

What are the actions in France to develop the CO₂ capture and storage technology?



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CCS Perspectives in Europe and France

Energy efficiency + Renewable energy + CO₂ Capture & Storage (CCS)

Europe: 2030 Climate and Energy policy framework for EU

- **40% reduction in GHG emissions** from 1990 levels
- Raising the share of energy consumption produced from renewable resources to 27%
- 27% improvement in the energy efficiency

France: “Factor 4” target

- **Reducing GHG emissions by 75% by 2050**, compared to 1990 levels → **implementing CCS is part of the options**
- **75 Mt CO₂ per year potentially concerned by CCS** (electricity generation and industrial sectors) – 19% of total CO₂ emissions
- A cumulative volume of about **1 Gt of CO₂ emission reduction between 2020 and 2050**, needing to identify appropriate storage sites

Strategic programming of research

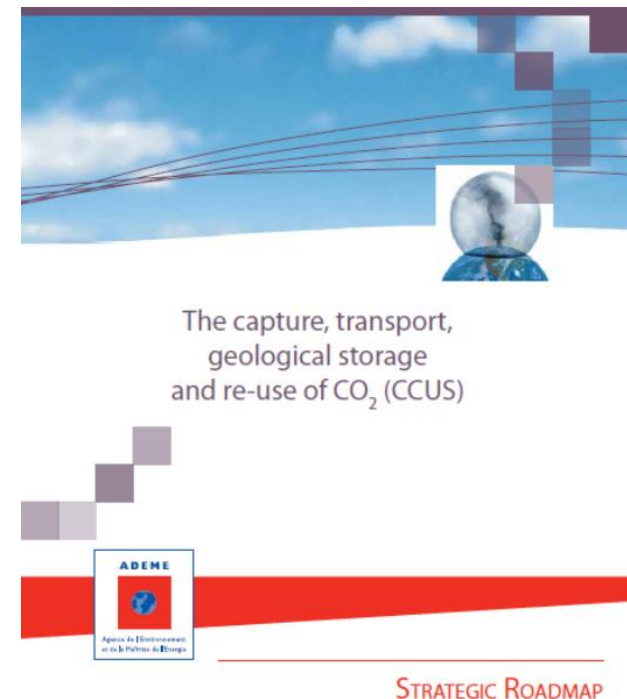
- In 2008, a key measure of the « Grenelle de l'Environnement » process: creation of a R&D demonstration fund with 325M€
- 2011: Energy 2050 Report
- 2013: New technologies of “green economy” report

Technological Roadmaps

Strategic road maps elaborated in each field by ADEME with experts from industry and research in order to share “common visions” of technologies and social organization deployment and identify barriers to address through demonstrators

2008: CCS Roadmap

2011: CCS Roadmap revised -> CCUS





French programmes for Research and Innovation French National Research Agency (ANR)



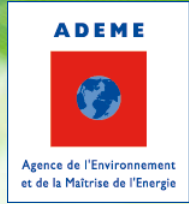
Calls for CCS projects

- **2005-2008: CCS programme**
 - 4 calls for projects in order to develop new technologies for the safe and low cost CCS and prepare the emergence of pilot projects
 - 33 selected projects - Grants: 27M€
- **2009-2010: only CO₂ capture** included in Energy Efficiency programme
 - 4 selected projects - Grants: 4,4M€
- **2011-2013: SEED (Efficient and Decarbonised Energy Systems) programme including CCUS**
 - 10 selected projects - Grants: 7,4M€
- **2005-2013: 47 projects on CCS for 38,8M€**

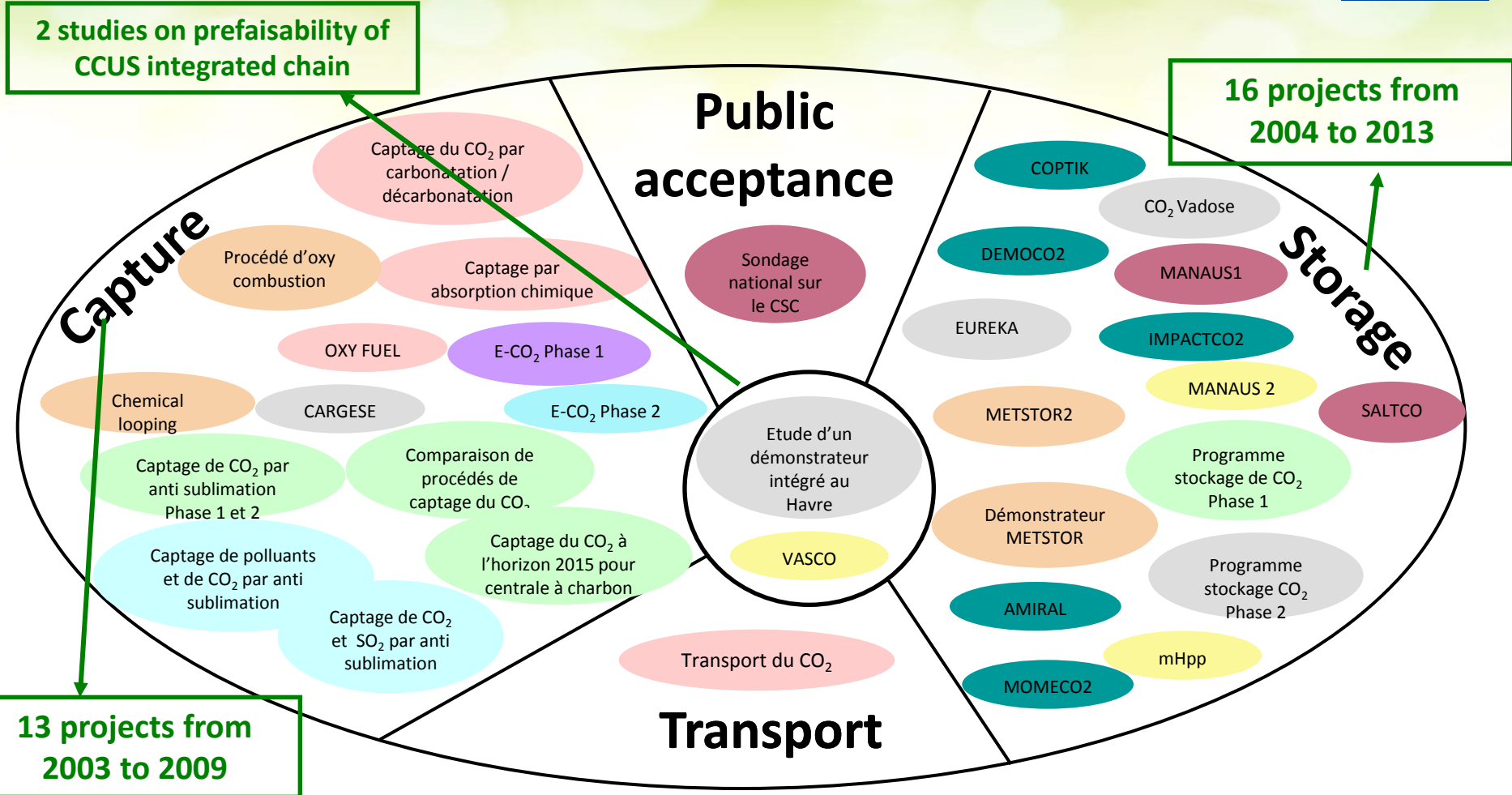
www.agence-nationale-recherche.fr



French programmes for Research and Innovation French Environment and Energy Management Agency (ADEME)



2003-2014: 33 R&D projects funded (Grant: 6,6 M€, Total budget: 24 M€)

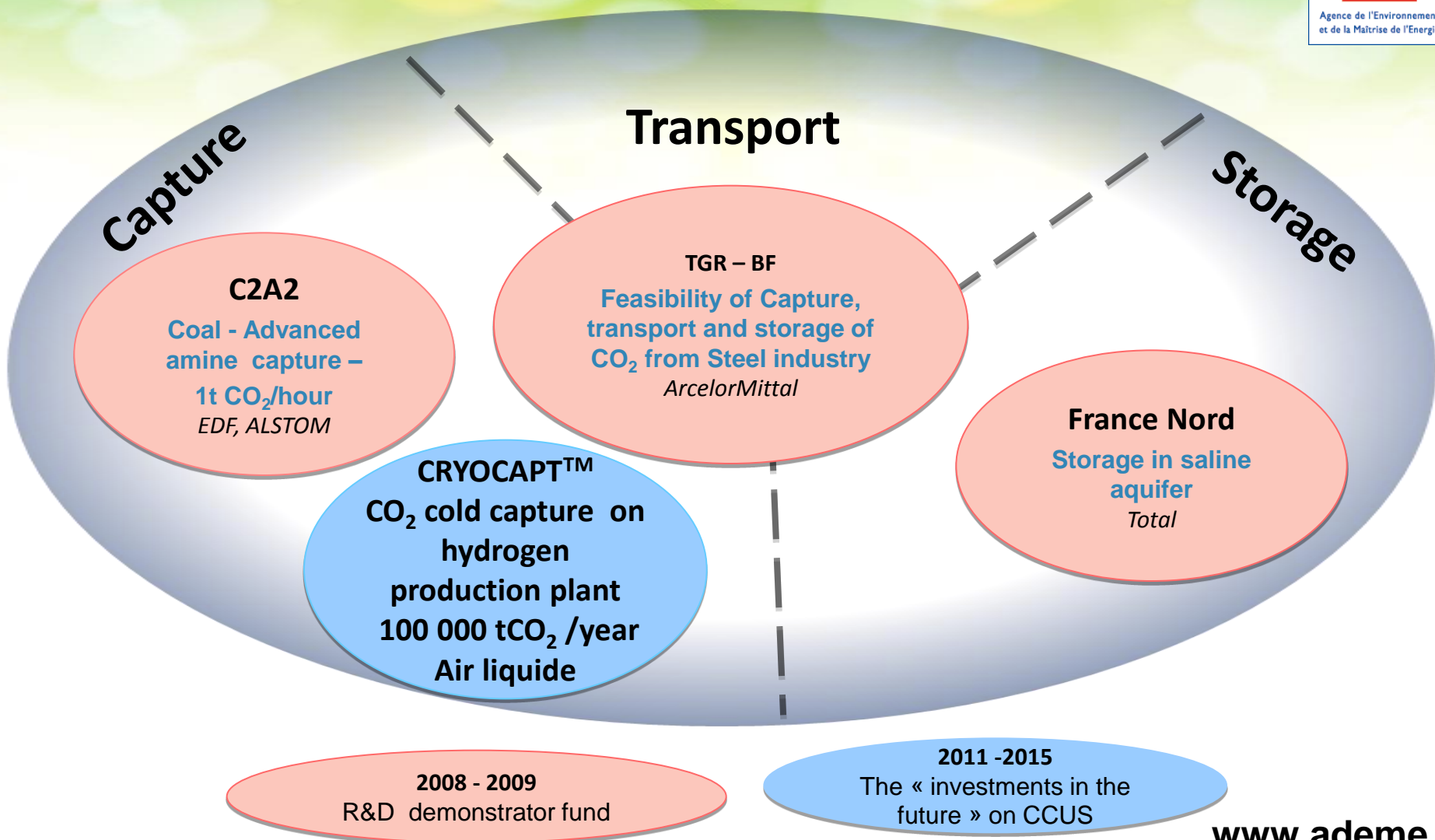




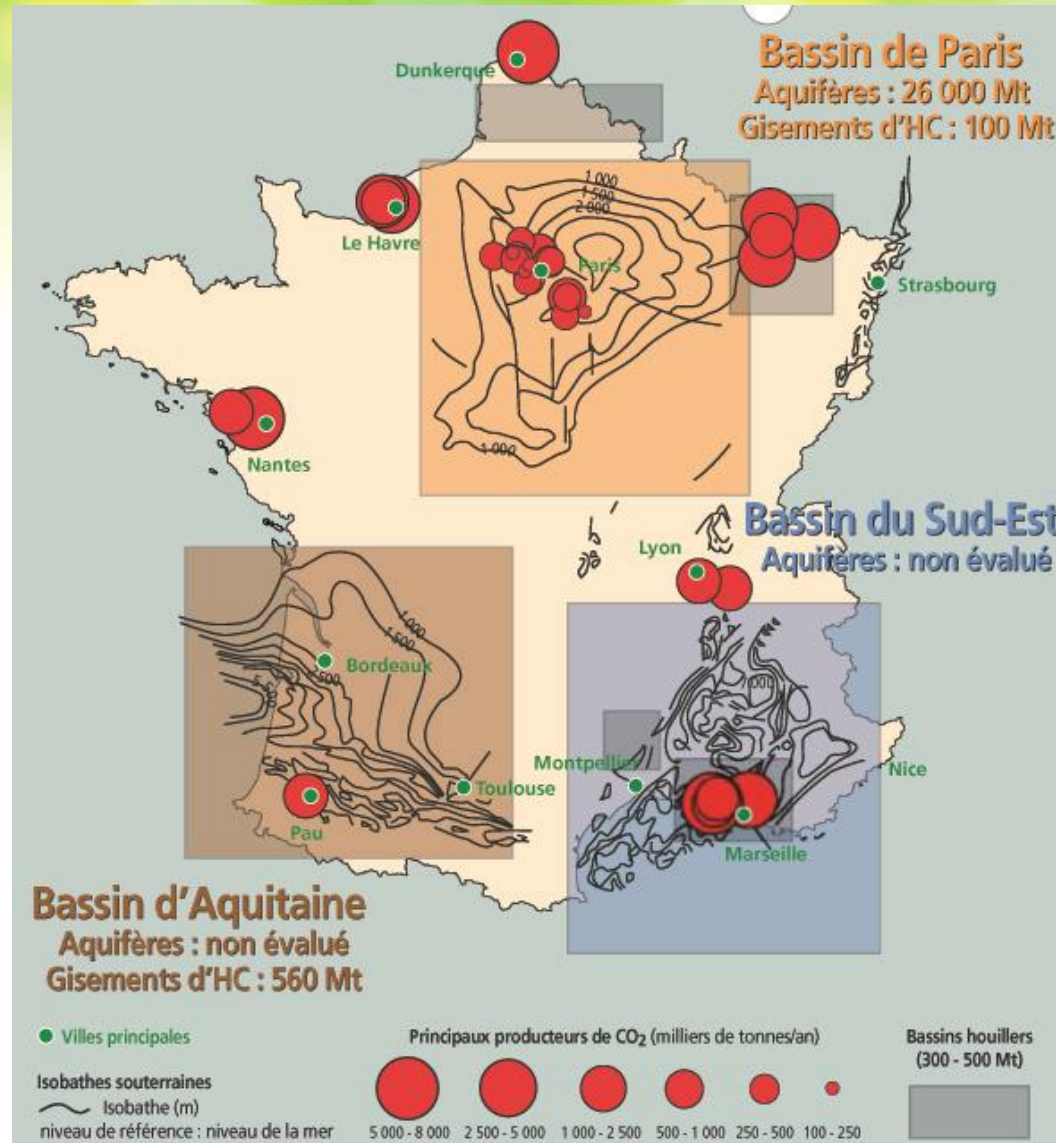
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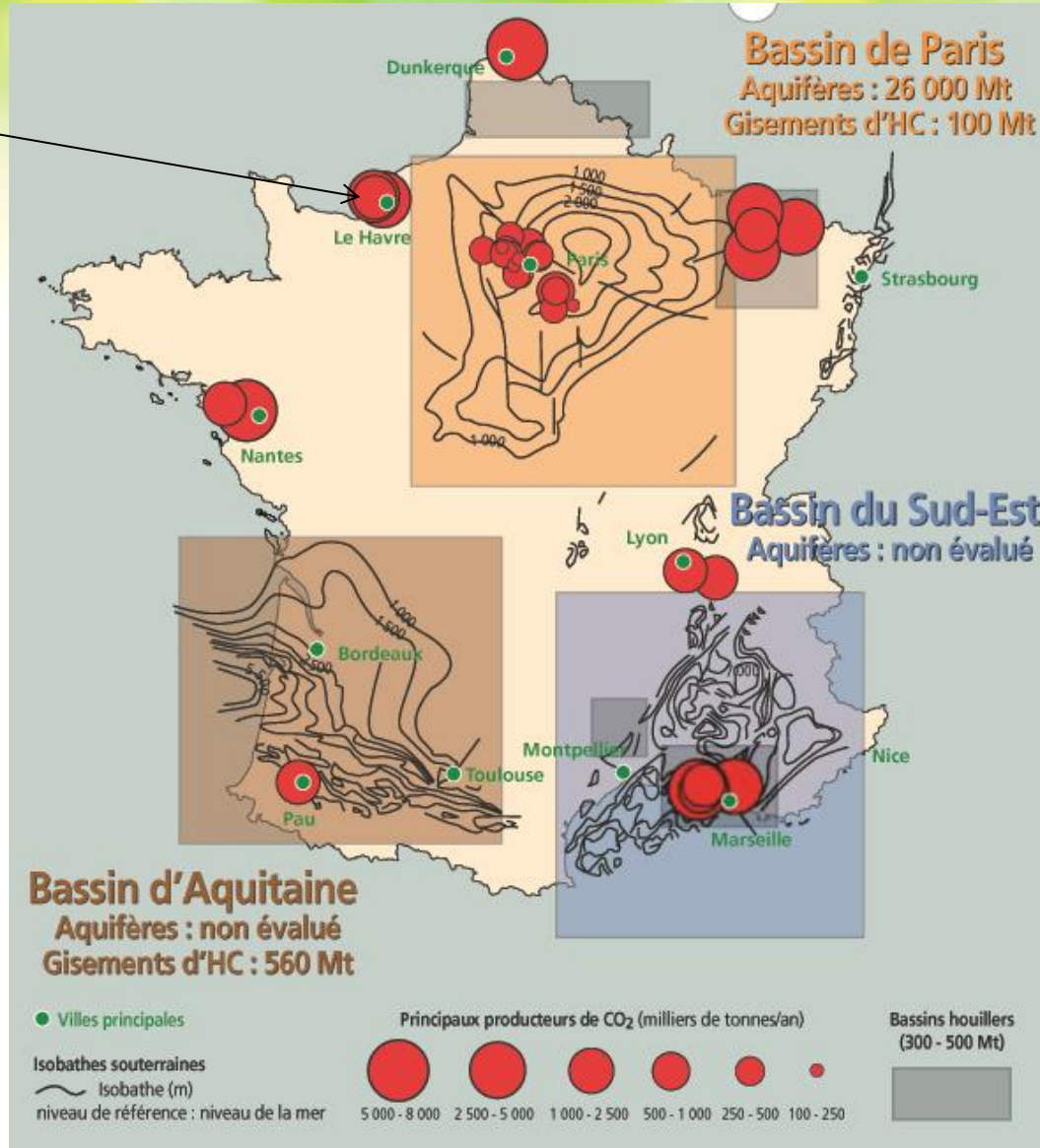
R&D Demonstrators with total budget: 142 M€ (Grant: 43 M€)



Main CO₂ emitting regions in France and potential storage areas (theoretical capacities)



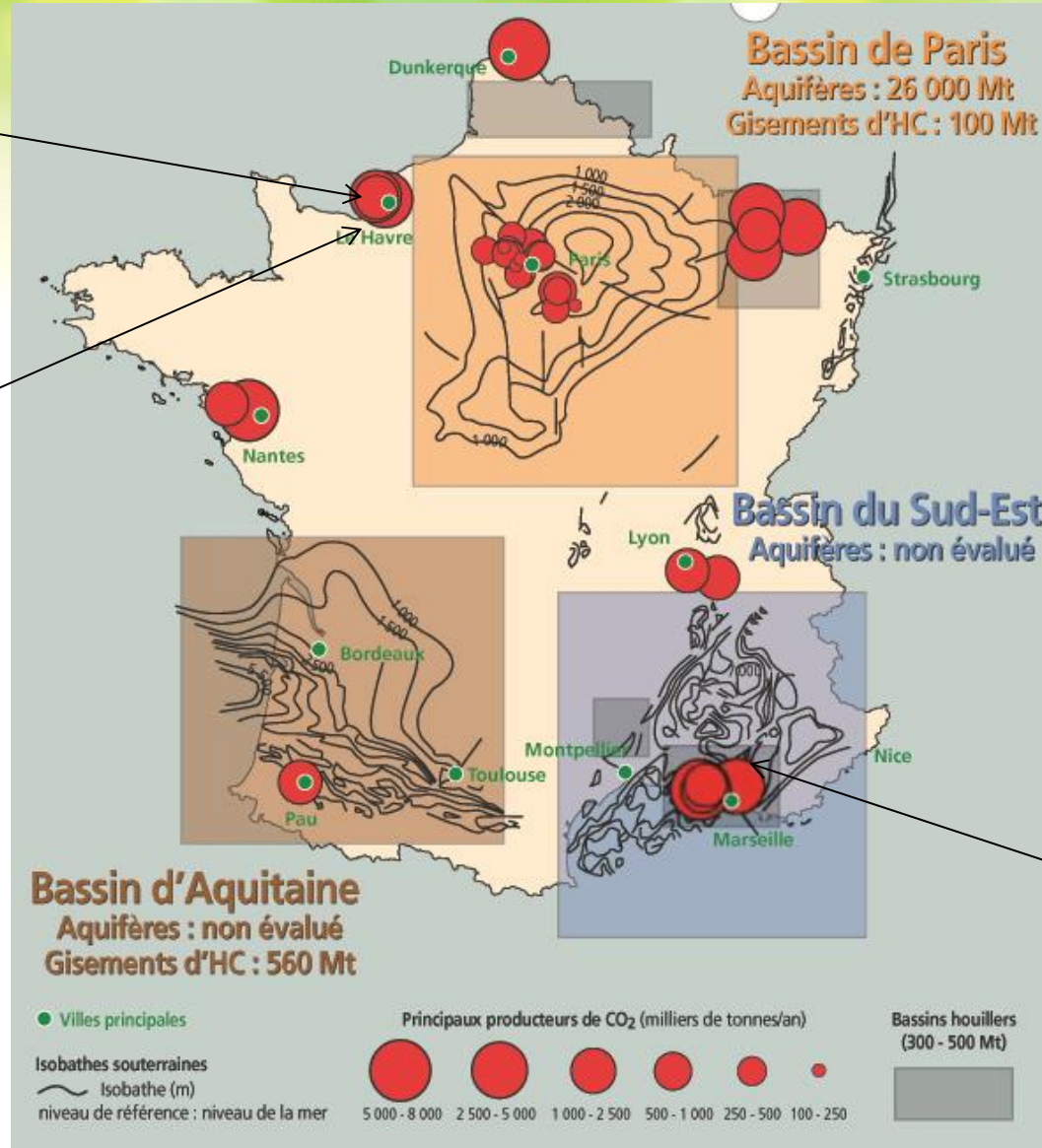
Main CO₂ emitting regions in France



Main CO₂ emitting regions in France



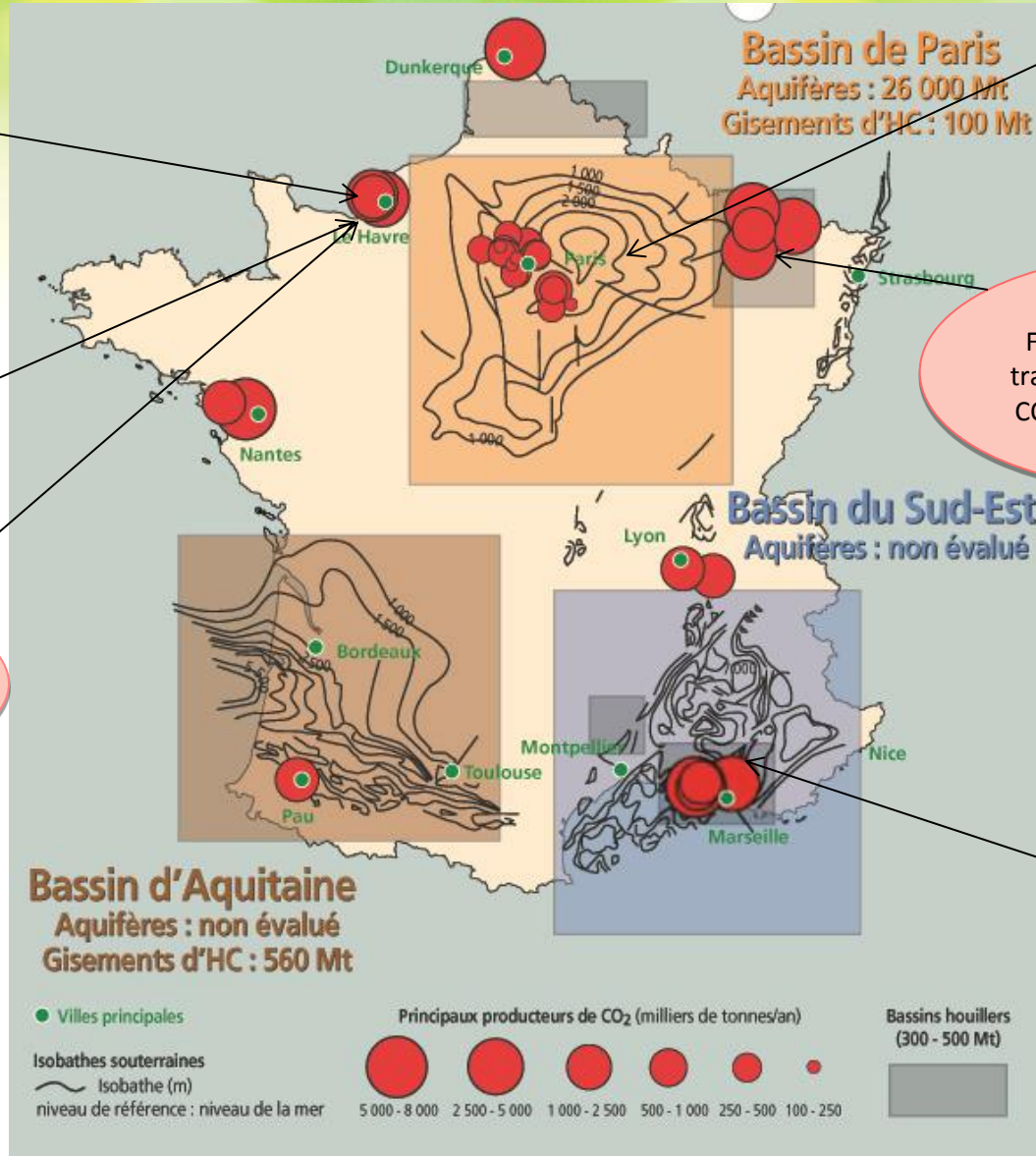
Study on prefaisability of CCUS integrated chain in Le Havre



VASCO: Study on prefaisability of CCUS integrated chain in Marseille area

Source BRGM (projet européen GESTCO)

Main CO₂ emitting regions in France



France Nord
Storage in saline aquifer
Total

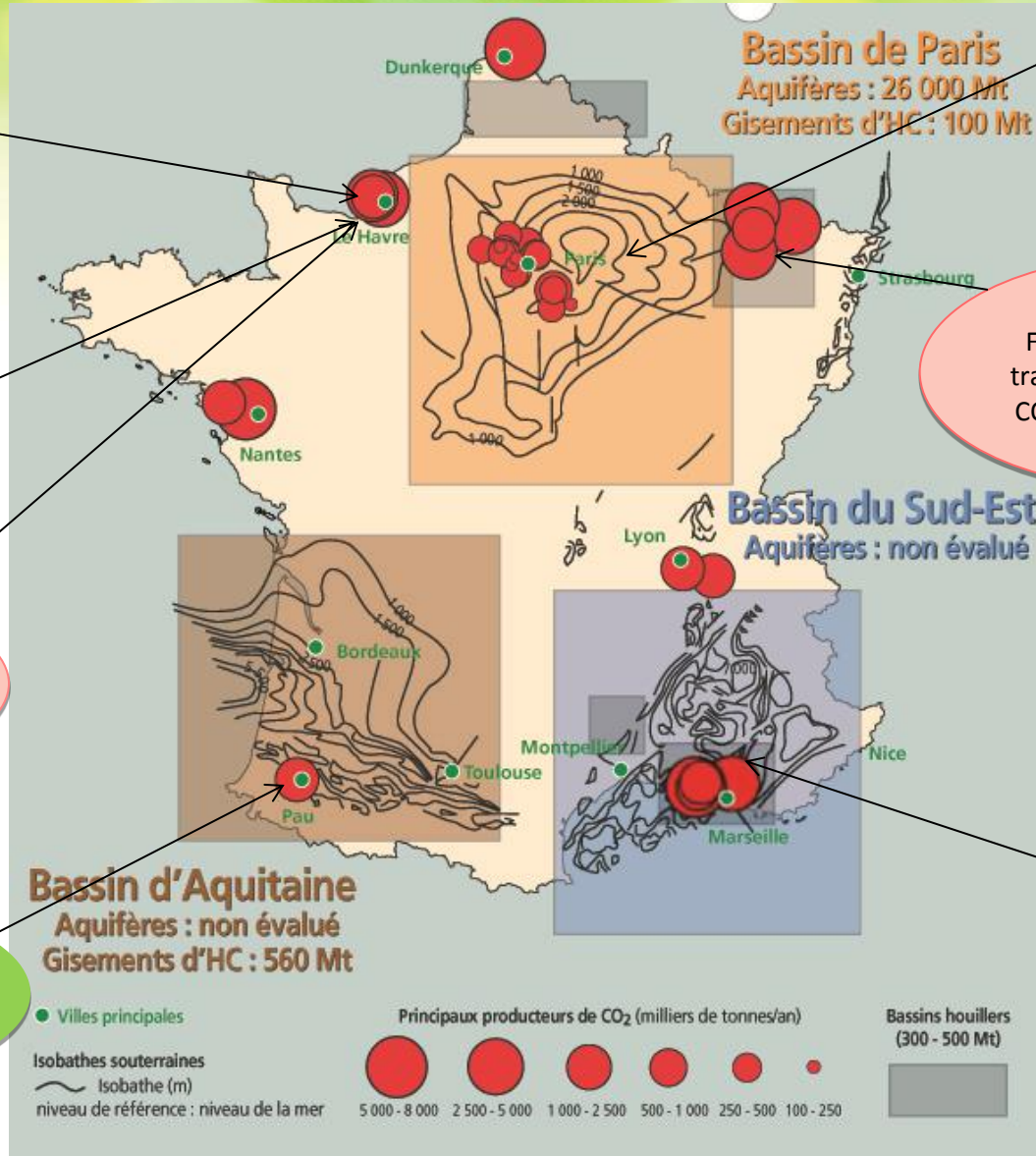
TGR – BF
Feasibility of Capture, transport and storage of CO₂ from Steel industry
ArcelorMittal

Study on prefaisability of CCUS integrated chain in Le Havre

C2A2
Coal - Advanced amine capture
1t CO₂/hour
EDF, ALSTOM

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Lacq-Rousse
Integrated CCTS pilot-
60 000 tCO₂ stored
Total

VASCO: Study on prefaisability of CCUS integrated chain in Marseille area

Main CO₂ emitting regions in France

CRYOCAPT™

CO₂ cold capture system on hydrogen production plant
100 000 tCO₂/year
Air liquide



Study on prefaisability of CCUS integrated chain in Le Havre

C2A2

Coal - Advanced amine capture
1t CO₂/hour
EDF, ALSTOM

Lacq-Rousse

Integrated CCTS pilot-
60 000 tCO₂ stored
Total

Bassin d'Aquitaine
Aquifères : non évalué
Gisements d'HC : 560 Mt

● Villes principales

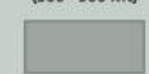
Isobathes souterraines
— Isobathe (m)

niveau de référence : niveau de la mer

Principaux producteurs de CO₂ (milliers de tonnes/an)



Bassins houillers
(300 - 500 Mt)



Bassin de Paris
Aquifères : 26 000 Mt
Gisements d'HC : 100 Mt

France Nord

Storage in saline aquifer
Total

TGR – BF

Feasibility of Capture, transport and storage of CO₂ from Steel industry
ArcelorMittal

Bassin du Sud-Est
Aquifères : non évalué

VASCO: Study on prefaisability of CCUS integrated chain in Marseille area



Club CO₂, the French team of CCUS

- Information and initiative hub on carbon dioxide capture, transport, use and storage (CCUS), Club CO₂ brings together the actors of the industrial world and research concerned by CCUS.

- Main actions:

- Identification of guidance lines and challenges for R&D program
- Encouragement of collaborative projects between public and private researchers





Merci pour votre attention



www.captage-stockage-valorisation-co2.fr
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