

FRENCH NATIONAL CCUS STRATEGY

CCUS IN EUROPE:

- CCUS is a « **Net zero Strategic Technology** » under the *Net Zero Industry Act (2023) regulation, alongside other low carbon technologies (hydrogen, wind power, solar, battery etc.*
- **EU dedicated strategy** (Industrial Carbon Management) and **funding** (Innovation Fund...)
- **4 working groups** installed by European Commission to address specific issues:
 - CO2 infrastructure
 - CO2 standard
 - Public perception
 - Carbon Utilization

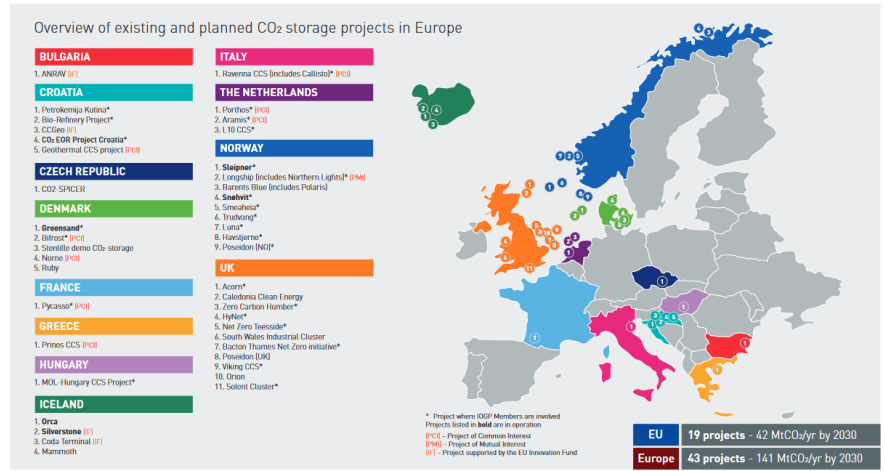
Project	Type	Category	Sector	Location	Coordinator	Technology pathways
CO2LECT Innovation in Carbon Capture and Transport	IF2CCal – Overall large-scale	E energy-intensive industries	Cement & lime	Germany	GEMEX-Zement GmbH	Carbon capture for storage
Stavros Separation Technology and Resonance Flaring Injection and Storage Hatzegone	IF2CCal – Overall large-scale	E energy-intensive industries	Other	Germany	Stavros Mera CCS AG	Offshore CO2 storage
TerraCO2-Si range TerraCO2: the reduction of CO2 emissions through geological storage, a catalyst of the CO2 market	IF2CCal – Overall large-scale	E energy-intensive industries	Other	Spain	REPSOL EXPLORACION SA	Offshore CO2 storage
CarboClearTech CarboClearTech	IF2CCal – Overall large-scale	E energy-intensive industries	Cement & lime	France	LAFARGE CEMENTS	Carbon capture for storage
H2HUE/index Hydrogen and heat production with a 300 MW electrolyser and large-scale heat pumps on an existing power plant site in Emden	IF2CCal – Overall large-scale	E energy-intensive industries	Hydrogen	Germany	Stavrosk Hydrogen GmbH	Renewable hydrogen production and heat by district heating from waste heat recovery

Innovation fund grand (2024)



MARCH 2024

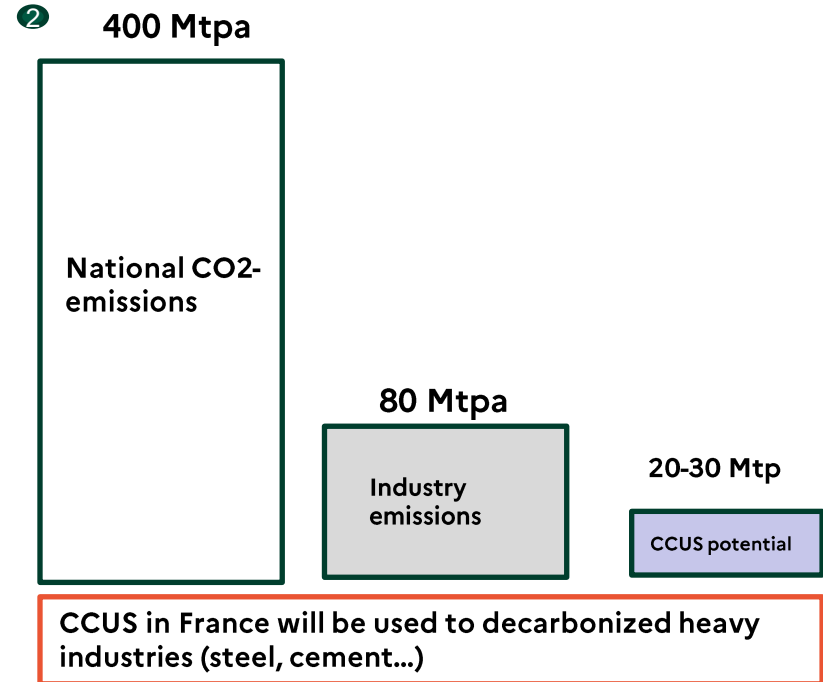
CO2 storage projects in Europe



CCUS IN FRANCE:

- A dedicated strategy
- Public support
- First « large decarbonization project » tender to be launched in 2025

France electricity production is 90-95% low carbon (nuclear, hydropower, wind & solar power, biomass)



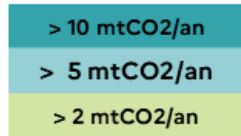
Emission reduction through CCS

- 5-10 % of industrial emission by 2030
- 20 -30 % by 2050

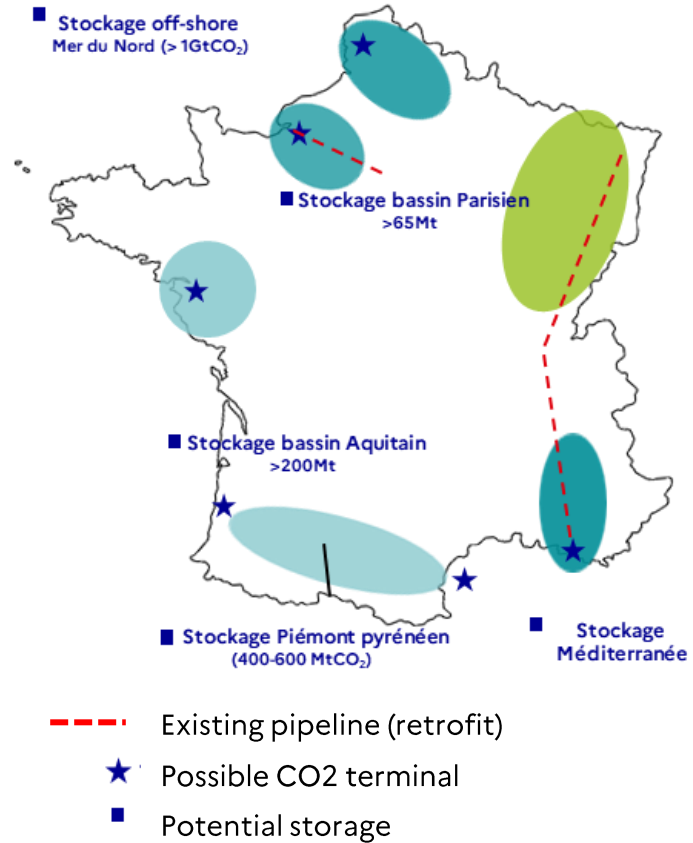
2028
2 à 4
MtCO₂/an

2030
4 à 8,5
MtCO₂/an

2050
15 à 30
MtCO₂/an



Industrial clusters



the French Government's action on CCS

Capture

Set CCUS target using bottom up approach

Design public support mechanism (CCFD)

Support R&D

Transport

Design and Implement regulatory framework

Improve project bankability

Finance regional infrastructures studies (ZIBAC)

Storage

3D seismic survey and onshore storage development

CO2 injection pilot

CO2 diplomacy

Focus on CCFD Mecanism (not exhaustive)

$$grants_i(\text{€}) = Q_i(E_{ref} - E_{achieved_i})(p_{CO2}^{sub} - p_{CO2_i})$$

With :

Q_i the quantity produced in year i ;

E_{ref} the volume of GHG emissions per unit of ETS reference product;

$E_{(achieved)_i}$ the volume of GHG emissions achieved per product unit in year i ;

p_{CO2}^{sub} the price declared by the industrialist during the auction procedure.

It is expressed in €/tCO2e avoided and is constant throughout the contract;

$[p_{CO2}]_i$ the price of CO2 in year i , set according to ETS price in year i

1. Eligibility :

- Hard to abatte industrial emission
- Power generation is not eligible
- Advanced discussion with T&S CO2 operator
- CCU where CO2 is not stored permantely is not eligible

2. Project rating

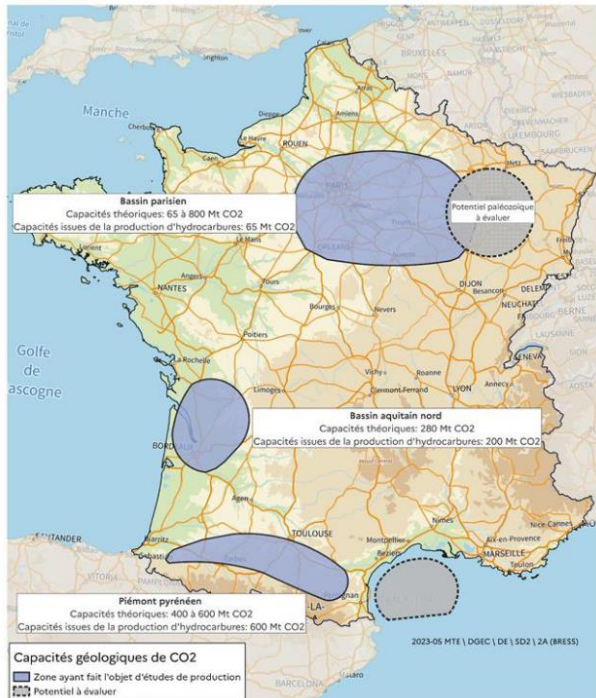
- 70% price criterion (€/tCO2)
- 30% non-price criterion

CCUS transport regulation

Transport

- Open access and transparency
- Profitability control for CO₂ transport operator benefiting from upstream through support CCFD
- No direct CAPEX/OPEX for infrastructures other than CCFD upstream support

Stockage – Developing onshore storage in France



Sovereign storage capacities: economic and strategic challenges:

- More competitive because more accessible than storage abroad
- Guaranteed operational security, in compliance with current French regulations

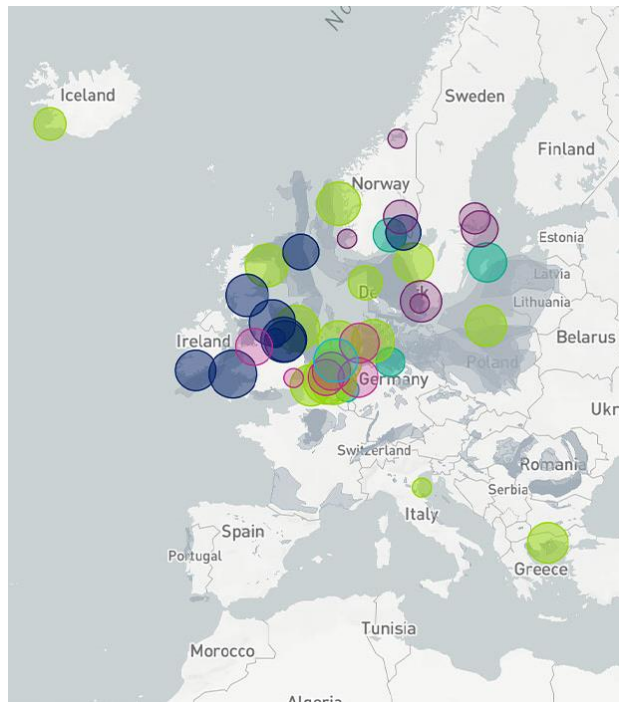
First estimates :

- Up to 65 Mt in the Paris Basin and around 200 Mt in the Aquitaine Basin
- Up to 600 Mt in the Pyrenean Piedmont (southern Aquitaine Basin)
- For other sedimentary basins: there are as yet no sufficiently detailed studies on CO₂ storage capacities.

Implementation schedule :

- :Launch of a Storage AMI in April 2024
- EVASTOCO₂ study conclusions scheduled for June 2024
- Launch of a Call for Projects for seismic campaigns and injectivity tests planned for late 2024
- Ongoing information and exchange campaigns with stakeholders

Stockage – International partnership and « CO2 diplomacy »



The French government will facilitate access to storage facilities in the North Sea and Mediterranean:

- Need to enable French industrial emitters to develop CO2 capture and storage projects
 - Only short-term operational outlets for French emissions
 - North Sea: Northern Lights projects in Norway, and Aramis in the Netherlands;
 - Mediterranean: Raven in Italy and Prinos in Greece.
- The development of European CO2 storage capacity will be strengthened by the implementation of the European NZIA (Net Zero Industry Act) regulation, soon to be adopted. Translated with DeepL.com (free version)

Implementation calendar

- France - Denmark bilateral partnership to be signed in June 2024
- France - Norway to be signed in June 2024
- Ratification of London Protocol presented to French Parliament in 2024
- Ongoing discussions with our European neighbors

**Transport ICM Forum
and working group**

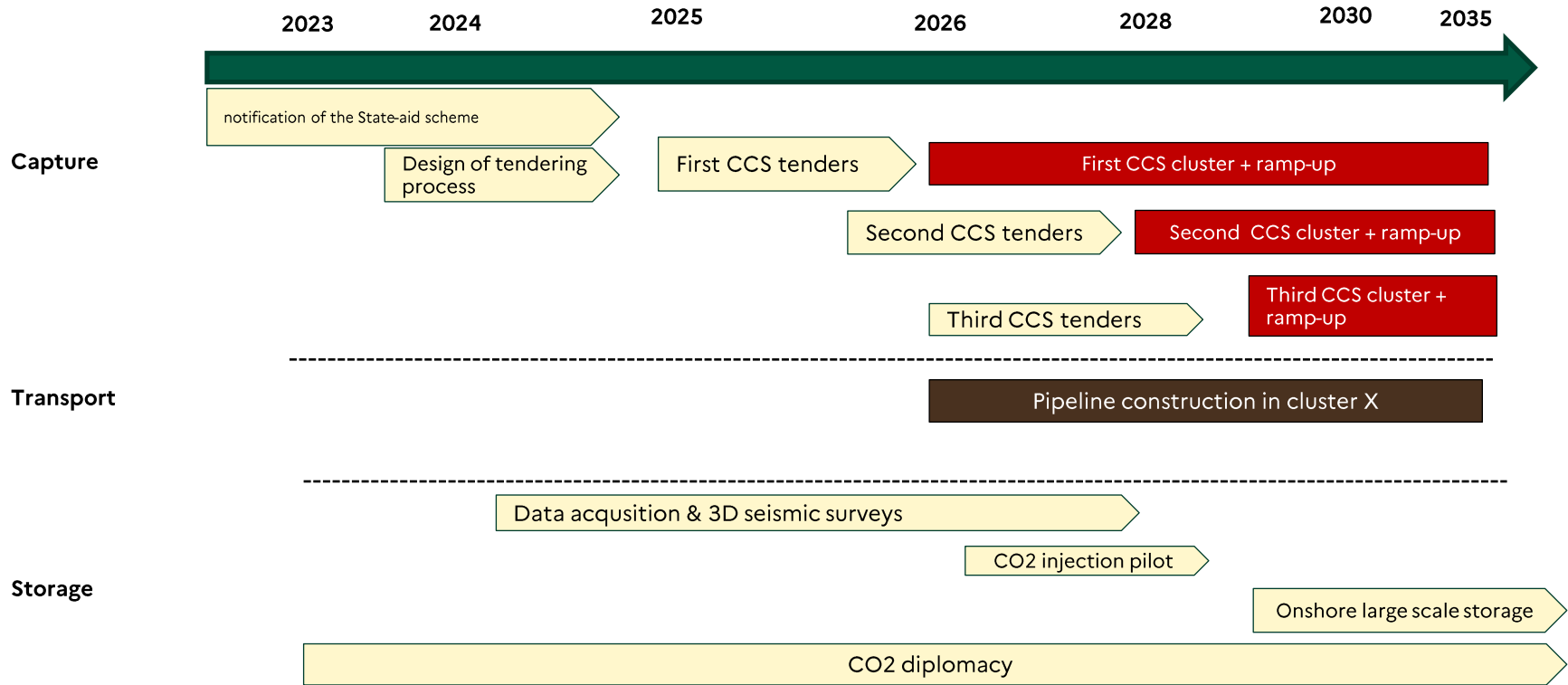
https://energy.ec.europa.eu/topics/carbon-management-and-fossil-fuels/industrial-carbon-management/icm-forum-and-working-groups_en

**Call for interest /
storage CCUS**

<https://www.economie.gouv.fr/actualites/appe-manifestation-dinteret-developper-capacites-stockage-carbone>

**Call for interest
financing**

<https://www.safecluster.com/project/ami-grands-projets-industriels-de-decarbonation-2024/>



CCUS IN FRANCE : TARGET TO NET ZERO BY 2050

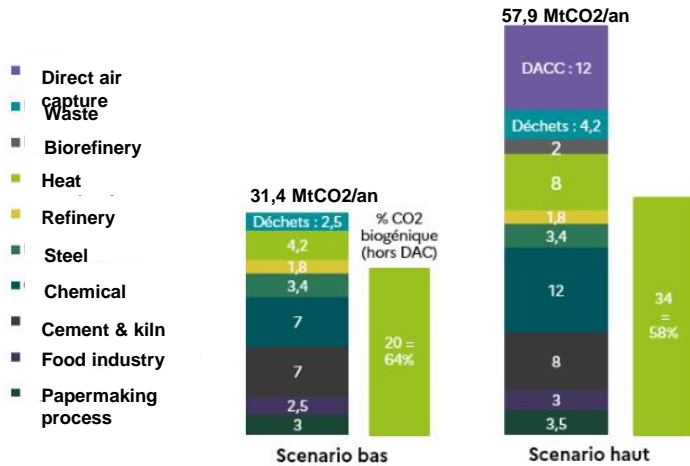


Figure 2 : Prévisions 2050 en MtCO₂/an captées, par origine et par destination