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CCUS FRENCH STRATEGY

October 4th – 5th, 2023

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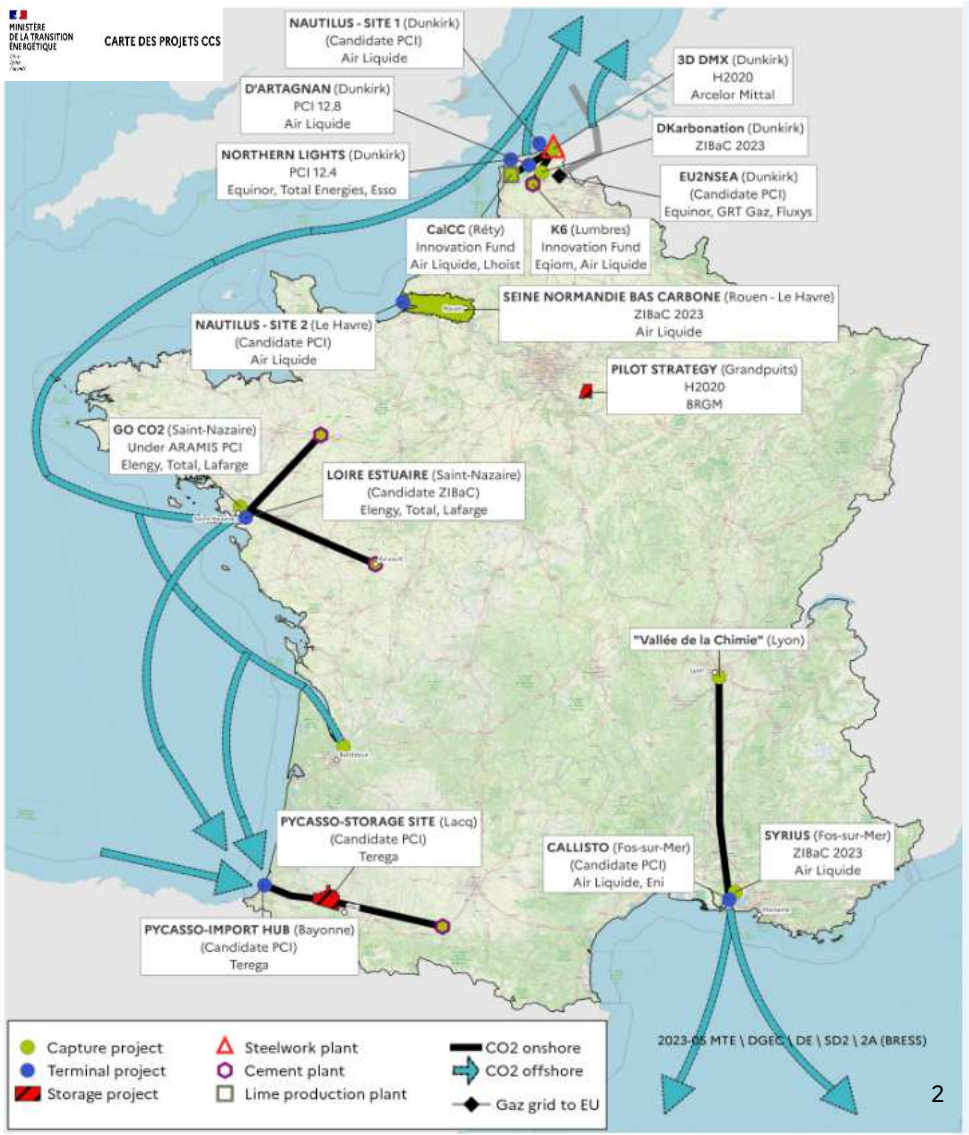
CCUS, a rising dynamics in France

A combinaison of 4 bricks

1. CO_2 capture
2. Transport
3. Storage
3 bis. Utilization

Many emerging projects, some of them expected between 2026 and 2030.

€ : H2020, IF, PCI, national fundings…



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CO_2 capture potential in France

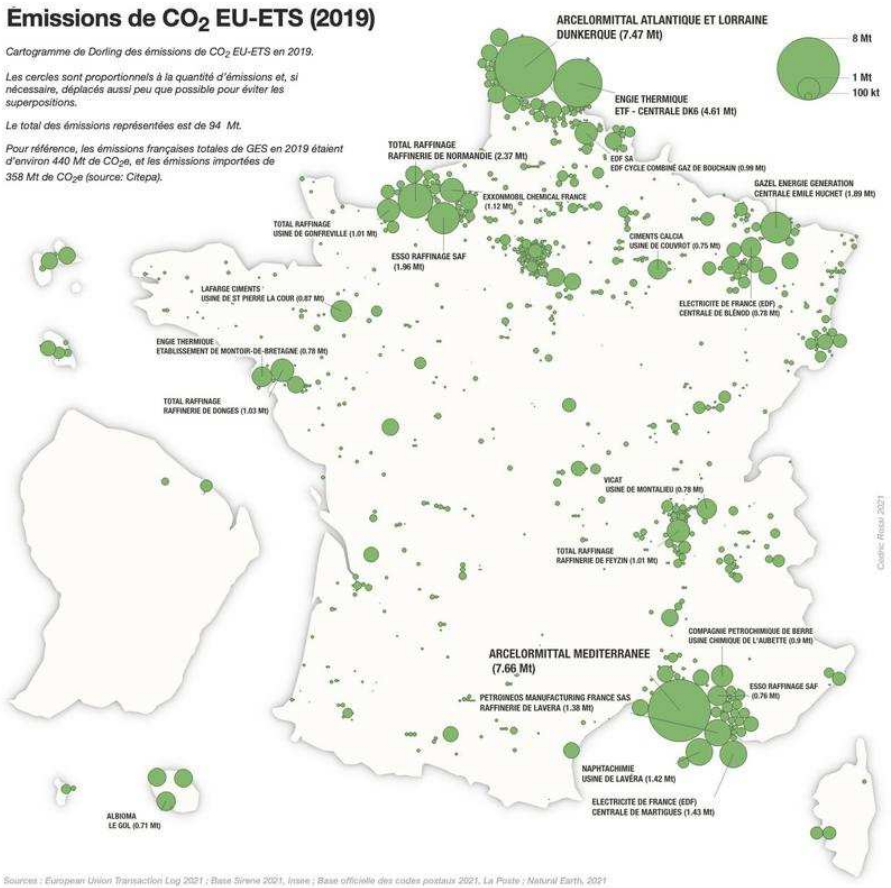
Global framework:

- CCUS : An essential lever to reduce <u>hard-to-abate</u> emissions from industry
- CCUS : A necessity to achieve carbon neutrality in 2050

Capture trajectory :

- A lot of emitters localised in industrial hubs, including 4 hubs close to the sea
- Working with the 50 largest emitters to assess the potential for CO_2 capture

French GHG emissions from industry and energy



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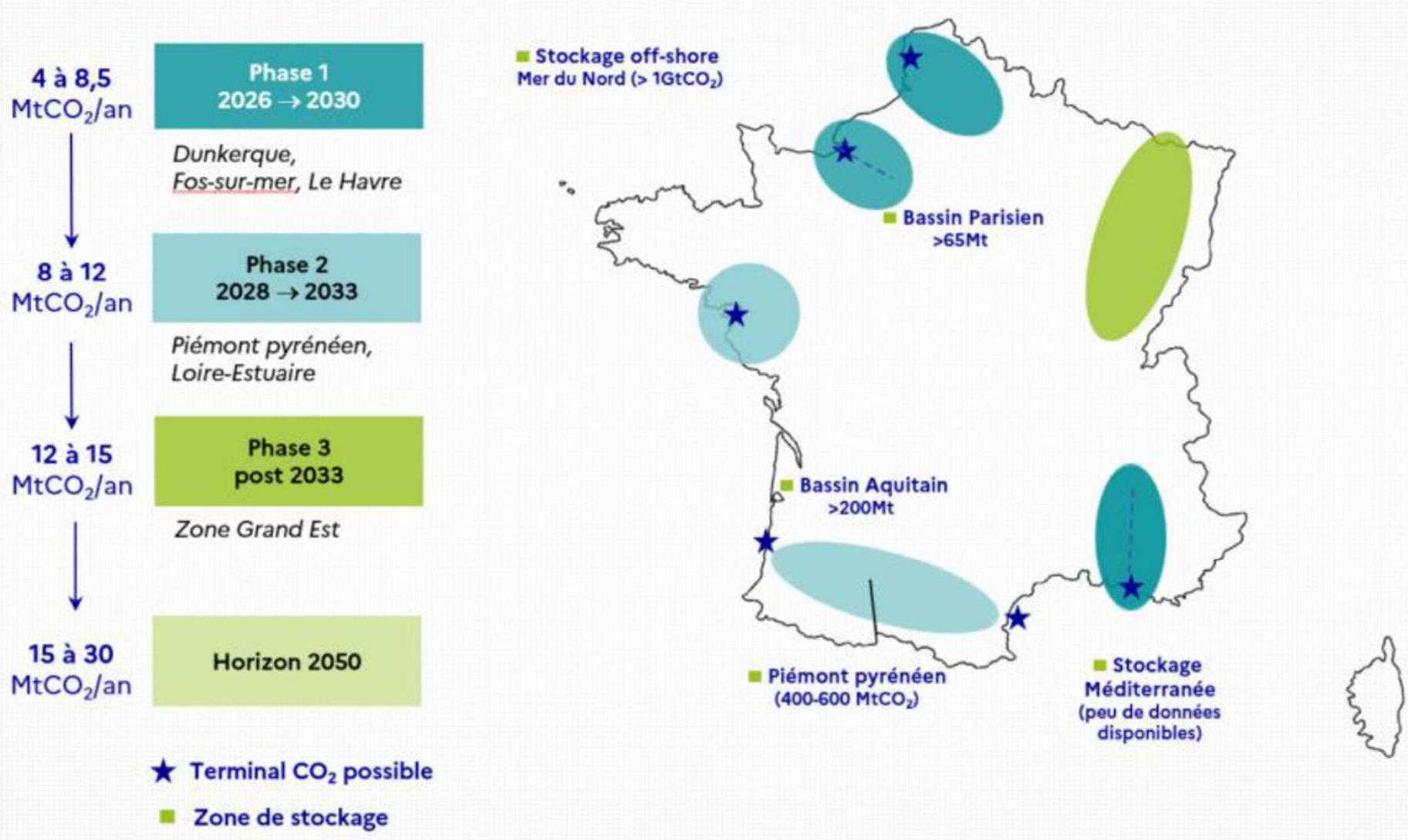
Trajectory of captured CO_2



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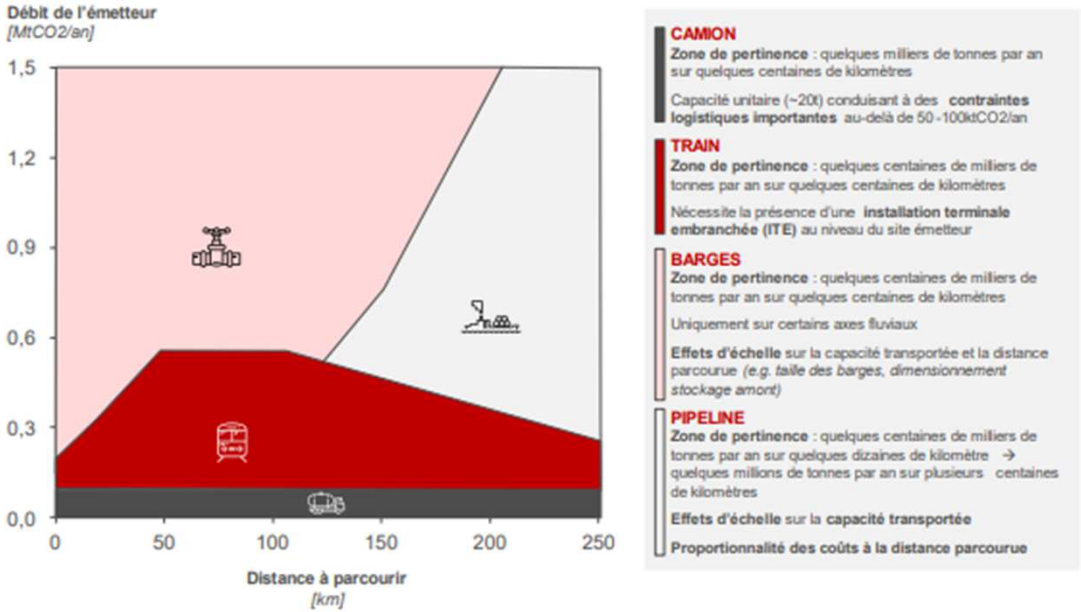
CO_2 transport

A vision of needs to be developed quickly

- Diversified modes: pipelines (very large volumes) / trucks / trains / barges, etc.
- Regulatory Development of pipelines in some clusters, and other means of transport for smaller quantities or more rapid development
- Role that should be given to the CRE (French Energy Regulation Commission)
- In-depth transport consultation on-going with different possible financing models and risk sharing to be specified between the State / infrastructure operators / its users.

Relevance of different logistics solutions (Mt_{CO2}/year emissions and distance)



Source: Club CO2's study on potential CO2 transport scheme in France

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CO_2 storage

Identification of some areas with CO_2 safe storage potential

- ❑ Storage potential in France =
  - In sedimentary basins or depleted hydrocarbons fields
  - Depth > 800m
  - With CO_2 barrier layer (clay…) : safe reservoir seals
  - Onshore and offshore
  - Knowledge and expertise available : national methane storages in operation since decades.
- ❑ Calendar :
  - Short-term : off-shore & abroad : North Sea, Mediterranean Sea.
  - Medium/long term : national storages for sovereignty issues, transport optimization … : Aquitaine basin, Paris basin and Mediterranean basin.

How to accelerate on international storage

- ❑ London Protocol ratification :
  - Preparing the ratification law : impact study under assessment
  - Full process will take 12-18 months (Parliament approval)
- ❑ Bilateral agreements : on-going discussions with several countries to sign Letters of Intent (1 signed with Norway already) and bilateral agreements on CO_2 maritime export

How to accelerate on national storage

- ❑ Studies and works to be launched :
  - Inventory study by CSF-NSE w. ADEME funding (by March 2024) :
    - Based on previous works and available data
    - Inventory of areas and potential volumes
  - Tenders for injection tests and seismic campaigns :
    - What is the French sub-soil CO_2 injectivity ?
    - Filling seismic data gap in promising but under-explored areas
- ❑ Communication campaign : inform on what is CCUS, its technologies…

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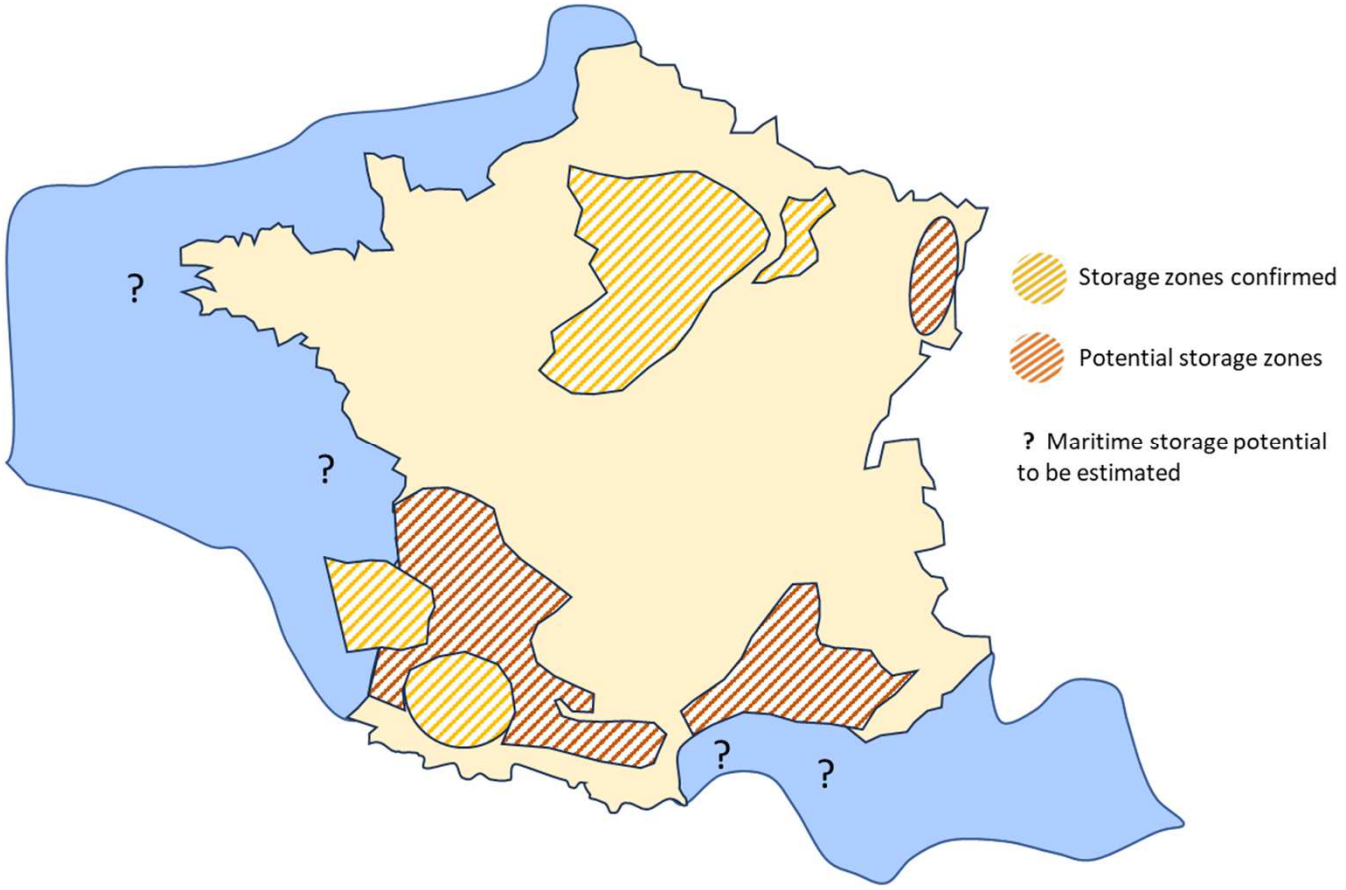
CO_2 storage



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CCUS: French strategy

5 identified axes :

A CCUS deployment trajectory based on prioritisation by major industrial zones:

- first Dunkirk, Le Havre and Fos-sur-Mer,
- then the South-West and Loire-Estuaire,
- and finally Grand Est.

Public support for CO_2 capture at industrial sites : Carbon Contracts for Difference (CCfD) mechanisms to be launched in the first half of 2024.

A framework for CO_2 transport infrastructures, to be regulated by the Energy Regulation Commission, with the necessary risk sharing between infrastructure operators, their industrial users and the State.

Diversification of CO_2 storage possibilities, based on partnerships with European countries, and by launching assessments of storage potential in France's main sedimentary basins.

The possibility of using CO_2, as an alternative to storage, which could be a lever for decarbonising the aviation and maritime sectors in particular.

Public consultation until 29th of September : ≈ 90 contributions

- Question 1: Does the CCUS deployment trajectory presented meet needs, in terms of geographical distribution and timetable?
- Question 2: How can a CCfD mechanism be calibrated to meet the challenges of decarbonising industry, and in particular the deployment of CCUS?
- Question 3: How can we support the development of infrastructure for transporting captured carbon, with a balanced sharing of risk between the State, infrastructure operators and industry?
- Question 4: Under what conditions do you think it would be possible to deploy CO_2 storage in France?
- Question 5: What role do you see for CO_2 recovery? What uses should be given priority for CO_2?