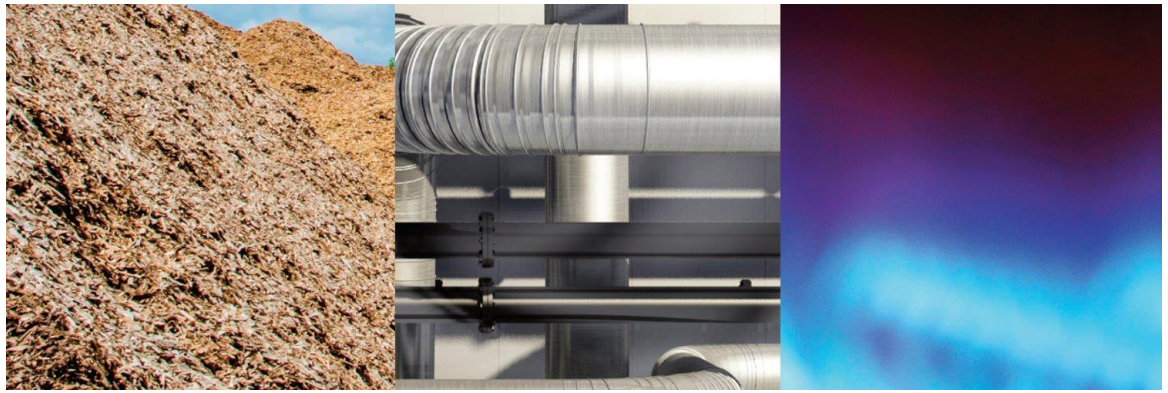
IEA TASK 33: Gasification of Biomass and waste

Country update – France



FRANCE TASK 33 MEMBERS : GASIFICATION OF BIOMASS AND WASTE

Chourouk NAIT SAIDI
Executive officer of Pyro-gasification - ATEE

Referent for all TASK 33

Marion Maheut
Project Manager- ENGIE

Referent for « Gasification and SNG »

Mathieu Morin
R&D Enginner – IFP Energies Nouvelles

Referent for « Gasification and Fuels »

A French association bringing together the stakeholders across the entire value chain

HISTORY

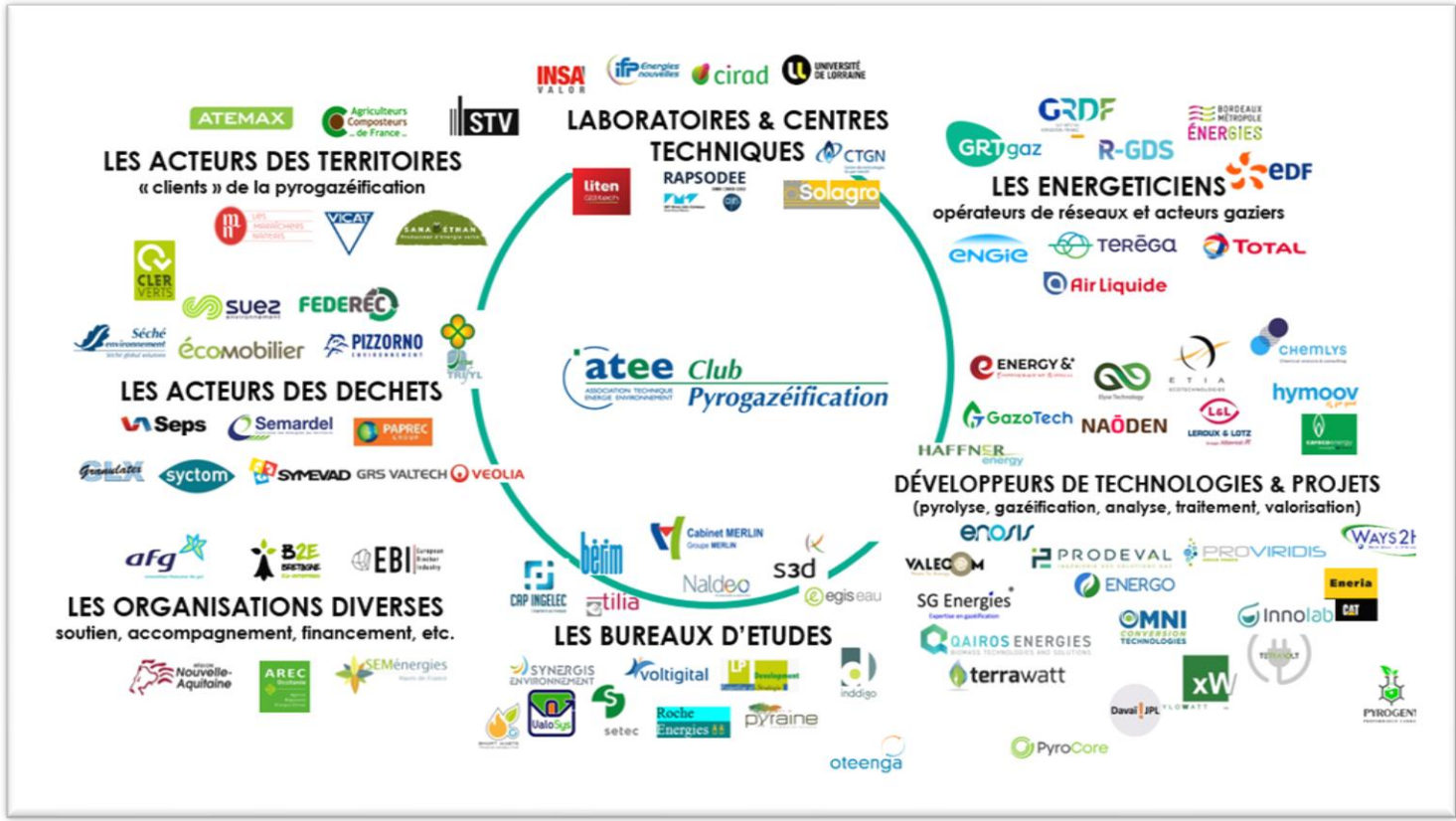
- **2014: Creation of the “Pyrogasification Club” 2014**

Gathers the main stakeholders in the sector across its entire value chain (biomass and waste managers, manufacturers, "end customers", equipment manufacturers, engineering offices, laboratories and researchers, gas network managers, major energy companies, etc.)

- **2019: the Club joined ATEE,** the French Technical Association for Energy and Environment

MISSIONS

- **Structure and lead a collaborative exchange platform,** promote the sharing of feedback and collaboration between members
- **Bringing the voice of stakeholders to the public authorities**
- **Communicate, inform and maintain a sector watch**
  - ✓ participate in events, publish resources in order to raise awareness of the sector
  - ✓ inform members by providing them with information on news of interest to the sector (ongoing consultations, legislative and regulatory changes, launch of a call for projects, etc.)



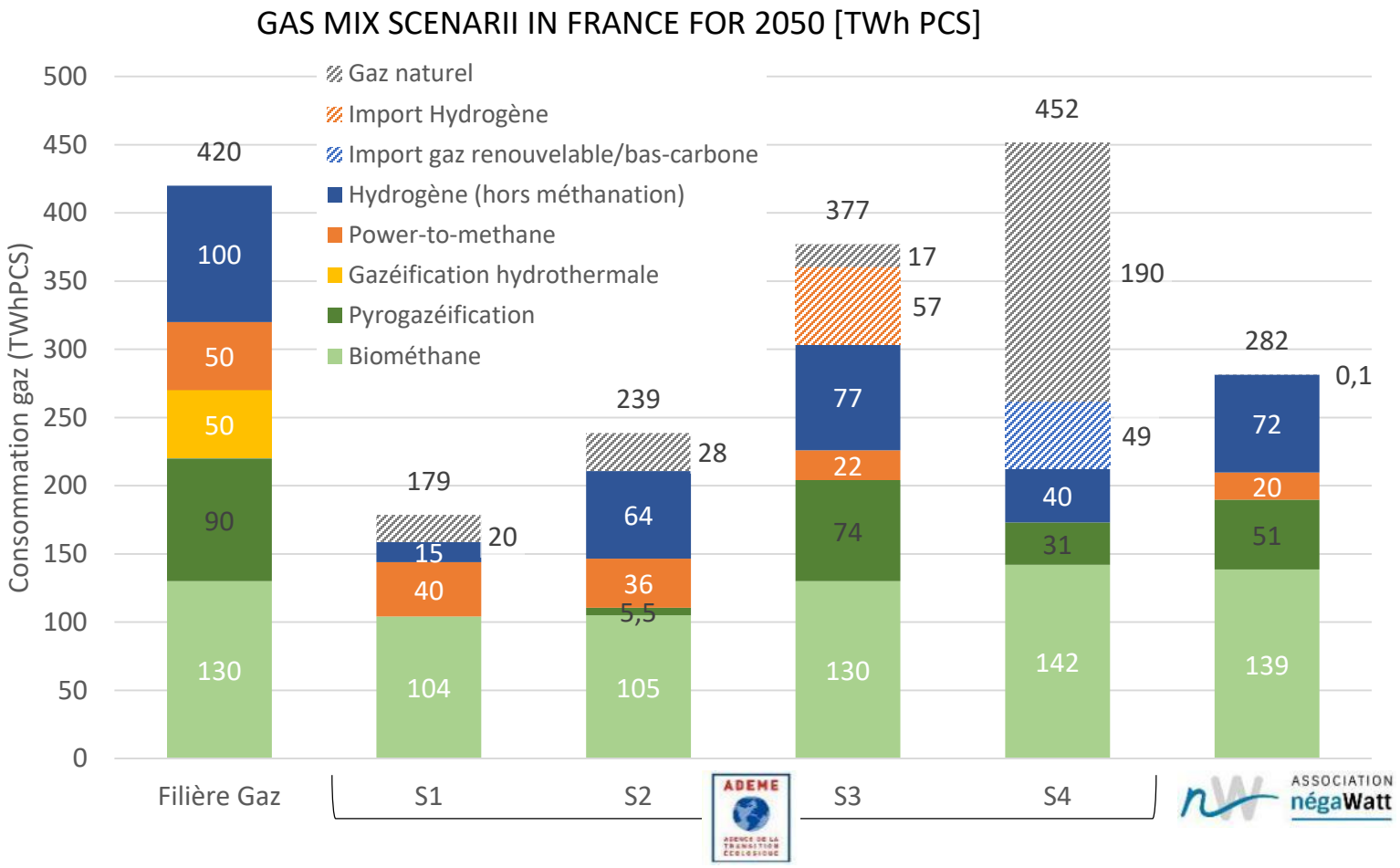
Production of SNG and Biomethane

IEA Task 33 - Vienna - October 18th, 2022

THE GASIFICATION IS A LEVER FOR THE DECARBONIZATION OF THE GAS NETWORK

RENEWABLE AND LOW CARBON GAS ROUTE 2030 - 2050

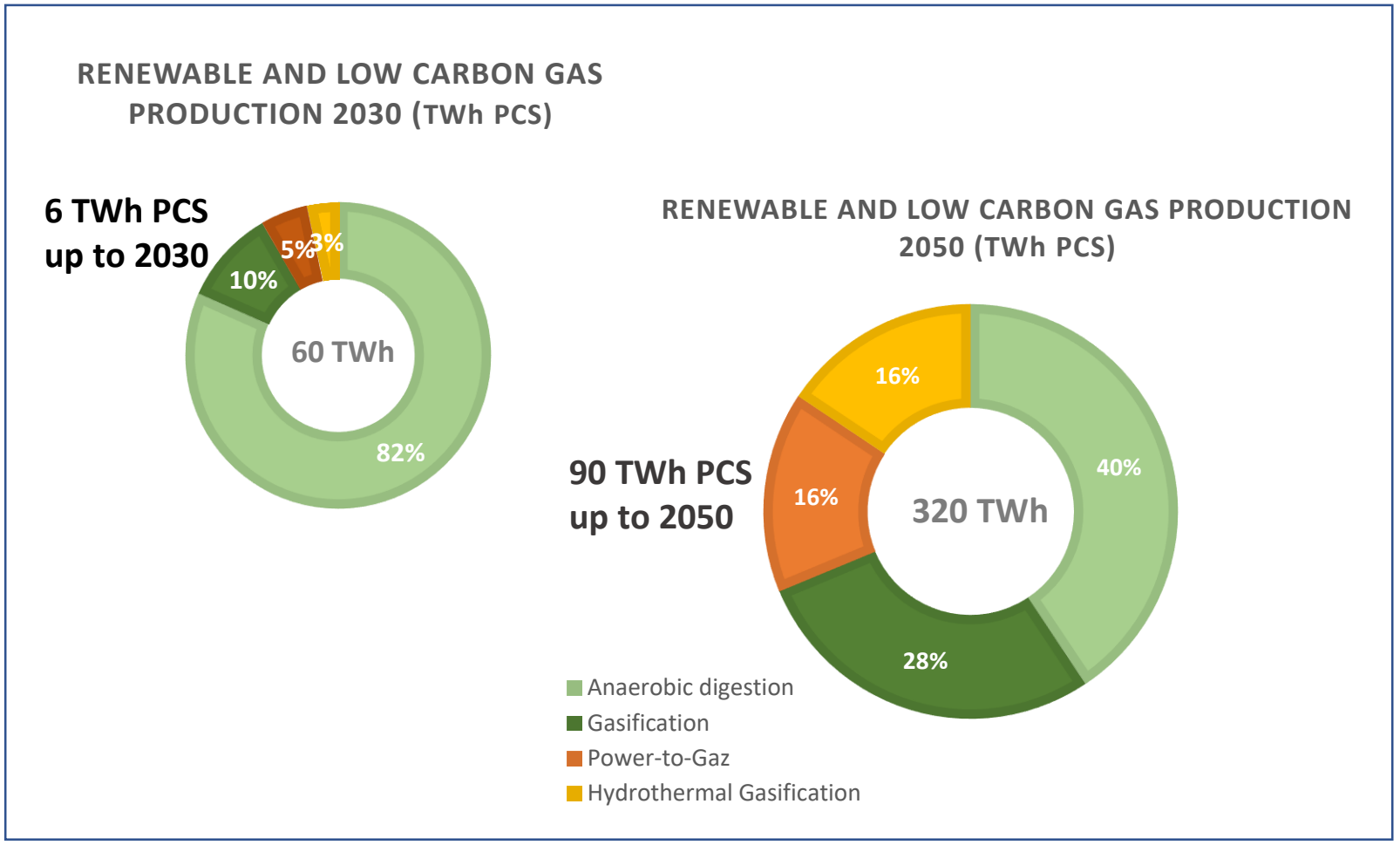
The **gasification of biomass and waste for the production of renewable and low-carbon methane for injection** is present in the different 2050 perspective studies such as ADEME, negaWatt and network manager scenarii.



THE GASIFICATION IS A LEVER FOR THE DECARBONIZATION OF THE GAS NETWORK

RENEWABLE AND LOW CARBON GAS ROUTE 2030 - 2050

The trajectory of renewable and low-carbon gas production by gasification with respect of the hierarchy of uses of biomass and waste recovery represents up to **10% of renewable gas production in 2030 and 30% in 2050.**



French Policy

- **Authorization to inject renewable gases into the networks** (art. L. 111-97 of the energy code): regulatory sandbox in progress
- **Partial definition of gas from gasification:**
  - **Biomass / wood waste = biogas, or biomethane** if cleaned and injected
  - **CSR** (e.g. plastics): no suitable definition for synthetic methane (in progress LOW CARBON GAS proposition in PJL ENR)

The Gasification and SNG Valorisation

Overview of some Gasification plants in FRANCE

ATEMAX - St Langis-Lès-Mortagne
Industrial installation ("CRE bid solicitation cogeneration of biomass)
Activity waste: animal meal (29 kt/year)

SYNTHANE - Compiègne
Demonstrator - Pyrolysis and catalytic methanation
Tests on various carbonaceous wastes

KERVAL CENTRE ARMOR – St Brieuc
Pilot site - 160kWth, 90 kWe
Tests on various carbonaceous waste: wood, CSR
⇨ Duplication of the process with consumers
⇨ Implementation of a circular economy scheme

R-HYNOCA – Strasbourg
Industriel Demonstrator
With local Biomasse local
⇨ 720 kg d'H_2 / day : for mobility uses (bus)

INNOV' ENERGY & TITAN V - Nantes
R&D platform / Demonstrator
Gasification and biological methanation
Carbonaceous waste (biomass, CSR, WWTP sludge)

SYNNOV waste – Villers-sous-Montrond
Industrial plant - 7 MWe, 12 MWth
Biomass, industrial waste, sorting waste
Valorisation of 45 kt/year

WOOD-HY – CC Landes d'Armagnac
Industrial plant (start-up 2022)
Forestry residues (cut wood, thinning)
⇨ 600 t of green H2: industry, mobility
⇨ CO2 co-product valorized in food industry

GAYA - Plateforme St Fons Green Lab
Demonstrator / R&D platform - 1 MW
Wood residues then wood waste and CSR
⇨ Demonstration of the whole technical chain

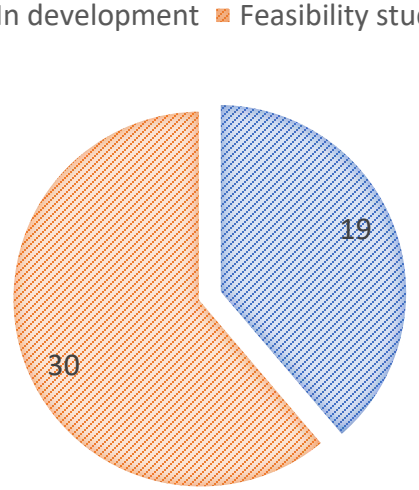
Production of Electricity and Heat
Production of SNG – biomethane for injection
Production of Hydrogene

The Gasification and SNG Valorisation
Overview of Gasification for biomethane injection Projects

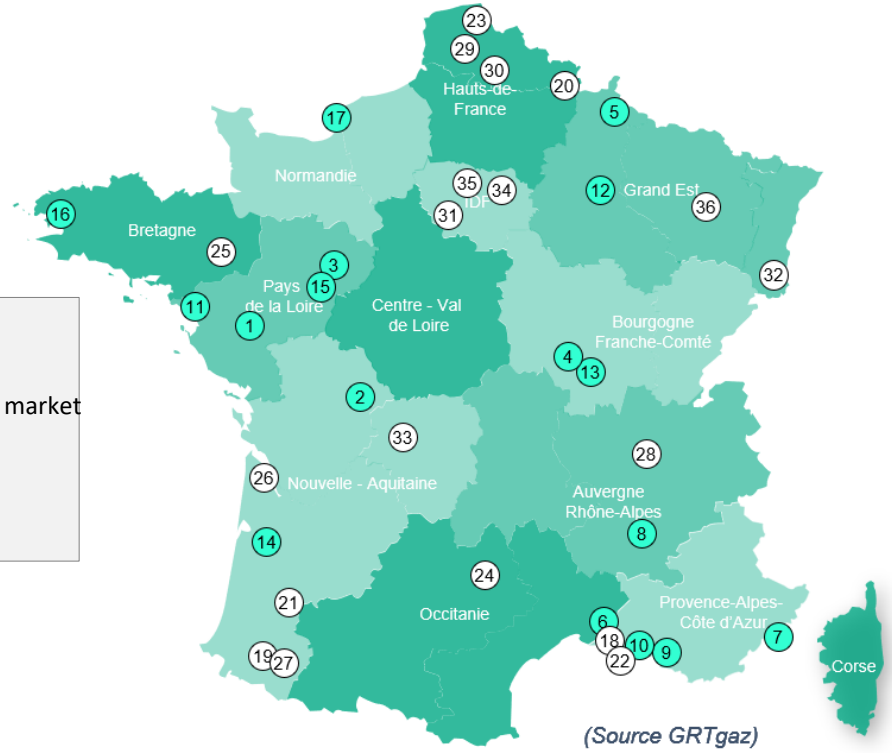
49 projects have submitted an application under the AMI (Call for Expression of Interest) launched by GRTgaz and NSE throughout France. Of these, 19 are at the development stage.

The information provided by the project leaders shows the potential of the sector and its ability to contribute to the achievement of the objectives of incorporating green gas into the French mix. With a **total capacity** of the identified projects evaluated at **4.1 TWhPCS/year**

49 Project participants



11/13 regions



The Gasification and SNG Application

GAYA R&D Project

Project Targets

Proof the technical, economic and environmental feasibility of 2nd generation biomethane production

An R&D programm that last 10 years

gaya

ENGIE Lab, repotec, cea, FCBA, LRGP, cirad, ECOLE DES MINES D'ALBI CARMAUX, le LABORATOIRE DE GENIE CHIMIQUE, UCFF Union de la Coopération Forestière Française, UCCS, ctp Centre technique du papier

A unique R&D demonstrative plant

covering the entire production chain

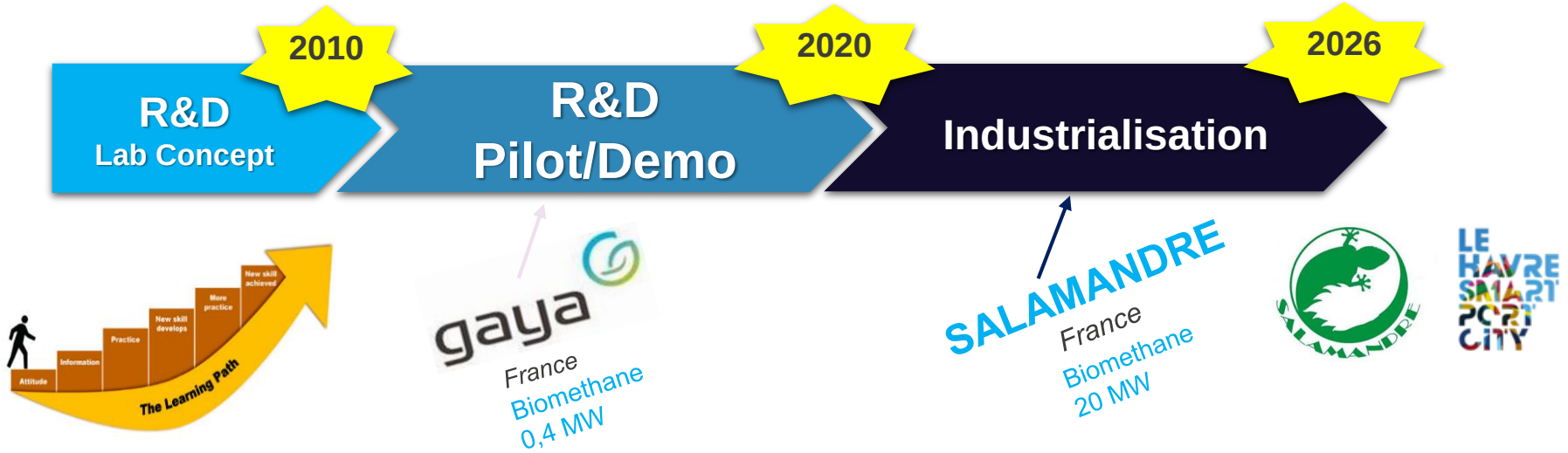
Avec le soutien de

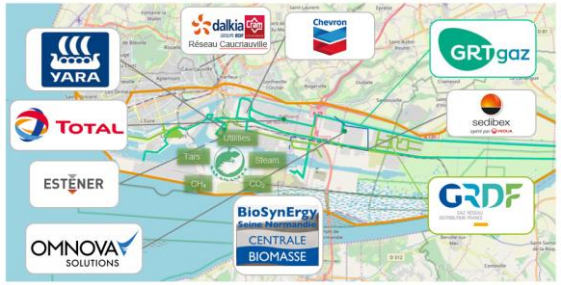
ADEME Agence de l'Environnement et de la Maîtrise de l'Energie

teneerdis

COMMERCIAL TECHNOLOGY

SALAMANDRE Project the commercial plant after GAYA pilot





Production of Bio-fuels

IEA Task 33 - Vienna - October 18th, 2022

The BioTfueL project

The BioTfueL project purposes are to :
develop, demonstrate and commercialize a full B-XtL chain

The process chain was validated and optimized on a wide range of biomasses

End to end solution :
- ✓ From R&D to market
- ✓ From biomass to final product

6 partners

R&D: cea, IFP Energies nouvelles

Industrials: Avril, TotalEnergies

Licensors: Axens (Powering integrated solutions), thyssenkrupp

One single point contact

Axens
Powering integrated solutions

Basic, Feed	EPC	Operation	Commercialization
2010	2014	2017	2021

190 millions € € €

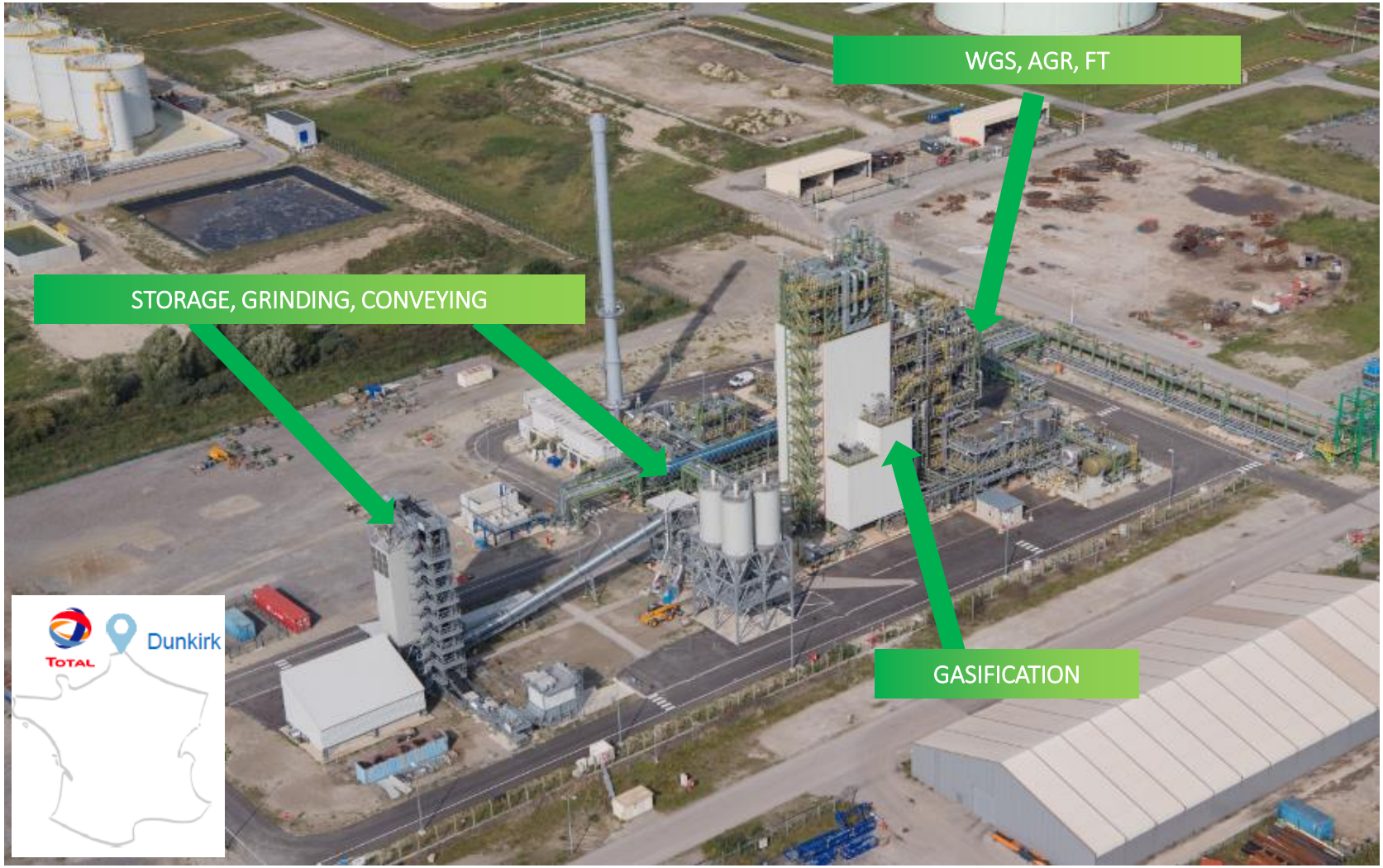
11 + years R&D project

2 demo units

The BioTfueL project

Gasification and gas treatment demo plant

- Gasification, conditioning of synthetic gas and synthetic fuel production
- **High carbon** conversion
- **High syngas** yield and quality
- Produce **renewable fuels**
  - ✓ Gasoline / Naphtha
  - ✓ Sustainable Aviation Fuel
  - ✓ Diesel
- Gasification : **15 MWth**



COMMERCIAL TECHNOLOGY

After the BioTfueL Demo

- Technology de-risking and optimization: completed
  - Validate the process chain on **a wide range of biomasses**
  - Production of **Fischer-Tropsch Waxes from Biomass**
  - **Optimize** the operating conditions and **maximize** the yields
  - Consolidate **performances** and **validate the extrapolation model**
  - Implement **improvements** from operations feedbacks
  - **Operability,** confirm the time on stream during **long term operations**

- Commercialization: on going
  - Axens (on behalf of consortium): **single licensor** for the complete B-XtL chain
  - A performance guarantee for the complete chain
    - For processes and catalysts
    - From biomass to final products
  - A full set of **services from studies to unit start-up** and follow-up

6 partners

R&D: cea, IFP Energies nouvelles

Industrials: Avril, TotalEnergies

Licensors: Axens (Powering integrated solutions), thyssenkrupp

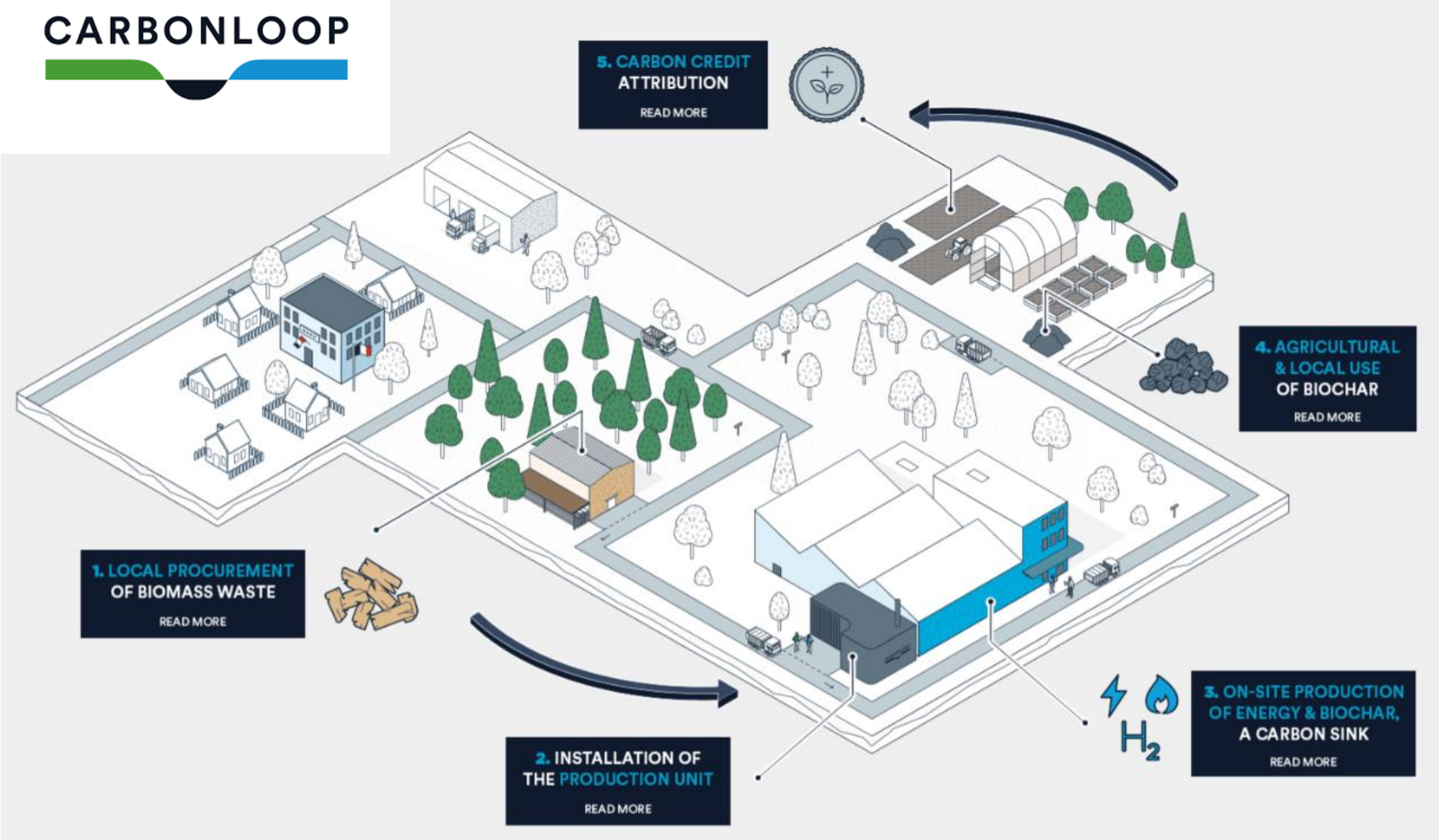
Production of Green Hydrogen and Biochar

IEA Task 33 - Vienna - October 18th, 2022

Production of Hydrogen for mobility

Haffner Energy
Making Hydrogen Super Green

CARBONLOOP



Thank you for your attention