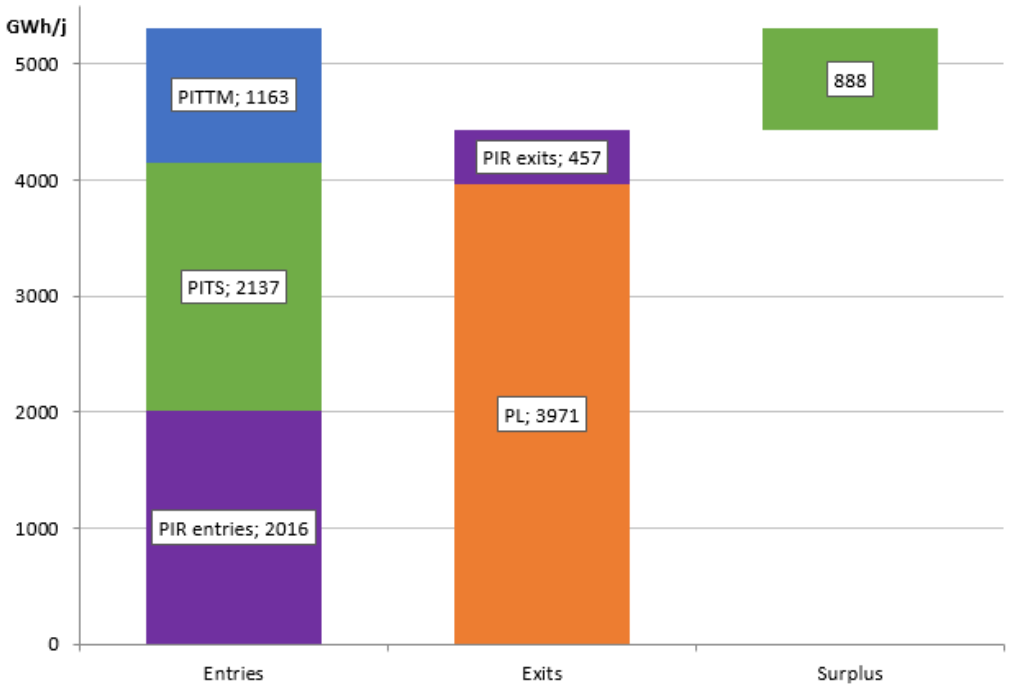
MARKETABLE CAPACITIES

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.

888 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 for winter 2018-2019 is surplus at a cold peak risk of 2%.

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

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

(1) P2 spell, 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.

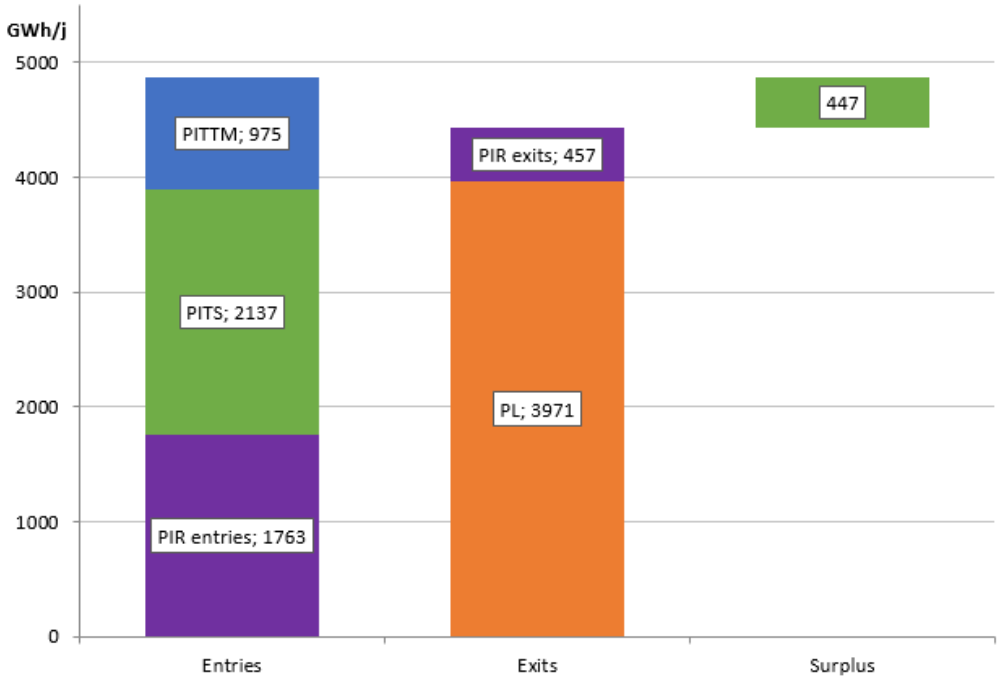
SUBSCRIBED CAPACITIES

The **subscribed capacities** reflect shippers' intentions in terms of supply with 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.

447 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 447 GWh/d. For the record, the Winter Outlook 2017-2018 referenced a deficit in the order of almost 209 GWh/d for a 2% risk cold peak.
For PIRs and PITS used as input at the maximum subscribed capacities, this implies a need for LNG output of at least 528 GWh/d.

This margin of 447 GWh/d gives the system flexibility and allows shippers to make decisions on their supplies including P2. This margin is relative and peak balancing will depend on the gas in stocks at the PITTMs and on the actual use at each point of the subscribed capacities which will be done 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 2018/2019

PRINCIPLE

SCENARIOS EXAMINED

ASSUMPTIONS ADOPTED

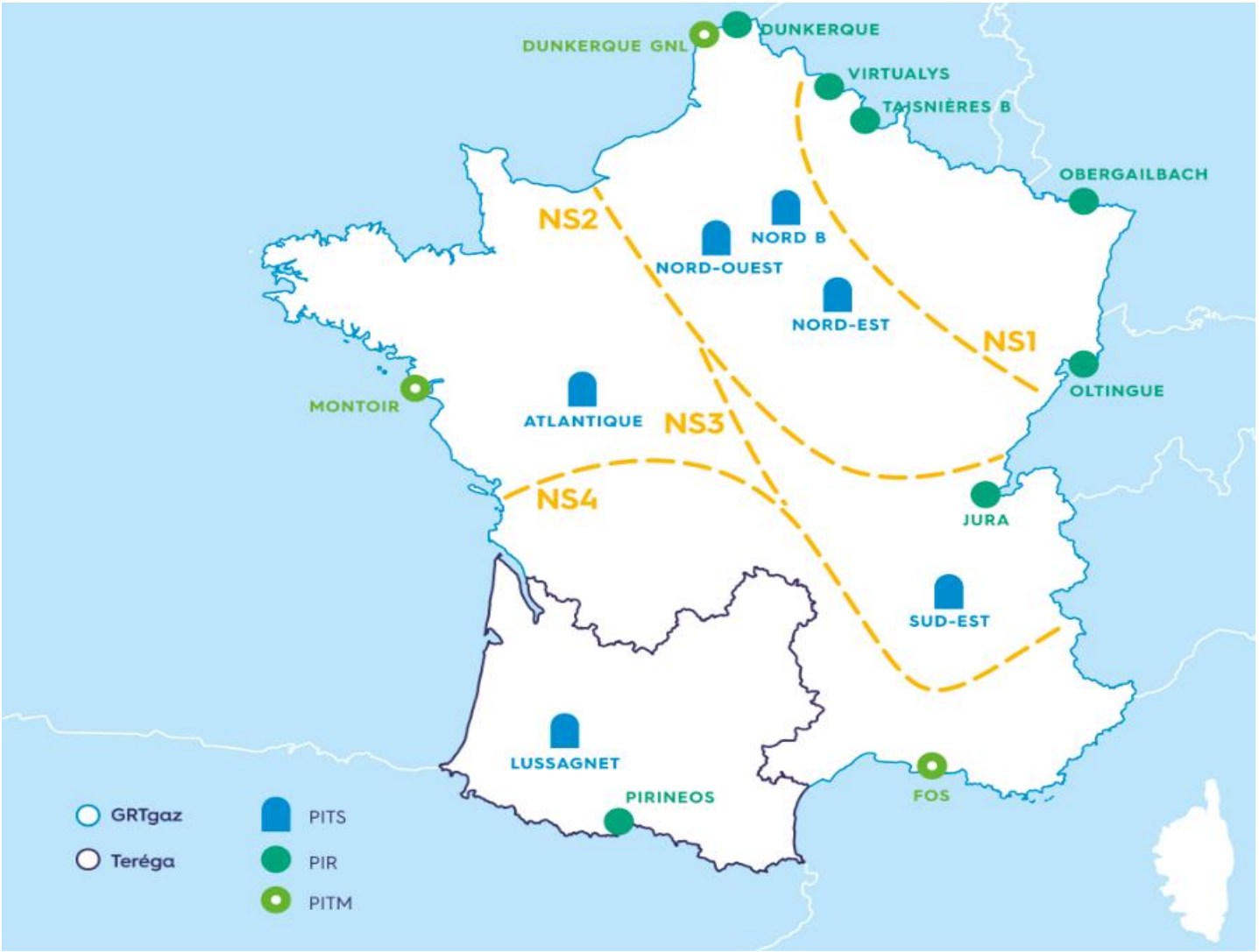
RESULTS

PRINCIPLE

The reasoning in cold peak capacities is not sufficient to assess the overall balance coverage for the winter and in particular the balance covergae between the various supply sources considering the possible infringement of the network bottlenecks.
The TSOs also decided to make several projections on winters with varied gas demand levels.

That's why, the TSOs decided to make several projections on winters with varied gas demand levels.

The TSOs have chosen voluntarily to consider historically attested supply scenarios in a North-South direction. This exercise assesses the downstream supply needs downstream of the NS1, NS2, NS3 and NS4 network bottlenecks as illustrated below, considering entries mostly on Northern PIRs.
These bottlenecks are referenced in the documents regarding the TRF.



SCENARIOS EXAMINED

Examination of saturations

North ➡ South

3 **winter gas scenarios**

A gas demand in volume up to

339 TWh

➢ Methodology

On each day in winter, we test the supply bottleneck scheme in order, if necessary, to saturate the network 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 via the PIRs and then closing the French balance coverage by means of the storage facilities in the upstream balance bottleneck of each bottleneck,

The expected result is a possible top-up of gas, to cover the French balance coverage or the downstream balance coverage of the bottlenecks.

➢ 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 by volume: simulation of a 2% risk cold winter corresponding to a total gas demand of 339 TWh.
- 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 335 TWh.
- The most recent winter: winter of 2017-18 showing a total gas demand of 328 TWh.

Each of these scenarios includes the same gas demand assumptions of the combined gas cycles, i.e. an average load rate of 71% corresponding to a gas demand level historically attained or exceeded 10% of the time.

ASSUMPTIONS ADOPTED

Pirineos and Oltingue set at subscribed capacities level

Uniform **LNG following** 2 scenarios

Storage facilities:

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

Entry PIR closed off

➢ **Pirineos and Oltingue exits:**

The Oltingue and Pirineos network interconnection points are considered outgoing throughout the winter, in terms of equal subscribed capacities for this winter for marketable capacities (i.e. 223 GWh/d for Oltingue and 165 GWh/d for Pirineos).

➢ **LNG scenario:**

2 uniform output scenarios at the PITTM are being examined:

- no LNG
- average quantity at 280 GWh/d, constant over the winter: this level corresponds to the average level observed since early 2018. Chosen distribution is as follows: Fos = 100 GWh/d, Montoir = 100 GWh/d, Dk LNG = 80 GWh/d.

These scenarios do not reflect the actual use of the PITTMs, but highlight the additional supply requirements downstream of the bottlenecks in the event of low use of the PITTMs.

➢ **Contribution of the storage facilities:**

The early winter volume under consideration is a fill level of 122 TWh as of 1st November, or 95% of the subscribed volume. 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 adjusted for each scenario of the balance coverage closed-off upstream of the bottlenecks up to the total use of marketable or subscribed capacities (2 variants).

RESULTS

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.

	LNG at 280 GWh/d	LNG at 0 GWh/d
Winter with 3 d P2	0 TWh	0 TWh
Cold winter with 2% risk	0 TWh	0 TWh
Winter 17/18	**0 TWh**	**0 TWh**

On the other hand, the projections bottlenecked to **subscribed capacities** for entry PIRs show that cold winters with maximised exits to Switzerland and Spain require additional entries (volume over the gas winter) mainly to cover the downstream balance coverage of the bottlenecks.
This capacity must be targeted in time according to stock level and the level of natural gas demand. It may result in entries from Spain via Pirineos or LNG inputs to the Fos-sur-Mer and/or Montoir terminals.
However, this requirement, downstream from the North-South network bottlenecks, remains below or close to the LNG supplies observed in previous years.

	LNG at 280 GWh/d	LNG at 0 GWh/d
Winter with 3 d P2	0 TWh	15 TWh
Cold winter with 2% risk	0 TWh	19 TWh
Winter 17/18	**0 TWh**	**9 TWh**

CHAPTER

03

CONCLUSIONS

KEY MESSAGES

KEY MESSAGES

Good level of subscriptions and correct filling of storage facilities

Supply of LNG required for the French balance coverage and the management of bottlenecks 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 Teréga are introducing an indicator that reflects the level of strain on stocks downstream of the network bottlenecks.

GRTgaz and Teréga have **no particular alert** to give before the start of this winter.

Indeed, the **capacities offered to the shippers as well as their subscription levels** for the winter of 2018-2019 (all points taken together) **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 storage facilities and the historical filling to 123,9 TWh on 31/10/2018, or 96.5% of the subscribed volume give the French transmission network more flexibility and consolidate the real operational security.

Good stock management is, therefore, necessary throughout the winter in order to guarantee sufficient withdrawal capacities in the event of a cold peak.

Projections show that a minimal supply of **LNG** and/or entries from Spain are nonetheless necessary to **cover the balance** and **manage the network bottlenecks** for cold winter scenarios or in the event of a spike in gas demand.

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 permitting a decision to be made on the possibility of using 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

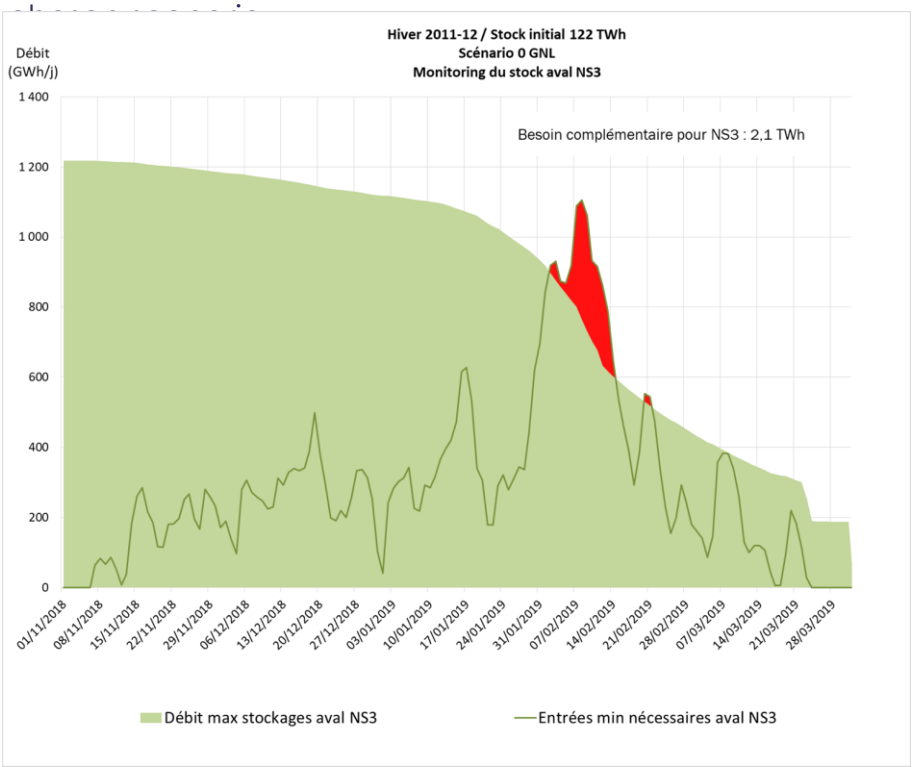
Appendix 1
Monitoring of downstream stocks

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.



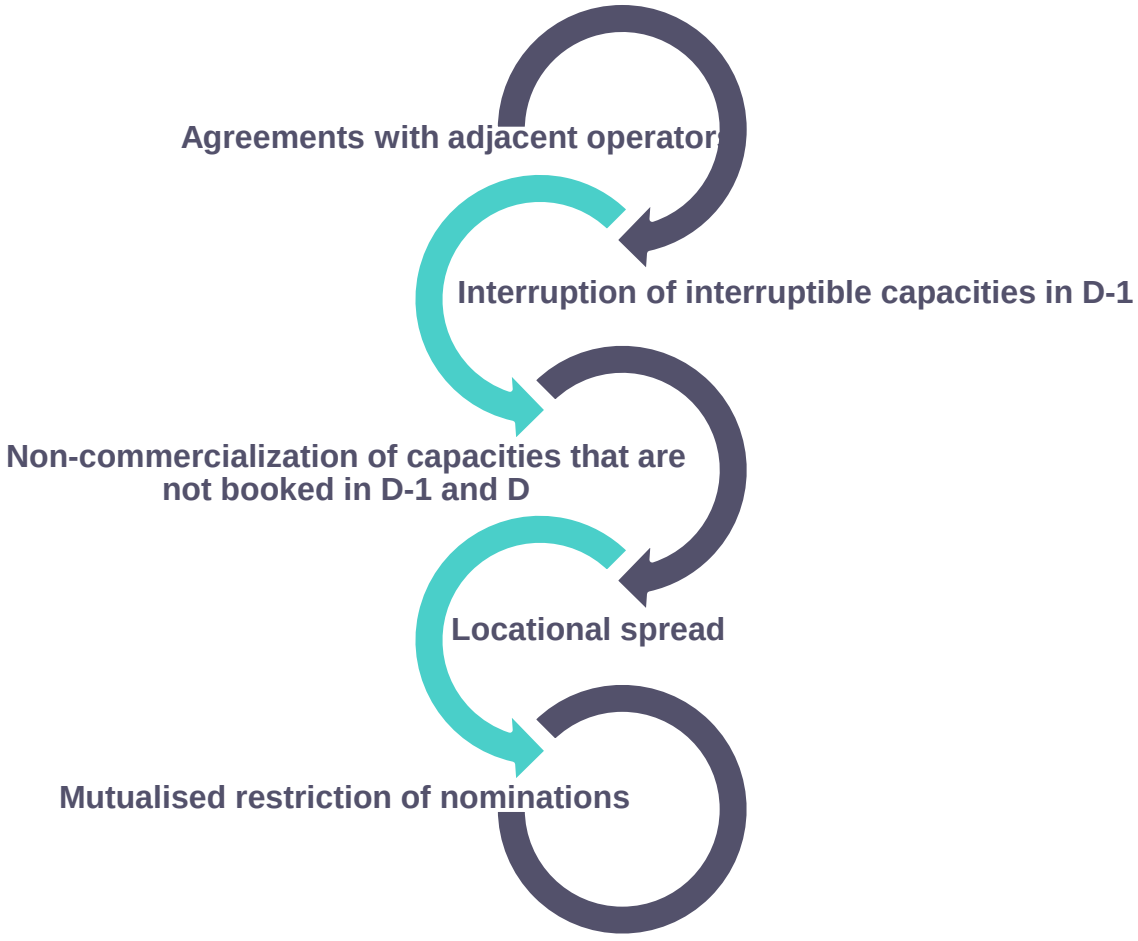
Thus, each day of the winter, the TSOs monitor the growth of the stocks located downstream of the bottleneck and carry out a projection of this stock for the remainder of the winter in the scenario to be covered.

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 - 1/2
Feedback on winter 2017-2018

➢ **Winter Outlook 2017-2018**

The Winter Outlook 2017-2018 had highlighted the low subscriptions on the storage facilities with identified risks in the event of a cold peak or cold scenarios over several consecutive days.

The vigilance mechanism for last winter was also increased with the early implementation of the locational Spread in order to ensure correct management of possible bottlenecks on the network.

The South-East bottleneck was under particular vigilance with possibility of bottleneck episodes under the following conditions:

- low output levels at the terminals
- insufficient draw-off of salines
- significant gas demand by CCG plants around Fos-sur-Mer.
- not necessarily very low temperatures

The locational Spread for the winter of 2017-2018 affected the North bottleneck and the Southeast bottleneck. GRTgaz was able to manually intervene on the Powernext platform of locational products via 3 intervention windows.

➢ **Key lessons learned from winter 2017-2018**

2017-2018 wasn't a very cold winter on average but it was marked by alternating cold and mild spells. Even if the current volume in the storage facilities was finally judged to be sufficient for that winter, it should be noted that the shippers called upon these facilities at the fast payment bottleneck speed especially on Lussagnet at the end of winter when the late cold wave was bringing the end-of-winter stocks to zero useful volume levels. The PITTMs were called upon at historically high levels in late March, also to cover the end of winter. It is therefore likely that these stocks will be found to be insufficient for an even colder winter without an additional supply of LNG or a greater use of cross-border points from early winter.

In terms of mechanism, the locational Spread has proven its worth for bottleneck management with a very positive balance since all the quantities were sourced under competition in the upstream and downstream offers.

Appendix 3 - 2/2
Winter feedback 2017-2018

➢ Detailed winter feedback

This winter was marked by a diversity of temperature and bad weather spells. The month of December was particularly mild while the month of February was cold with a late cold peak at the end of February.

There was no problem of balance coverage during this winter which finished slightly above seasonal average but with periods of sustained cold leading to a total gas demand of 317 TWh. The low volumes in the storage facilities at the start of winter were totally depleted by 31/03 with a strong demand particularly for payment on Lussagnet.

These low late winter levels led GRTgaz and Teréga to increase their vigilance for the French balance coverage and for South-East late winter bottleneck management.

➢ Detailed feedback on locational Spread

locational Spread was used 13 times during the winter of 2017/2018, but only for management of South-East bottlenecks. There were 3 notable different spells:

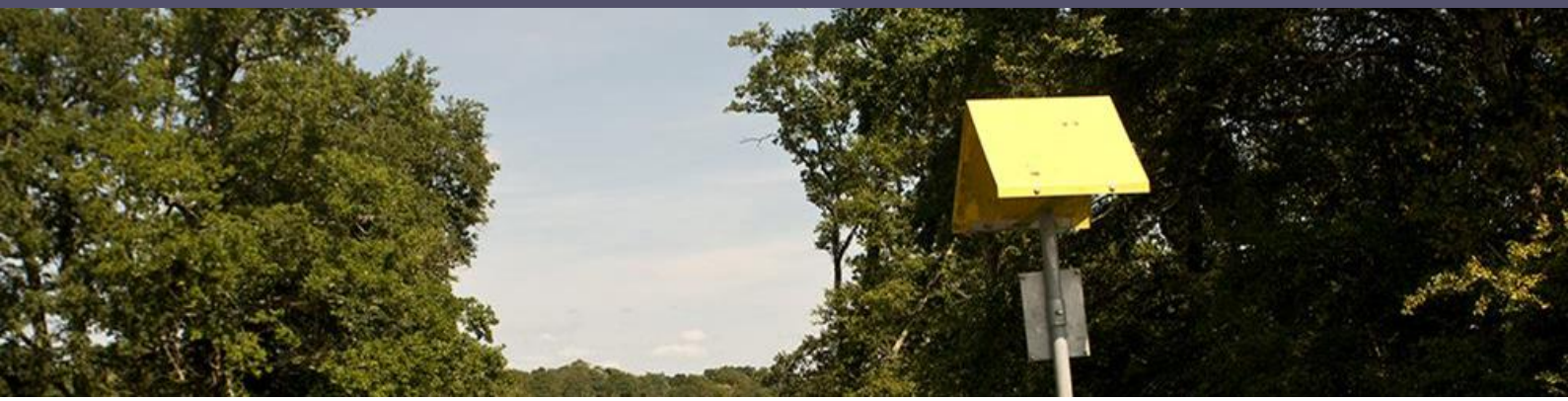
19 stakeholders took part in the 13 interventions carried out by GRTgaz during the winter of 2017/2018. No problem was encountered in the execution of the mechanism.

GRTgaz mainly used the first of the three planned intervention windows. Indeed, the selections at the beginning of the gas day on those days required a quick response via the locational Spread to ensure balancing of the zone.

All the quantities called for were supplied. Of all the 13 operations, 8 different shippers saw their offers selected, at least 2 of which were by call.

The quantities called for ranged from 11 to 75 GWh for a total called volume of 476 GWh. The prices obtained (spread price) varied between 2.3 and 6.7 €/MWh for an average price of 5.41 €/MWh. The total cost of the mechanism for the winter of 2017/2018 was €2.6 M.

Only the South-East PITS was the subject of selected purchase offers downstream of the South-East bottleneck (100%). Lussagnet was the point most solicited for sale upstream of the South-East bottleneck: Lussagnet: 98%, South-Atlantic: 1.5%, Pirineos 0.5%.



GRTgaz

TEREGA