Les

# RENDEZ-VOUS CLIENTS natran

VERS UN AVENIR
ÉNERGÉTIQUE DÉCARBONÉ

**Thursday**

**3**

**april**

9.00am – 5h00pm

Workstation

Paris 1st

natran

At the heart of your energies

# Introduction

Pierre Cotin

02/04/2025

# Program

Introduction

NaTran, at the heart of your energy

Today's network news

Prospective: consultation multi-energy

Lunch

Renewable gas introduction

Decarbonation strategies

- Industrials' testimonial
- White paper « Decarbonizing industry with gas solutions»
- The « CH0C » project, development of a low carbon oxycombustion boiler for industry

Conclusion

Networking break

naTran

At the heart of your energies

# NaTran, at the heart of your energy

Pierre Duvieusart

02/04/2025

# Any questions?

natran
At the heart of your energies

# Today's network news:

## Gas overview 2024

**Willy Devaux**

02/04/2025

# European gas markets stabilize in a context that remains tense

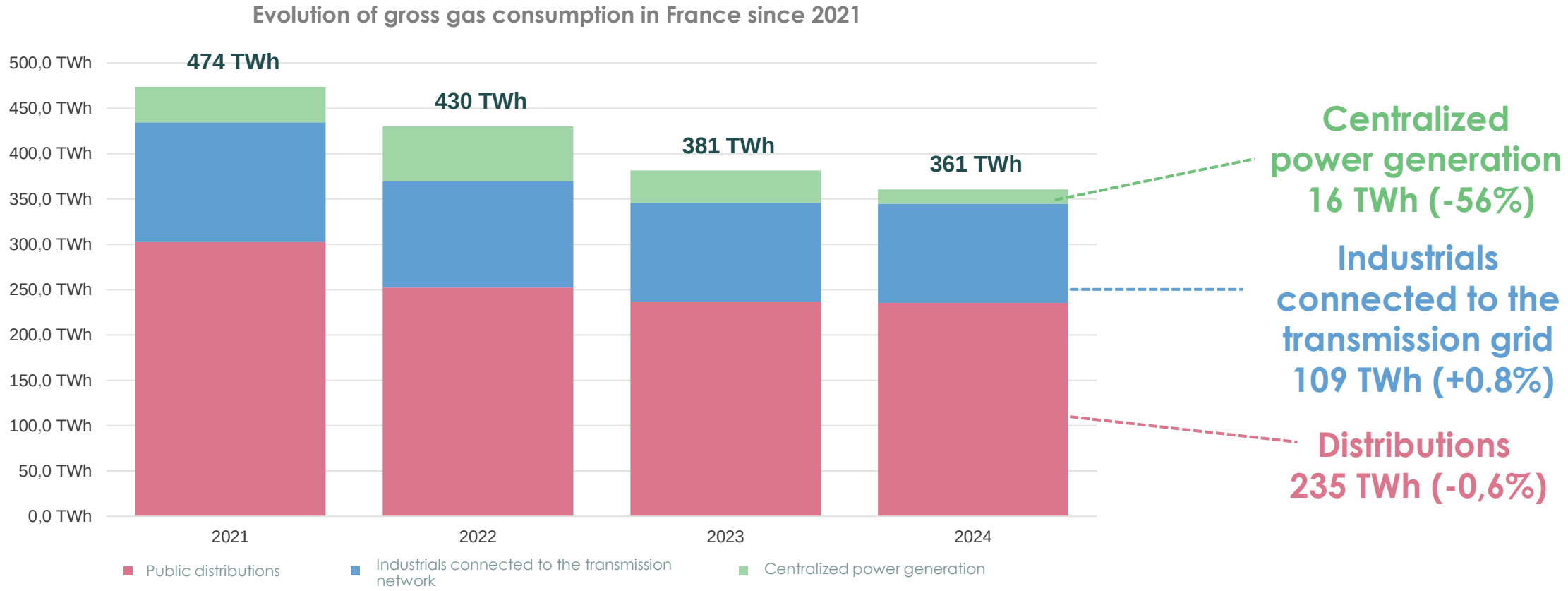
Prices of French (PEG) and European (TTF) marketplaces since 1 January 2021


Source : Argus - Analyse : NaTran

- **European gas demand broadly stable in 2024 compared to 2023, imports down 6%** (offset by storage)
- **Price volatility down in 2024, but a still tight market and narrow price differentials between European markets**
- Average annual gas prices expected to fall by the market in the medium term: around **€25/MWh by 2028**

# Gross gas consumption down by 5.5% in 2024

## Marked decline in the consumption of gas-fired power plants, stabilisation of industrial consumption and trend erosion of consumption on the distribution networks



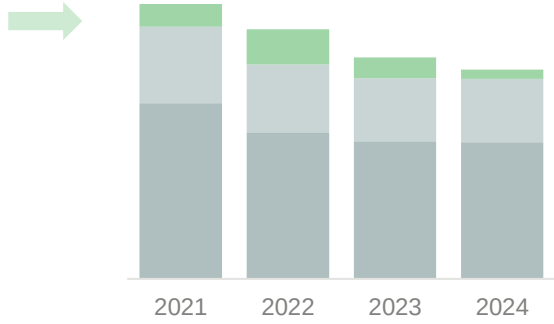

*Sources : NaTran, Teréga, GRDF - Analyse : NaTran*

# Very low use of gas-fired power plants to balance the electricity system

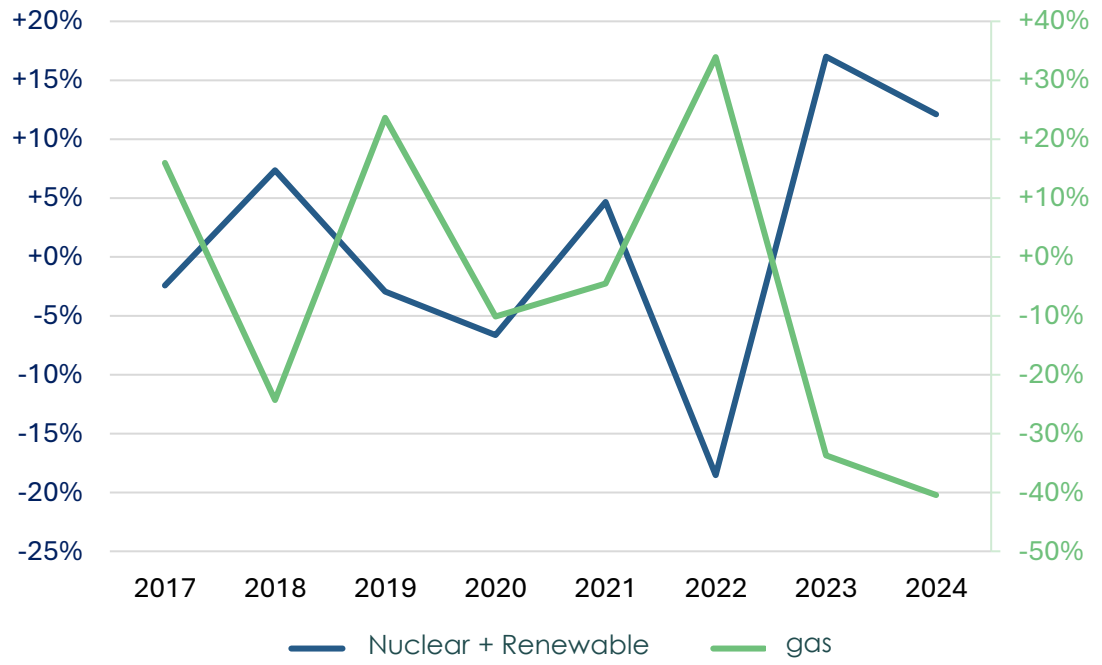
- **Exceptional nuclear and renewable energy production in 2024**
  - Record electricity production from renewable sources (+12% compared to 2023)
  - Nuclear production on the rise

- **The consumption of gas-fired power plants has therefore fallen significantly**, reaching 16 TWh in 2024

- **The gas system continues to play its role in balancing the electricity system**, thanks to its great flexibility to compensate for variations in electricity production and consumption

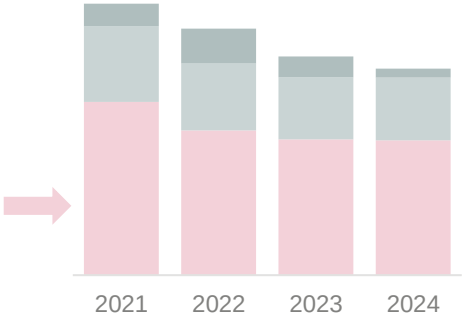



**Annual changes in electricity production from nuclear + renewables vs. gas**

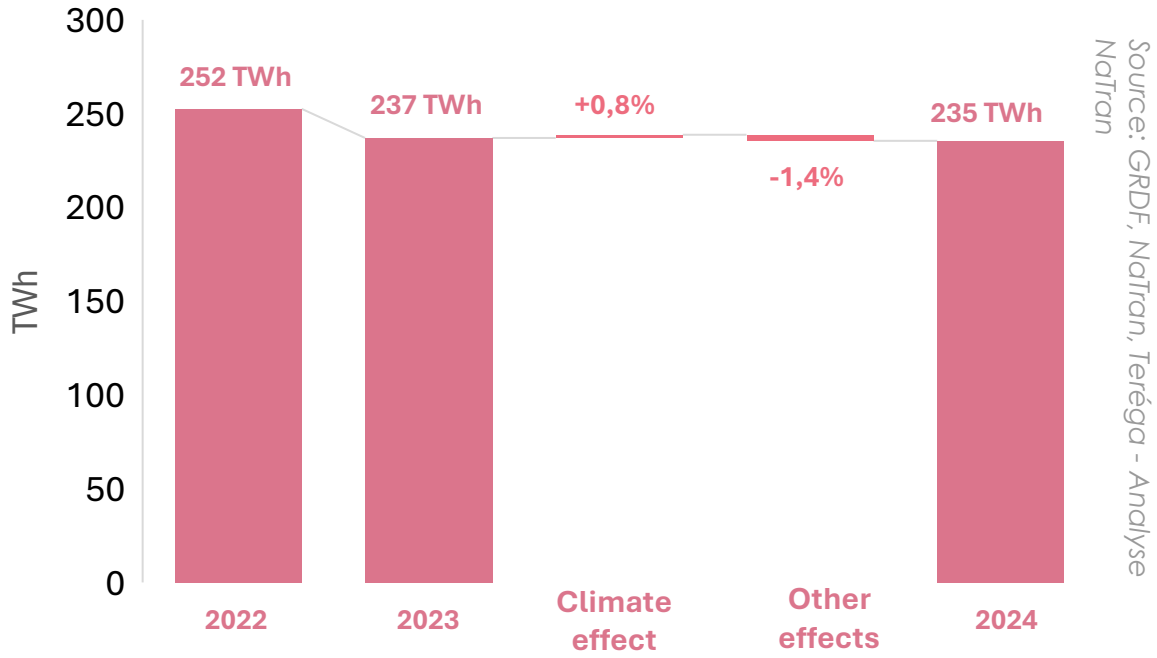



*Left-hand scale: nuclear and renewable, right-hand scale: gas*
*Sources: RTE - NaTran analysis*

# Public distribution consumption slightly decreases



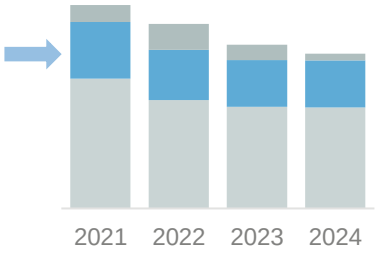

Decomposition of the evolution of gross consumption by public and public distributions in France



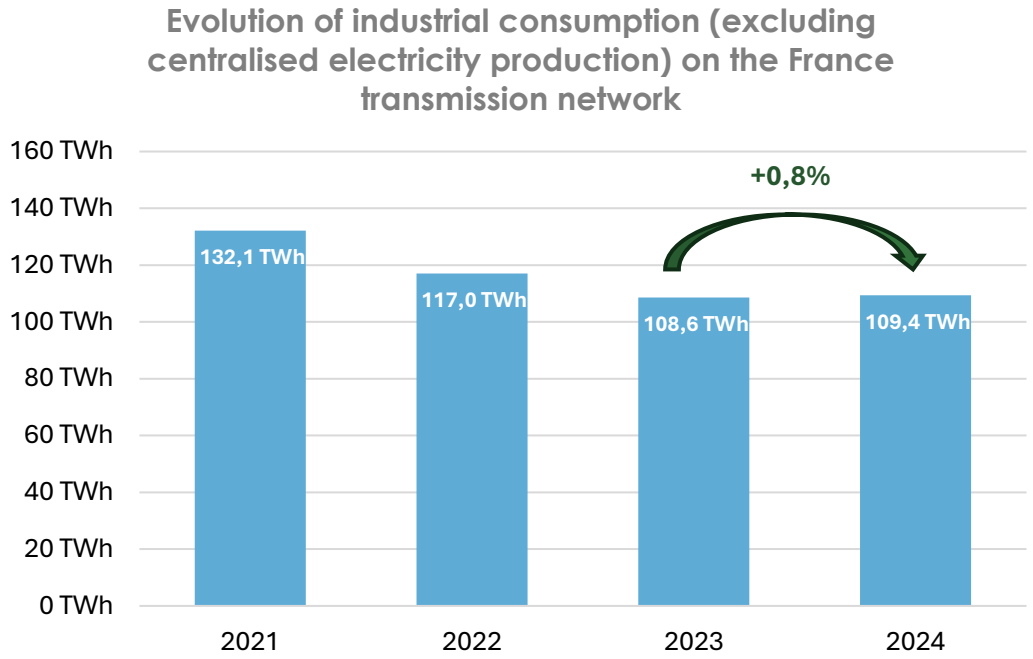

Source: GRDF, NaTran, Terega - Analyse NaTran

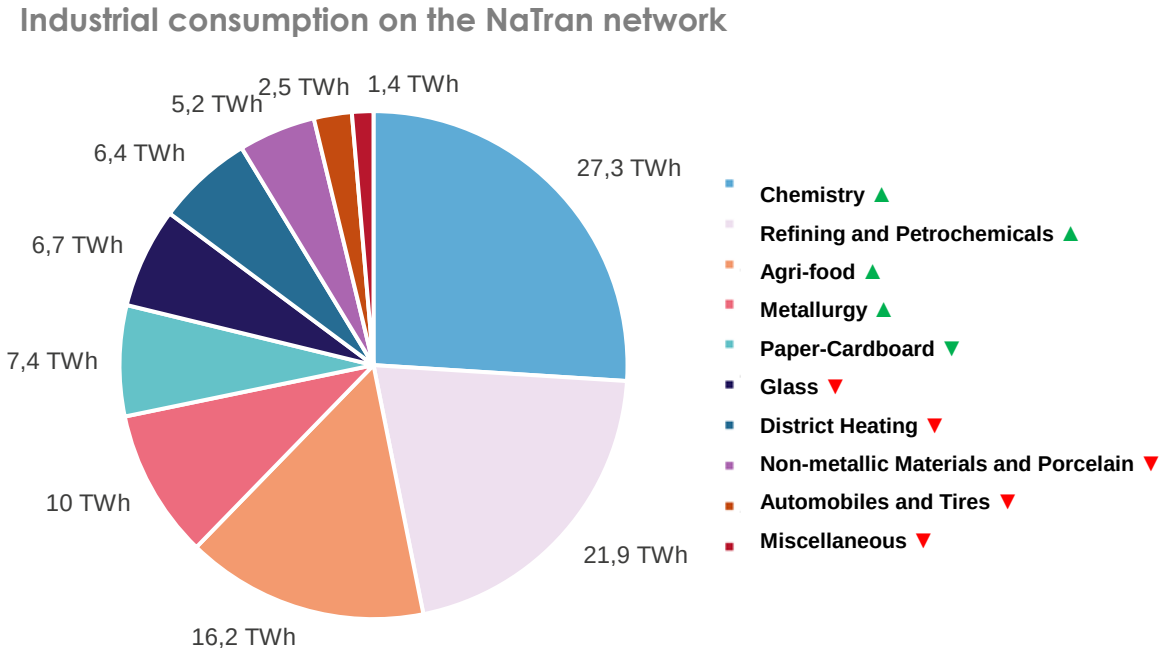
- In climate-adjusted terms, consumption by public distributions (France as a whole) is **down by 1.4%** compared to 2023
- **But in gross terms**, consumption is **only down 0.6%** compared to 2023 (2024 colder than 2023)
- **Efforts to reduce fuel efficiency** have continued in 2024

# Industrial customer consumption is slightly recovering by 0.8%



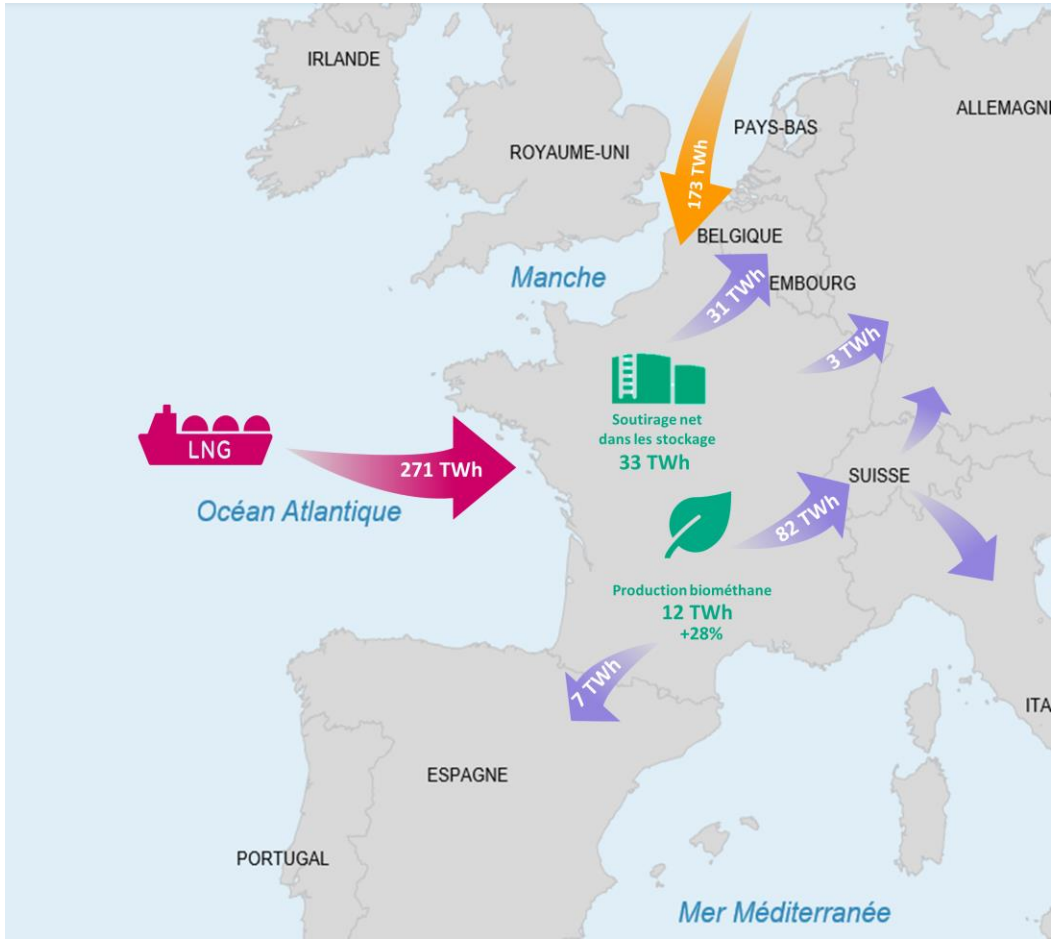

Source : NaTran, Teréga - Analyse NaTran




- **Slight increase** in gas consumption by industrial customers (**+0.8%** vs. 2023)
- The recovery of some sectors brings most of the results: chemistry, refining and petrochemicals, metallurgy and agri-food

# France remains an important gateway for LNG in Europe



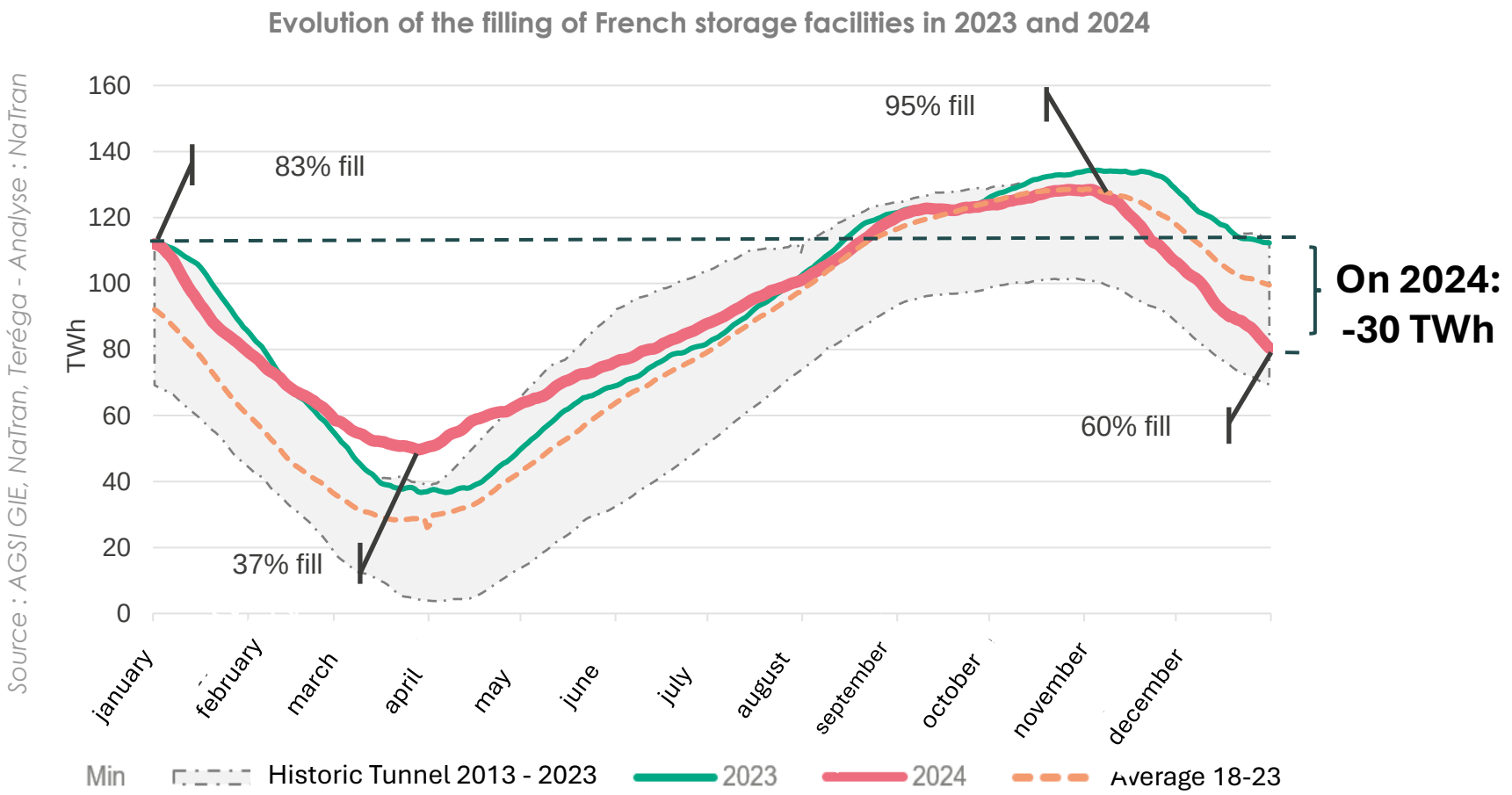

Source : NaTran, GIE, Teréga, ODRE - Analyse : NaTran

- France confirms its position as a **major LNG entry point** into Europe: 24% of European LNG imports
- LNG represents **57% of inflows into France (43% by pipelines)** in 2024
- France intensifies its transit level with **123 TWh net (+10%) of gas exported to its neighboring countries**
- **Bidirectionality** maintained at certain interconnection points, in particular with Belgium and Spain, which provides additional flexibility


* Netting des volumes par pays

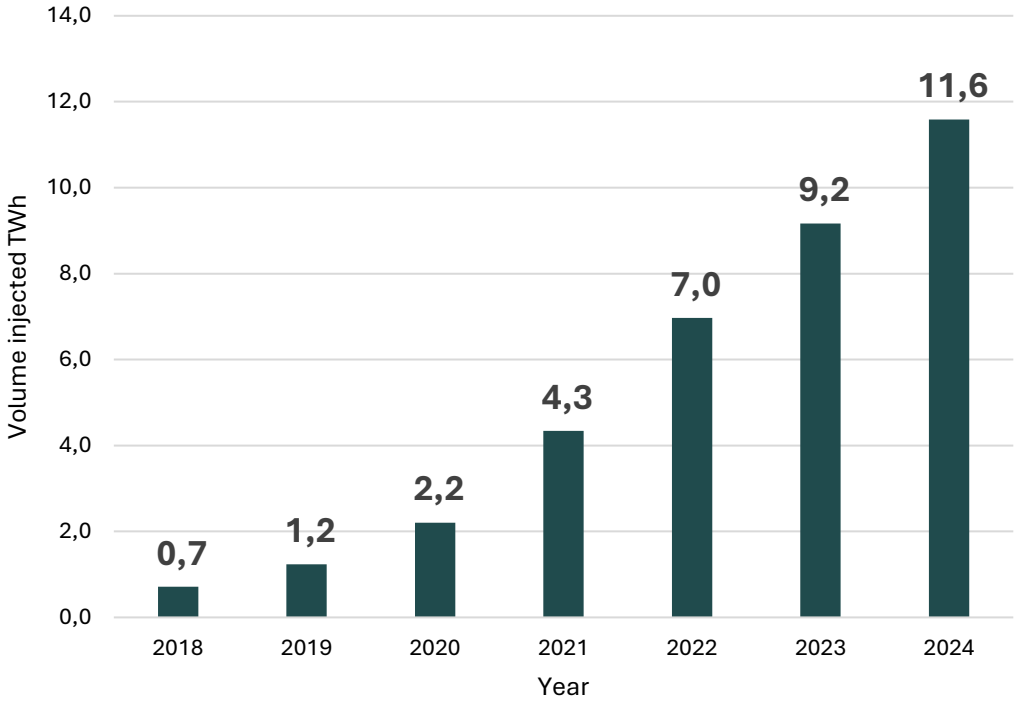
# Storage highly requested by shippers at the end of 2024

- At the end of the winter of 2023/2024, a historically high level of French stocks
- Storage facilities in high demand by shippers from the beginning of winter 2024/2025
- In 2024, a net withdrawal of approximately 30 TWh (in 2023, zero net withdrawal over the year)



# Renewable gases: a sustained dynamic

Evolution of the quantity of biomethane injected into the networks, in TWh




- **Sustained biomethane growth** in 2024: **11.6 TWh injected** (the equivalent of the production of 2 nuclear units) through 731 anaerobic digestion sites.
- Adaptation of networks: the **development of reverse flow flows is accelerating, with 28 reverse flow flows in service** and more than 70 others under construction, in studies or identified in the zoning validated by the CRE.
- **Increased project dynamics: +36%** of new projects entered into the capacity register in 2024 compared to 2023

# Any questions?

At the heart of your energies

# Today's network news:

## Highlights and outlook

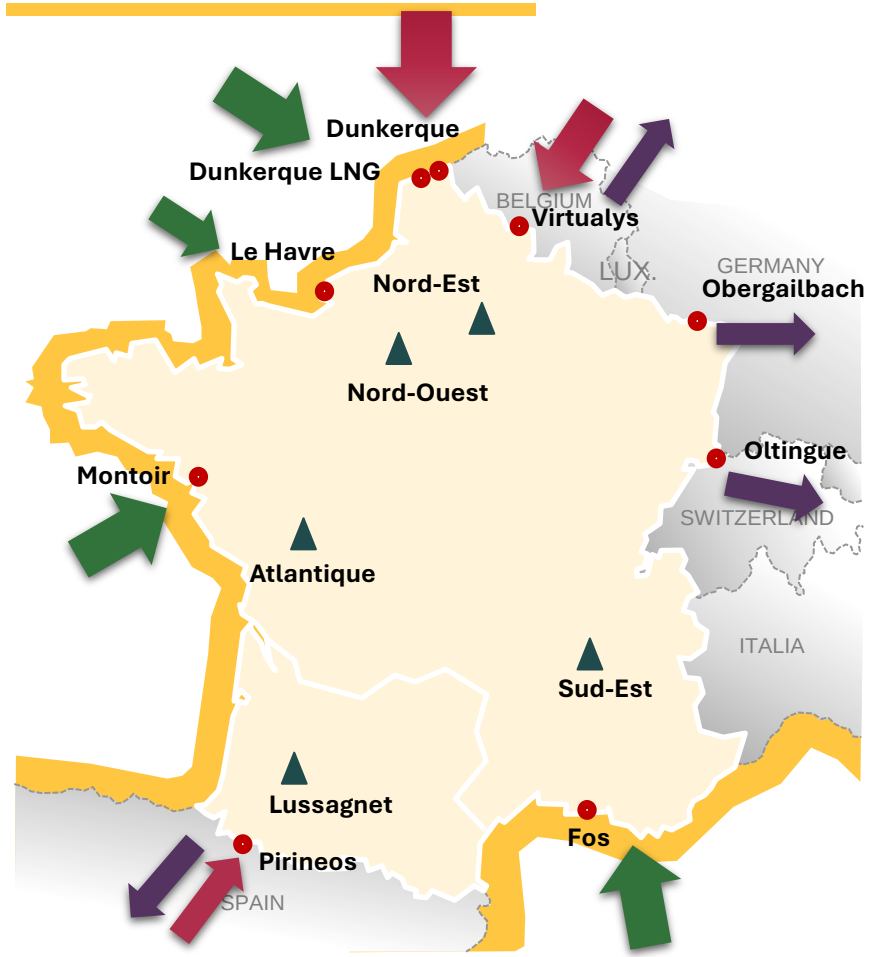
**Romane Chamaillard, François Blanchard, Isabelle Pelloux-Prayer**

02/04/2025

# Winter 2024/25 Highlights

01

# TRF: a source of flexibility for our customers



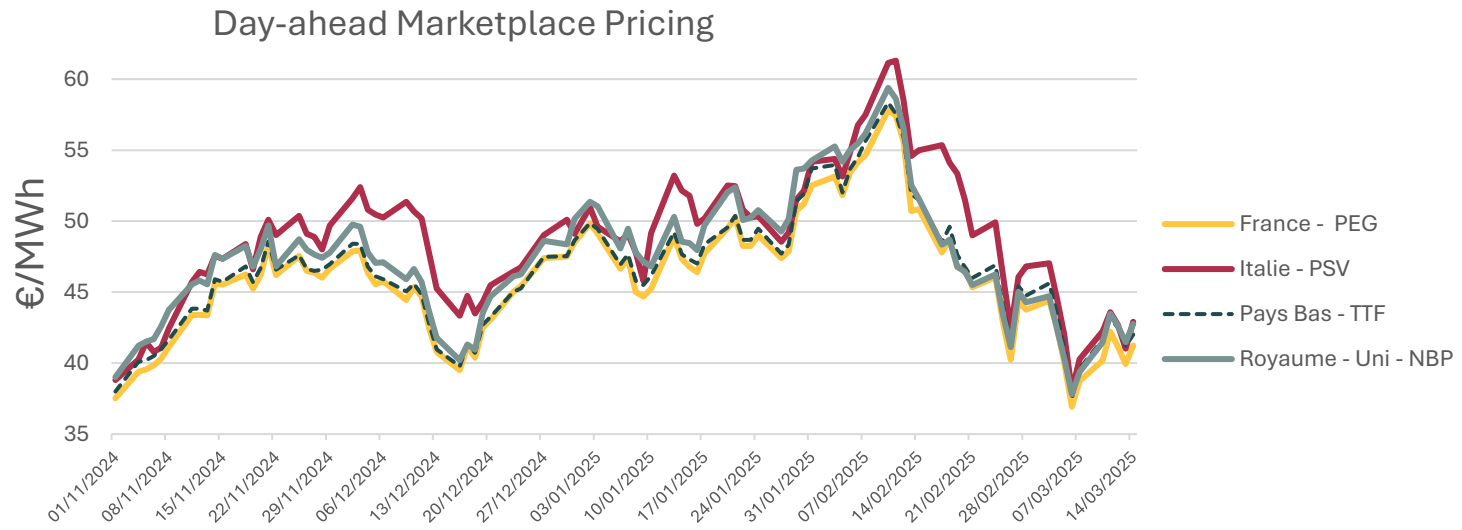

**A wide range of entry capacity** on our network:

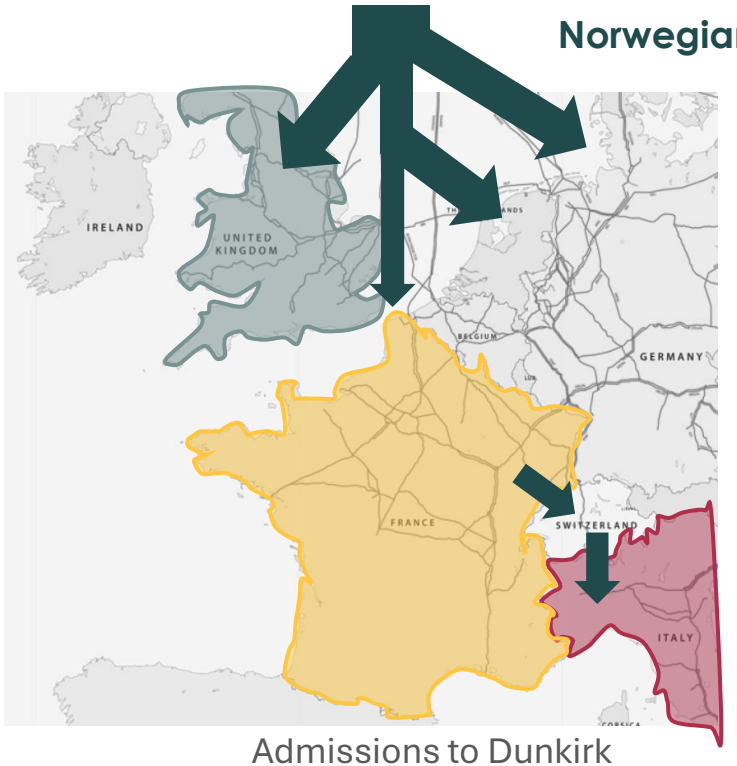
- By **pipeline**
- From **LNG terminals**
- From **storage**

→ **Diversity of supply sources and arbitrage opportunities for customers**

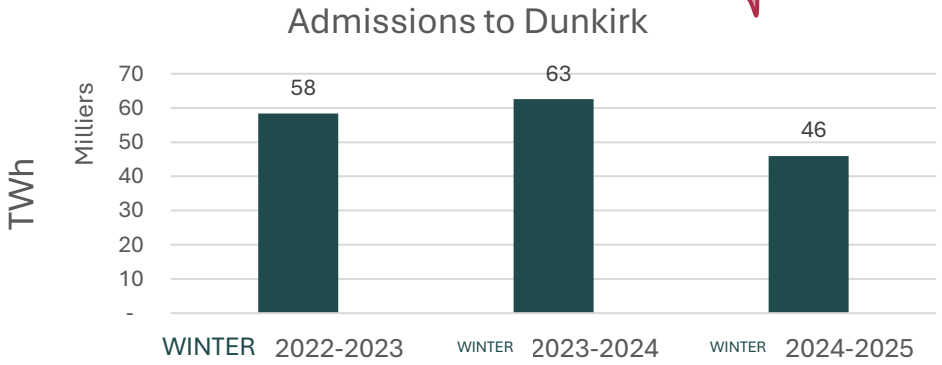
**Export capacities available to Germany and Switzerland to meet market demand since the war in Ukraine**

# Winter 2024/2025: flows in France resulting from price dynamics



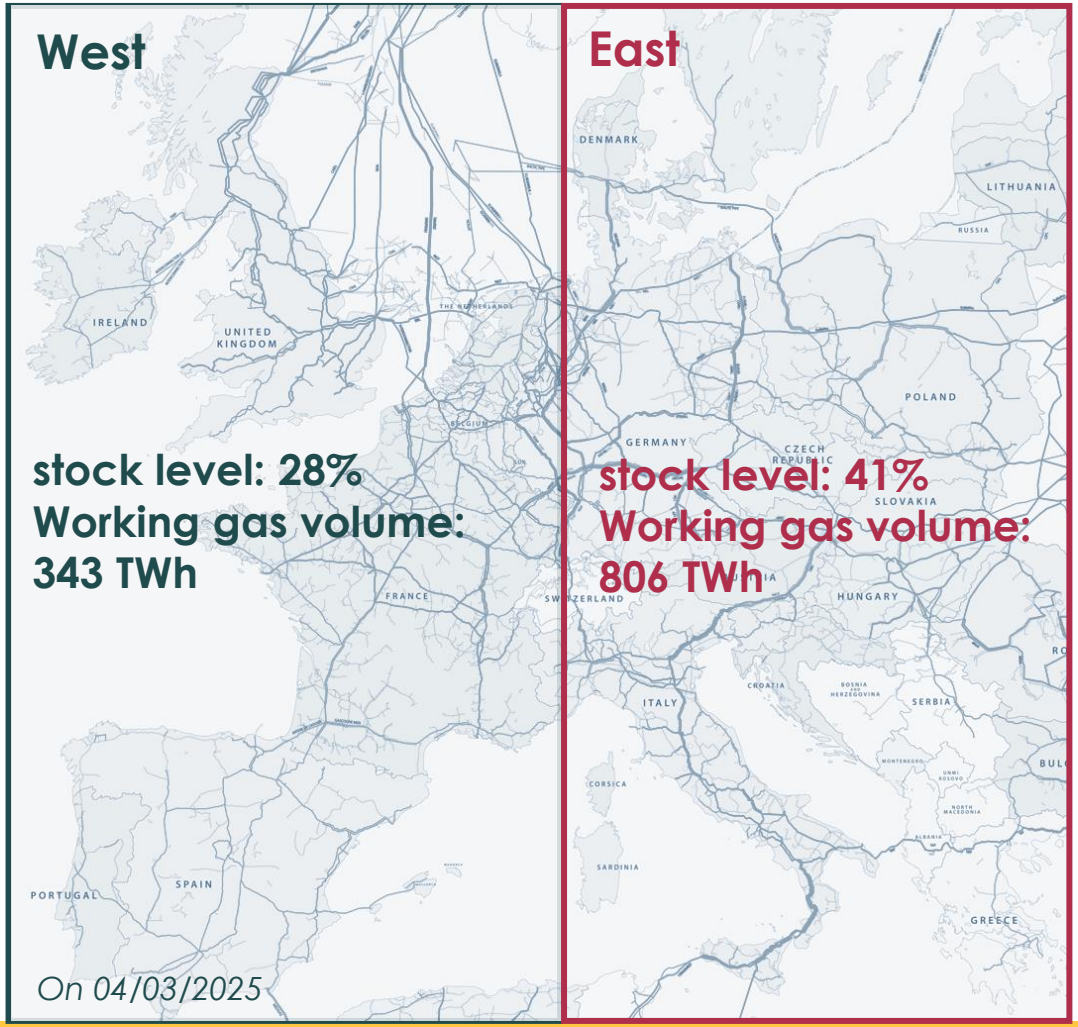




- The **PEG** is one of the **cheapest marketplaces in Europe, an asset for the French consumer**
- **Moderate Norwegian supplies** in Dunkirk :
  - A drop in Norwegian production compared to previous years
  - Norwegian gas flows that are primarily directed towards the most expensive marketplaces
- **Exports to Switzerland** and Italy **continue to be strong**




*Winter N-N+1: from 1 November N to 15 March N+1*

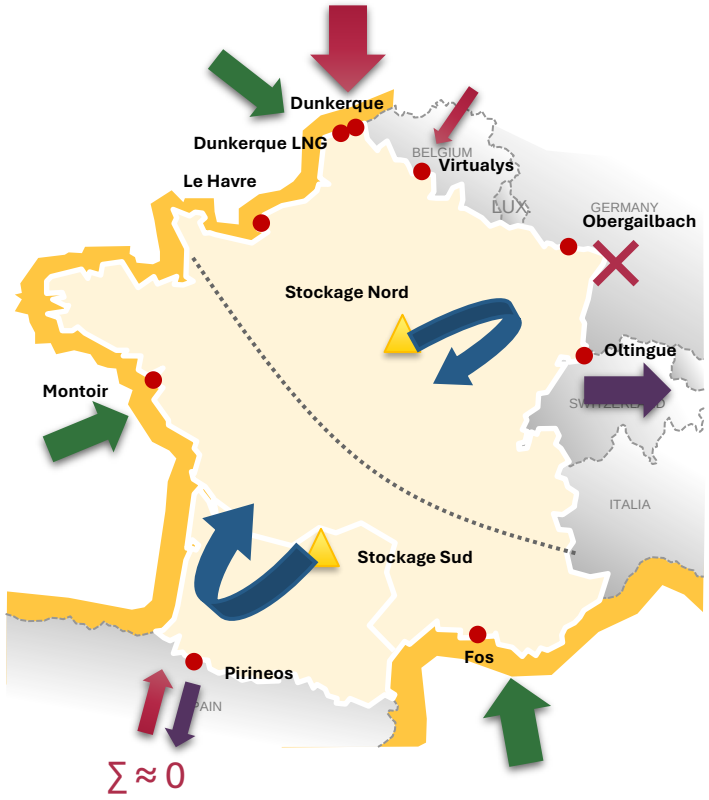
# The use of storage, a European approach




- In winter, in the context of an interconnected European market, the solicitation of all storage facilities is necessary to meet European consumption
- Economic trade-offs lead to a differentiated use of storage facilities and reflect distinct physical realities between the West and the East:
  - **In the east, storage is more preserved in winter because the possibilities of filling in summer are limited**

**In the West, withdrawals are more sustained** because the diversity of sources of supply facilitates the injection campaign.

# Effective mechanisms to deal with South-North congestion




Setting up a 24/25 winter flow

- **More favorable flows than the previous 2 winters, with a more balanced distribution of sources of supply→ Fewer South/North tensions**
- Effective mechanisms to deal with congestion through the continuous improvement process of the last 2 years

A reduction in decongestion costs

**Some figures on the winter of 2024/2025(vs winter 2023/2024)**

- **22 days of congestion(28 days)**
- **Locational spread: 730 GWh(2,4 TWh)** for 1.5 M€ **(9,6 M€)**
- No impairment of shippers' firm capacities

**What's next**

**A consultation in the 1st half of 2025 with a TRF REX on the winter shared with the market**

# 2025 perspectives

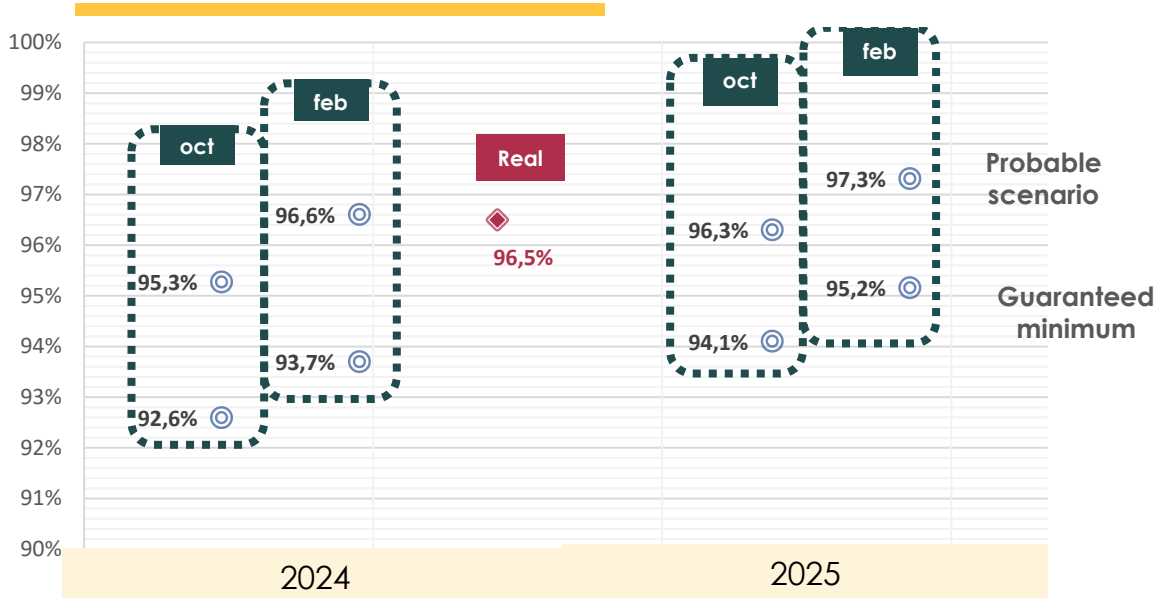
02

1 The 2025 works program for shipper customers

2 Summer outlook 2025

3 A slightly lower network usage tariff on 1 April

# The 2025 works program for shipper customers




Availability of firm subscribed capacities at all TRF entry/exit points (including Teréga points)

## A constant search for optimisation of work impacts:

- **Better capacity** availability **compared to 2024** on the guaranteed minimum: +1.5%
- An **improvement in the overall availability** rate on the probable scenario since the 1st publication **thanks to optimizations and coordination with adjacent operators:** +1%


**85 days of restrictions avoided thanks to the measure**

## An evolution in the management of works on TRF boundaries:

- **A more flexible mechanism**, in the hands of the TSOs, to **reduce restrictions**
- **In 2025: a Small Works threshold of 120 GWh/d on EO2D instead of 30 GWh/d**

Reminder : if works' impact ≤ threshold Small Works → No capacity restriction

# The Summer Outlook:

# The tool for assessing the filling of storage facilities during the summer

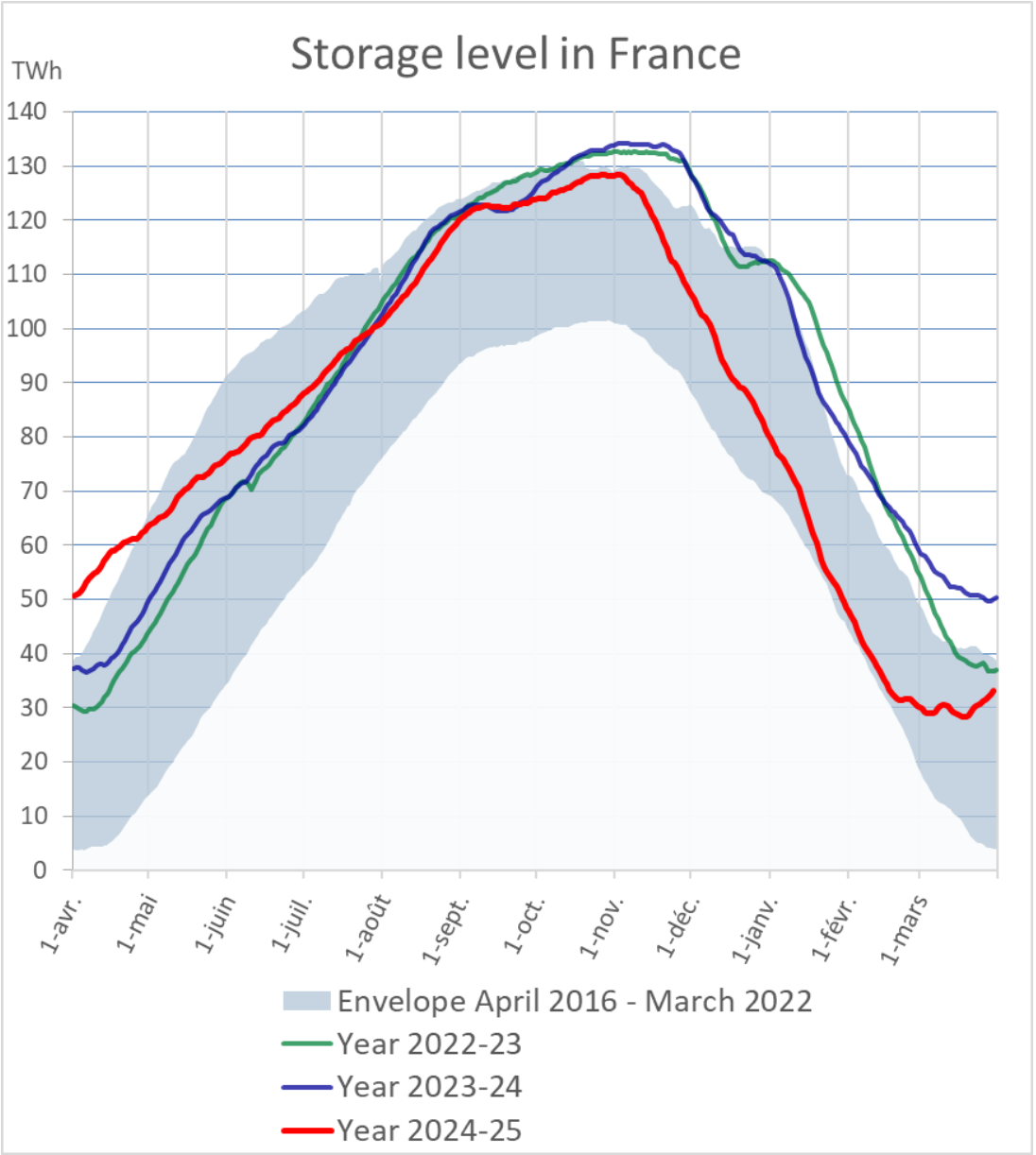

**Seasonal review carried out in accordance with the regulatory framework**
(French Energy Code, Art. L141-10)

**Objective: To check the possibilities of filling storage facilities from April to October, taking into account the limits of the network and maintenance programs**

**Note: Infrastructure feasibility assessment exercise**
(not forecasting or assessing the availability of sources of supply)

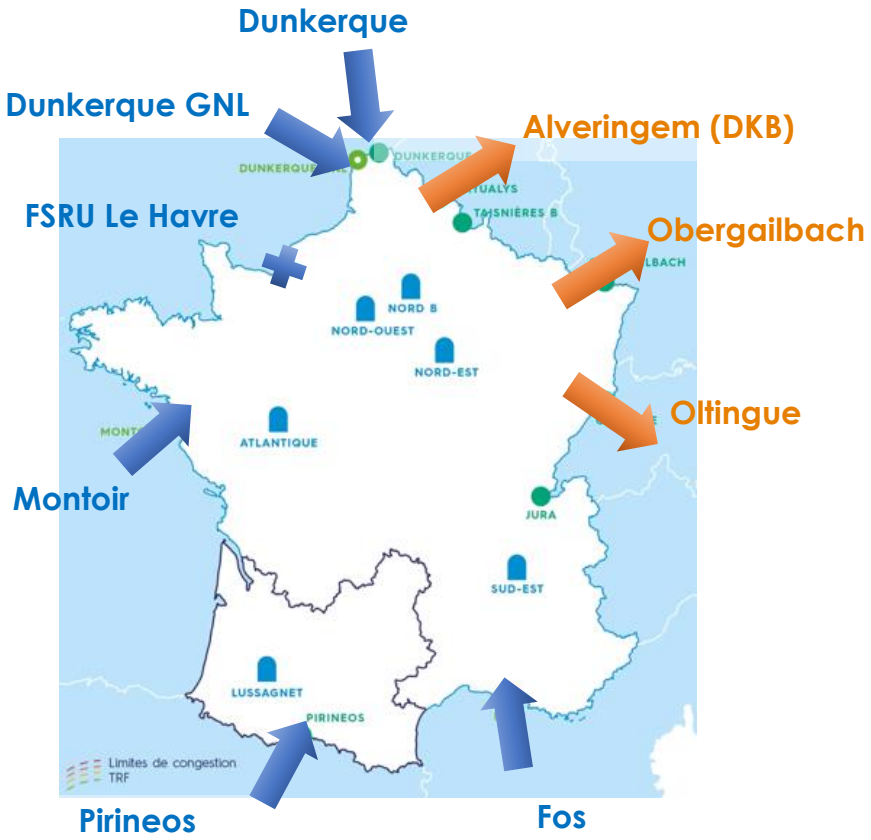
# Storage situation at the end of winter

- Storage offer 2025-26 : Working Gas Volume = **125,5 TWh** (129,55 TWh in 2024)
- Storage level H+L on April 1st : **33,7 TWh**, i.e. 27% of WGV (50,4 TWh, i.e. 39% of WGV in 2024)
- European storage on April 1st : 388 TWh (669 TWh in 2024) for a WGV of 1139 TWh (1130 TWh in 2024)
- Compared to summer 2024, there is **290 TWh more to be injected in European storage this year, including 13 TWh in French storage**



# Results :

## storage levels that can be achieved according to net import assumptions (imports – exports)




| H gas storage level on October 31st ( % of WGV) | | | | |
|---|---|---|---|---|
| Net import (TWh) | 240 | 220 | 200 | 180 |
| High consumption scenario | 97,7% | 81,4% | 64,7% | 48,0% |
| Medium consumption scenario | | 100,0% | 85,7% | 69,0% |

*Orders of magnitude : 1% of H storage= 1,2 TWh ≈ 1 LNG carrier ≈ 4 days of export at Oltingue*
*Gas summer= 214 days*

*1 TWh ≈ 0,8% of Useful Volume of French storage*

- Taking into account the maintenance schedule of TSOs and adjacent operators
- Two consumption scenarios : high and medium

**The network enables storage facilities to be filled**

# In summary: the network enables storage facilities to be filled, but large inflows are required

Security of supply: storage is important to cover the different climatic scenarios for the coming winter (covering the risk of 2% cold peak and volume)

Availability of infrastructures is sufficient to allow storage facilities to be filled before winter, while taking into account significant exports to Europe

Due to the reduction in Russian supplies, replenishing a high stock level requires :
- high net imports
- throughout the summer

# A slightly lower network usage tariff for the year 2025-26

- The **ATRT8 tariff** came into effect on **April 1**, 2024 for 4 years, ensuring **relative stability of the tariff** over this period
- The **annual evolution is very regulated**
- It will **lead to a slight reduction** in tariff terms on **1 April 2025**

*Application of the CRE deliberation n° 2025-35 du 2025/01/29 on the annual change in the rate for use of NaTran and Teréga natural gas transmission networks*

**Tariff evolution on 1 April 2025**
(October 1, 2025 for PIRs)

**-0,67 %** for **main network**

**-0,55 %** for the **regional network**

**Inflation forecast 2025**

*+ 2024 adjustment: realized vs. forecast inflation gap*

**+1,15 %**

**Clearance of the CRCP**

*Coefficient k capped at +/-3%*

**-1,82 %** for Main network

**-1,7 %** for the regional network

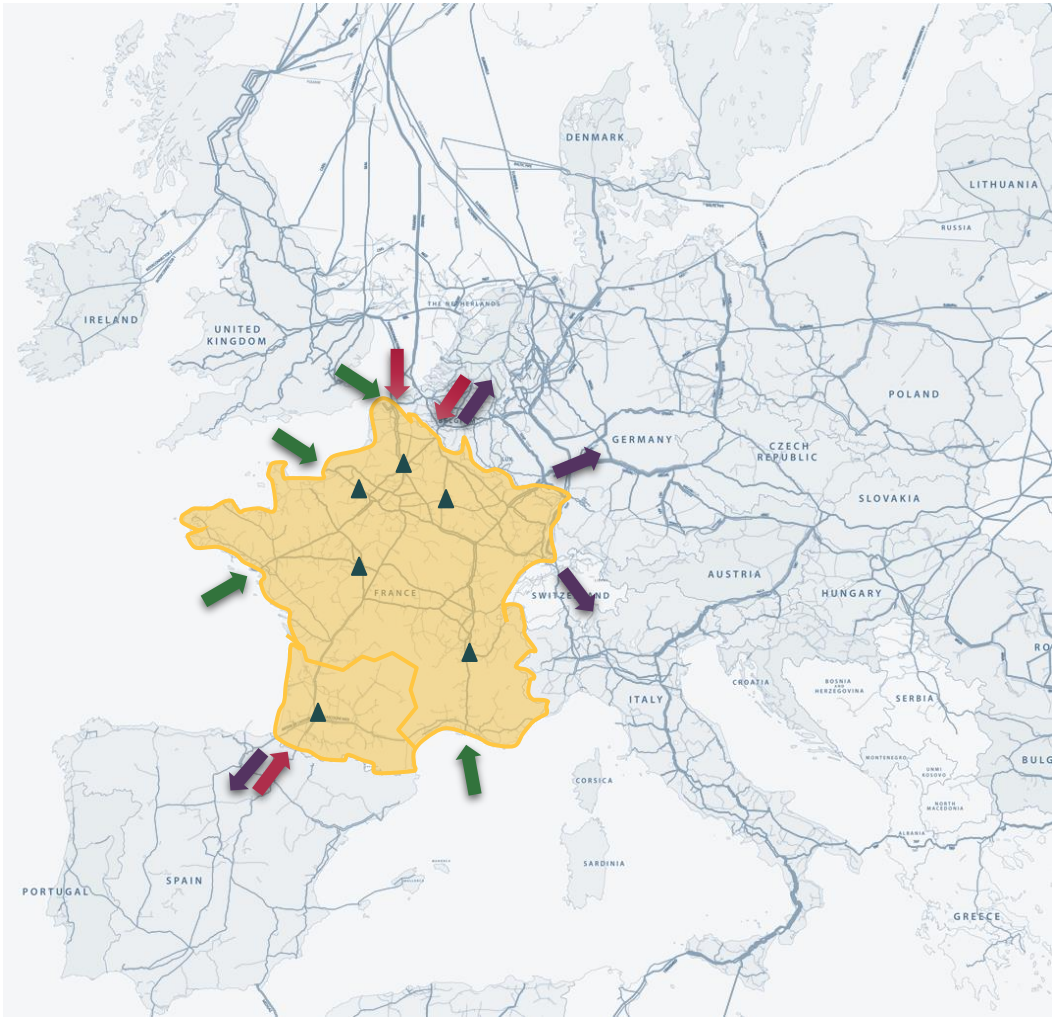
*Accrual of Expenses and Income (CRCP): difference between recorded and estimated expenses/income, on items that are unpredictable and difficult to control*

Transmission revenues

Energy costs, capital costs...

# In summary

- **The market context is normalising**: the effects of the Russian-Ukrainian crisis are stabilizing, the European market has adapted
- A **sustainably competitive PEG**, thanks to the flexibilities offered by the sources of supply in France
- The TRF: an infrastructure offer that also generates **value for the European gas system**
- Outlook for summer 2025 :
  - **Transport capacities** are **available for filling storage facilities**
  - **Net imports** have to remain **high throughout the summer** to replenish stocks



# Any questions?

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# Prospective:

# Consultation multi-energy CH4, H2 et CO2

Mathilde Delignou

02/04/2025

# NaTran and Teréga are launching the "$CH_4$, $H_2$, and $CO_2$ Concentrations" initiative to raise awareness and take action in the $H_2$, $CO_2$, and $CH_4$ markets

## The Context:

- **For $CH_4$ :**

An exercise that fits within the framework of our public service obligations.

- **For $H_2$ and $CO_2$ :**

Develop shared visions, needs, and coherence for $CH_4$ transport infrastructure, but also for $H_2$ and $CO_2$ from now on. Ensure coherence with existing scenarios with other energy vectors.

## Our Objectives:

- Coordinate **certain assumptions** with the aim, in particular, of feeding into the PDD and BPP
- **Enhance them** with feedback from stakeholders

**>> Size the network in alignment with the needs of our clients and stakeholders, both at the national and regional levels**

## The targets :

Stakeholders and players in the H2, CO2, and CH4 markets: institutional bodies, producer/consumer associations, industrial players, RDI actors, trade unions, and energy foresight stakeholders…

Launch on April 4th 2025
H2 and CO2 workshops on May 13 – CH4 workshop on June 3

**4 scenarios focused on European decarbonization objectives & national energy planning**

# Presentation of 4 European decarbonisation scenarios

## 2 central scenarios that are based on a narrative of accelerating energy transition efforts :

- The first, based on various elements provided by the public authorities, in particular the consultation documents of the PPE (PP scenario)
- The second, based on the reference scenario of the Gas Outlook of the French GRT and GRD, several of whose fundamentals are common to the reference scenario of the RTE Forecast Balance (PG-A scenario)

## 2 additional scenarios, part of a narrative of partial achievement of objectives

- These 2 scenarios consider more or less marked delays in the transition of end uses but also of production mixes
- They make it possible to take into account a reasonable range of uncertainties for security of supply analyses and the updating of infrastructure development analyses up to 2035.
- These scenarios are also largely based on the contingency scenario of the Gas Outlook and the one developed by RTE in its Forecast Assessment.

# CH4, H2 & CO2 consultations: an open and continuous dialogue

## Programming from April to June

### Launch Webinar

**April 4, 2025**

- Presentation of the context and challenges of the approach (objectives, methodology & timetable, etc.)
- Presentation of the scenarios and their uses
- Presentation of the H2 and CO2 master plans

**Sign up!**

### Two H2 & CO2 workshops

**May 13, 2025**

- Presentation of the methodology for the construction of the H2 and CO2 scenarios
- H2 & CO2 Master Plans Presentation
- Exchanges around thematic round tables and specific questions
  - **H2 round tables:**
    - E-fuels pour l'aviation et le transport maritime
    - Flexibilité des électrolyseurs
    - Continuité d'approvisionnement et *sourcing*
  - **CO2 round tables (under construction):**
    - Décarbonation des indus. & usages
    - E-fuels

**Objectives: to consolidate our working hypotheses and adjust the master plans**

### A CH4 workshop

**June 3, 2025**

- Presentation of the objectives pursued
- Presentation of the method and the CH4 (bio) prod/consumption scenarios studied
- Presentation of extra-EU supply scenarios
- Spectrum of hazards
- Discuss specific questions about the scenarios

**Objectives: to verify the relevance of the scenarios studied to analyse CH4 fluxes in Europe in 2035 and ultimately their implications on supply safety.**

# SIGN UP!

# Any questions?

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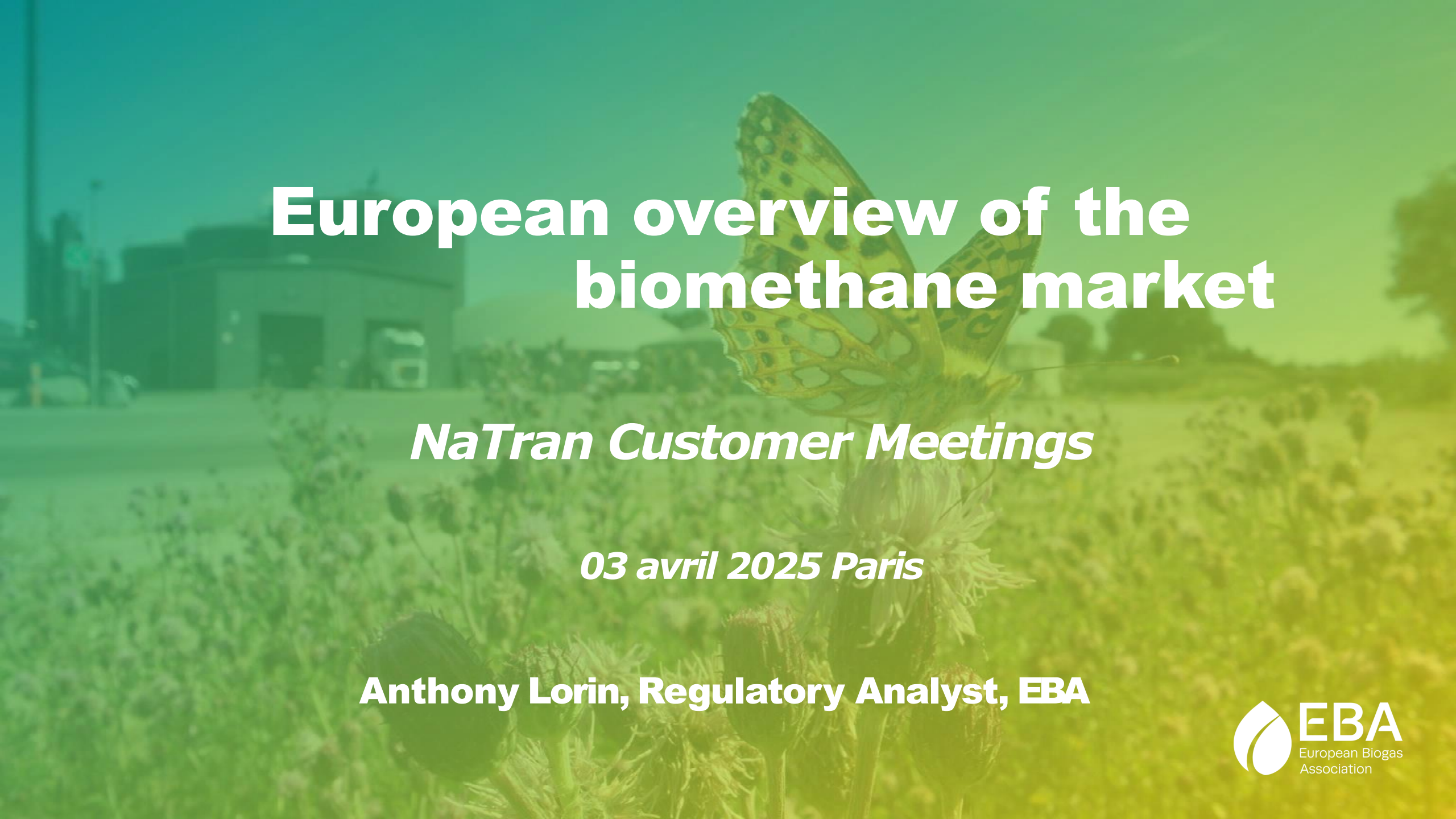
# Renewable gas introduction:

## European overview

**Anthony Lorin**
**European Biogas Association, EBA**

02/04/2025



# European overview of the biomethane market

## *NaTran Customer Meetings*

***03 avril 2025 Paris***

**Anthony Lorin, Regulatory Analyst, EBA**

EBA
European Biogas Association

# Introduction

# Déroulé de cette présentation

**01** European production

**02** Consumer markets

**03** Needs for political action

# European production

1

# Recent trends:
# A strong but uneven dynamic

EBA
European Biogas Association

# Biogas accounts for 7% of the natural gas consumed

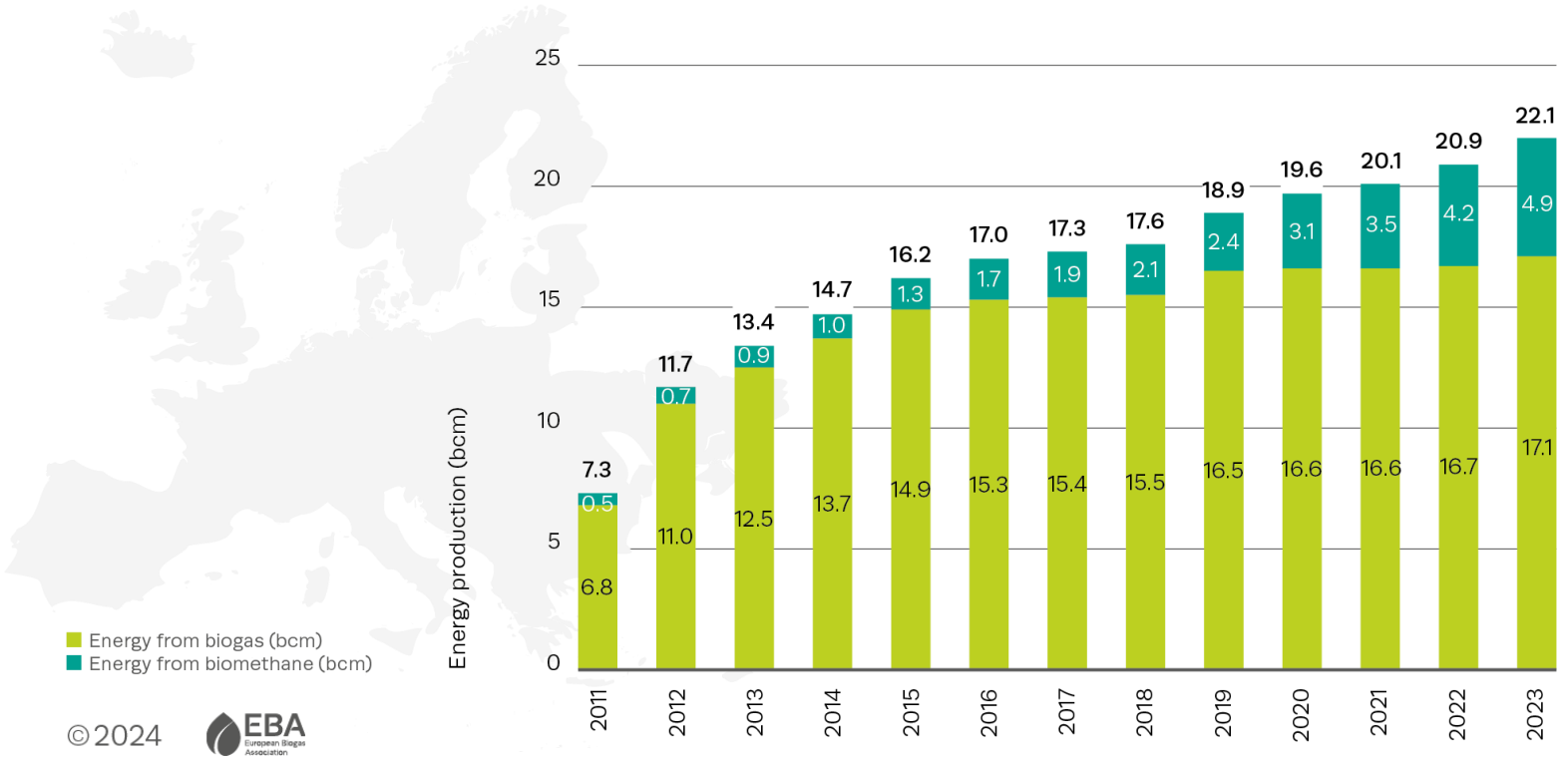
## Combined production of biomethane and biogas in Europe

**22 bcm/an**

**230 TWh/an**

= Gas consumption of Belgium, Denmark and Ireland combined

*Combined production of biomethane and biogas in Europe (billion m3)*



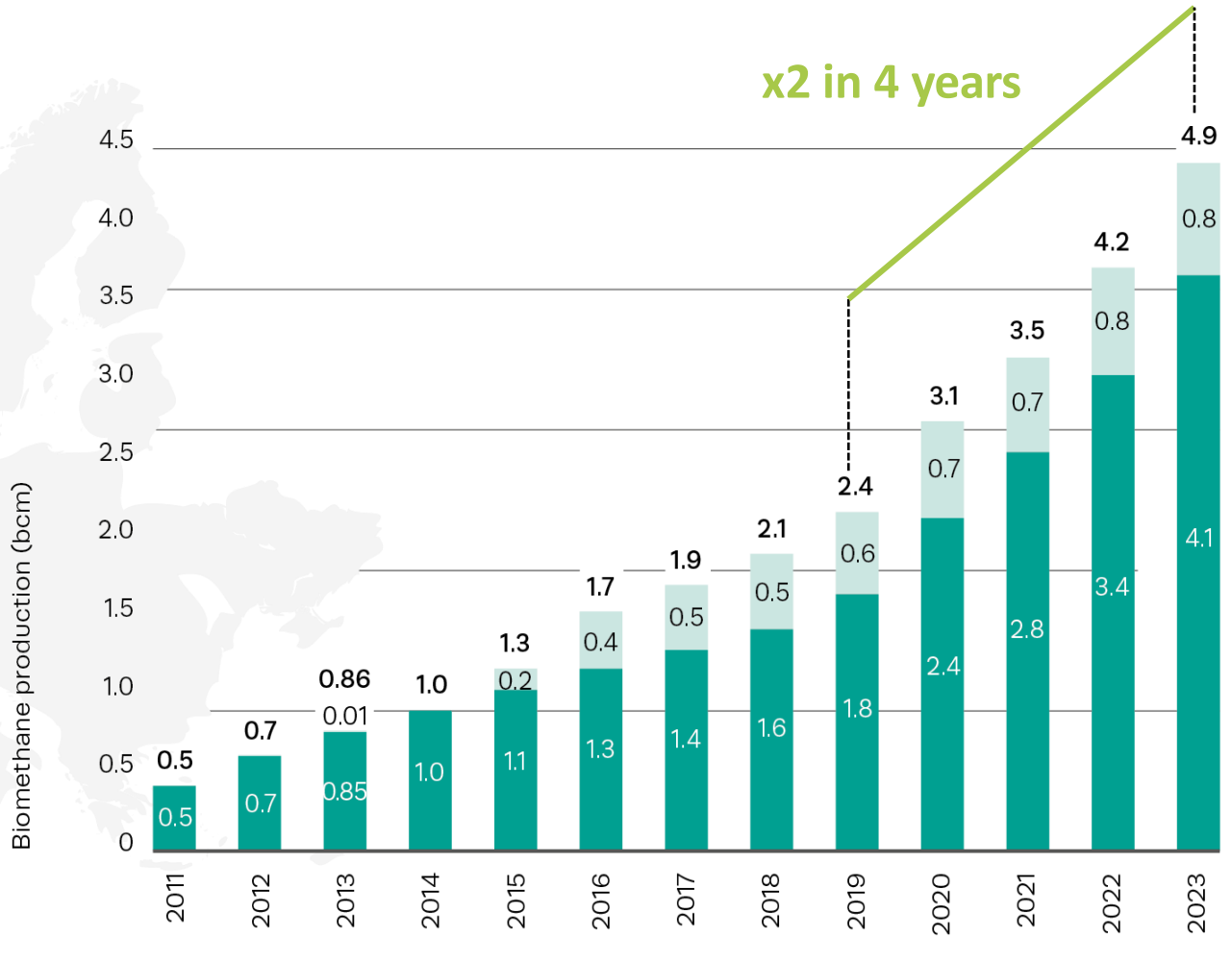
# The take-off of the past decade continues

**In 2023: 5 billion m3 of Biomethane**

- 18% annual growth

**Italy, France, Denmark and the United Kingdom** are the leaders in new production capacities.

*Biomethane production in Europe (billion m3)*





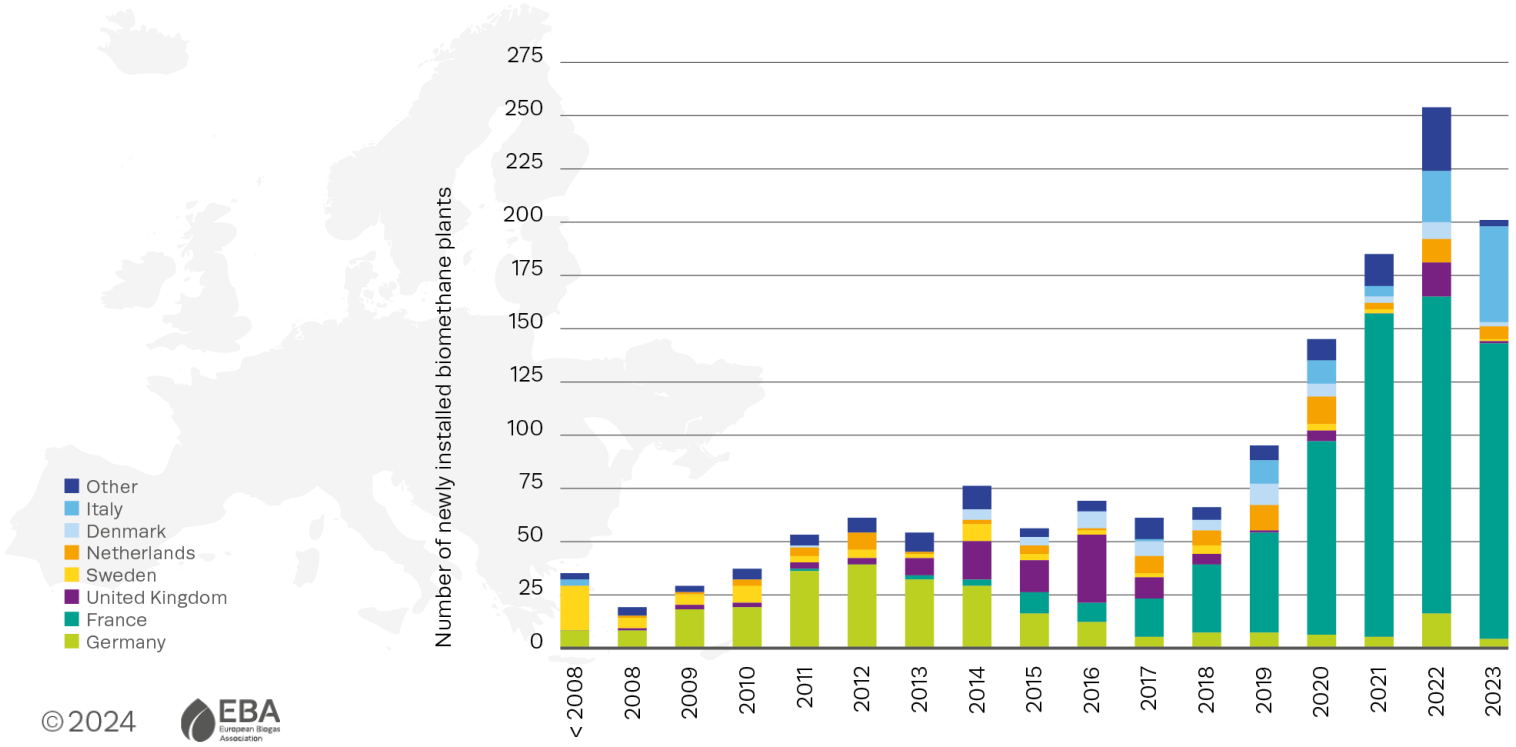

EBA European Biogas Association

# Launch of new units dominated by France

**A total of 1,510 installations in Europe at the end of 2023**

>85% connected to the gas network, mainly to the distribution network

*Number of new biomethane plants in Europe each year, 2008 - 2023, total by country*






EBA European Biogas Association

# From 12 to 25 producer countries in 8 years

12 producing countries in 2015

25 producing countries at the end of 2023

2

# Looking ahead:
# A substantial potential that still needs to be convinced?

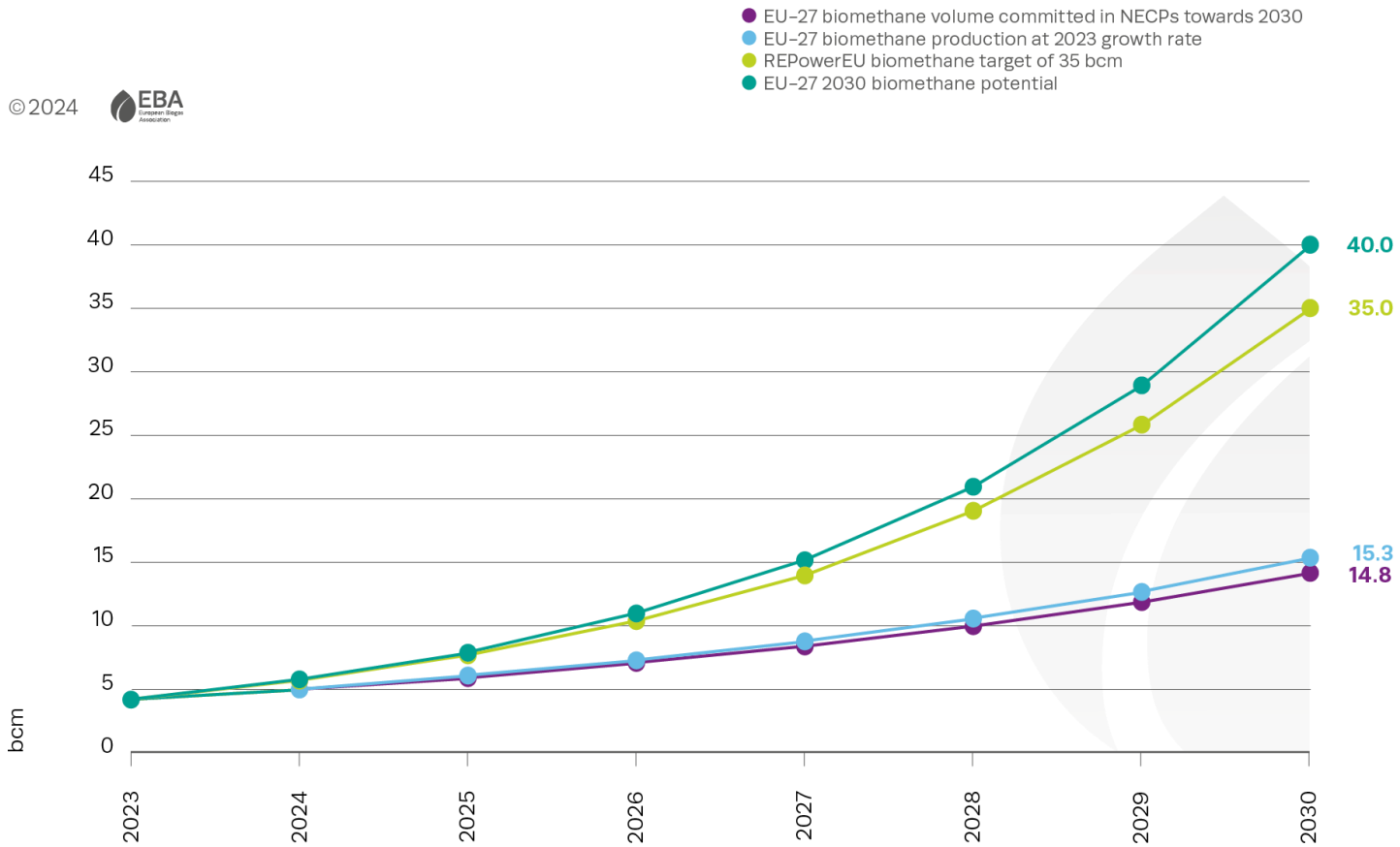
EBA
European Biogas Association

# About 15 bcm planned by 2030 based on government plans

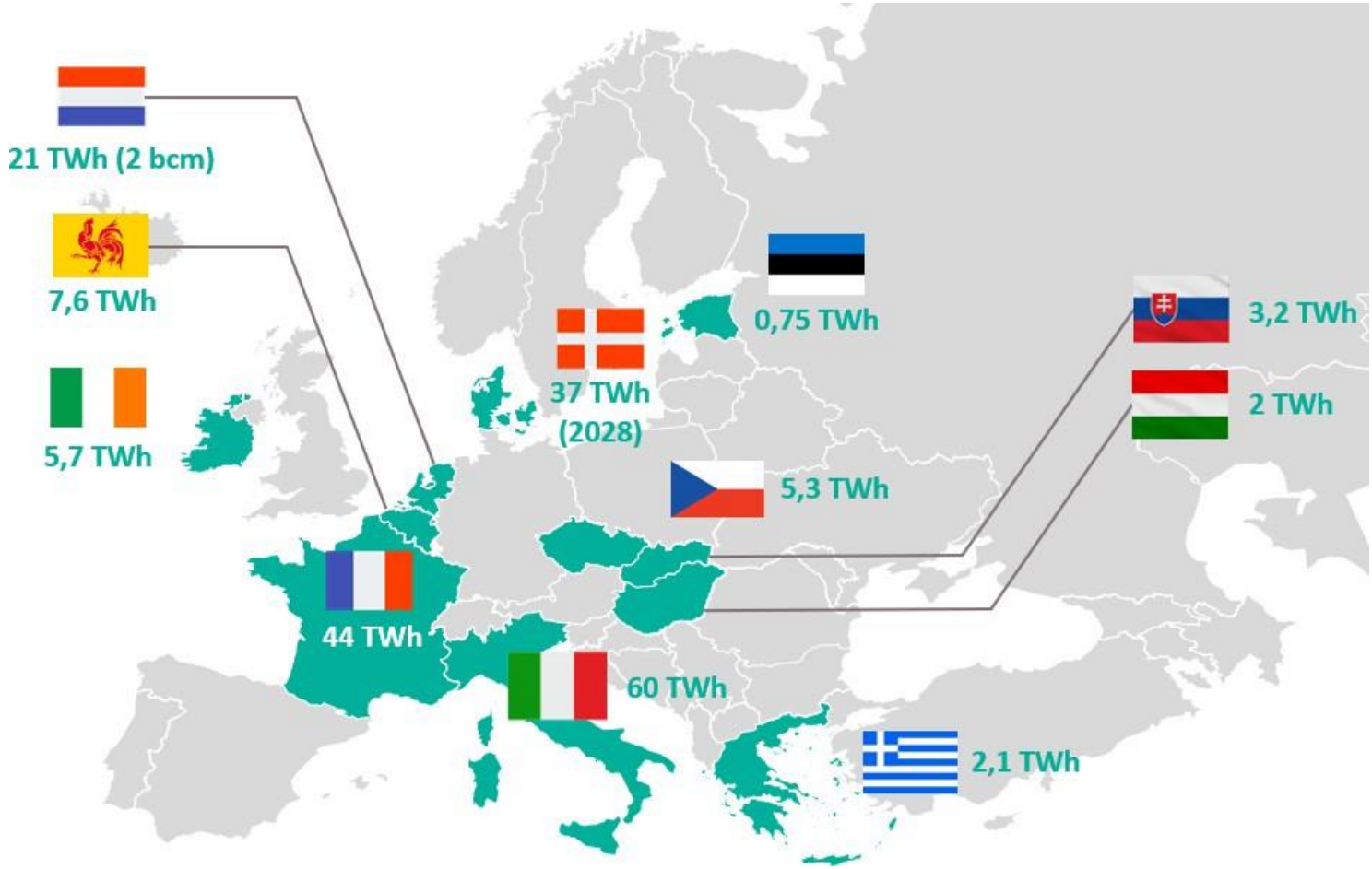
**This is also the target if the annual growth rate remains at 21%**

- Accelerated growth is needed to achieve the 35 billion m3 target

*Growth curves for biomethane in the EU-27*



# From 3 to 11 official biomethane targets in Europe




*Biomethane consumption or production targets formally adopted in government plans (January 2025)*

# Medium-term private investment forecasts

€27 billion in investments planned for biomethane

**6.3 bcm**
New capacity in Europe by 2030

**950**
New biomethane plants in the next 5 years

**Denmark, Poland and Italy are the 1st investment destinations**

# Synthetic biomethane will emerge in the coming years

## 195 gasification units in Europe

**Germany, France, Italy and Finland** are the countries with the most gasification plants

> 60% of operational plants in Europe are TRL ≥ 9

35 plant projects planned by 2030

## Use in cogeneration
## Timid appearance of the SNG

85% of the installations are used for cogeneration

only 8 produce synthetic natural gas (SNG)

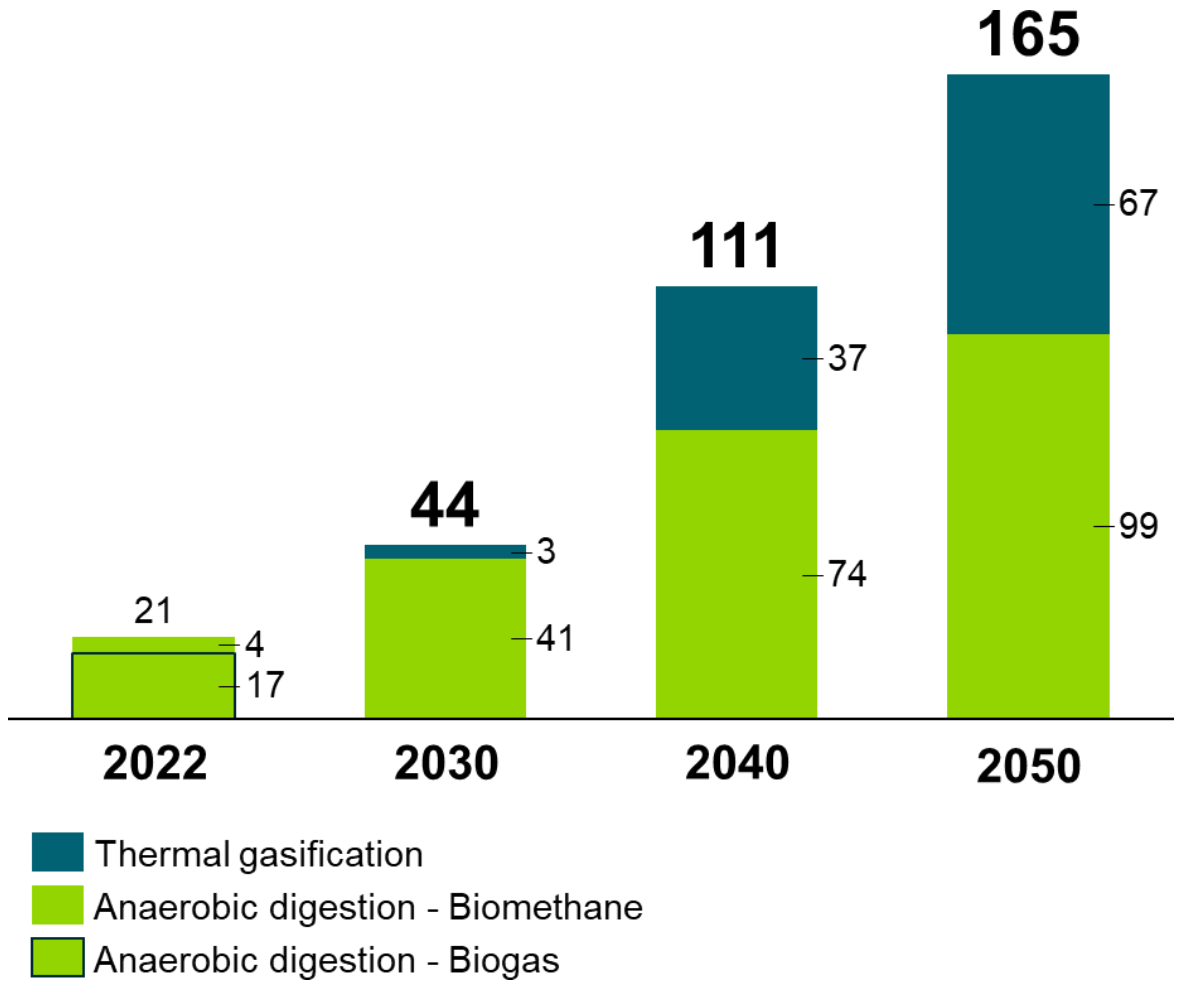
33 SNG development projects

*Source: EBA, Rapport Gazéification, 2024*

# Significant potential for increasing biomethane production by 2040 and beyond

## Potential for biomethane production in Europe

- 44 billion m3 by 2030
- 111 billion m3 by 2040
- 165 billion m3 by
- 2050



# The potential can be further increased through the deployment of new feedstocks and technologies, as well as through the use of landfill gas

## Raw Materials

### Digestate from anaerobic digestion

The digestate can be used to produce additional biomethane by hydrothermal gasification or pyrolysis, in specific cases.

### Marginal and contaminated land

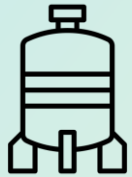
Significant potential for the production of bioenergy crops on underutilised land, without contributing to increased land-use change or compromising existing food production.

### Algae

Interest in using algae as a sustainable feedstock for biomethane production, while providing multiple co-benefits

## Technologies

### Hydrothermal gasification



Versatile technology capable of converting a wide variety of biogenic and fossil (wet) waste and effluents into biomethane and producing numerous co-products.

### Landfill gas

Existing landfill gas sites represent an important source of low-cost biomethane production in the short to medium term.

### Renewable methane


Renewable methane production can facilitate the integration of energy systems and help increase the overall yields of biomethane production.

# Consumer markets

*Varied use with increased transport*

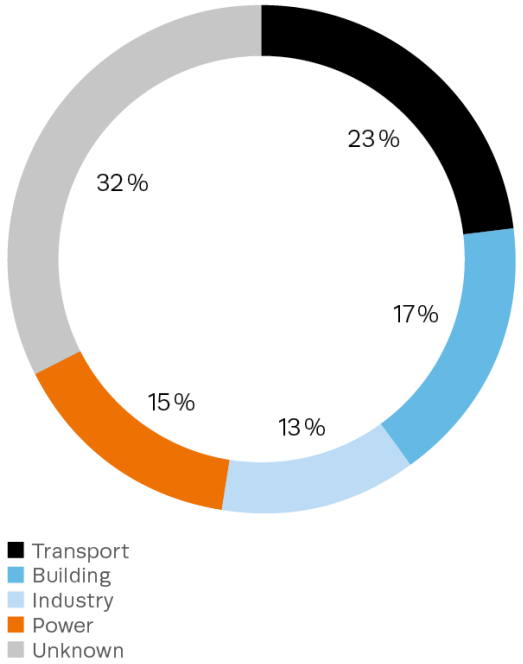
# Versatile use of a versatile fuel

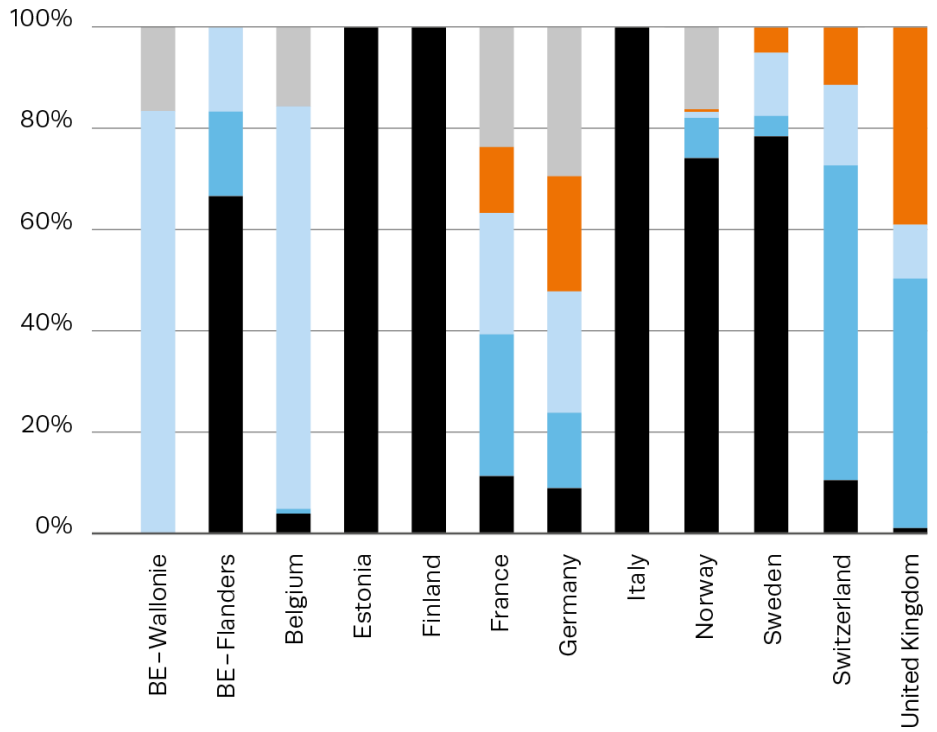
**End uses depend on the country**

Transport

Heating or electricity

*Percentage of biomethane production used in different sectors, overall (left) and by country (right)*



# Growing interest in bioLNG

**From 1.5 TWh to 21 TWh of production capacity in 5 years (2020-2027)**

**14 EU countries** produce bioLNG

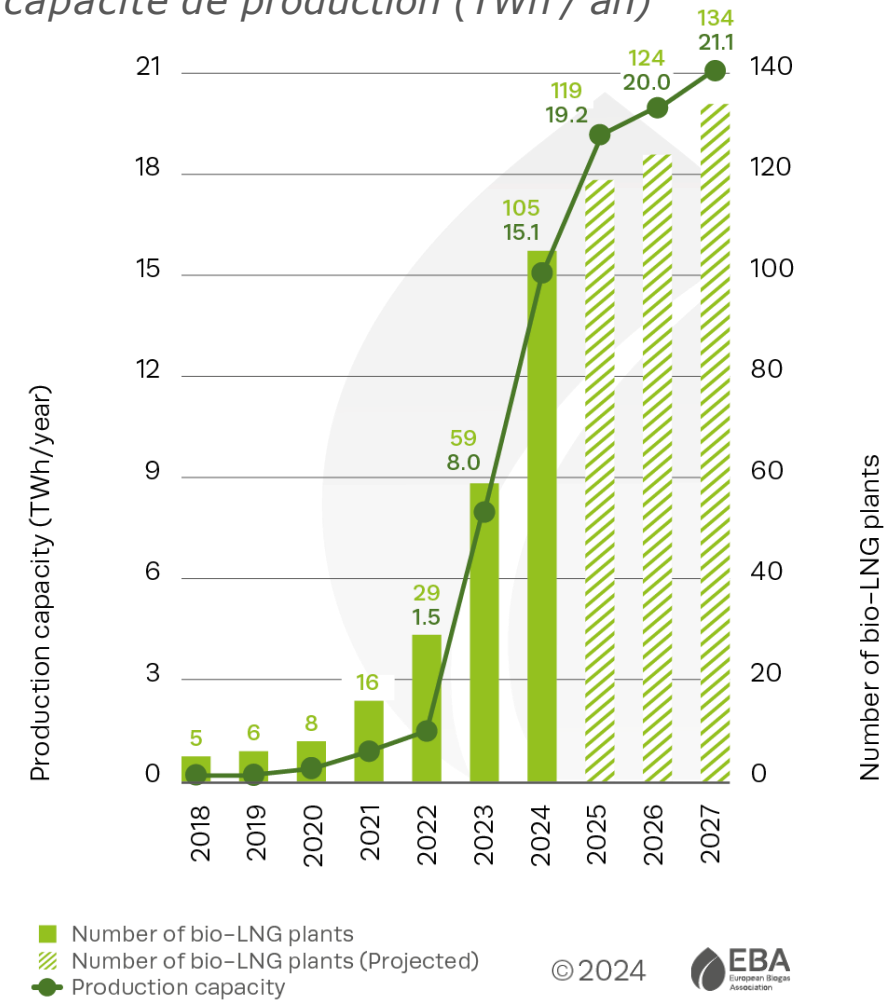
Belgium, Denmark, Finland, France, Germany, Italy, Netherlands, Norway, Poland, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

**Preferred road transport** for 80% of the bio-LNG produced in Europe

**Maritime transport in perspective for the 2030s**

- Led by EU regulation
- LNG adoption by carriers (>,470 LNG cargo ships in 2023; +540 planned)

*Évolution actuelle et future du nombre d'usines de bioGNL et de la capacité de production (TWh / an)*



# Policy and regulatory needs

# Opinions of industrial companies

Survey of 23 companies from 9 different countries as part of the project

# Biomethane Users' Declaration


**28** A Public Declaration signed by 28 (potentially) biomethane-consuming companies

**11** 11 requests to the new European Commission

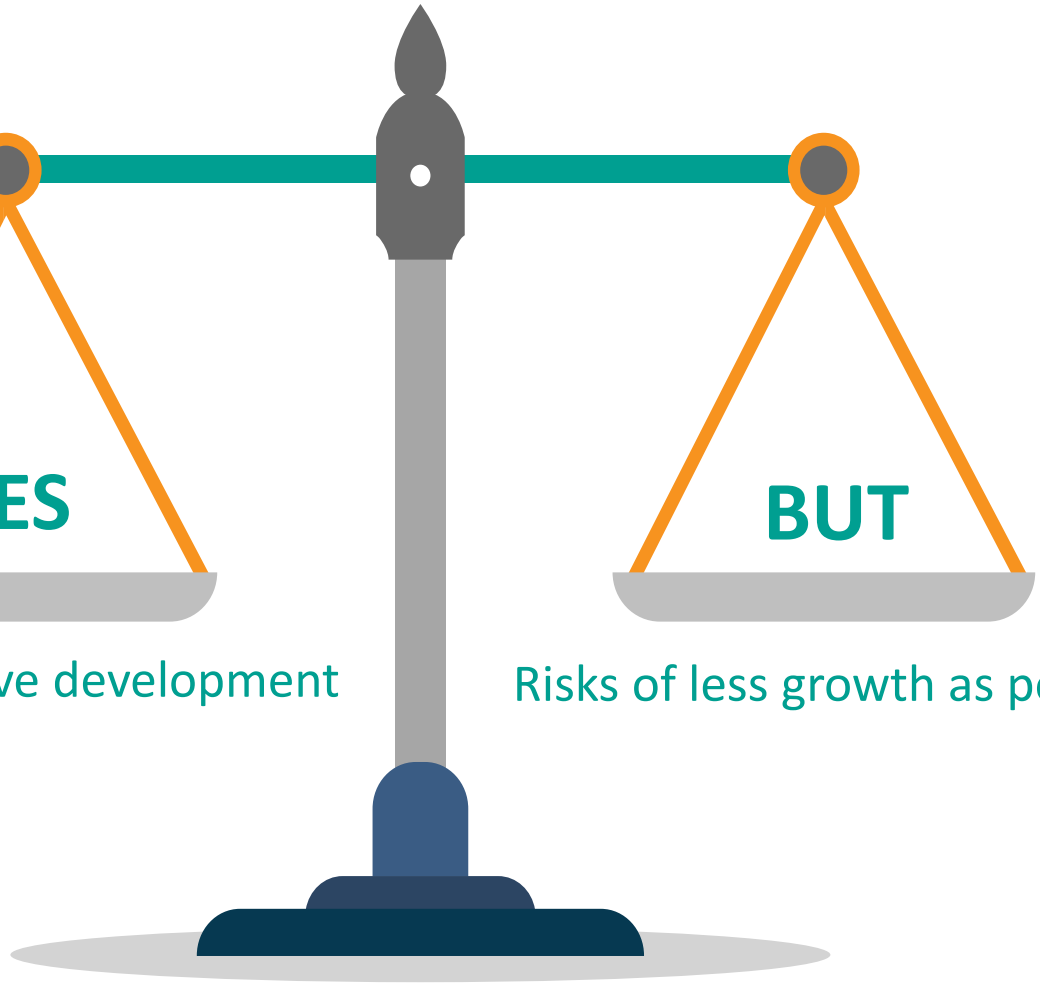
# Conclusion

*The 2020s, a decade of take-off?*

# Policy and regulatory : *market maker* or *showstopper*?

- From 30 to 50 TWh in 4 years
- 25 producing countries

- Significant but limited private investment
  6 bcm VS 15 bcm wanted by governments




Very clear positive development

Risks of less growth as possible

- Government forecast of 15 bcm in 2030
- Role of biomethane recognized, with 11 national targets
- Right to injection recognised at EU level

- Regulatory uncertainty
- Need for simplification
- Fragmented European market
- Technological neutrality

# Biomethane Offtakers Declaration for a Clean Industrial Deal

## A call for sustainable biomethane use in Europe

Get involved

biomethane-offtake-declaration.eu

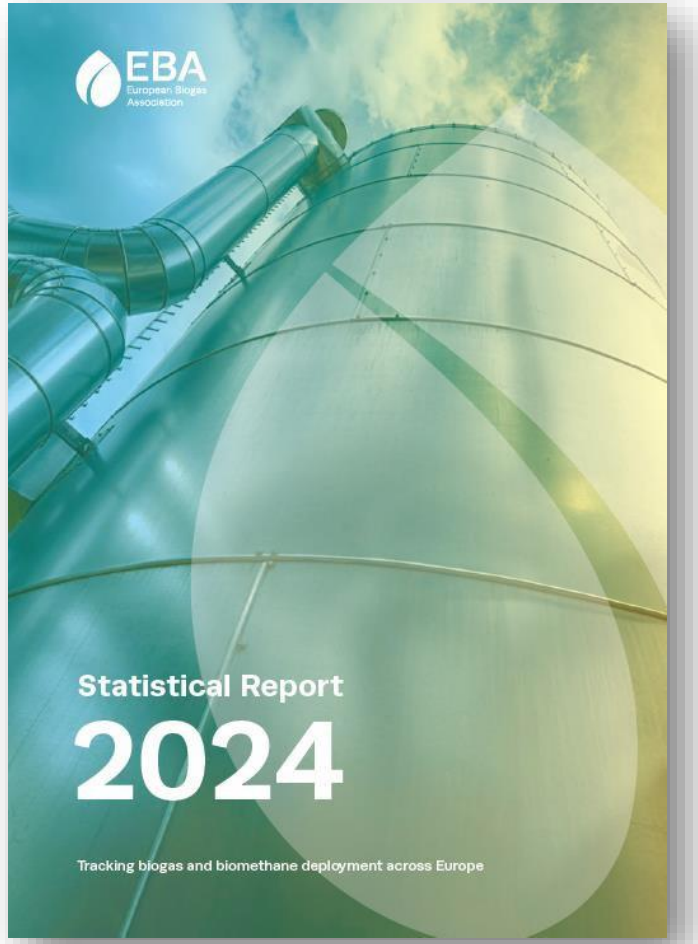
*Coordinated by European Biogas Association*

# Get the EBA Statistical Report 2024

The full report is available for free for all EBA Members and upon purchase for external parties.

Get the Report for free
(EBA members)

Buy the Report
(external parties)




For any questions, please contact us at info@europeanbiogas.eu

# European Biomethane Week 2025

## 13-17 October 2025

## European Biogas Conference: 14-15 October 2025

## Autoworld, Brussels

# Any questions?

At the heart of your energies

# Renewable gas introduction:

## France in Europe

Jean-Marc Le Gall

02/04/2025

# Renewable gases: A sustained momentum


- **Sustained biomethane growth in 2024**: 11.6 TWh injected (the equivalent of the production of **2 nuclear power plants**) through 731 Anaerobic Digestion sites
- Adaptation of gas networks: With the right to inject scheme, the development of reverse flow facilities is accelerating, with **29 reverse flows in service (+8 in 2024)** and more than 70 others in construction, in studies or identified in the master plan validated by the Regulator
- **Increased project dynamics**: +36% of new projects capacities entered into the capacity register in 2024 compared to 2023

# 731 sites injecting in gas networks at the end of 2024

622 agricultural sites

476 « autonomous »

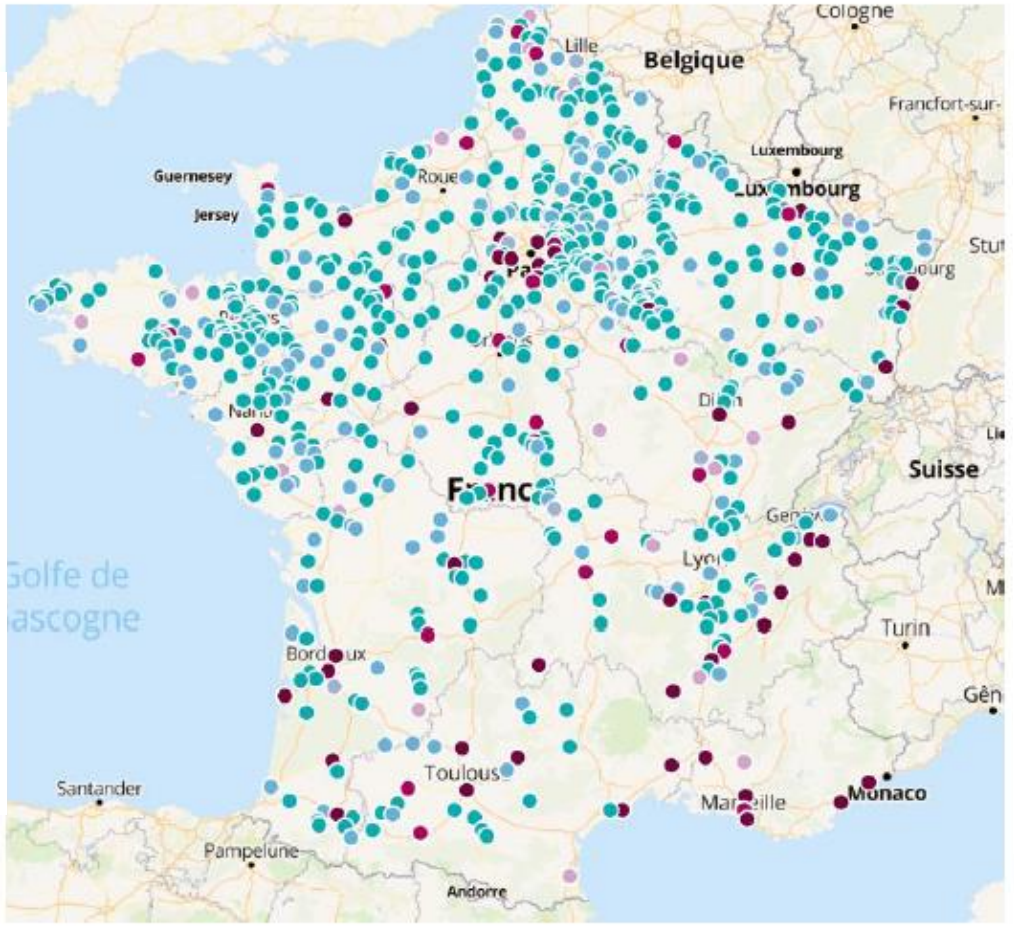
146 collective

8 households waste

24 non hazardous waste landfill

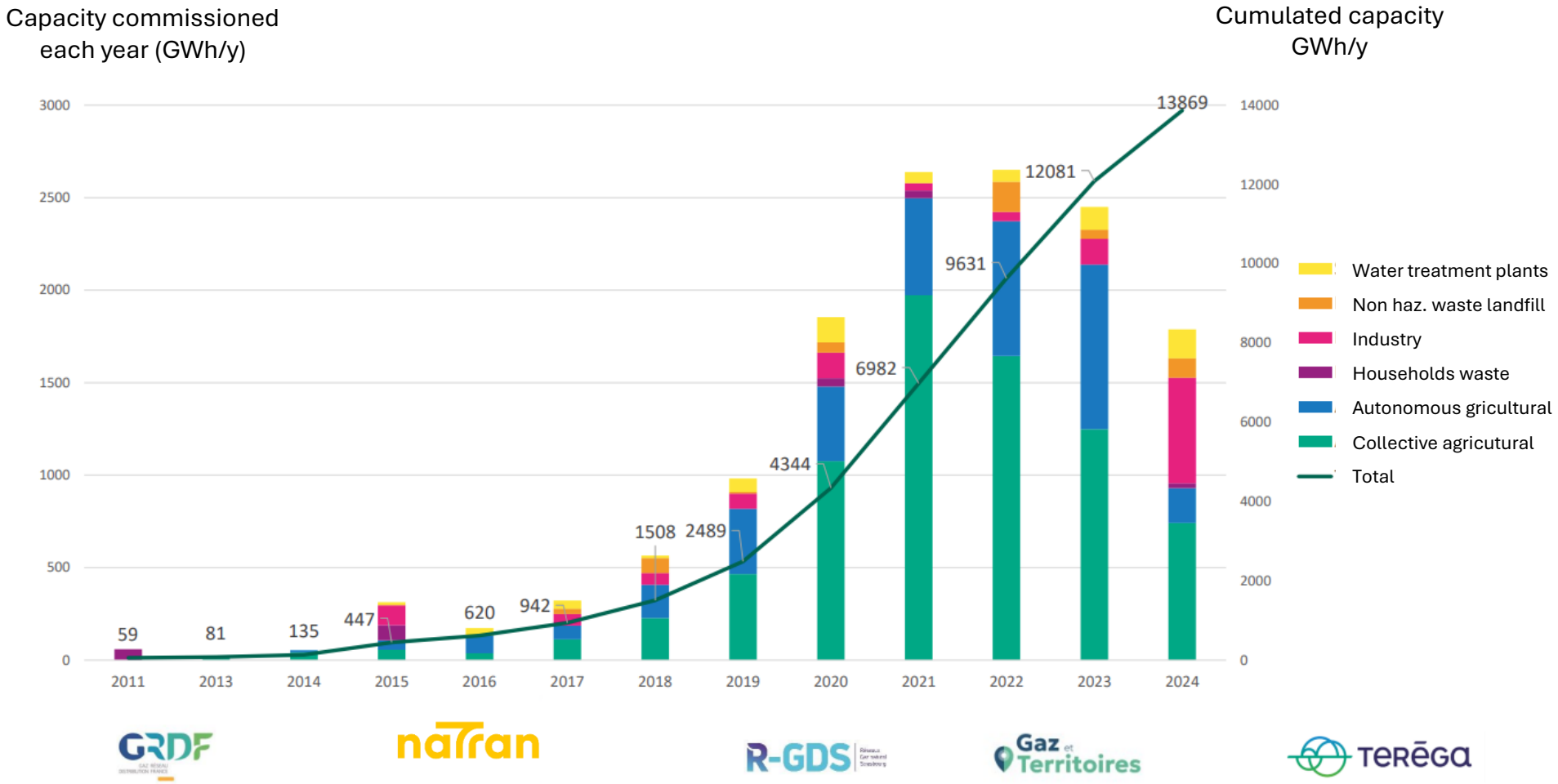
25 industry

52 water treatment plants



# Nearly 14 TWh connected by the end of 2024

## Connected capacity dy the end of 2024



# A mid-terme national production target achievable by mobilizing the various levers of support for AD, to be completed by the development of new technologies

**Target injected biomethane: 44 TWh 2030 and the upper limit of 79 TWh 2035 are achievable**

**Various levers to mobilize to achieve this trajectory:**

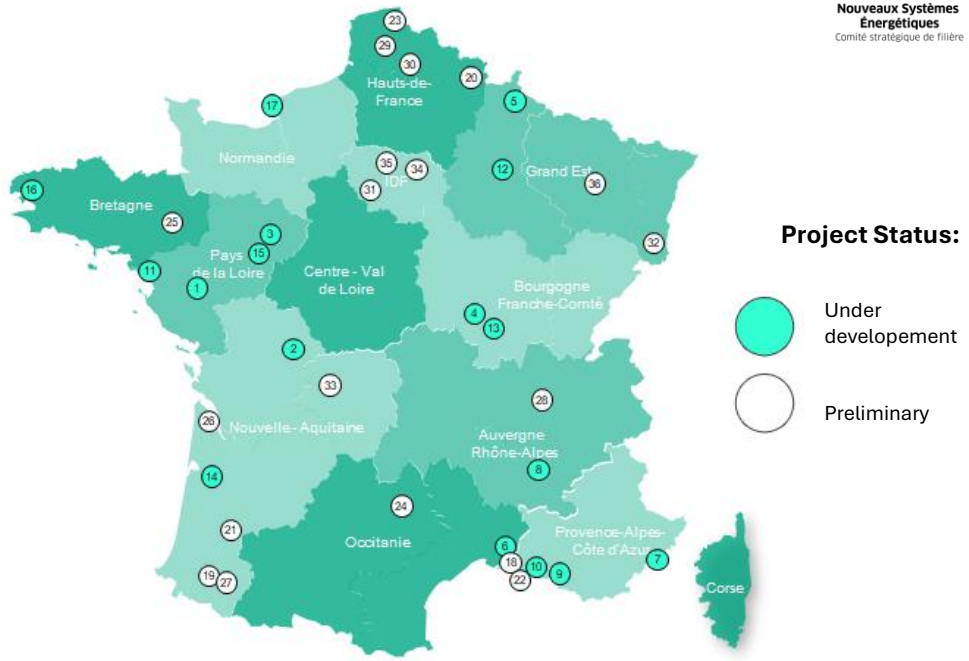
- Maintaining the feed-in tariff for sites <25 GWh/year
- Promoting the development of **larger sites by ensuring fair value sharing** between developers and farmers providing inputs
- Taking advantage of new sectors: the **growth of new technologies** will enable the complete decarbonization of gas in the long term
- Shifting from production support to **demand support**, once the technologies are mature:
  - Mechanisms to be strengthened: Obligations of incorporation mechanisms for residential and commercial buildings + mobility
  - Industry: Mechanisms remain to be invented to promote the use of biomethane in industry

# Innovative renewable gas production sectors: Thermal gasification in the starting blocks

- A technology that makes use of our **residual waste that is currently little or poorly recycled**: wood waste, solid recovered fuels (SRF), etc. Observation of under-use of installed SRF production capacities.
- NaTran has initiated a **partnership with FEDERREC** to work with recycling stakeholders with a particular focus on SRFs conversion into gas. This represents a major challenge in bringing energy and waste together.
- Natran animated a Call for Projects (through the National Energy Cluster) and made it possible to identify 49 projects enabling the recovery of approximately 1.3 Mt of residual waste, including 19 in the development phase.
- **The 6 most advanced projects are already registered** in the capacity register.

Thermal gasification projects identified through Natrans's Call for Projects

Nouveaux Systèmes Énergétiques
Comité stratégique de filière




13 confidential projects are not represented on this map

# Innovative renewable gas production technologies: Hydrothermal gasification also poised to emerge

- The Call for Expressions of Interest organized in 2024 with the National energy Cluster made it possible to identify 24 projects and demonstrated the capacity of this sector to industrialize.
- A specific capacity to enhance the value of inputs, particularly industrial ones, which are little or poorly valued

### Industrial Waste

**Agrifood**

Vinasse, grape marc, wheat residue, industrial sludge, etc.

**Chemicals**

Heavy distillation, glycerin, industrial sludge, etc.

### Municipal Waste

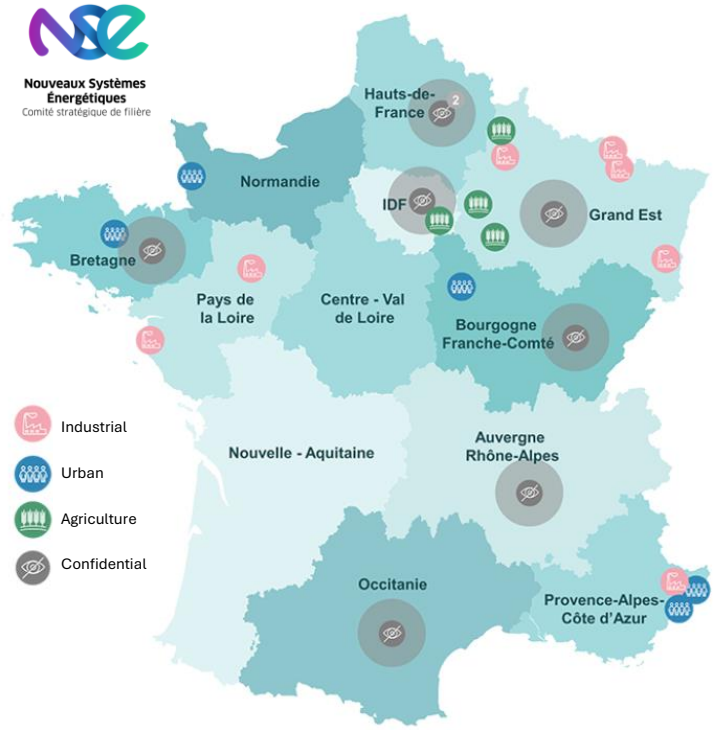
Sludge from sewage plants

Grease, biowaste, pulp, etc..

### Agriculture residues & waste

Digestates but also manure, biowaste, straw, grape marc

Hydrothermal gasification projects identified through Natrans's Call for Projects



# Any questions?

At the heart of your energies

# Decarbonisation strategies:

## Industrial testimonials

**Pierre-Yves Menet, *Constellium***
**Nicolas Créon, *L'institut du verre***
**Catherine Daudon, *Placo Saint-Gobain***

02/04/2025

# Decarbonisation strategies

Animated by

**Sylvie JADOUL**
Decarbonation of industrie's expert, NaTran

**Pierre-Yves MENET**
Casting and Recycling group manager, Constellium

**Nicolas CRÉON**
Environnement manager, L'institut du verre

**Catherine DAUDON**
Energy Process manager, Placo Saint Gobain

# Any questions?

natran
At the heart of your energies

# Decarbonisation strategies:

## White paper « Decarbonizing industry with gas solutions»

**Sylvie Jadoul**
**Jean-Victor Rotger**

02/04/2025

# A complete white paper to discover and study gas solutions:

LES MATINALES de Francegaz

Thursday, 20th March – 10h am > 11h30 am

**First presentation of the white paper: "Decarbonizing Industry with Gas Solutions"**

Francegaz natran GRDF

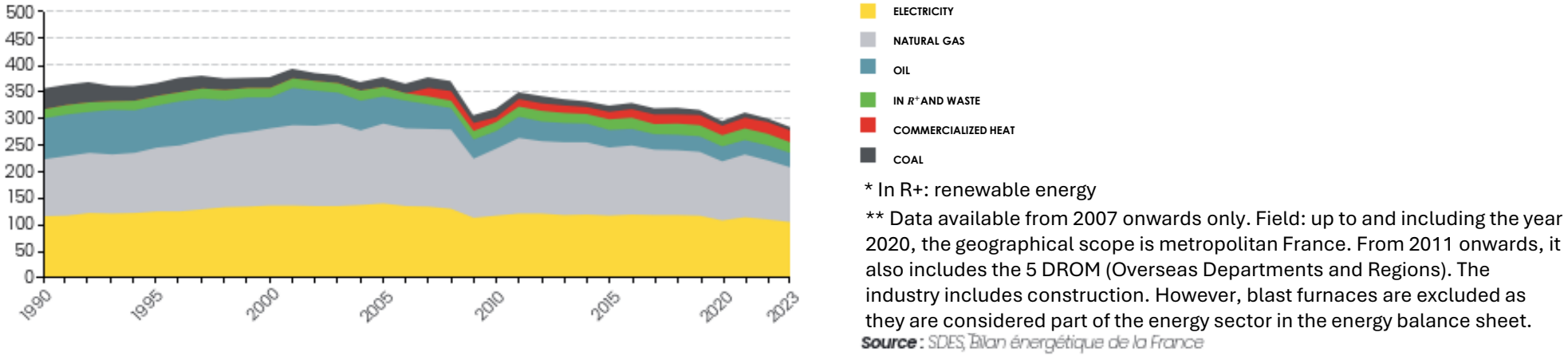

https://www.natrangroupe.com/medias/actualites/livre -blanc-decarboner-lindustrie-solutions-gaz

# Gas energy, an adapted and relevant energy for industry

## Electricity and gas remain the 2 predominant vectors in industry

INDUSTRY : 283 TWH EN 2023 (CORRECTED DATA ON CLIMATE VARIATIONS)

In Twh (corrected data on climate variations)




* In R+: renewable energy

** Data available from 2007 onwards only. Field: up to and including the year 2020, the geographical scope is metropolitan France. From 2011 onwards, it also includes the 5 DROM (Overseas Departments and Regions). The industry includes construction. However, blast furnaces are excluded as they are considered part of the energy sector in the energy balance sheet.

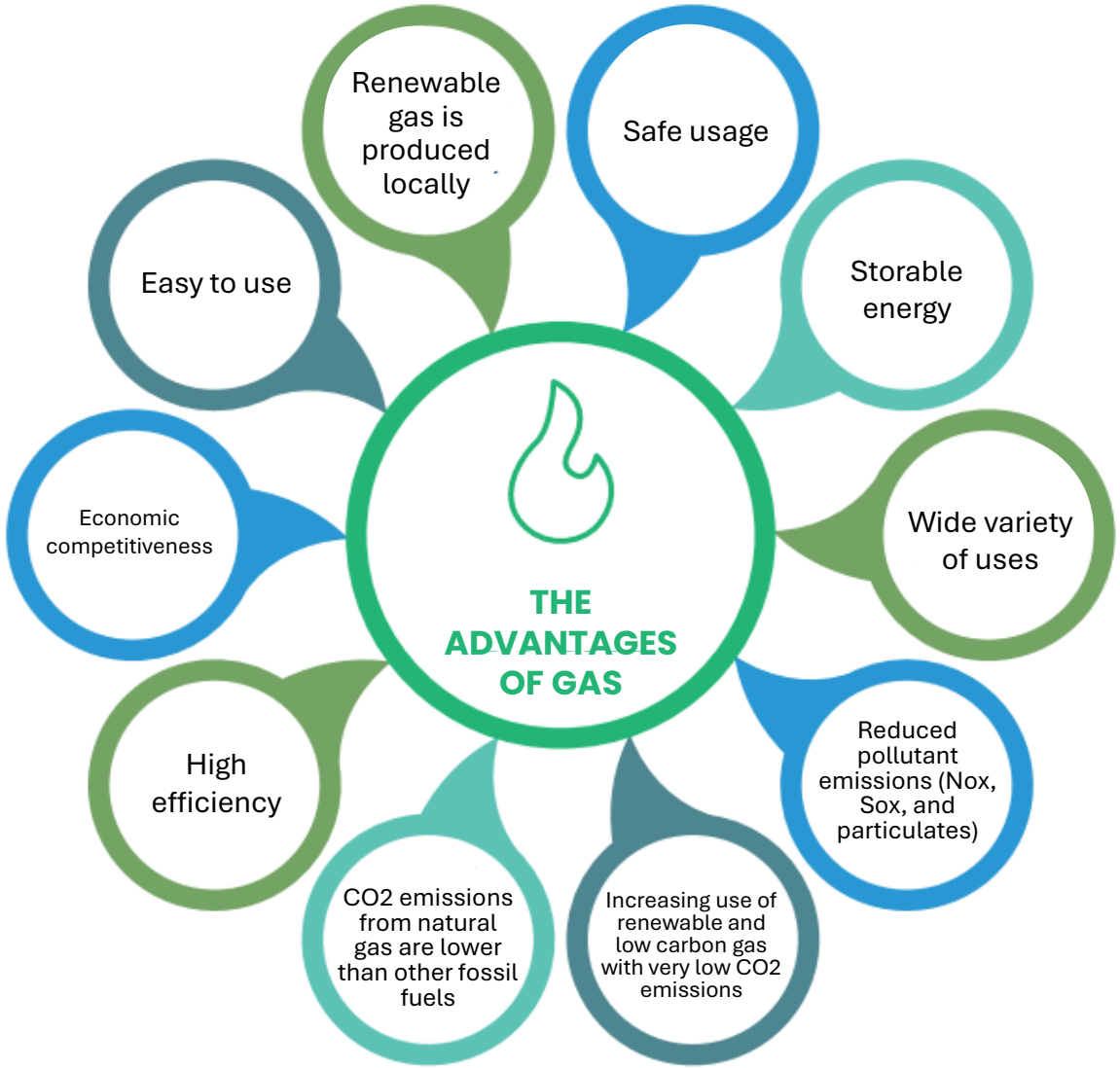
**Source :** SDES, Bilan énergétique de la France

Source : *Consommation finale d'énergie par secteur et par énergie | Chiffres clés de l'énergie – Édition 2024 (developpement-durable.gouv.fr)*

## Three main uses of gas in industry

- Low-temperature use: gas is used as fuel, especially for boilers (mainly to produce steam).
- High temperature use in furnaces (melting, firing, holding, processing, etc.).
- Use as a raw material.

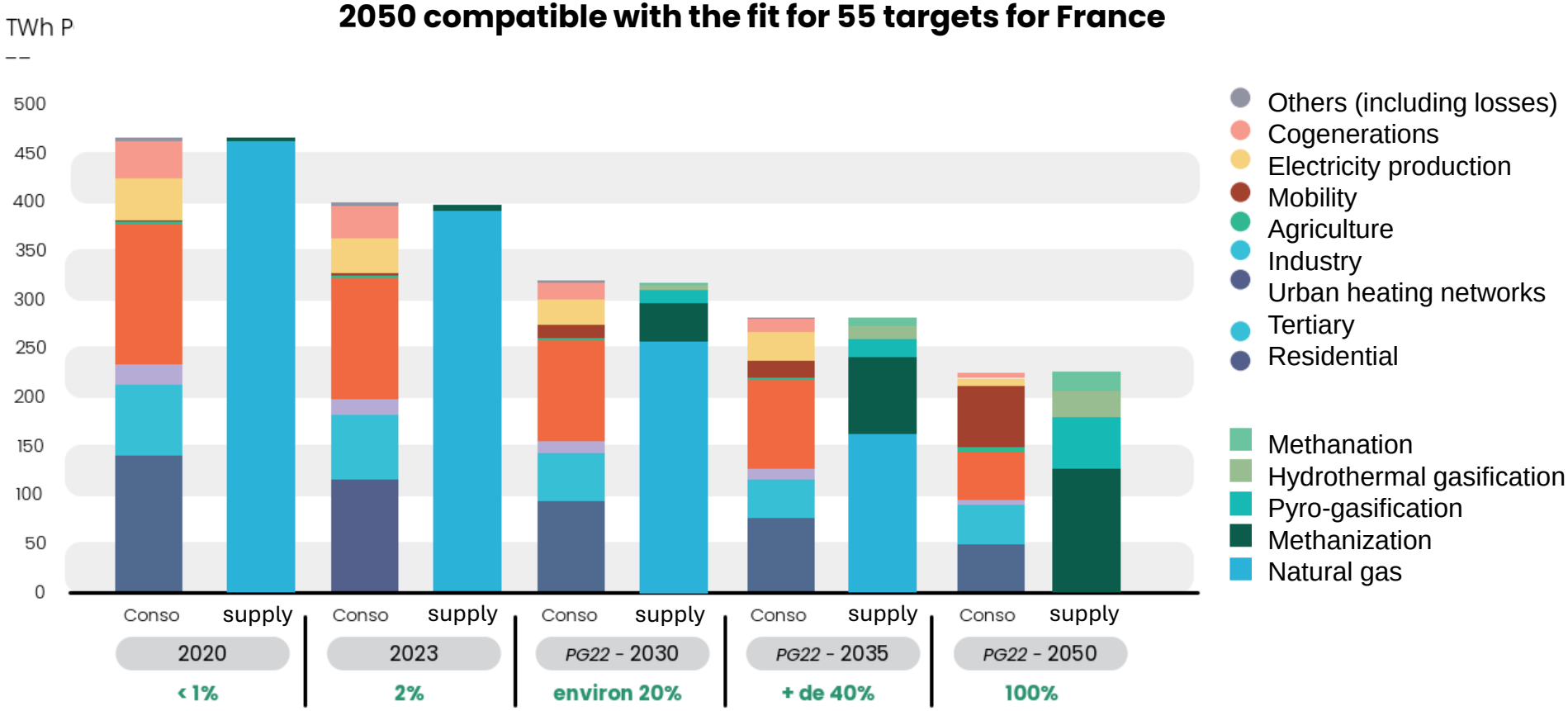
# 10 good reasons to choose gas and green gas



# What is the role of gas in 2050?

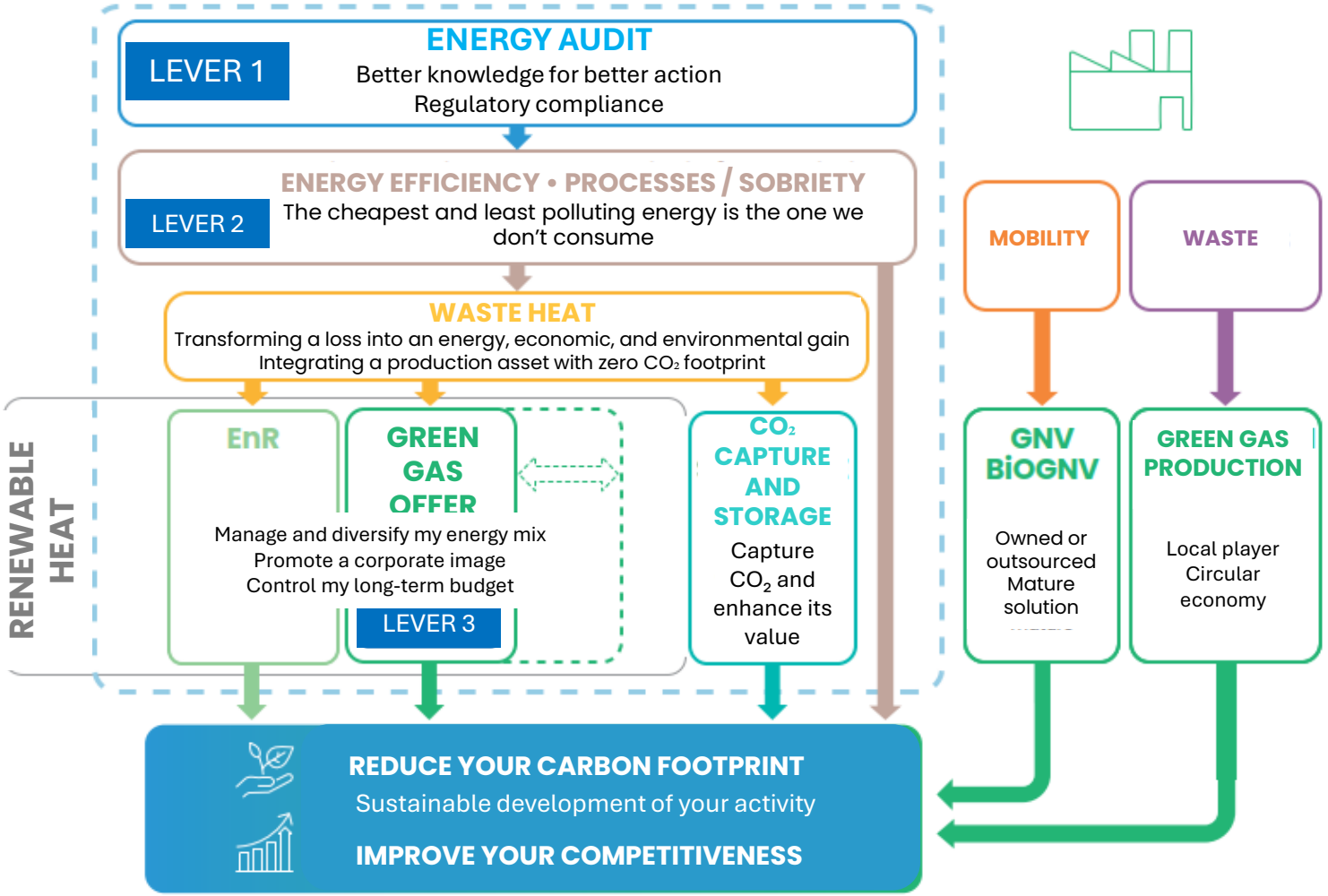
## Scenario compatible with Fit For 55

**Gas outlook – Gas consumption and supply between 2020 and 2050 compatible with the fit for 55 targets for France**



# Levers to drastically reduce fossil CO2 emissions in industry

## The gas vector at the service of energy control



# Announcement of the next events around the different levers.

Thematic and technical webinars (1h) from the levers of the white paper

- June 17, 2025 at 11 a.m. = Sobriety, energy efficiency and waste heat recovery
- September 16, 2025 at 11 a.m. = Renewable energies, green gases, how to integrate them into your mix
- December 9, 2025 at 11 a.m. = CO2 Capture, Storage and Utilization (CCUS) and Ch0C boiler
- February 2026 = NGV (natural gas vehicle) en bioNGV

# Our experts committed to your side

## Are you an industrial company connected to the network managed by NaTran?

https://www.natrangroupe.com/en/you-are/customer/Industrial-consumer

**Your Contacts :**

### Guillaume Bannier

Rhône Méditerranée territory

*Departements concerned: 01, 03, 04, 05, 06, 07, 13, 21, 25, 26, 30, 34, 38, 39, 42, 43, 58, 63, 69, 71, 73, 74, 83, 84, 89*

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### Agathe Lesigne

Centre Atlantique territory

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Immeuble Crystal Place Vauban La Madeleine 59777 Euralille

# Any questions?

At the heart of your energies

# Decarbonation Strategies :

## The « CH0C » project, development of a low carbon oxycombustion boiler for industry

**Pauline Plisson,**
**Naldéo**

02/04/2025

# THE "CH0C" PROJECT – DEVELOPMENT OF A LOW CARBON OXYCOMBUSTION BOILER FOR INDUSTRY

## Presentation by Naldeo, leader of the Ch0C consortium

« Imagine & Undertake
Technical excellence at the service of the climate"


Naldeo

# NALDEO – TECHNICAL EXCELLENCE AT THE SERVICE OF THE CLIMATE

*Naldeo is an independent ETI engineering and consulting company specialising in the field of ecological transition, whose motto is "**Technical excellence at the service of the climate**".*

*The Naldeo Technologies & Industries entity is the result of a spin-off at the end of 2020 from the Energy Environment department of Bertin Technologies.*

**+250**
**EMPLOYEES**

**25 Million**
**IN REVENUE**

**20** **PROJECTS / YEAR ABROAD**

**ISO 9001**
**ISO 14001**
**ISO 45001**
**ISO 50001**
**Certification MASE**
**Qualimétha**
**OPQIBI**

bpifrance EXCELLENCE

accélérateur Transition Energétique

ADEME Club ADEME International

France Innovation

Nouveaux Systèmes Énergétiques
Comité stratégique de filière

# TRAINING: THE INSTITUTE FOR CLIMATE TRANSFORMATION

**In 2023, Naldeo and ECAM LaSalle launched the Climate Transformation Institute, dedicated to the transmission of operational skills to companies committed to the decarbonization of their activities:**

[www.instituttransformationclimat.com](http://www.instituttransformationclimat.com)

## APPREHEND

The major climate challenges through the European taxonomy

## DEVELOP

Your energy, hybrid, and environmental performance, and the development of your climate action plans

## RELY ON

Lean problem-solving (practical tools and methods) to achieve concrete operational results

## TAKE ADVANTAGE

of peer exchange time to share and identify best practices currently in use in your business environments

Naldeo also designs tailor-made training modules (references: BPI France's SME Decarbonization Accelerator, GRDF, ENSTA, Arts & Métiers, Middlenext, etc.)

# REFERENCES – INNOVATION & CONSULTING DEPARTMENT



- **Carbon Footprint ® and Life Cycle Assessments**(ACV) d'entreprises et produits
- **Decarbonisation trajectory of multinational companies** (industry, services and retail) aligned with the Paris Agreement (+1.5°C)
- **Evaluation of new technologies for investors**(Fields: bioenergy, energy storage, hydrogen, green mobility, negative emissions, etc.)
- **Support for the industrialization of innovations of** numerous start-ups (charging stations, e-fuels, CO2 recovery, recycling, etc.)
- **Engineering studies** for the design of a pilot plant for CO2 capture and recovery (CCUS)
- **Realization of a methanization pilot**, from the preliminary design to the delivery of the demonstrator, its commissioning and on-site acceptance
- **Support for the design** of a 5th generation heating and cooling network, a pioneer in terms of the integration of renewable energies and intelligent heat demand management (EPA Paris Saclay)
- **AMO for the design** of the largest French battery electricity storage project, remunerated on the flexibility markets

**THEY TRUST US**

AIR LIQUIDE, ALBIOMA, AMARENCO, AMUNDI, CMA CGM, EDF HYNAMICS, ELYSE ENERGY, GRDF, NATRAN, GTT, MERIDIAM, SWEETCH ENERGY, TILT CAPITAL, TOTALENERGIES, VALLOUREC, VOLTALIA

# CH0C : LOW CARBON OXY-COMBUSTION BOILER

**Client :** **Consortium Ch0C**

*This project is funded by the State as part of the France 2030 plan operated by ADEME.*

*A solution to decarbonize industrial steam!*

## The Consortium partners

Fabricants : Babcock Wanson, Naldeo, Verdemobil Biogaz, fives, ENGIE Solutions, VSPU

Financeurs : natran, TotalEnergies, GRDF

Observateurs : carboneo, EIFFAGE Energie Systèmes MECI, agro Mousquetaires, Coca-Cola Europacific Partners, Bonduelle, AGRIAL, Constellium, Université Paris Cité

## Issues

Industrial boilers for "steam and hot water" use account for about 20% of the CO2 emissions of the industrial sector in France.

They emit nearly 19 Mt CO2/year (including 12 Mt CO2/year for Natural Gas).

=> Need to develop a decarbonization solution for this sector!

## Innovative solution

Launch the manufacture of a 3 MW industrial demonstrator of a low-carbon boiler operating in oxy-combustion, and coupled with a CO2 capture unit.

Oxy-combustion improves the energy efficiency of the process and facilitates the capture of CO2 with highly concentrated CO2 fumes.

*=> the explanation in video!*

## Naldeo activity

Naldeo is the technical leader of the Ch0C Consortium and responsible for Basic Design, supervisor realization, and performance synthesis

# THE FIRST CH0C BOILER UNDER MANUFACTURE - JANUARY 2024 IN NÉRAC (BABCOCK-WANSON PLANT, LOT-ET-GARONNE)

# AN INDUSTRIAL DEMONSTRATOR UNDER CONSTRUCTION IN VILLERS-ST-PAUL IN THE OISE DEPARTMENT

## Main challenges to be solved

- **Technical and environmental:**
  - o Specific development of an oxy-combustion burner associated with FGR recirculation :
    - o Limiting NOx and CO emissions
    - o Ensure flame stability/quenching effect
    - o Guarantee the resistance of the materials (higher temperature and O2 content
    - Gas efficiency of the boiler => Efficiency/PCI targeted: 98%
    - CO2 recovery => Target rate: 95%
    - Regulatory: Need to adapt to the specificities of Ch0C discharges
    - Human: Multi-partner coordination / technical and commercial objectives of each

## Current Progress

Delivery of boiler, burner, gas supply gantries this summer
Civil engineering and integration / mechanical, electrical and automation works in progress
Commissioning is scheduled for the end of 2024, then test campaigns in 2025, followed by marketing!


# The boiler (Ch0C), a future tool to decarbonize your steam and hot water uses in industry.


**Contacts :**

Pauline Plisson – Director of Innovation pauline.plisson@naldeo.com

Florian Lagrange – Project Manager Ch0C florian.lagrange@naldeo.com

# Any questions?

At the heart of your energies

# Conclusion

François Lacourt

02/04/2025

Les
RENDEZ-VOUS
CLIENTS naTran

VERS UN AVENIR
ÉNERGÉTIQUE DÉCARBONÉ

**Jeudi**

**3**

**avril**

9h00 – 17h00
Workstation
Paris 1er

# Thank you