Les

Rendez-vous Clients GRTgaz

The resilience of the gas system in a new energy context

Thurday April 13

9.00am-5.00pm

Pavillon Wagram
Paris

Les Rendez-vous Clients GRTgaz

Introduction

Pierre Cotin

Program

9.30am

Plenary

- **Introduction**
- **Review of an unprecedented winter:**
  - European context
  - Gas consumption in France
  - TRF: new challenges to overcome
  - Sobriety: mechanisms to prevent grid tension
- **Summer rand winter outlook**
  - 2023 maintenance schedule to sustain our infrastructure
  - 2023 Summer Outlook summary: analysis of the possibility of storage filling
  - Future evolutions of the offer
  - ingrid: what's new with your client portal?

12.00am

Lunch

2.00pm

Plenary

- **Introduction**, Thierry Trouvé, GRTgaz CEO
- **Gas energy transition**
  - Anthony Mazzenga, GRTgaz Development Director
  - Salamandre Project: pyrogasification on Le Havre port area, interview of Thomas Pierre, Business Development Support Manager-New Gases Engie
- **Decarbonisation by biomethane**
  - Overview of the sector and regulations
  - Interview of Loic De Bergh, Arkema Energy Director

4.00pm

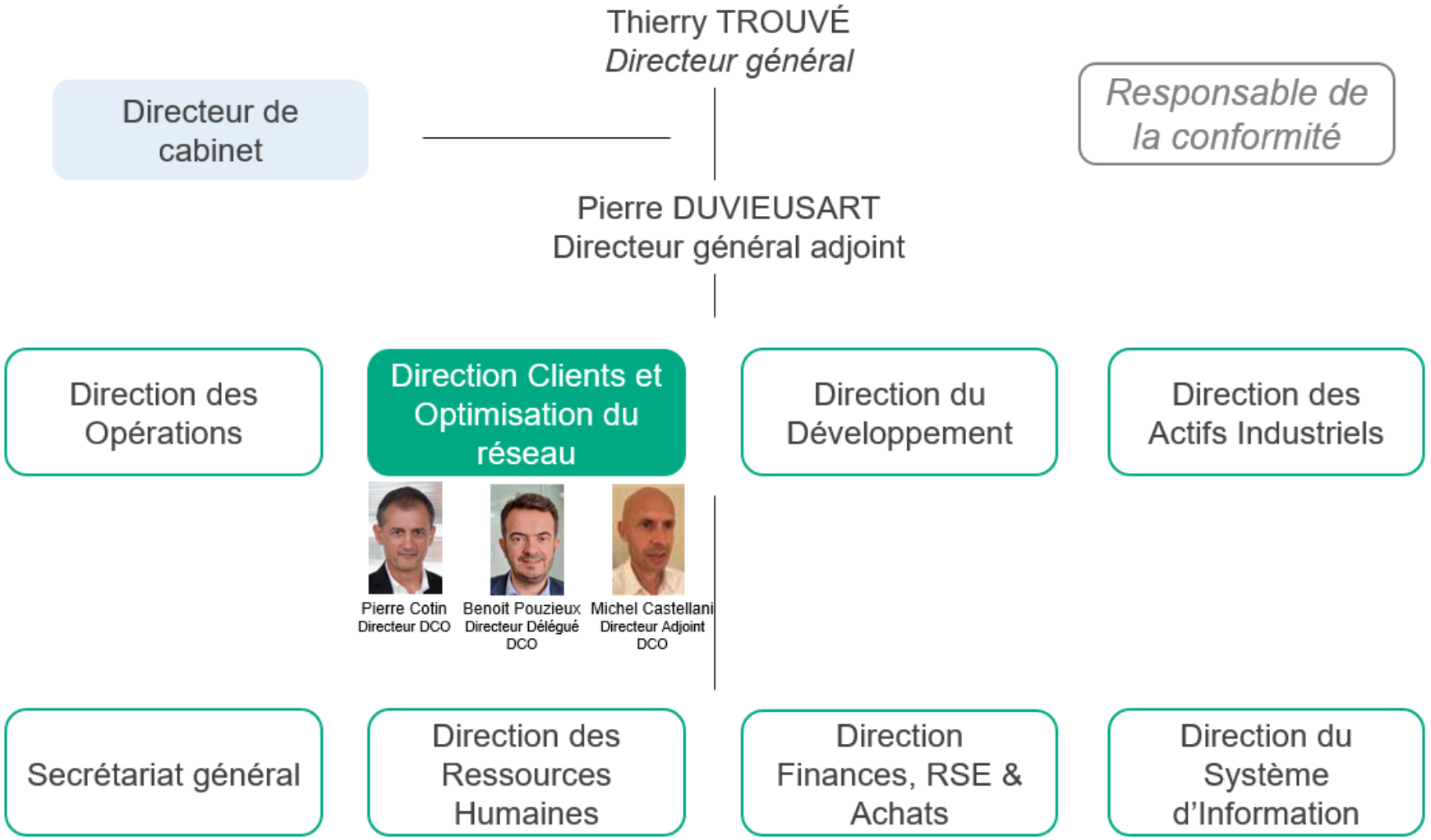
Networking break

Les Rendez-vous Clients GRTgaz

Introduction

Pierre Cotin
Benoit Pouzieux
Michel Castellani

The Direction Clients et Optimisation du réseau



Organigramme de GRTgaz, 2023

Les Rendez-vous Clients GRTgaz

Introduction

Pierre Cotin
Benoit Pouzieux
Michel Castellani

Do you have any questions ?

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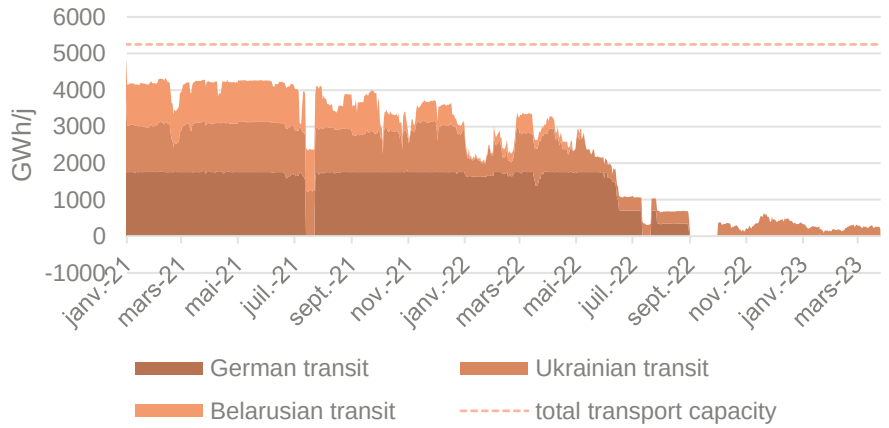
Review of an unprecedented winter

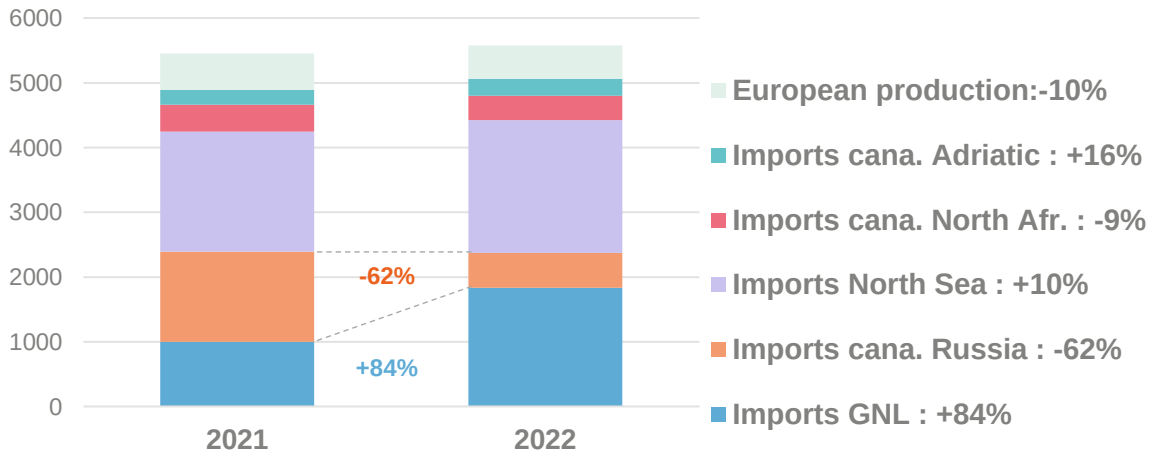
Matthieu Morin
Eglantine Kunle

The resilience of the European gas system to the energy crisis following the war in Ukraine

Russian deliveries to the EU via Belarus, Ukraine and NordStream



Major European gas supplies (incl. UK) (in TWh)

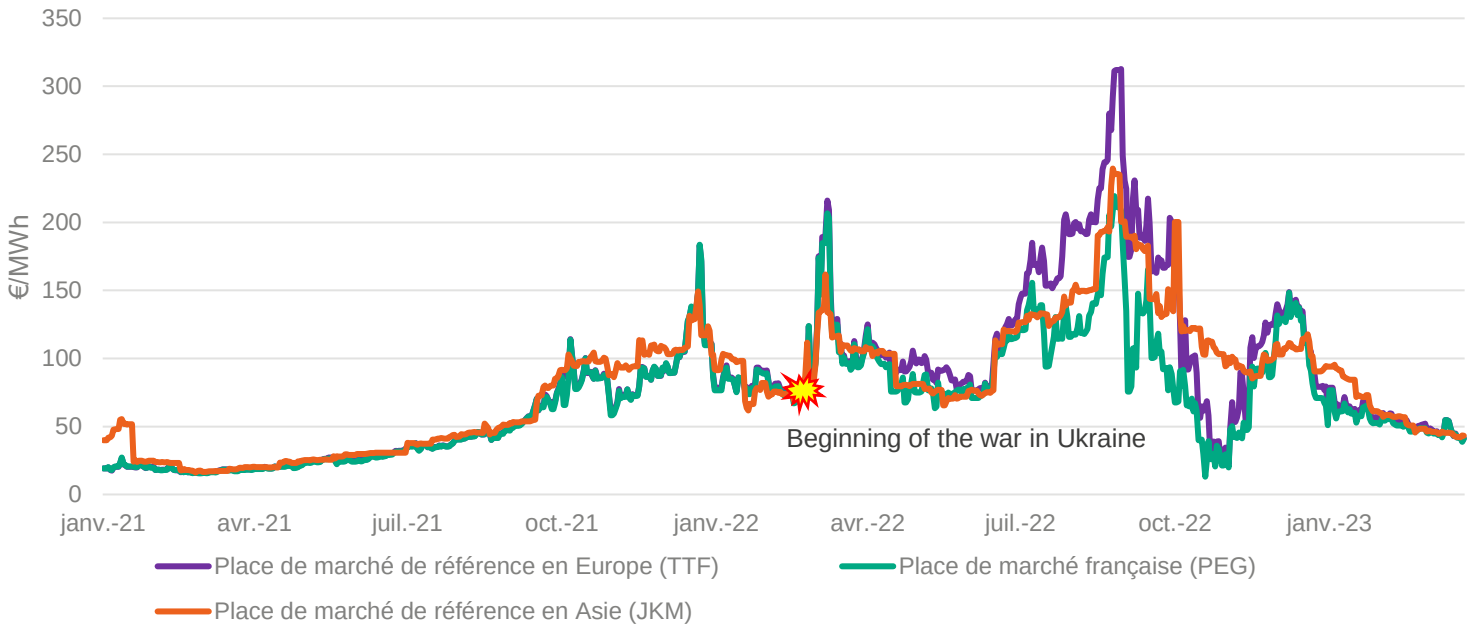


- **Drastic drop in Russian gas imports by pipeline** in early 2022 in Europe, and almost stop from summer
- These imports were replaced mainly by **LNG imports** delivered mainly to the west of Europe
- Other sources of supply were **used to their maximum.**
- Implementation of new European objectives and regulations through **REPowerEU** to maintain security of supply, increase energy independence (including ending reliance on Russian gas by 2027) and limit price increases.

Source : ENTSOG - Analyse GRTgaz

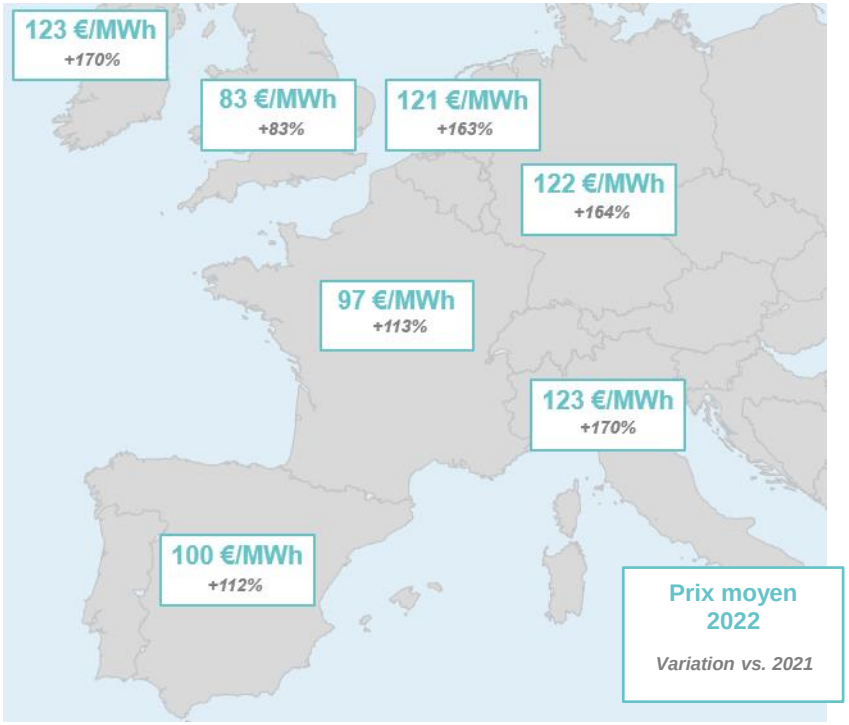
Rising gas prices in Europe in a tight supply environment, but limited increase for the PEG

Prices of French (PEG), European (TTF) and Asian (JKM) marketplaces since 1st of January 2021



Source : EEX, Bloomberg - Analyse : GRTgaz

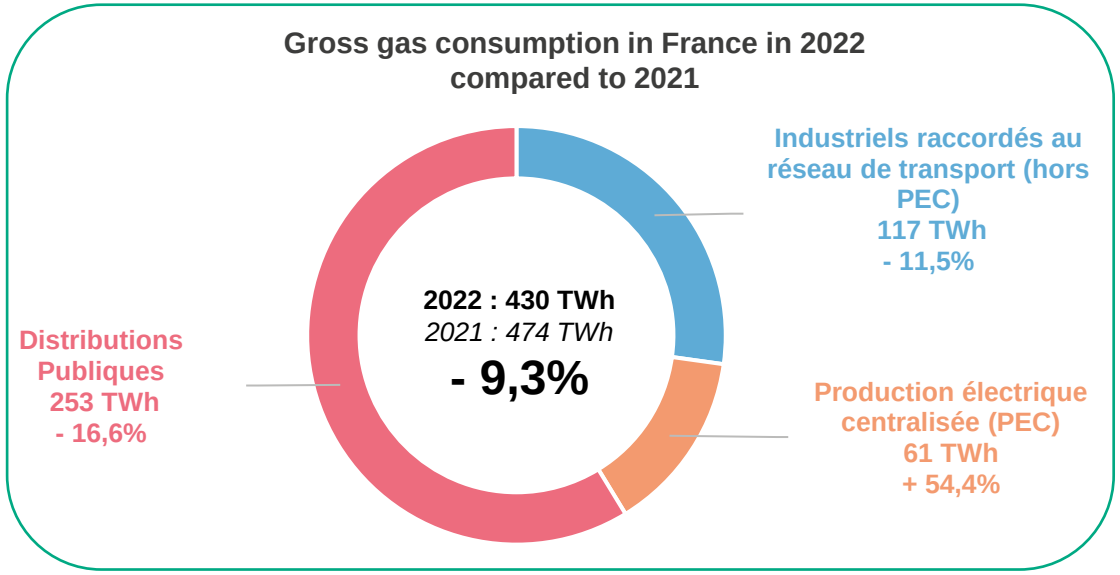
2022 average spot prices for the main European markets



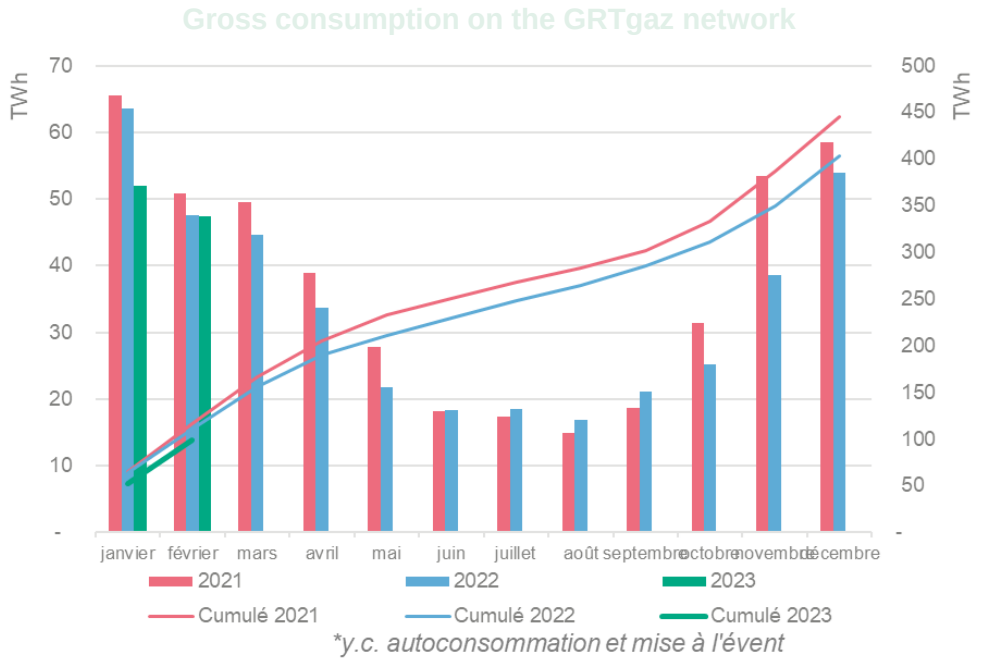
Source EEX, Bloomberg, Mibgas – Analysis by GRTgaz

- **Prices rising** on all European markets, highly volatile and uncorrelated in 2022
- High prices allowed more LNG to be imported
- Given its comfortable location, the PEG is the cheapest market place
- End of winter marked by a convergence of the various market places at pre-crisis levels (easing of supply through the installation of new infrastructures, good filling of storages and demand with the efforts of sobriety granted)

Gas consumption following the downward trend of 2022 (despite the tensions in the electricity system)



Sources : GRTgaz, Teréga, GRDF, ELD – Analysis by GRTgaz

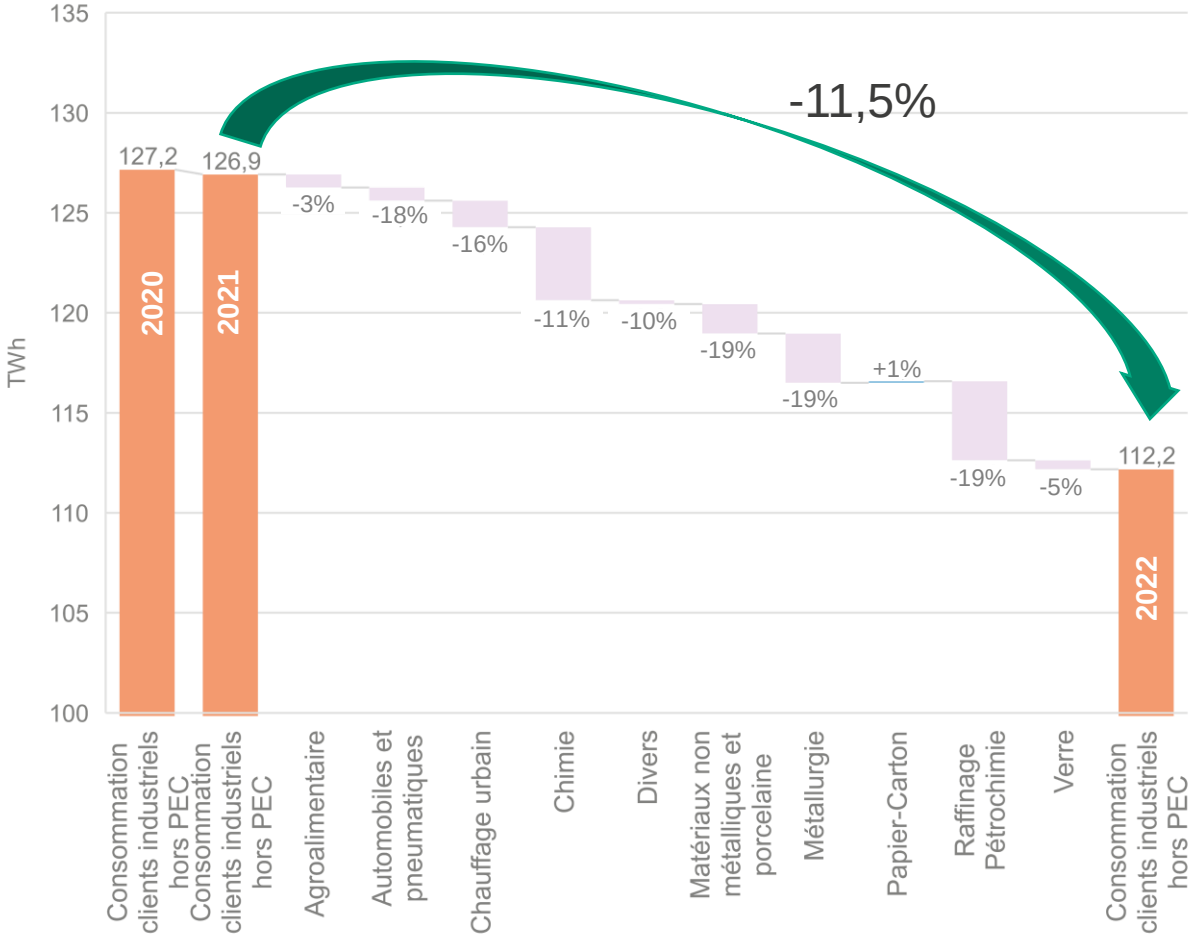


A decrease in consumption of 9.3% over the year 2022 compared to 2021 which continues in 2023 (-10.5% compared to 2022), driven by:

- **a change in the behaviour of final consumers** (influenced by the government's energy efficiency plan and a price effect) partially offset by unprecedented support for the gas system
  to the electrical system (notably in February 2023 +61% of PEC compared to 2022 with the recovery of nuclear unavailability)
- **a mild climate:** 2022, the warmest year ever recorded by Météo France,
  showing a difference from 2021 of +1.58°C in weighted annual average consumption and a beginning of 2023 that follows the same trend

Consumption of industrial customers in France down 11.5% compared to 2021

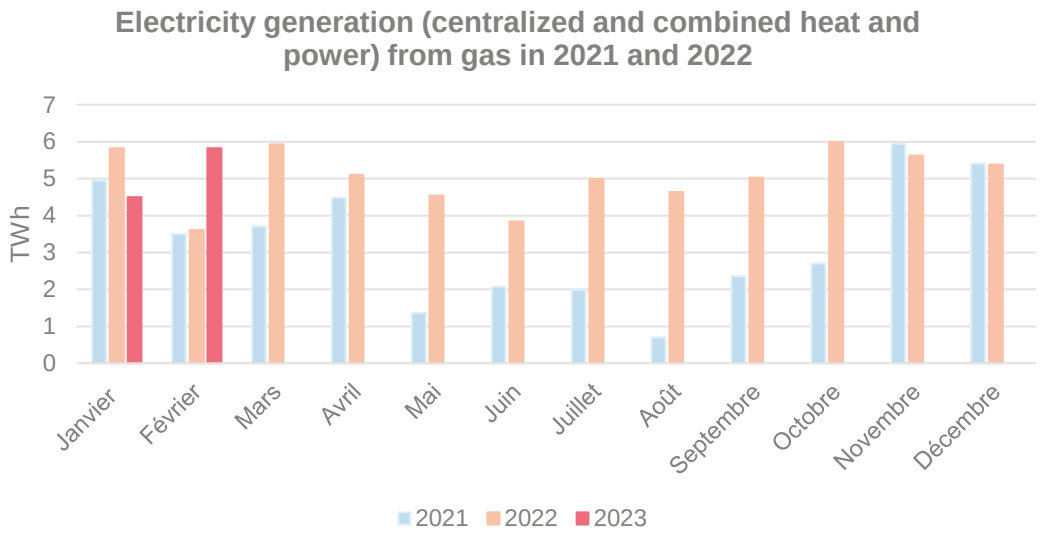
Evolution of gross consumption of industrial customers connected to the GRTgaz network broken down by sector (excluding centralised electricity production)



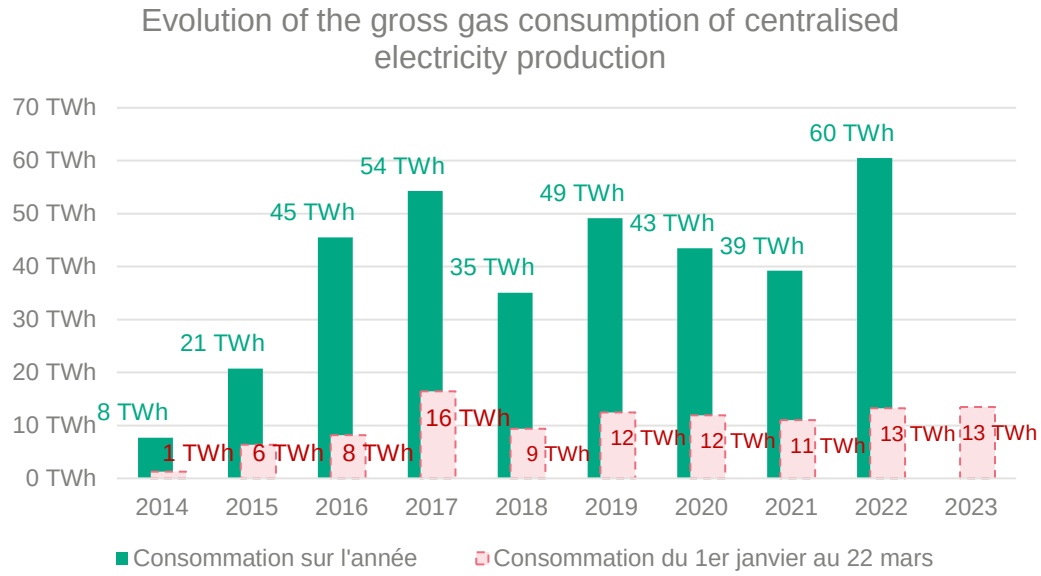
Source : GRTgaz - Analyse GRTgaz

- The rise in energy prices has led to different behaviours among the different industrial consumers
  - A reduction in industrial production or even the shutdown (temporary or permanent) of certain sites;
  - Anticipation of planned maintenance
  - A switch to other energy vectors
  - Better optimisation of their energy efficiency;
- This decline continues in early 2023: -13.5% of consumption compared to 2022 for industrial customers excluding centralized power generation

In 2022, gas was essential to balance the electricity system



Source : Eco2mix - Analyse : GRTgaz



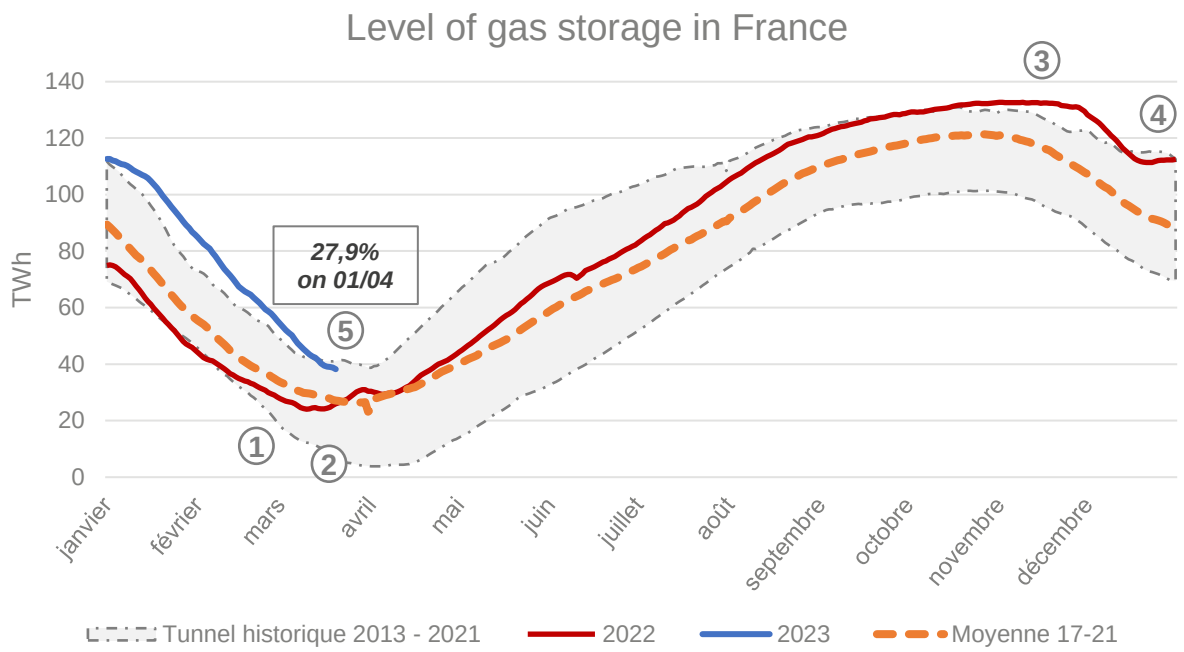
Source : GRTgaz - Analyse GRTgaz

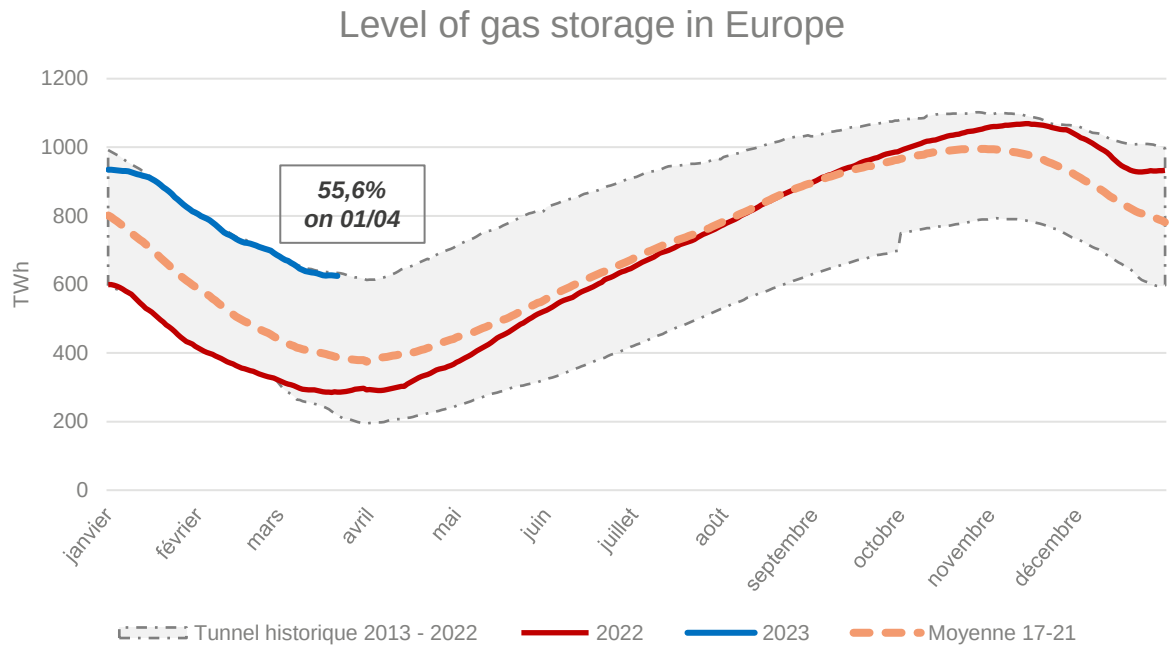
- **High point in gas consumption** for centralized power generation: up 54.4% compared to 2021 (as a reminder, commissioning of the new **Landivisiau** power plant in March 2022)

- Gas-fired power plants heavily used even in summer to **compensate for the numerous unavailability of nuclear power plants** (production down 23% vs 2021) and to preserve the water reserves of dams because of the low hydraulicity over the year (2nd rainiest year since 1959)

- The gas system played its full role in **ensuring the balance of the electrical system**

Storage: an unprecedented 2022

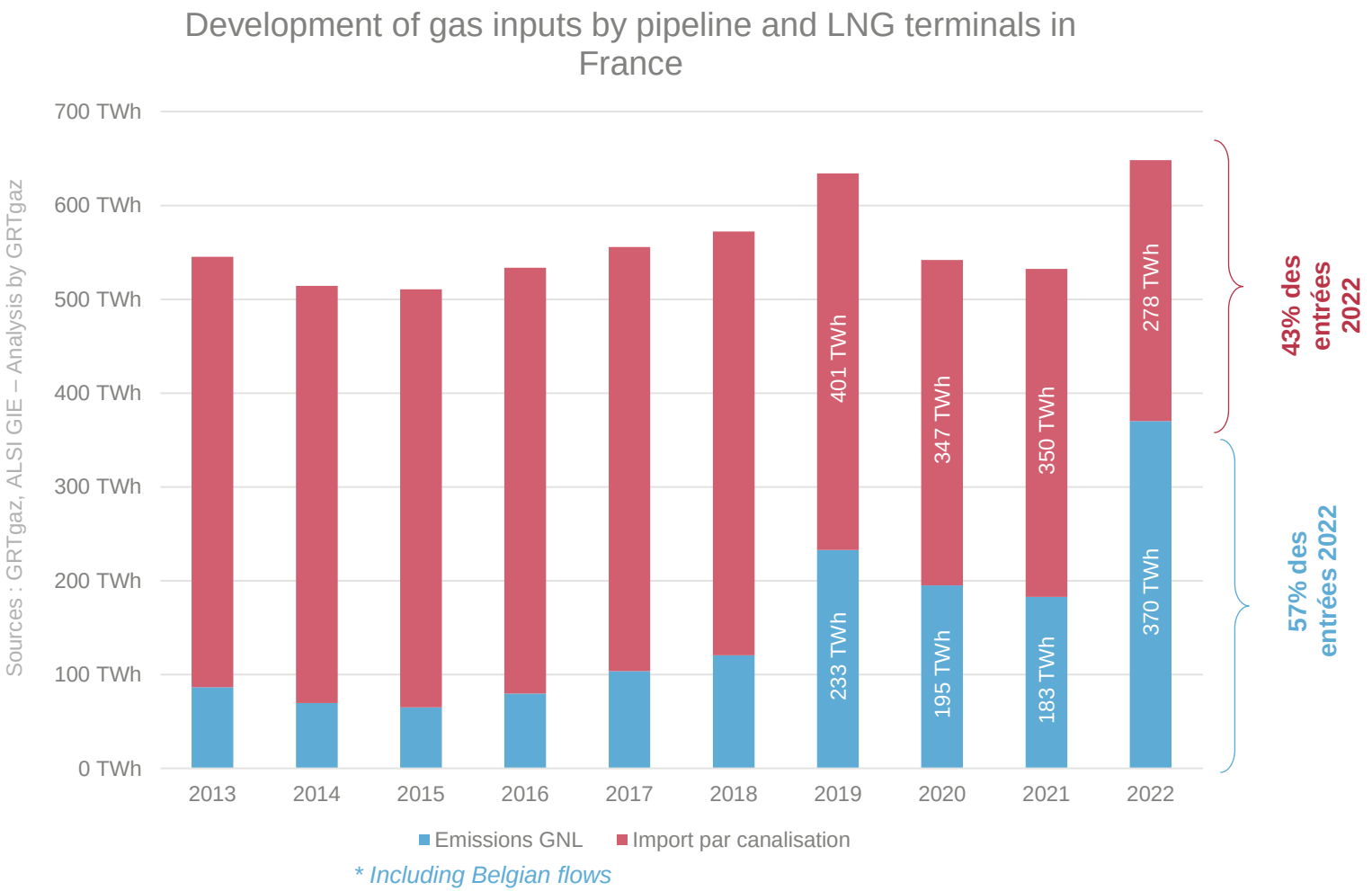




Source : AGSI+ GIE - Analyse : GRTgaz

- A low storage level at the beginning of war ①
- An early 2022 injection campaign**, 1 month** in advance ②
- **100%** fill level reached in early winter ③
- **Re-injections** in the middle of the extraction campaign in December ④
- A lower level of storage than in Europe in relation to the need for aquifer cycling
- A comfortable situation at the end of winter (28.4% filling on 22/03 against 20.8% in 2022) ⑤

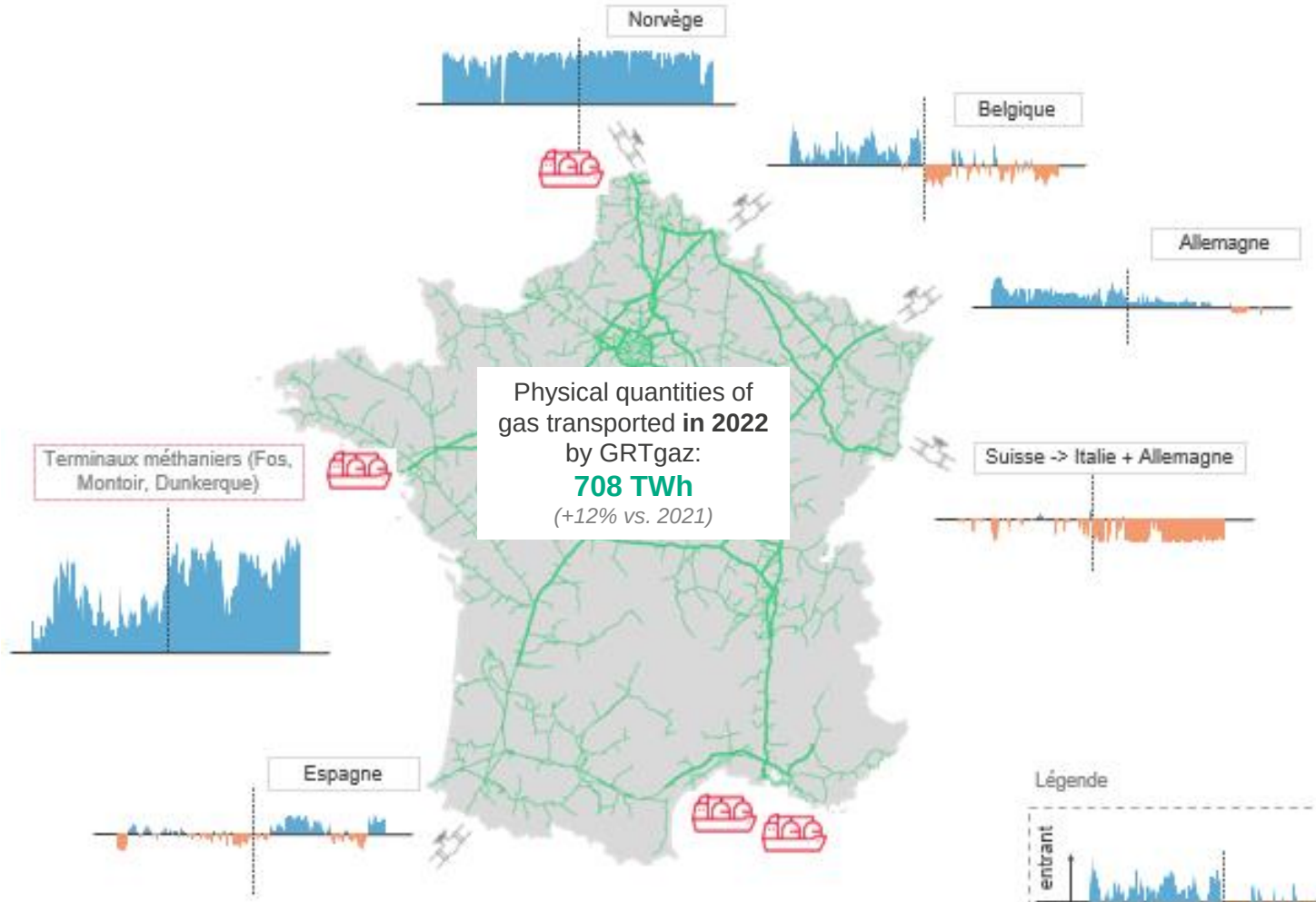
Massive LNG inflows to compensate for lower Russian deliveries and ensure security of supply



- **LNG inflows up** 102% compared to 2021, offsetting the decline in pipeline inflows and limiting withdrawals from storage
- **Decrease in pipeline imports** (-21% compared to 2021)
- To secure the supply, **a new floating terminal (FSRU)** is being developed in Le Havre for commissioning in September 2023
- In 2023, the distribution of inlets between pipeline and LNG remains similar to the 2022 average (54% LNG, 46% pipeline)

Reversal of historical flows and increase in quantities transported

Evolution of flows at interconnection points between 2021 and 2022



Source : GRTgaz – Analysis by GRTgaz

- France is becoming a **major entry point for LNG** in Europe and gas flows are now reversing from Western Europe to Eastern Europe.
- These LNG arrivals contribute to European solidarity by **doubling transits** compared to 2021
- These exports remain strong at the beginning of 2023: +32% year-on-year January-February 2023 compared to the same period in 2022
- **Bidirectionality of flows** at the French borders illustrating the level of maturity reached by the French and European gas networks, capable of adapting to very varied flow configurations (Obergailbach to Germany set up in October 2022)
- Gas network widely requested demonstrating the relevance of its sizing, even in a context of crisis and **reversal of flows**
- **No significant interruption** in import flows or in the operation of gas infrastructure

Do you have any questions ?

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TRF: new challenges to overcom

Aurélie Jager
Isabelle Pelloux-Prayer

TRF: new challenges to overcome

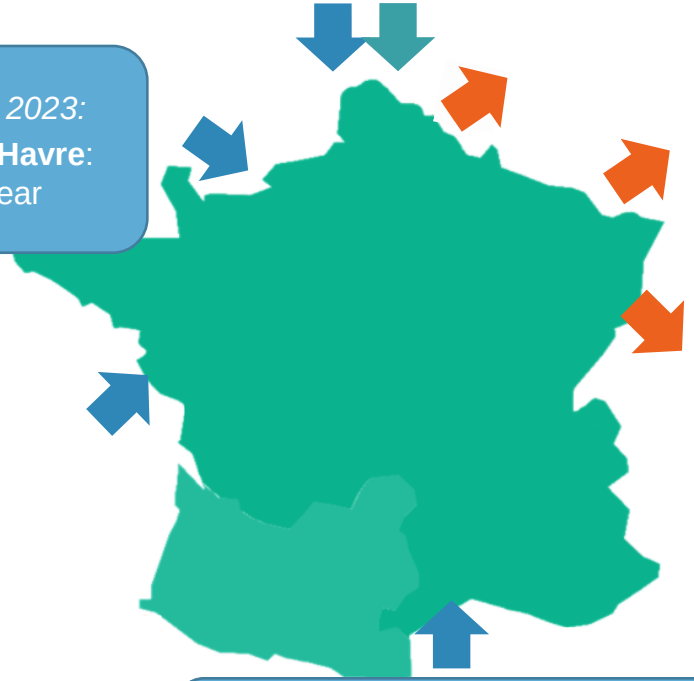
Infrastructure to support security of supply

Coordinated actions between infrastructure operators to develop capacity in a short timeframe

Since July 2022:
Increased maximum send-out capacity at **Dunkerque LNG**: +25 GWh/day for 2022

By September 2023:
A **FSRU in Le Havre**: ~46 TWh/year

Since October 2022:
Commercialization of **physical exit capacities to Germany**, up to 100 GWh/day



Since May 2022:
Fos Cavaou debottlenecking: ~+17 TWh/year
Grid debottlenecking by GRTgaz & Teréga: +10 GWh/day

- New capacities to **increase supplies and transits and offer more flexibility** in new flow patterns

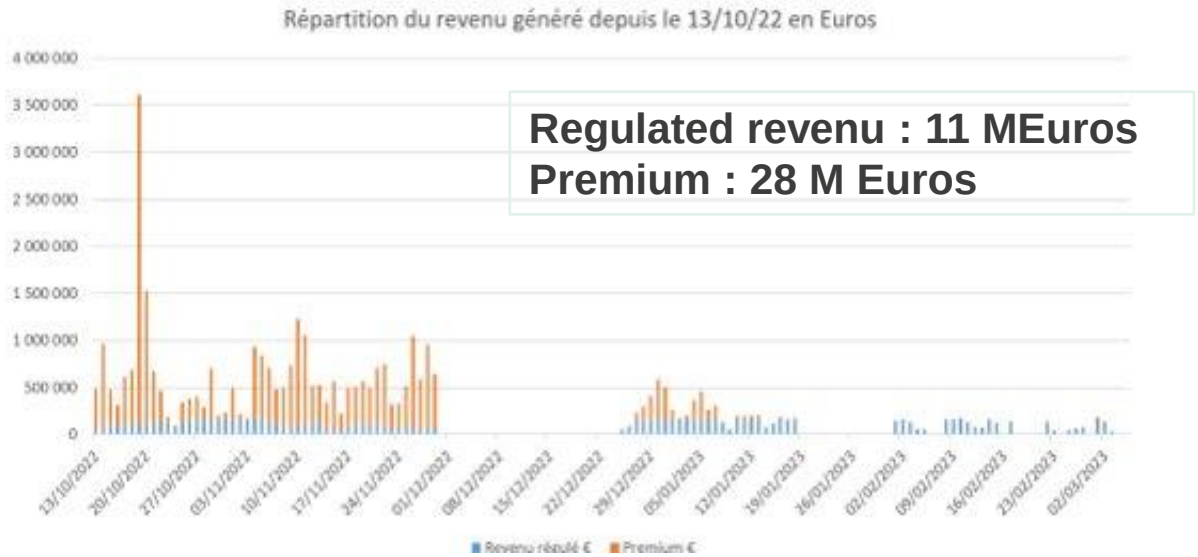
The daily output capacity offer France - Germany, marketed since October 12 on the PIR Obergailbach

Meeting Germany's demand to strengthen **energy solidarity** between France and Germany

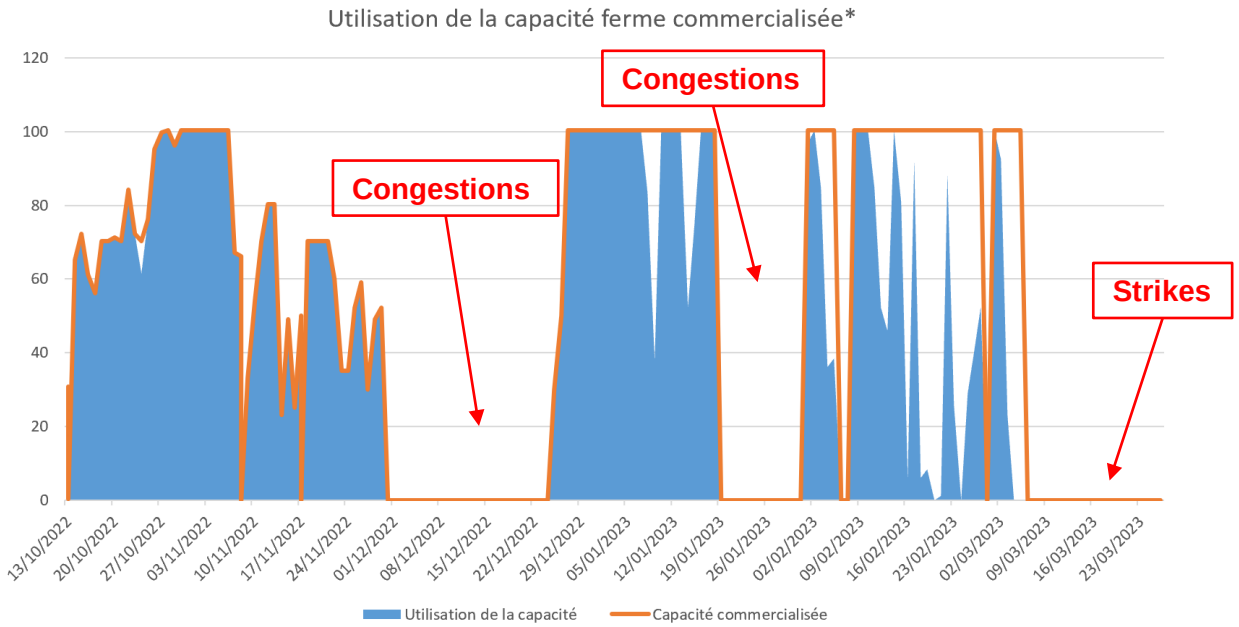
- **Daily firm capacity up to 100 GWh/d allowing a flow of odorized gas from France to Germany:**
  - ✓ **Implementation achieved without investment**, thanks in particular to the acceptance of odorised gas by German transporters
  - ✓ **Daily evaluation of the leve**l according to different parameters of the network (consumption in the N/E zone, level of extraction/injection in Cerville, possible work in the zone, level of vigilance of the S/N limits of the network)
  - ✓ **Sale of VIP France to Germany capacity** at auction **on Prisma on D-1** for D as a bundled product (output capacity of the French network in Obergailbach bundled with input capacity on the German network)
  - ✓ Operating characteristics close to those of the existing offer on the other Network Interconnection Points

** pursuant to the Deliberation of the Energy Regulatory Commission no. 2022-242*

The success of a technically feasible offer, operable in the systems and marketed to the whole market



Regulated revenu : 11 MEuros
Premium : 28 M Euros



Key numbers

- Average capacity of **52 GWh/d** (and 84 GWh/d excluding congestion and strikes)
- Subscription rate: 82%
- Subscribed capacity utilisation rate: 93%
- The 100 GWh/d was proposed for 63 days

A new flow configuration within the TRF

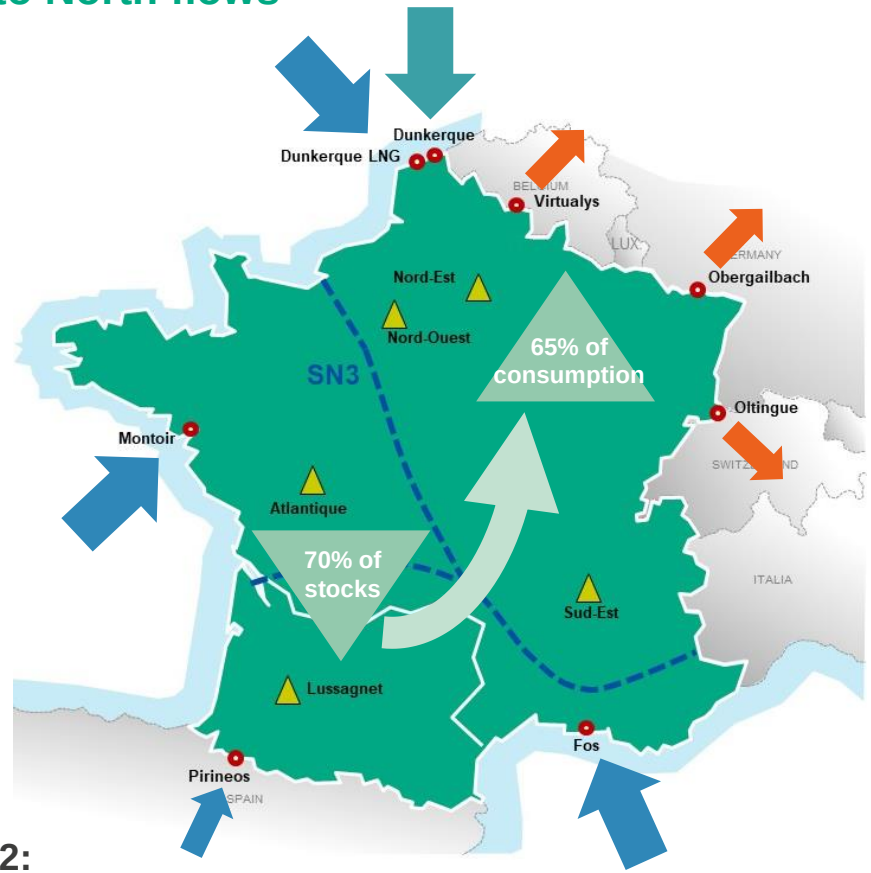
Built with North to South flows, operated last winter with South to North flows

At the inception of TRF:

- Zone merging optimized by combining reasoned investments and mechanisms to manage residual network congestion

Historical flow configuration:

- **North to South** flows, resulting from supplies mainly from pipe entries in the North
- A risk of congestion mainly in summer, during the storage injection campaign



Since 2022:

- New supply and export patterns reconfigure flows within the TRF
- Exposing the TRF to a risk of congestion in the **South to North** direction, mainly in winter

Winter 2022-23: TRF to the test of South-North congestion

Adjustments to the TRF offer are needed, but TRF has been resilient

- 44 days of South-North congestion during the winter, sometimes at very high levels
- A first episode that was very difficult to manage operationally and led to some first adjustments of TRF mechanisms (CRE deliberation on 13/12/2022 to preserve gas entries at the borders)
- TRF mechanisms have been effective in resolving the following periods of congestion

The different mechanisms provided to solve congestion in TRF:

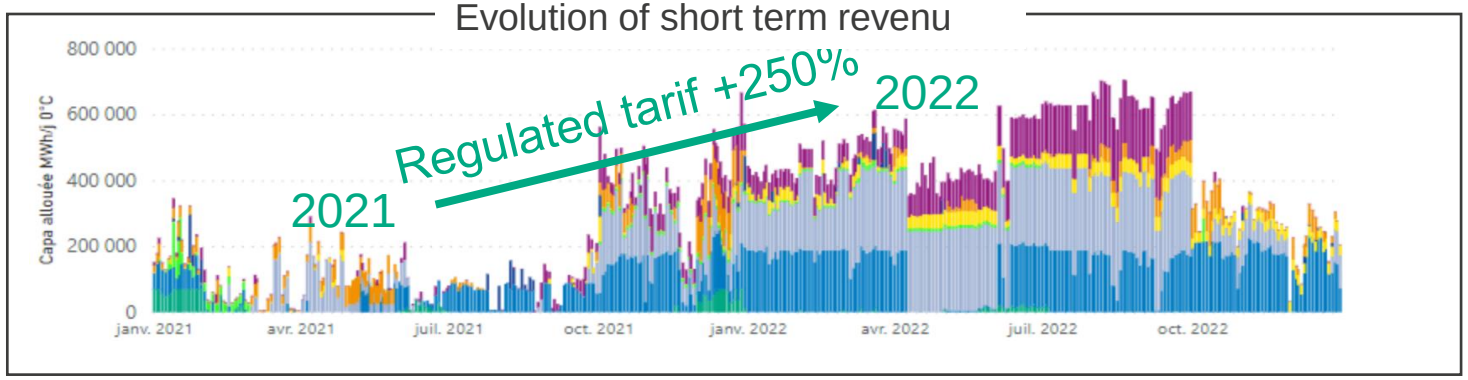
1- Shut-down of capacity sales & interruption of interruptible capacities	Commercialization of exit capacities France -> Germany stopped for 40 days
2- Call for tenders: locational spread	**Massive use of the locational spread:** 1 to 6 calls per day, up to 265 GWh in 1 day **Total over the winter: 5,1 TWh traded, for a cost of 54,6 M€**
3- Mutualised restriction of firm entry capacities upstream of the limit	**Mechanism of last resort, but activated 16 times in December** Not required during the following congestion episodes

Record capacity sales in an unprecedented context

Increase of 2022 results from the commercialisation of our capacities

Attractiveness of our network exit capacities (Virtualys, Oltingue and Obergailbach) and entry capacities (Dunkerque), almost all of wich are sold.

Evolution of short term revenu



Substantial revenues to offset part of the costs of congestion, thus helping **to reduce tariff pressure** by **limiting the tariff increase** from 1 April 2023.

Do you have any questions ?

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Sobriety: mechanisms to prevent grid tension

Amélie Viaud

Mechanisms to prevent grid tension

Reminder of mechanisms by order of use (merit order)

		Transmission Contract Interruptibility	Guaranteed Interruptibility	Secondary Interruptibility	Load shedding
Total interruptible capacity		25 GWh/day - 32 sites	144 GWh/day (theoric)	17,2 GWh/day - 32 contracts	
Subscribers		Shipper	Consumers T/D et GRT	Consumers T/D and GRT,Consumers D and GRT	No subscription, eligibility decided by prefectures
Activation conditions		Depending on local network constraints	When market tools no longer ensure network safety		Last resort
Principles	*Call for tenders*	No	Tender to consumers T and D, excluding electricity powerplants, GRTgaz target of 144 GWh/d	No call for tenders, no volume targets	Annual survey
	Minimum interruptible capacity	No	20 MWh/day	40 MWh/day	Determined by prefectorial lists
	Activation notice	54 h (0h00 D-3)	16h D-1, effective at 6. AM D+1	24 hours	2 hours
	Maximum compensation	50% discount on the firm capacity bill	200 €/MWh/D/activation day Exemption from storage compensation	No monetary compensation Exemption from storage compensation	No compensation

Interruptibilités : quelques chiffres et retour d'expérience

Identified interruptible capacities to date

42,2 GWj/day

- Transmission contract Interruptibility : 25 GWh/day (32 sites)
- Secondary Interruptibility : 17,2 GWh/day (32 contrats)
- Guaranteed Interruptibility : 0 GWh/day

Focus on guaranteed interruptibility tender

Due to the insufficient number of responses
(4 bids for an interruptible volume of 190 MWhd)
=> the tender was declared unsuccessful

Main reasons for this failure according to industrials:
Unattractive remuneration: monetary gains too low & remuneration variable component too high (90%)

System too complex : remuneration, penalties, consumption monitoring programs, low operationality, etc.

So far, the low volume of interruptible capacities (42.2 GWh/d) is not sufficient enough to delay or avoid load shedding

Interruptibility: thoughts on the mechanism evolution

GRTgaz proposes, **in consultation with our customers**, a reflection on the following elements:

Reduce the number of mechanisms

- Harmonize the terms of a new unified interruptibility offer with those of load shedding

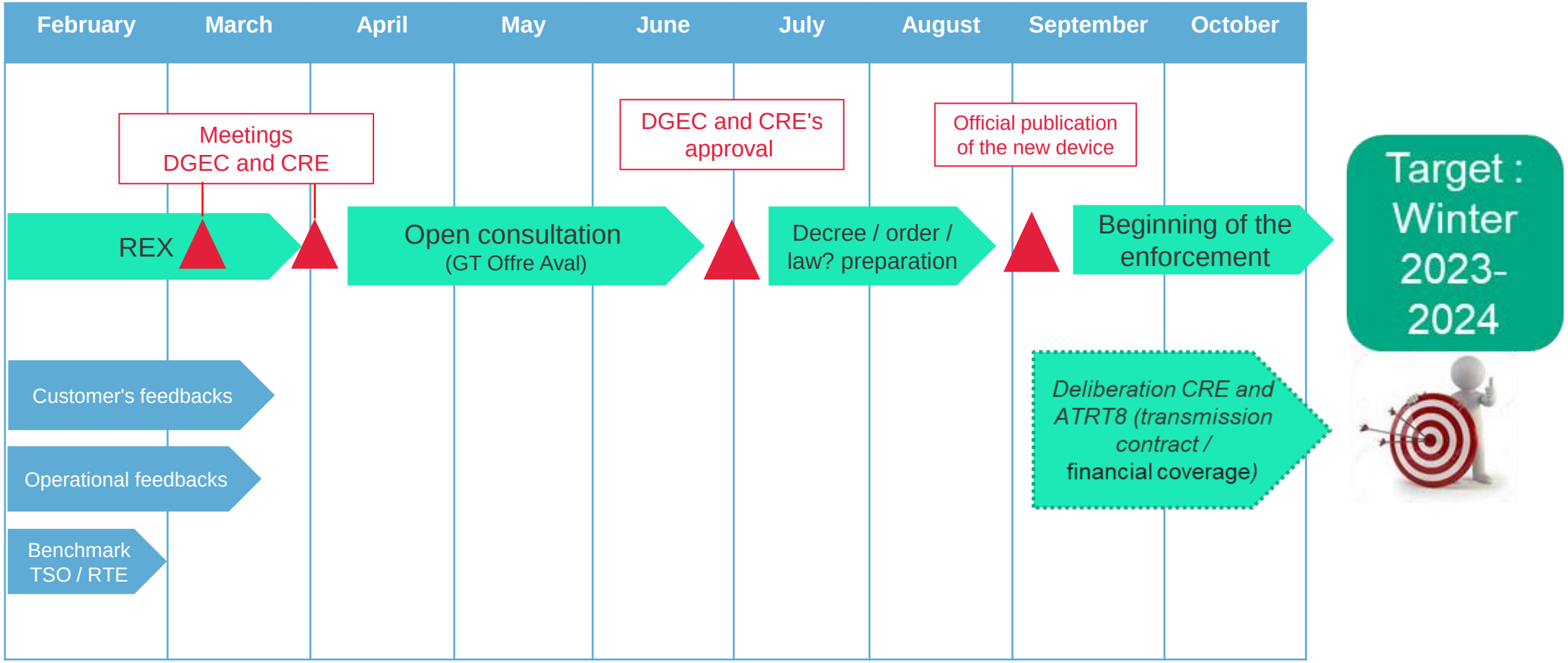
Find a compromise between

- the commitment and the level of risk taken by the subscribers (notice, number of days of activation)
- the compensation offered in return

should reflect the right cost of the service that is avoiding load shedding

The decisions will be endorsed by the CRE and the DGEC.

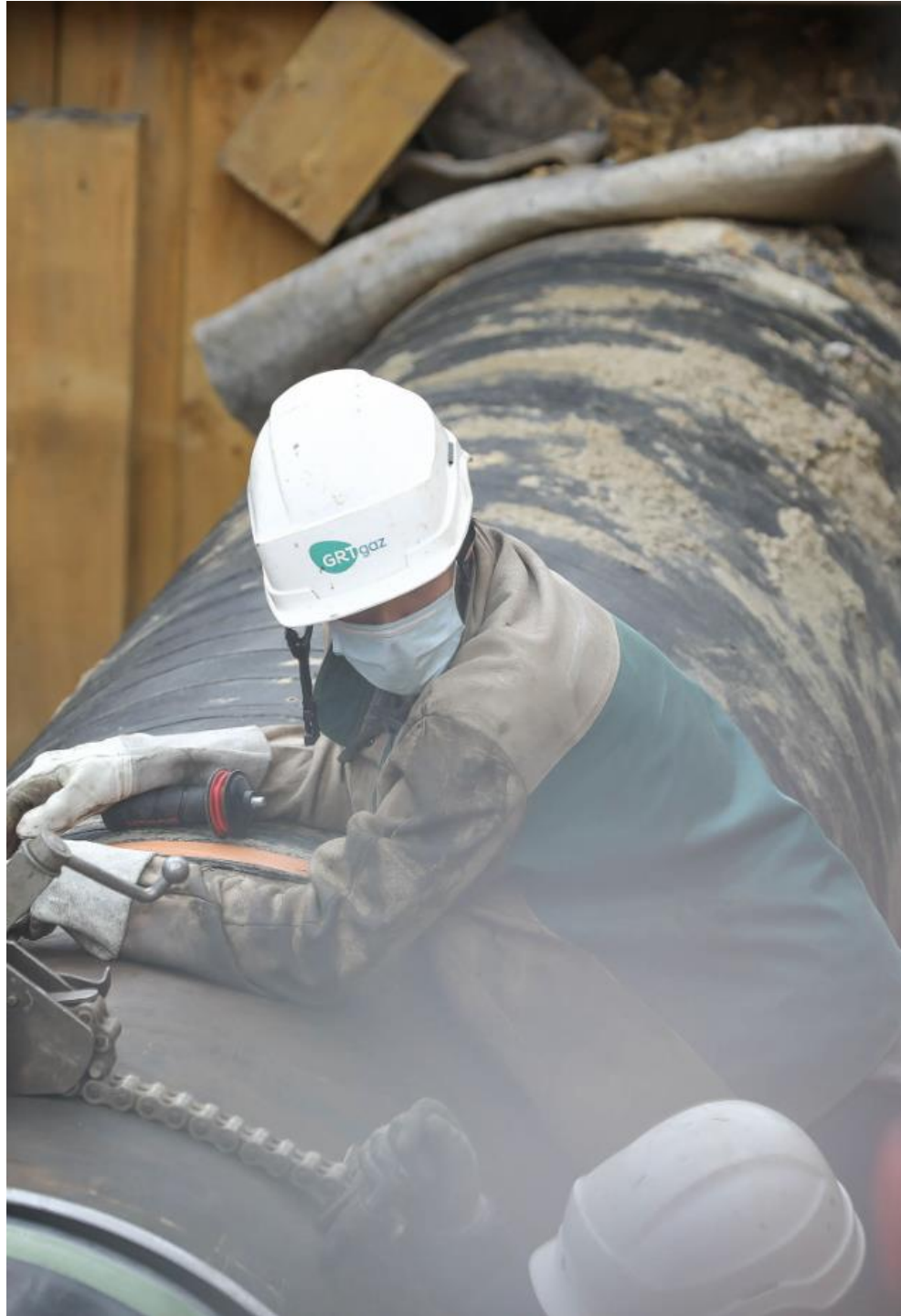
Planning proposal



Load shedding: what about the survey for this year?

Following the 2022 survey,

- Your responses were sent for analysis to the prefectures which draw up the priority lists in case of load shedding activation
  - We had 28 returns from 75 prefectures
- Discussions are underway with the DGEC, DGE, Carriers and Distributors, to develop a new version of the survey and obtain quicker answers from the prefectures for the year 2023
- The 2023 load shedding survey should be sent out by May
- The new lists validated by the prefectures should be known before winter 2023/2024



Do you have any questions ?

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Summer and winter outlook

Barbara Pichayrou
Isabelle Pelloux-Prayer
François Blanchard

Summer and winter outlook

01 **2023 maintenance schedule, to sustain our infrastructure**

02 **2023 Summer Outlook summary: analysis of the possibility of storage filling**

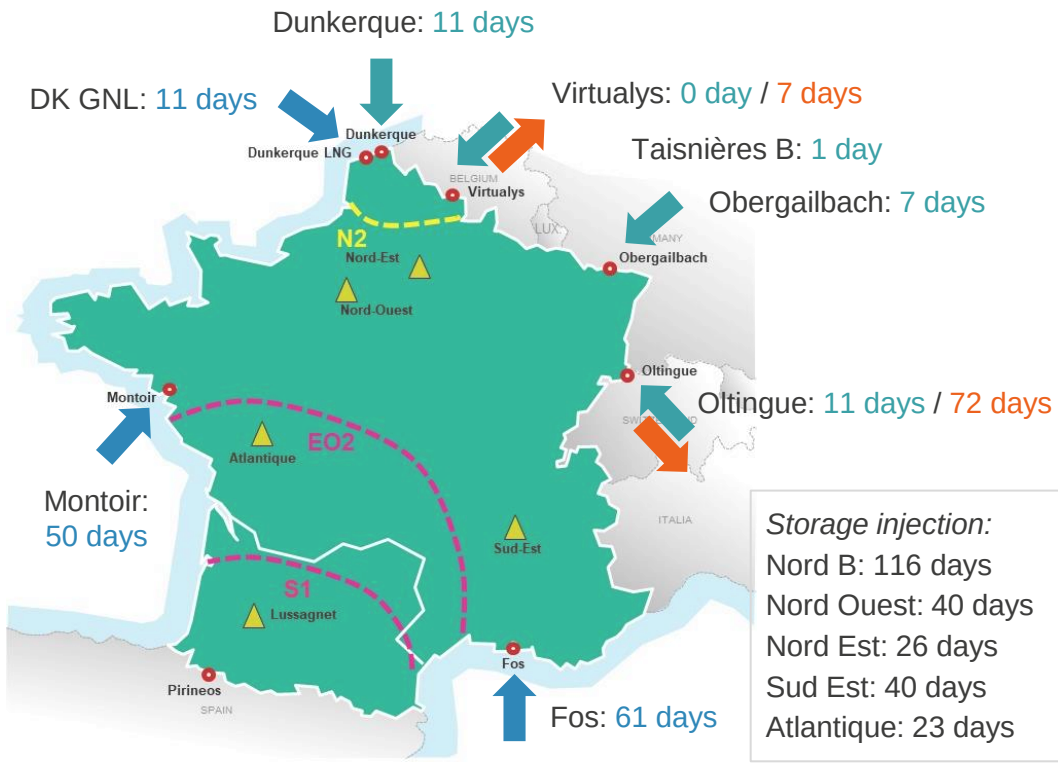
03 **Future evolutions of the offer**

04 **Conclusion**

The 2023 maintenance schedule for shippers

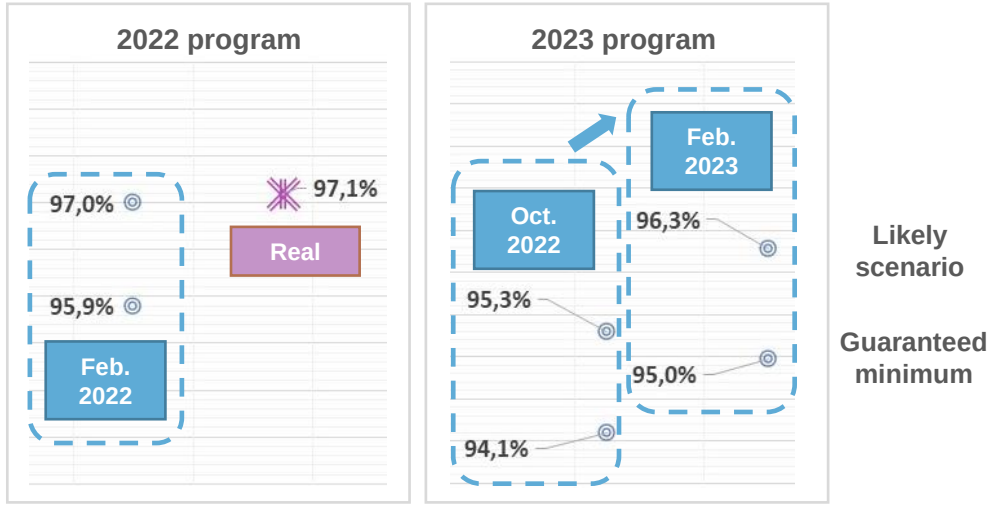
A permanent objective to optimize commercial impacts

SPN2U: 109 days *(impact on DK GNL, Dunkerque and Virtualys **entries**)*



Storage injection:
Nord B: 116 days
Nord Ouest: 40 days
Nord Est: 26 days
Sud Est: 40 days
Atlantique: 23 days

SPEO2D: 98 days *(impact on Atlantique, Lussagnet and Pirineos **exits**)*
SPS1D: 55 days *(impact on Teréga's **exits**: Lussagnet, Pirineos)*



Subscribed capacity availability calculated on all the TRF entry and exit points, including Teréga's points

- **Inter-operator coordination** to minimize the impact on clients
- Capacity availability improved since the 1st publication, but slightly lower than previous years:
  - A regulatory framework (increase in the frequency of pipeline inspections)
  - The new supply schemes since 2022 modify the impact of maintenance
- **Superpoints provide flexibility** to minimize the impact of restrictions

Summer and winter outlook

01 2023 maintenance schedule, to sustain our infrastructure

02 2023 Summer Outlook summary: analysis of the possibility of storage filling

03 Future évolutions of the offer

04 Conclusion

Introduction

This presentation contains the main information and key messages of the Summer Outlook 2023 which can be consulted for more details on the site GRTgaz: **lien**

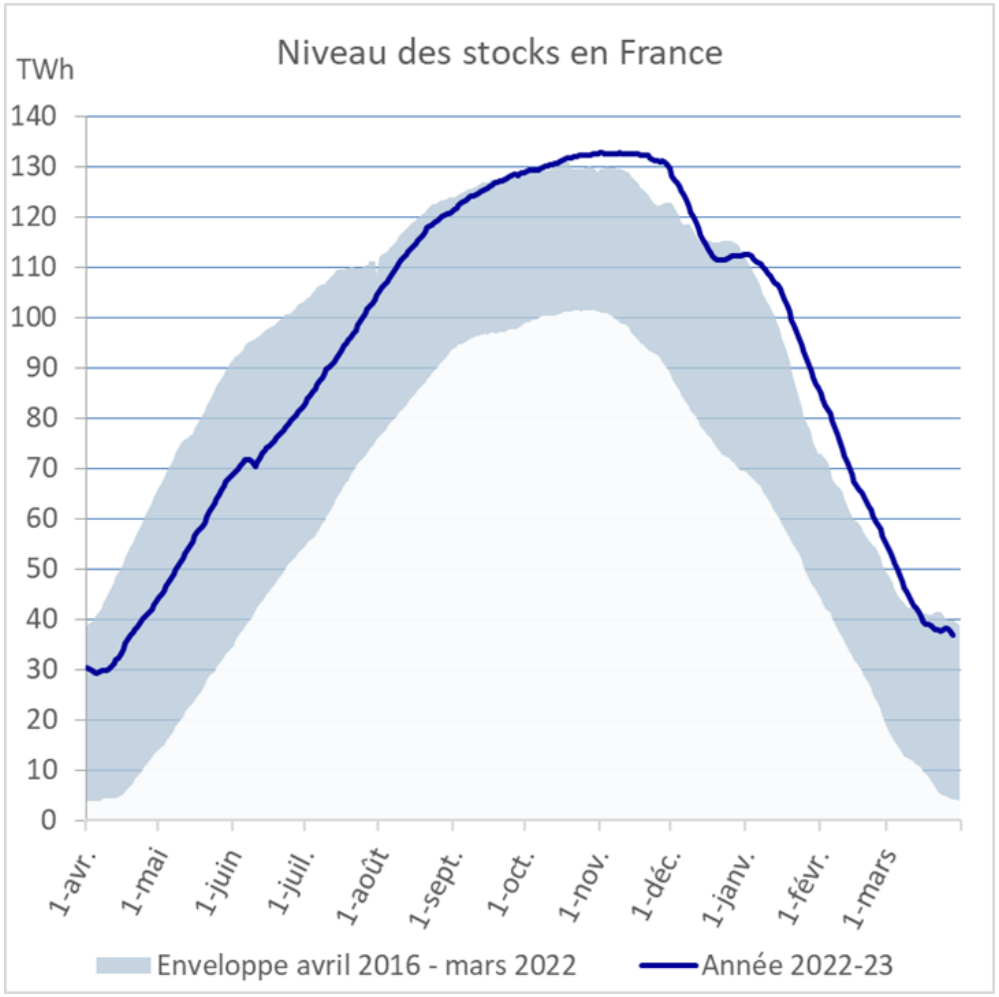
Seasonal assessment carried out in accordance with the regulatory framework (Energy code Art. L141-10)

Purpose: Verify storage filling capabilities across TRF from April to October, taking into account network limitations and maintenance schedules

Note: Infrastructure Opportunities Assessment Exercise
(not for forecasting or evaluating the availability of supply sources; simulations assume the availability (excluding maintenance) of LNG terminals and storage)

Stock status at the beginning of the season and filling targets

- Storage offer 2023-24: VU* = 130.2 TWh
  (of which not subscribed to date: 1 TWh in zone B)
- Assumption** of stock H+B on 1 April: 36 TWh, or 27.7% of the VU
- Security of supply issue for winter 2023-24: maximize the storage level at the end of October, especially in the current Russian-Ukrainian context, to cover the consumption of a cold winter with potentially high exports to Germany, Switzerland and Belgium
- Regulatory requirements:
  - French regulation: 85% of the volume subscribed on 01/11 (Mandatory for shippers)
  - European regulations: 90% of the marketable volume on 01/11 (Mandatory for storage operators)



* : VU = useful volume
** : according to storage on 28/03

Scenarios studied and results

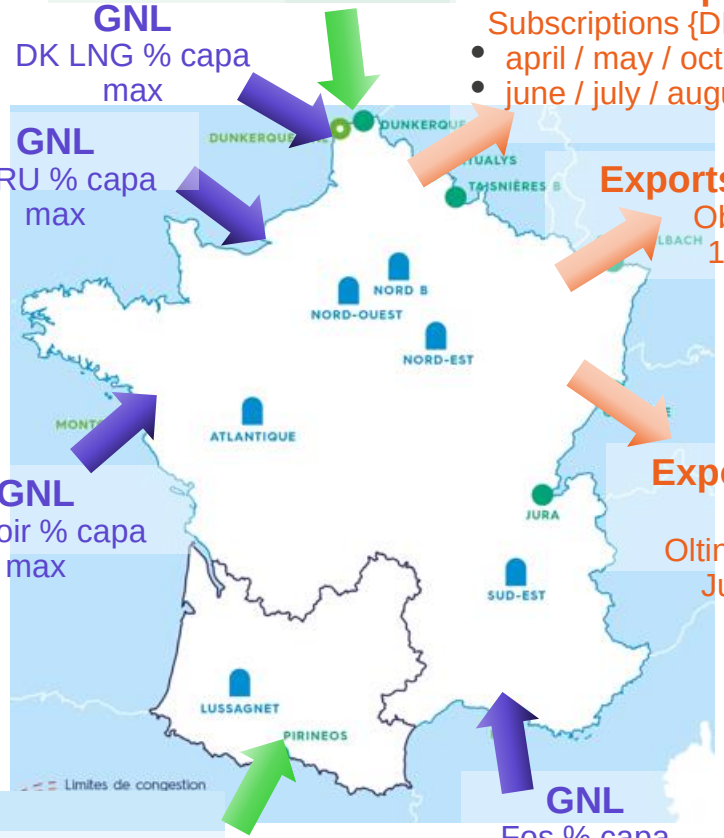
Imports max NO > FR
Dunkerque 570 GWh/d
(firm)

GNL
DK LNG % capa
max

GNL
FSRU % capa
max

Exports FR > BE
Subscriptions {DK LNG to BE} = 249 GWh/d
- april / may / oct : 249 GWh/d
- june / july / august / sept : 125 GWh/d

Exports max FR > DE
Obergailbach
100 GWh/d



Exports max FR > CH
Oltingue 260 GWh/d
Jura 37 GWh/d

GNL
Montoir % capa
max

Imports ES > FR
Pirineos % firm capa

GNL
Fos % capa
max

- **Consideration of the work of GRTs and adjacent operators**
- **Combined Gas Cycle Consumption = Summer 2022 Consumption (Record)**

Stock H on 31/10 (% VU)			
% use of capacities Pirineos & PITTM	100%	90%	80%
Cold summer (2016) Sobriety/price : DP 7%, indust. 10%	100% ☺	97% ☺	76% ☹
Mean 5 summers (2017-21) Sobriety/price : DP 7%, indust. 10%	100% ☺	>99% ☺	84% ☹

Orders of magnitude: 1% filling H = 1.2 TWh 1 LNG carrier 4 days export to Oltingue

The network does not constrain the filling of storage

⇒ **Sustained use of the Dunkerque, Pirineos & LNG entry points is necessary for a good level of storage filling**

Messages clés

Security of Supply: strong stakes on maximizing summer exit storage levels for next winter

The network allows the filling of the storage at the end of October

Due to the break in Russian supplies, the margin is small. The filling of the storage assumes:

* use of Dunkirk, Pirineos and LNG inputs at a level close to their maximum
* throughout the season.

The efforts of sobriety must continue to facilitate a maximum filling of storage, even in case of strong economic recovery, in anticipation of a winter 2023/24 potentially cold.

Summer and winter outlook

01 2023 maintenance schedule, to sustain our infrastructure

02 2023 Summer Outlook summary: analysis of the possibility of storage filling

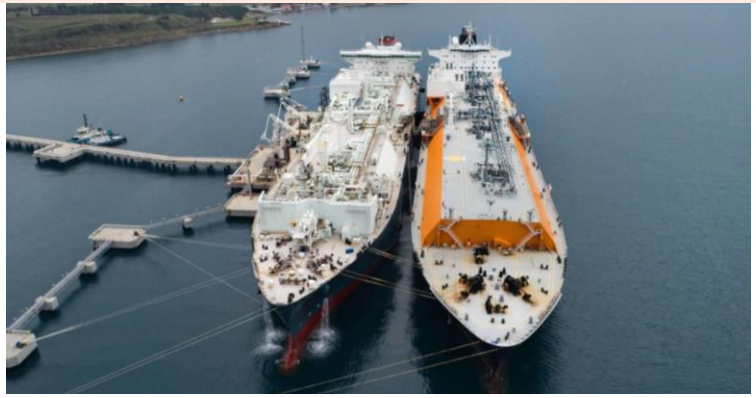
03 Future évolutions of the offer

04 Conclusion

Creation of a PITTM in Le Havre

A new LNG entry point to supply France from September 2023

Installation for 5 years of a **floating LNG terminal in the port of Le Havre**



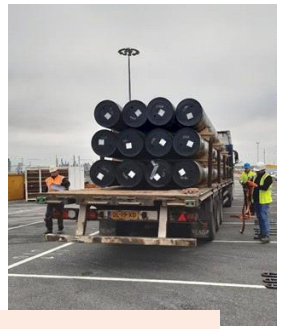
~46 TWh/year to be sent out to the network

New transmission capacities:

a single tariff for all PITTM,
subscription rules identical to Fos and Montoir

CRE deliberation of 31/01/2023 on the transmission tariff

A favorable position on the network for the operation of the TRF



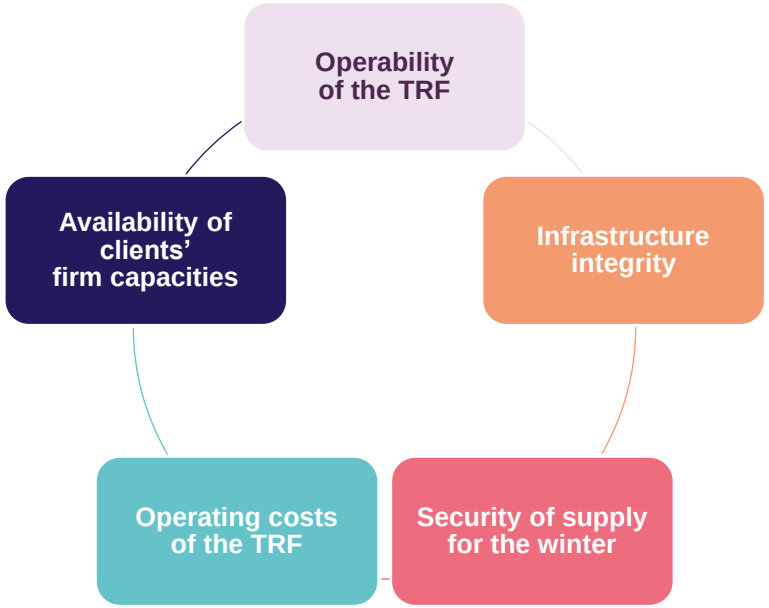
Start-up in September 2023

Adapting the TRF offer to South to North flows

Learnings from the past year to consolidate the operation of the TRF in new configurations

For winter:

- South-North congestion episodes may recur in future winters
- Issues highlighted last winter:



For summer:

- In case of maintenance: how to deal with the coexistence of impacts on North to South and South to North flows?

Adapting the TRF offer to South to North flows

Different adaptations of the rules are being studied

Improve balancing during the gas day

- *Interrupt UIOLI storage in case of congestion*
- *Modify nominations when too unbalanced*
- *Penalize intraday imbalances?*

Improve the efficiency of the locational spread

- *Open UIOLI on Dunkerque entry*

Limit operating costs of the TRF

- *Implement a swap between storages?*

Improve the last resort mechanism

- *Create a South > North superpoint*
- *Anticipate the restriction if it is repeated*

Adapt the rules for managing work impacts

- *Restriction and/or use of decongestion mechanisms?*

- A consultation process with the market initiated in December during the 1st episode of congestion
- Proposals already submitted to CRE to improve TRF mechanisms in the short term
- Complementary solutions under study
- A global consultation by CRE in the summer of 2023
- **Meet at the Gas Consultation on June 2, 2023 to discuss our proposals**

Towards improvments of the France > Germany offer

Aim = generate more revenu for GRTgaz, which will help reduce the transport price

(100 GWh/d for a year ≈ 40 M€/year)

Short term (2023)

- **Within-day capacity**
- *Increase daily capacities (> 100 GWh/d); under study*

Medium term, without investissement (2024?)

- *Finf a solution to sell the capacity during the congestions?*
- *Propose higher maturity products? (monthly, quaterly…)*

Long term–** with investissements **(2026-2028?)

- *Yearly capacity 100 to 200 GWh/d*
- *Technical solutions under study*
- **You will be able to ask for additionnal capacities through the « incremental capacity » process (July-August 2023). Information to the market in June.**

Topic to co-build with the market

Summer and winter outlook

01 **2023 maintenance schedule, to sustain our infrastructure**

02 **2023 Summer Outlook summary: analysis of the possibility of storage filling**

03 **Future évolutions of the offer**

04 **Conclusion**

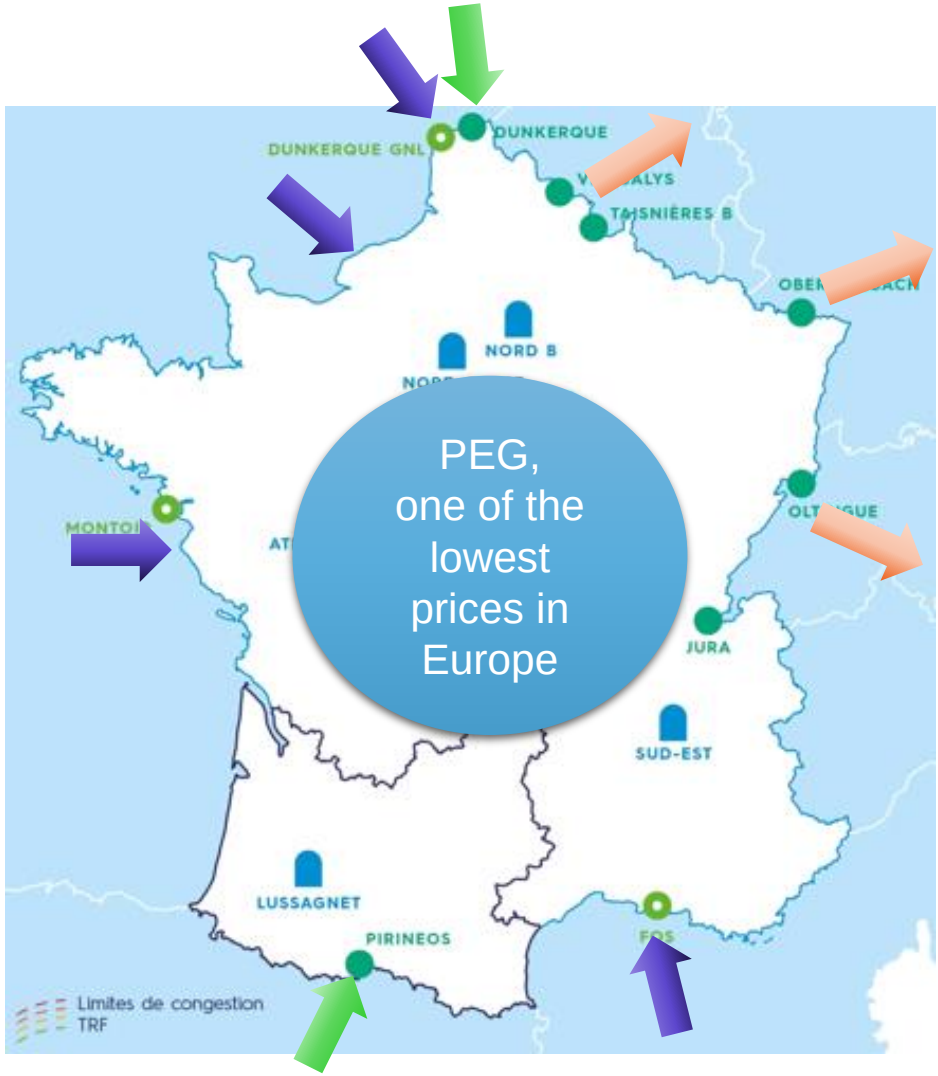
Summary: challenges to face, opportunities to seize

Summer Outlook 2023:

- Our infrastructures enable the filling of storages
- But it is necessary to get important gas flows at Dunkerque and Pirineos + LNG to ensure the security of supply

France is more than ever at the crossroads of european flows, a situation to value :

- Maximise LNG flows. Activate Le Havre FSRU as of September 2023
- Continue to export towards adjacent countries
- While minimizing congestion costs
- In order to optimise the transmission price



Do you have any questions ?

Les Rendez-vous Clients GRTgaz

Ingrid: what's new with your client portal?

Marine Alliel

What changes

2023

On 18th of January, Operations switched from TRANS@ctions to ingrid

10th of May 2023 : “Concertation Gaz” meeting (by Teams)

Contact your Account Manager to register and to check that you are included in our IT information mailing list

Between **end of 2023 and March 2024**, for Edig@s users, GRTgaz will replace the current managed file transfer software by its own solution

- A migration will be planned

2024

Beginning of 2024, Metering and Allocations will switch from TRANS@ctions to ingrid and ingrid lab functionalities will be included in ingrid

- Some changes in published files (XML dedicated to Edig@s messages for example)
- 2023 to prepare the change : technical guides updated, files with real data for testing, tutorials …

Begining **2024**, TRANS@ctions and ingrid lab will be switched off

Do you have any questions ?

Les Rendez-vous Clients GRTgaz

Lunch break

Les Rendez-vous Clients GRTgaz

Introduction

Thierry Trouvé

Do you have any questions ?

Les Rendez-vous Clients GRTgaz

Gas energy transition

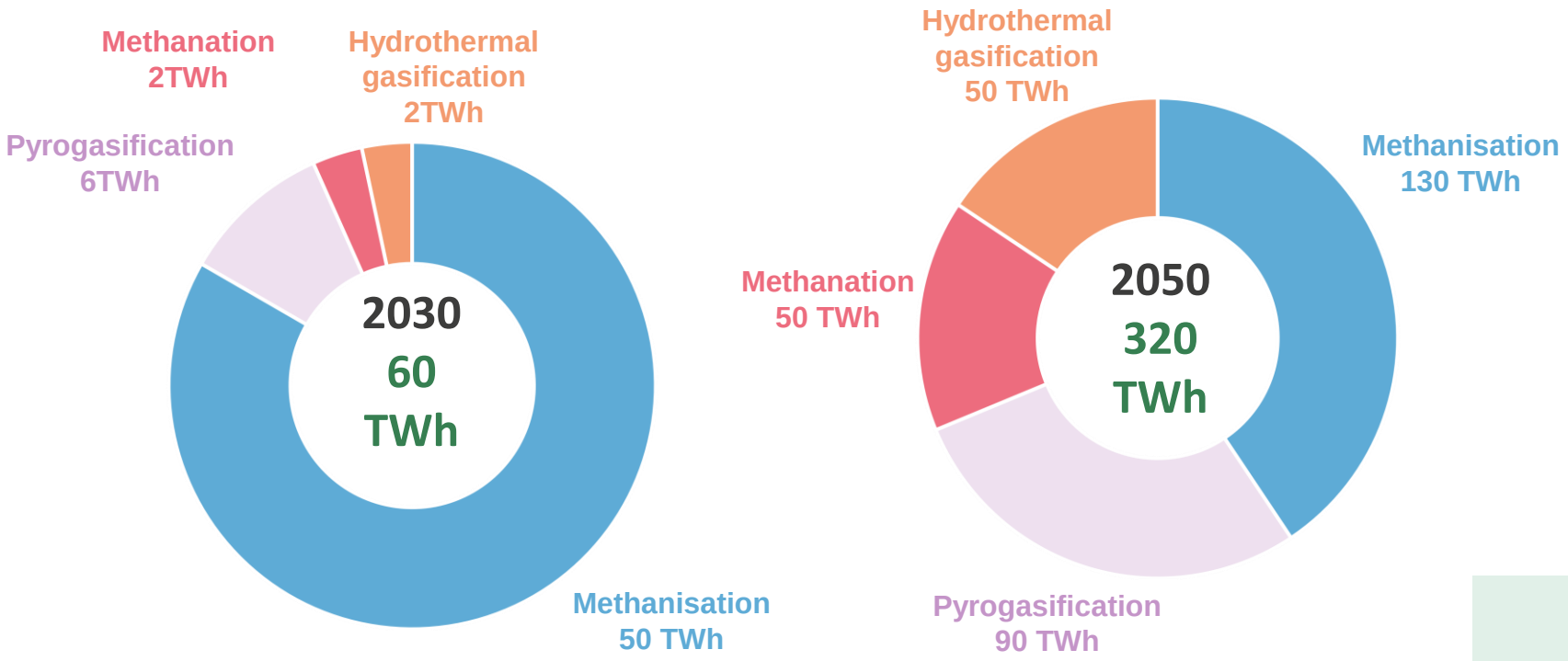
Anthony Mazzenga

Renewable and low-carbon gas sectors promoting the circular economy

inputs		Technologies	Type de gaz	Maturité
Food and crop waste, cover crops		Methanisation	Methane	Under generalisation 40 TWh in Europe
		Hydrothermal gasification	Methane *and/or hydrogen*	1st injections of a pilote industrial plant (NL)
Dry and woody biomass, solid recovered fuels ans wastes		Pyrogasification	Methane *and/or hydrogen*	Development of 1st industrial plants (FR)
Renewable electricity		Electrolysis with or without methanation	Hydrogen or methane	Electrolysis is mature Development of 1st methanation projects (FR)

A proven potential of development

Estimated production of renewable and low-carbon gas in 2030 and 2050 (TWh)



In 2030, up to 20% of gas consumption supplied in the grid from renewable gas and low-carbon gases

Source : Analysis from GRTgaz / GRDF / FGR / ATEE / Club Gazéification Hydrothermale, based on available studies (Ademe, Solagro, France Stratégie, Enéa), 2021

New generation gases : a significant development potential to fuel the energy transition

Development of new generation gas technologies : Pyrogasification, Hydrothermal Gasification (GH) and Methanation:

- First projects booked in the « registre des capacités » **(3 pyrogasification projects and 3 methanation projects)**
- **Positive developments in French law and regulation** : in particular the law on accelaration of renewable energies opens provisions of « droit à l'injection » to low-carbon gases.
- A call for expression of interest issued by CSF NSE regarding pyrogasification (1) confirms that **a French ecosystem is ready to go to industrial scale** : 49 projects identified.
- Publication of the first world White Paper on hydrothermal gasification, and first gas injections in Europe

(1) CSF NSE : Contrat Stratégique de Filière Nouveaux Systèmes Energétiques

GRTgaz develops regional H2 projects, prepares for their interconnexion to the European grids, and parterns CO2 projects of capture, transportation, storage and utilization

- GRTgaz contributes to structuring the hydrogen ecosystems into « **hydrogen valleys** » in the main French industrial areas.
- 5 regional H2 projects at different maturity stages
  - MosaHYc (Moselle towards Saarland)
  - HYnframed (port of Fos sur Mer)
  - DHUNE (port of Dunkerque)
  - WHHYn (French-Belgian Hub)
  - RHYn (Southern Alsace towards Germany and Switzerland)
- 2 H2 interconnexion projects
  - BarMar Project (Barcelona towards Marseille)
  - HY-FEN Project (Fos-sur-Mer towards Germany)

- GRTgaz launched a first call for expression of interest to foster the creation of **CO2 transportation infrastructures** in the **area of Dunkerque**

Source : GRTgaz

Do you have any questions ?

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Salamandre Project: pyrogasification on Le Havre port area

Thomas Pierre
Engie

Salamandre: pyrogasefication on Le Havre port area

Thomas PIERRE

Business development support manager - New Gases

Engie


ENGIE Lab
CRIGEN

Do you have any questions ?

Les Rendez-vous Clients GRTgaz

Decarbonisation by biomethane

Nathalie Cloatre
Guillaume Vens

Decarbonisation by biomethane

01 **Biométhane dynamism today**

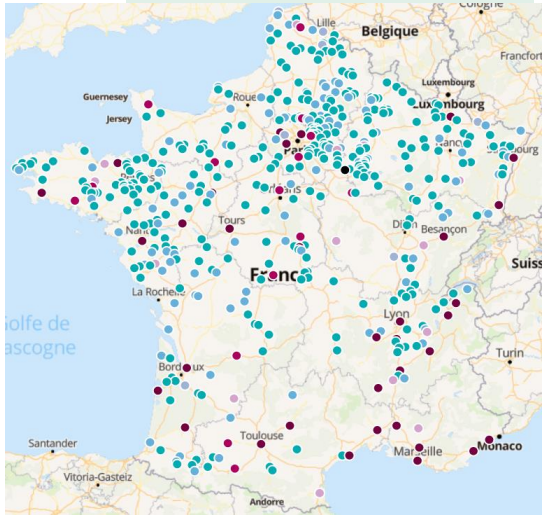
02 **Ambitions and future prospêcts**

03 **Various biomethane purchase mechanisms**

04 **Decree dated December, 8th 2022**

05 **Biomethane and ETS - Synthesis**

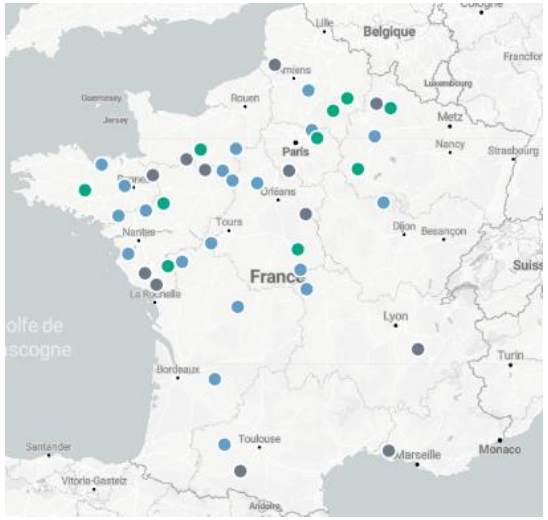
Biomethane is a reality in the energy mix



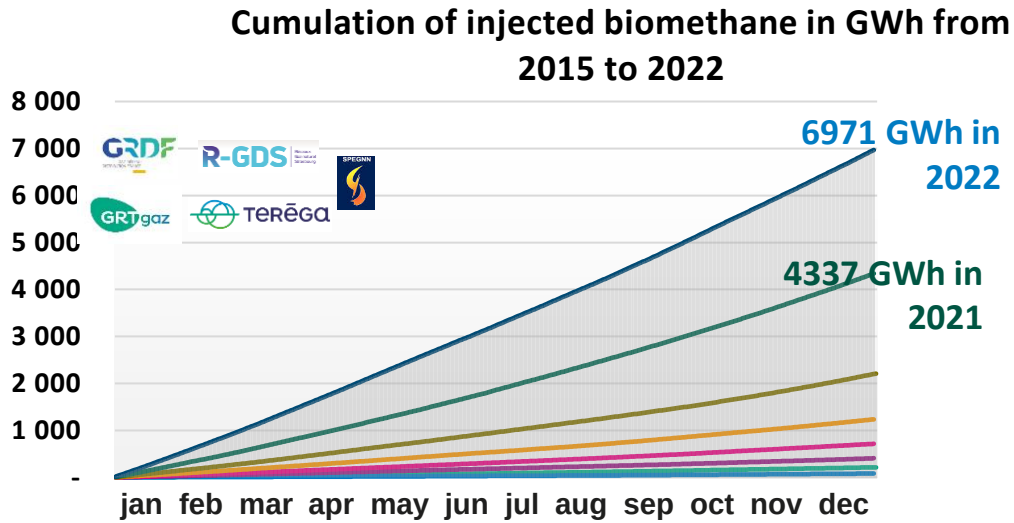
Mapping of injection sites

More than 500 biomethane injection sites in France
More than 800 by 2025 for 16TWh

Network infrastructures that adapt:
12 reverse flow stations in service
~40 by 2025

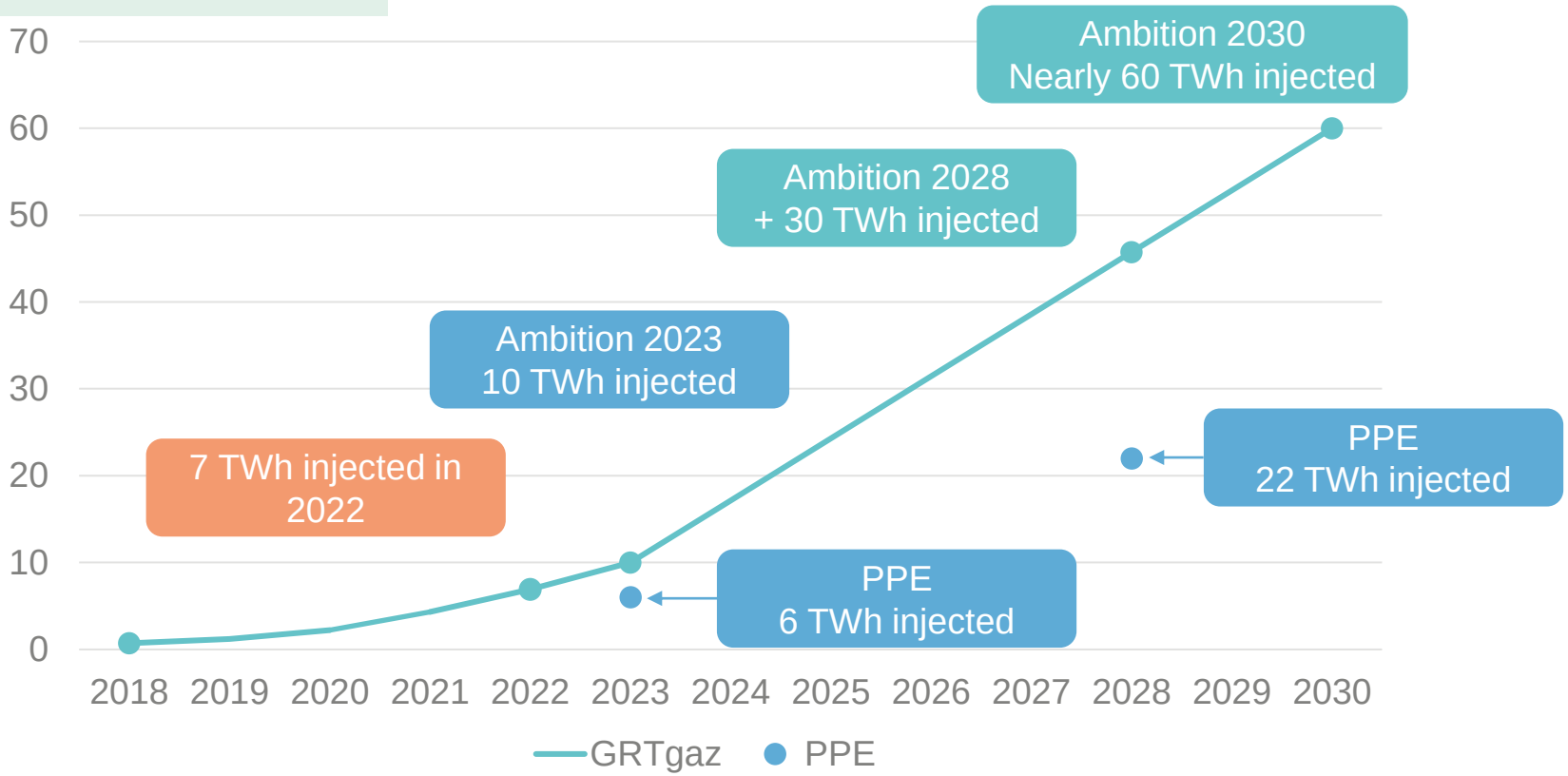


Mapping of reverse flow stations



7 TWh injected in 2022 or 1.5% of French annual consumption

An achievable 60 TWh industry ambition



Direct Purchase Agreement (BPA)

Certificate of Biogas Production

Call for tenders

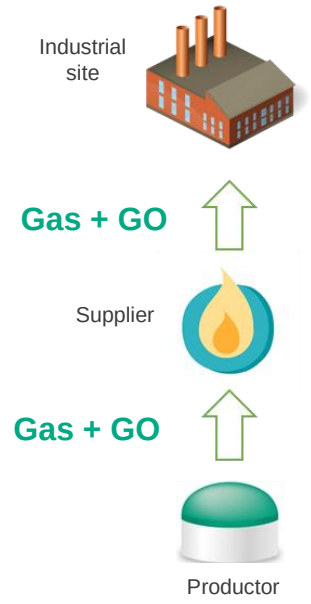
Price Purchase open window (<25GWh)

50 TWh of Biomethane from methanisation and ISDND + 10 TWh of innovative sectors

How to purchase biomethane

Maturity of devices

Purchase of green gas
through a supplier

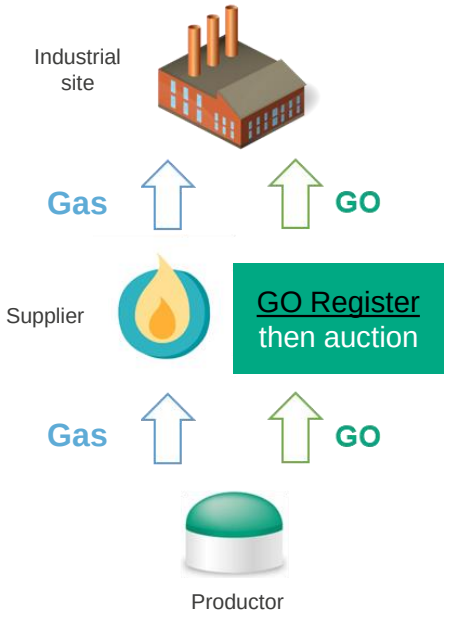


2030 volumes
(excluding 10 TWh innovative sectors)

~ 25 TWh

Today

Purchase of GO



- A consumer can create a « Non Buyer» account on the GO Register
- Same as buying green gas via a supplier for GO/ETS

2023

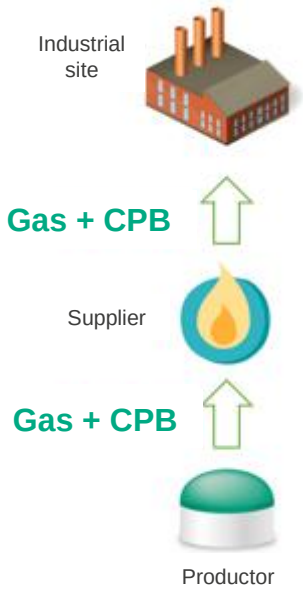
« GGPA » or « BPA »*

Direct green gas supply contract

2 TWh

Today

Biogas production certificate CPB



23 TWh

- Not before 2026
- Modalities currently under definition
- Public consultation expected from April 2023,

2026

GGPA / BPA * : Green Gas Purchase Agreement, Biomethane Purchase Agreement

Regulatory news: decree of 8/12/2022

Decree no. 2022-1540 of 8 December 2022 on guarantees of origin of biogas injected into natural gas networks

Biomethane with tariff

- A usable part in the ETS (+ if RED2 sustainability criterion respected
- The other reserved for the ESR
- Pro rata of ETS gas consumption/total gas consumption (France and N-2)
- Regulatory Ratio

Unsupported biomethane

- Usable in the ETS (if RED2 sustainability criterion respected)

Biomethane by European GO

- Usable in the ETS (if RED2 sustainability criterion respected)
- Provided that the original State has not already accounted for them

Biomethane and ETS: synthesis on 13/04/2023

* According to the provisions of the decree of 8/12/2022

Type of valuation by the productor	Acquisition of “Proof of Purchase”	RED II Sustainable Certification	Use in ETS
Purchase Price < Nov 2020	GO, via the Suppliers	Yes	**Yes ***
		No	**No**
• Purchase Price > Nov 2020 • "CRE“ calls for tenders • Experimental contracts (biomass only)	GO, via state auctions (> April 2023)	Yes	**Yes ***
		No	**No**
BPA	GO, via the Productor	Yes	**Yes**
		No	**No**
CPB (terms end 2023)	Automatic, up to mandatory supplier incorporation rate	Mandatory	**Yes**
	?? above the mandatory rate: ??		??
Foreign GO	GO, via Suppliers / Market (Need to connect French RGO 2023?)	Yes	**Yes**
		No	**No**

Do you have any questions ?

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Decarbonisation by biomethane : Interview of Arkema

Loïc De Bergh
Arkema

Interview

Loïc DE BERGH

Directeur Mondial de l’achat d’énergie, de la pétrochimie et des emballages
et Directeur de la décarbonation

Arkema

Do you have any questions ?

Les Rendez-vous Clients GRTgaz

Conclusion

Benoit Pouzieux
GRTgaz

Les Rendez-vous Clients GRTgaz

Thank you