PROJECT LED BY:

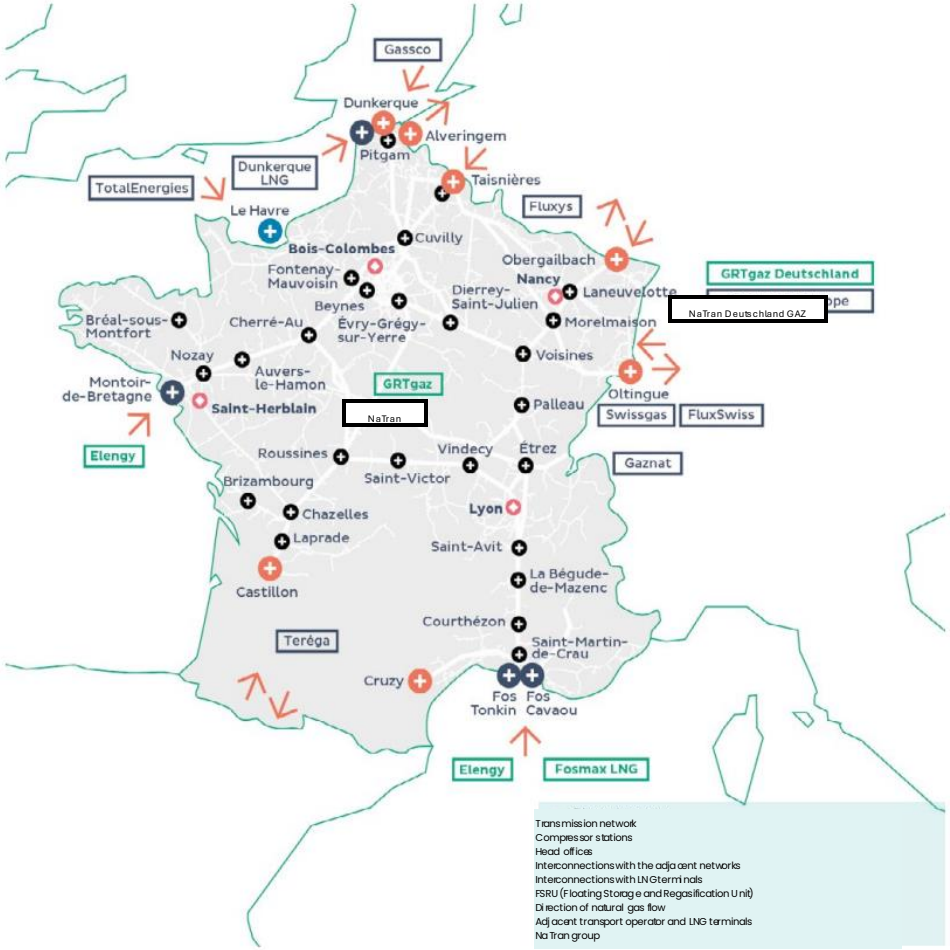
PROJECT SUPPORTED BY:

Welcome on the Jupiter 1000 project

First industrial Power-to-Gas demonstrator in France

February 2025 version

Quick overview of NaTran



NaTran group, it's :

- A regulated Transport Compagny
- 3 859 employees
- 33 795 km length of pipeline network
- 32 compression stations
- 588 TWh/year of gas transported in 2024
- 172 shipping customers,
- 688 active industrial customers,
- 18 connected distribution network operators

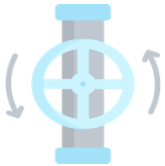
** Figures at the end of 2024*

Power-to-Gas : heart of an integrated strategy for Energy Transition

Power Grid support

- **Give a value** to electric surpluses, due to intermittent renewable production
- Support **power grid stability**, and help to **manage congestions**
- **Energy system optimization**

Gas Grid decarbonization



- **Get ready** to welcome **renewable gas** from our customers
- Replace fossil with **renewable** (H2 or synthetic methane)

- Capture and **recycle CO2**

Produce Gas locally

- Replace imports with **local production**

- **Reduce energy dependancy** of the country

- Develop **technological exports** and **local employment**

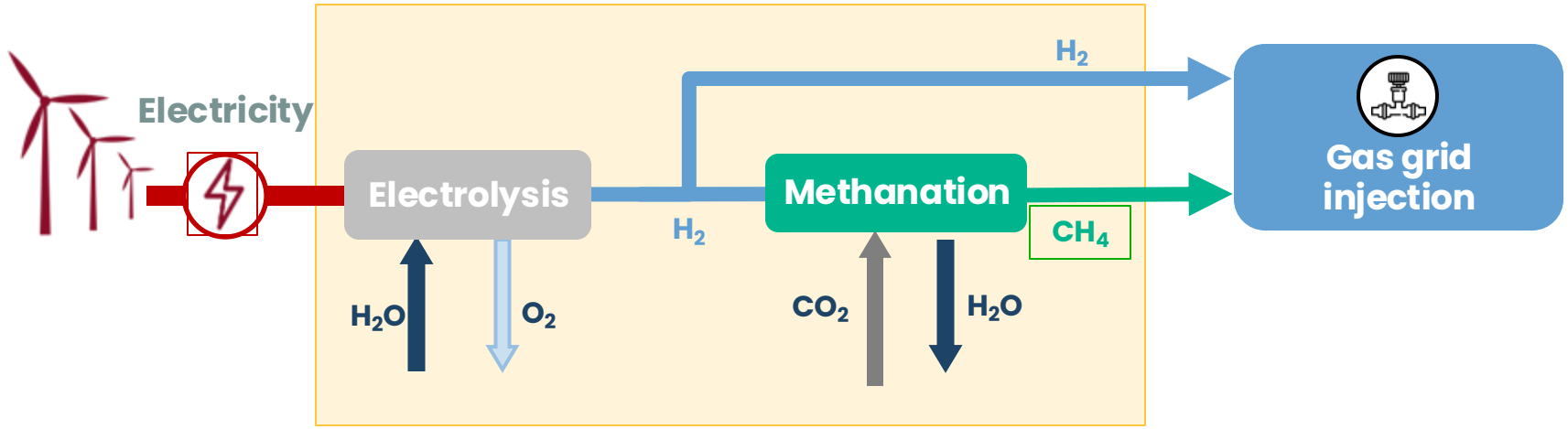
A strategy of grid integration at a country level, and the aim of global efficiency

From Power … to Gas !

JUPITER1000 by naTran

Hydrogen and synthetic methane are opportunities to decarbonize gas grids

Power-to-Gas / Jupiter 1000 process



$2\ H_2O \rightarrow 2\ H_2 + O_2$

$4\ H_2 + CO_2 \rightarrow 2\ H_2O + CH_4$

The plant is fully compatible to the strategy of renewable gas development : Hydrogen and synthetic methane

Jupiter 1000 project

JUPITER1000 by naTran

Our R&D objectives

1. **Learn** — *Power-to-Gas and technologies*
2. **Evaluate & Improve** — *Performance, safety, environment & economic benefits*
3. **Demonstrate** — *Use of Power to Gas to store energy via the gas transport grids*
4. **Promote** — *Large scale Power to Gas development*

Our R&D activities

Equipment Performance

- ❑ Mesure **performance of technologies**
- ❑ Test **distant control**
- ❑ Estimate **environment & economic benefits**

Reliability

- ❑ Learn from **operational experience**
- ❑ **Avoid failures** / anticipate consequences
- ❑ Control **degradation of equipment**

Hydrogen Impacts

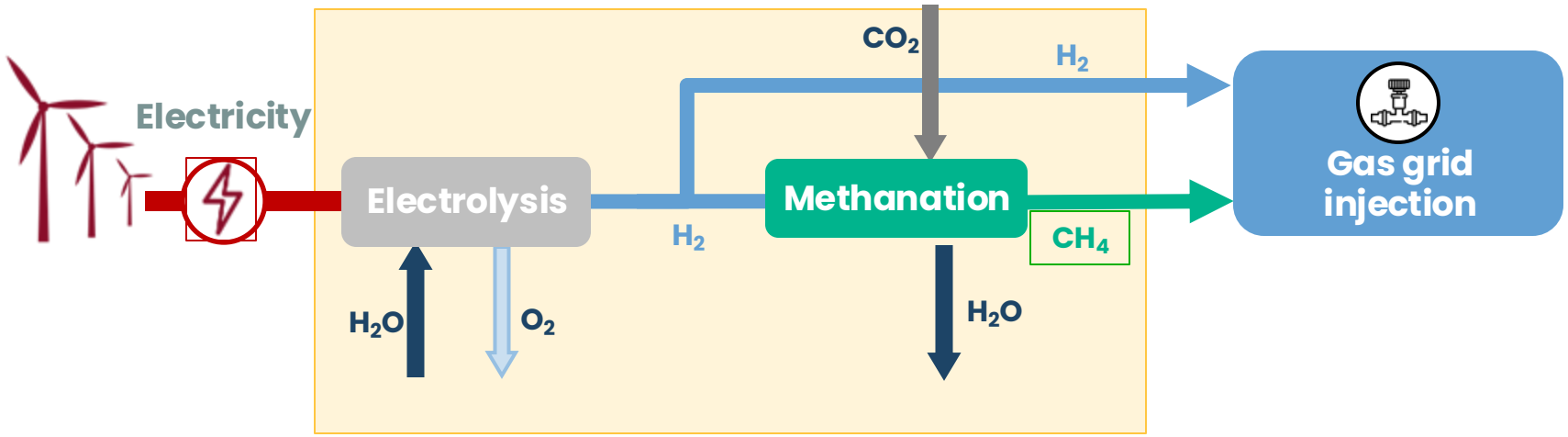
- ❑ Check impacts on **equipment**
- ❑ Check impacts on **pipelines**
- ❑ Check impacts on **industrial customers**

State of the art & Good practice

- ❑ Identify **technological tendencies**
- ❑ Provide **learning elements**
- ❑ Promote **good practice on safety topics**

Best mean to convince is to go from concept to real experience

Collaboration of 9 industrial partners



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1 MW$_e$ for 2 électrolysers

200 m³/h of hydrogène

2 % H2 rate … **Max 6 %**

25 m³/h of CO2

25 m³/h of e-methane

Collaboration of 9 industrial partners

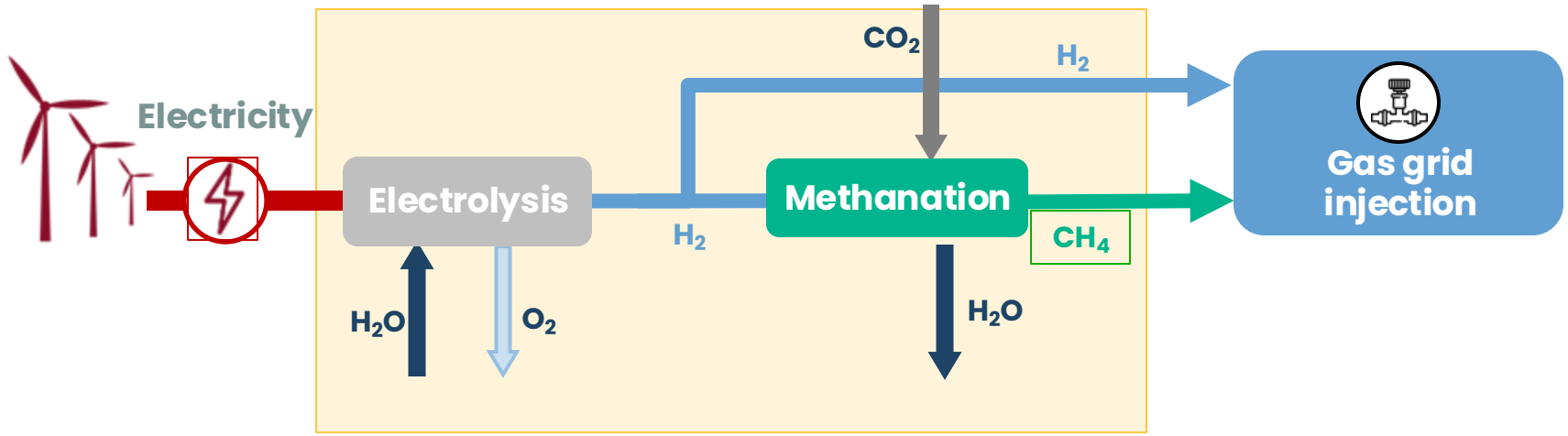
Power producer

Power grid operator

Electrolysis manufacturer

CO2 capture unit manufacturer

Gas network Operators



Support

Harbour developer

Methanation manufacturer

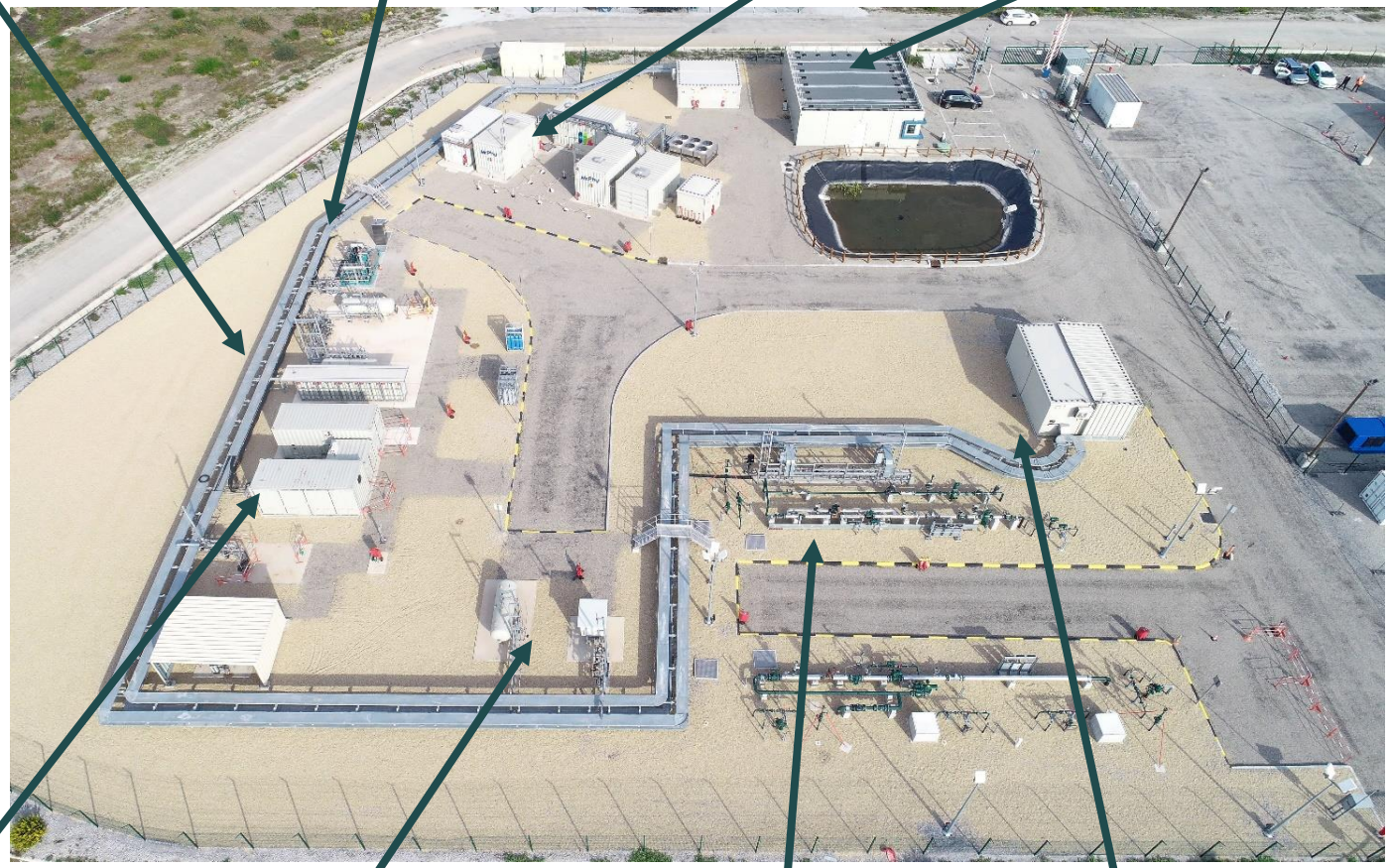
1 MW_e for 2 électrolysers

200 m^3/h of hydrogène

2 % H2 rate … **Max 6 %**

25 m^3/h of CO2

25 m^3/h of e-methane


H_2 Storage
H_2 Compression
Electrolysers
Control Room
Methanation
CO_2 Compression
Mix and Injection plant
Gas Analyse

An environment supportive for innovative projects

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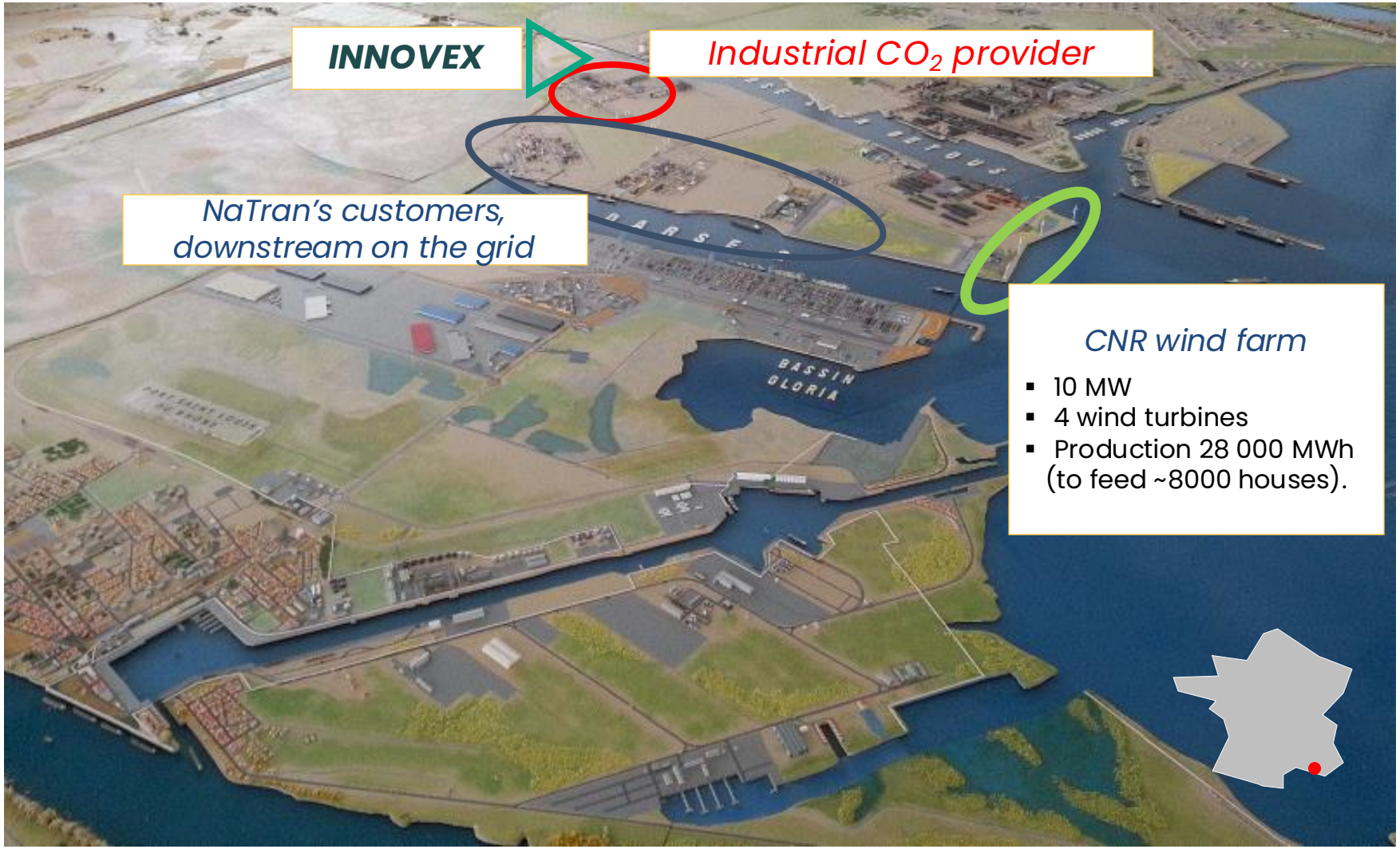
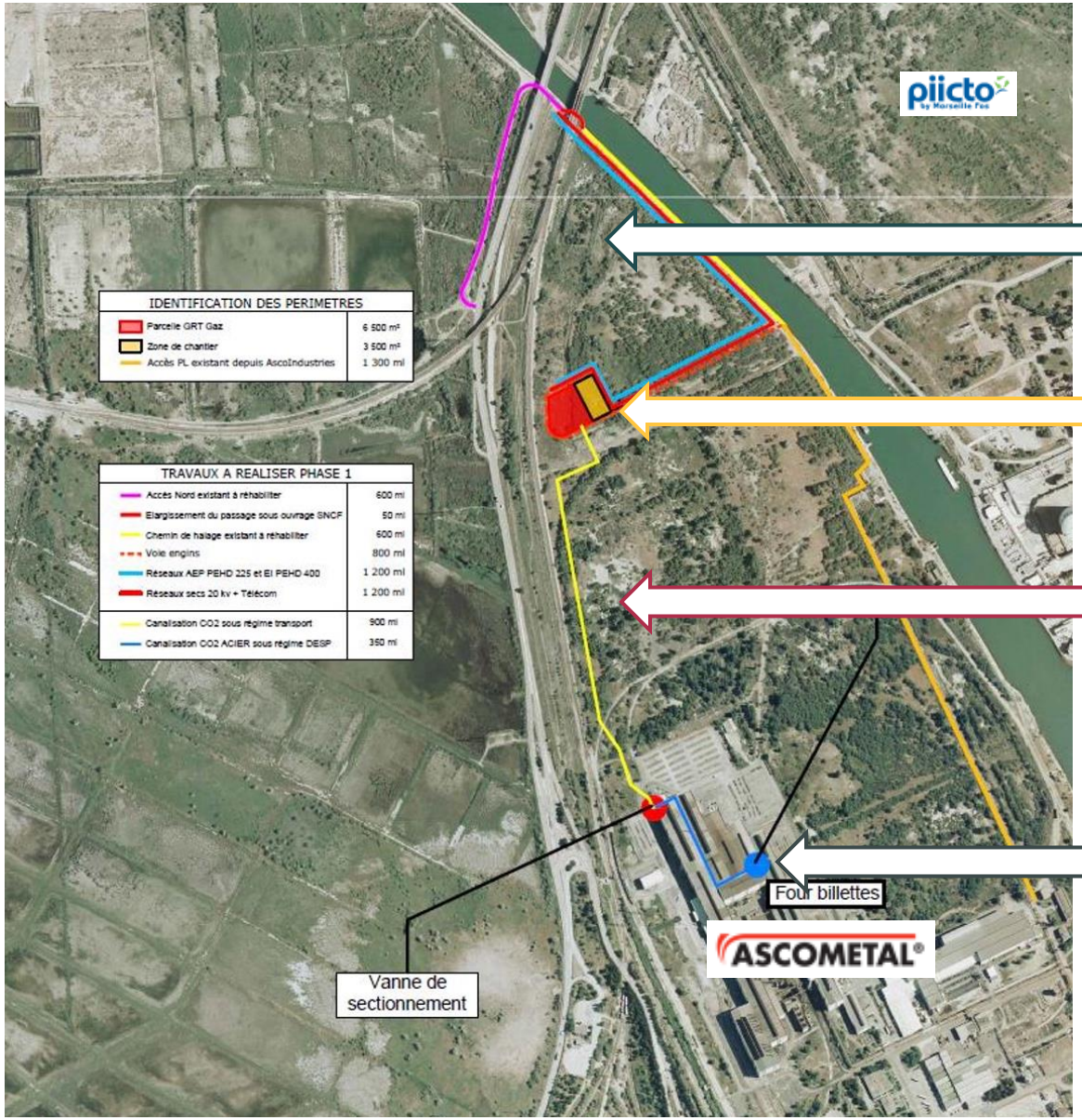
The project is developed on the INNOVEX platform, to increase synergies with the industrial neighbourhood



Jupiter 1000 collaborates with industrial customers

CO_2 Capture
CO_2 pipeline



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Innovex Platform

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CO2 Pipeline

CO2 Capture

The situation today …

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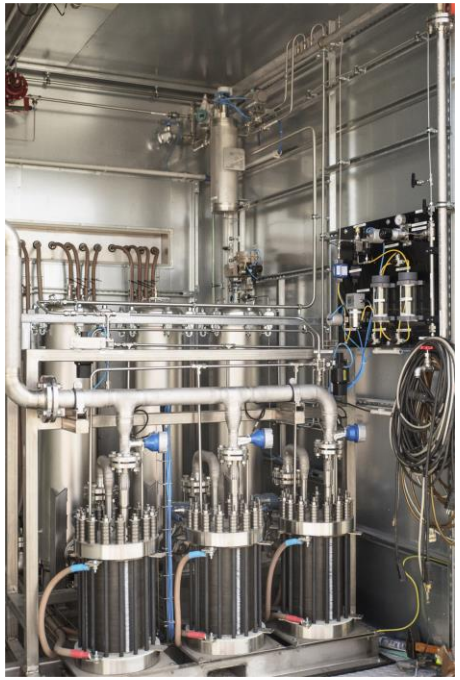
The alkaline electrolyser



The PEM electrolyser

The methanation device is settled

Hydrogen is injected in the grid since 02 2020

General planning

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Project creation : partners identification, contracts, finance	November 2013
Decision : launch of the Jupiter 1000 project	March 2016
Administrative authorisation	July 2017
Start of building	September 2017
1st Hydrogen injection (H2)	February 2020
1st synthetic methane production (CH4)	July 2022
CO2 pipe commissioning	mid 2023
Operation / Test phase	2020 – 2024
New activities on the plant	2025 - …

The project is supported by local & institutional actors

JUPITER 1000 by naTran

Financing organisms

Institutional partners

Project is well integrated in an environment favourable for innovative project

And with the active contribution of industrial neighbours

piicto by Marseille Fos

And so what ?

Jupiter 1000 will go on after 2024

Location of the different R&D test areas – Jupiter 1000

Today

JUPITER 1000 by naTran

New area : Test & Training

3

Connexion to other demonstrators ?

Existing area

Jupiter 1000 future
The plant will propose technical tests for customers

- Use of the existing plant to test new equipment and propose services for third parties
- ***A few examples*** *(not limitative list)*

Electrolyser tests

• In real and industrial condition

Jupiter 1000 advantage :

- Power feeding 400V=
- Pilot system and automates
- Few 500 kWe plants
- Exit for hydrogen

Test of gas grid equipment

• Test counters, sensors, regulators, analysors

Jupiter 1000 advantage :

- Easy to settle
- Real condition, flux of gas
- Hydrogen, methane, CO2 …

2

New area

A new test and training area

R&D PROJECTS

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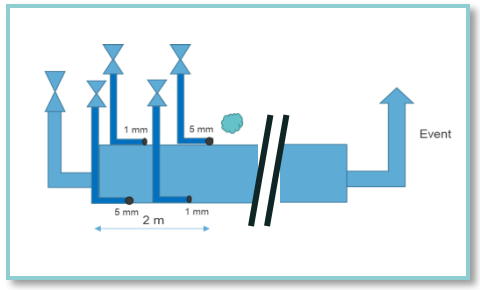
- **Opthycs** (European project)
- **New Pipe Tubing** (definition phase)
- **Etc …**



TRAINING DEVICE for GAS OPERATORS

- **Prepare arrival of new H2 grids**
- **Train gas grid operators** (maintenance works …)

H2 FIRE AWARENESS

- **Discover specificities of Hydrogen**
- **For operators, managers …**

AND MAYBE OTHER NEEDS?

Call for interest 2026+ running now

Not engaging

Closed on June 23rd 2025

Consult ri.natrangroupe.com

2

New area

FOCUS ON H2 FIRE AWARNESS

Objectives

- *Train operators to understand the safety challenges with hydrogen*
- *Identify what is different from natural gas behaviour*
- ***Make real demonstration***
- ***Propose training to external customers***
- *Same equipment near Paris*

Planning

S1 2023	2024	2025
First equipment on Alfortville station	**Engenieering studies** **Start of building on Jupiter1000**	**Commissioning** **First trainings**

Photo taken during a NaTran session - CNPP

JUPITER1000 by naTran

Any question ?

www.jupiter1000.com

X : @Jupiter1000PtG

https://ri.natrangroupe.com

We will now visit the plant …
A few safety rules

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Personal protection equipment

- Helmet
- High visibility vest
- Gas detector (for the group leader)

- Remain on the pathways
- If an alarm rings, please evacuate calmly

Anti Explosive protection

Thanks to leave in our deposit <u>any electronic device</u> :

- *Phone*
- *Connected watch*
- *Electronic Cigarette*
- *Camera*
- *Car keys*
- …

And of course :

- *Cigarettes*
- *Lighter*
- …

Enjoy your visit !