

ADEME NEDO Seminar

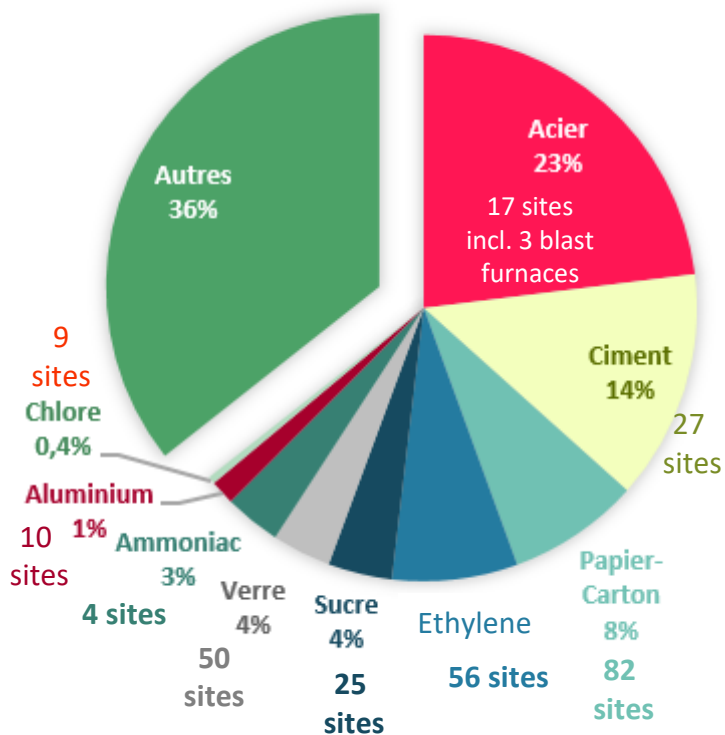
20 November 2023

Low-carbon industrial regions:
challenges and calls for projects
in **Hauts-de-France**

The challenges of decarbonising industry

Concentration by sector

Direct GHG emissions from industry



Industrie

18% des émissions françaises

~2/3 des émissions de l'industrie

Industries énérgo-intensives

Dont 75% couvertes par ~50 sites

CITEPA INSEE

Including the 9 highest-emitting sectors = 280 sites

10% of industrial jobs

Concentration by region

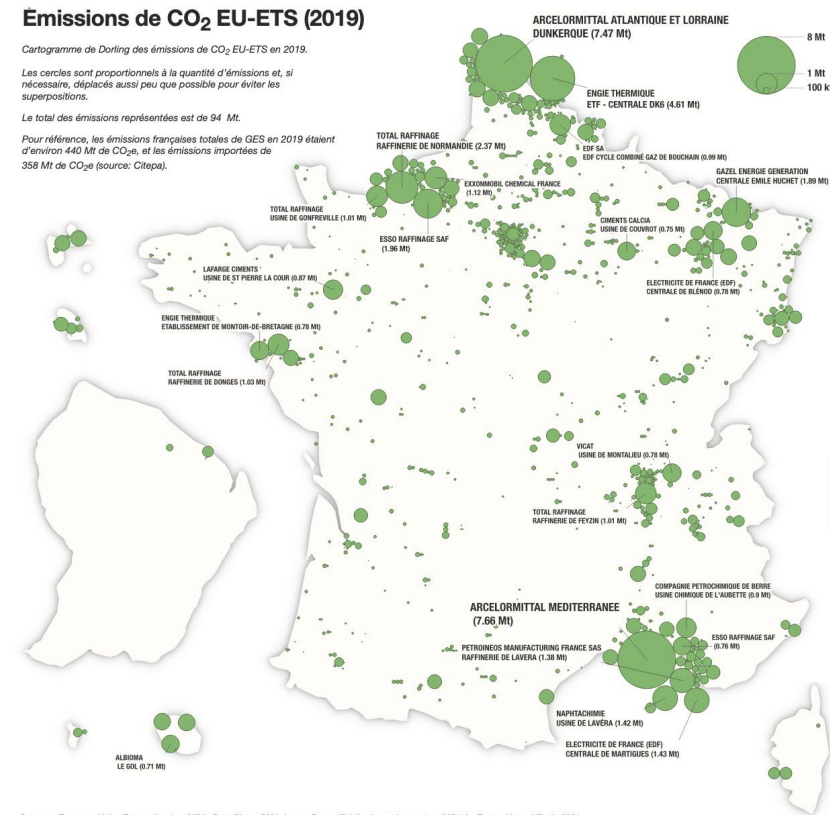
Emissions de CO₂ EU-ETS (2019)

Cartogramme de Dorling des émissions de CO₂ EU-ETS en 2019.

Les cercles sont proportionnels à la quantité d'émissions et, si nécessaire, déplacés aussi peu que possible pour éviter les superpositions.

Le total des émissions représentées est de 94 Mt.

Pour référence, les émissions françaises totales de GES en 2019 étaient d'environ 440 Mt de CO₂e, et les émissions importées de 358 Mt de CO₂e (source: Citepa).



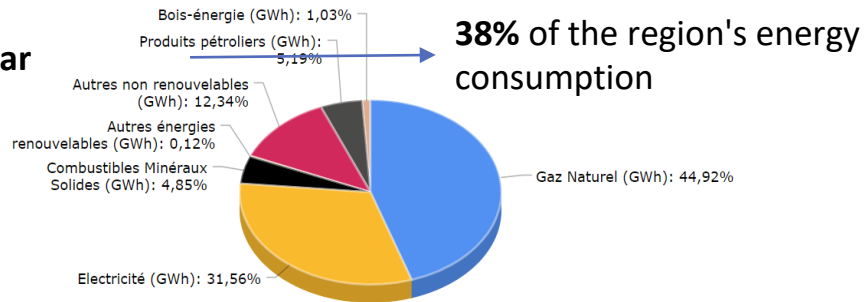
Sources : European Union Transaction Log 2021 ; Base Sirene 2021, Insee ; Base officielle des codes postaux 2021, La Poste ; Natural Earth, 2021

But we mustn't neglect the diffuse aspect: industrial fabric and jobs

Need for CAPEX, on Innovation and Infrastructure

Energy consumption and CO₂ emissions from industry in Hauts-de-France

76.5 TWh/year

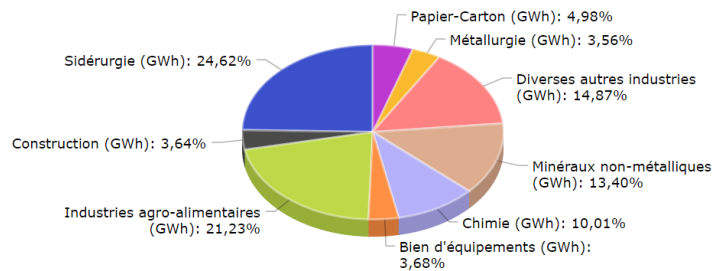


38% of the region's energy consumption

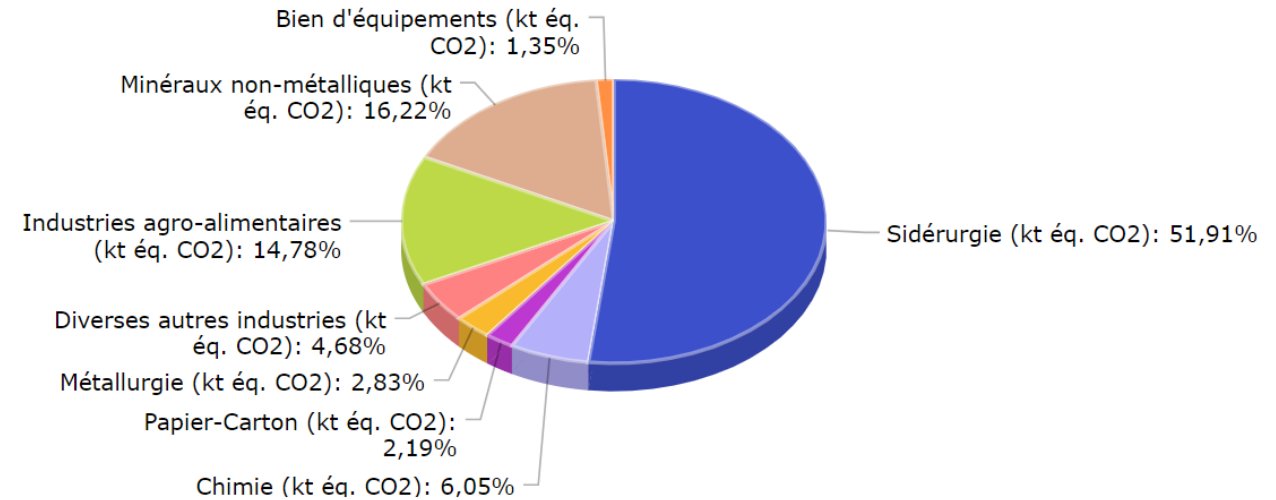
19 Mt / year CO₂e

37% of the region's direct CO₂ emissions

Gaz Naturel (GWh)	34 348	Electricité (GWh)	24 134
Combustibles Minéraux Solides (GWh)	3 710	Autres énergies renouvelables (GWh)	88,7
Autres non renouvelables (GWh)	9 436	Produits pétroliers (GWh)	3 966
Bois-énergie (GWh)	787		



Papier-Carton (GWh)	3 810	Métallurgie (GWh)	2 726
Diverses autres industries (GWh)	11 367	Minéraux non-métalliques (GWh)	10 249
Chimie (GWh)	7 656	Bien d'équipements (GWh)	2 813
Industries agro-alimentaires (GWh)	16 232	Construction (GWh)	2 786
Sidérurgie (GWh)	18 828		



Share of emissions from each industry sector in the Hauts de France region

The region emits 25% of national CO₂ emissions, 50% of which come from the steel industry

The HdF's industrial sector consumes 25% of the energy of the national industrial sector, led by the steel and the food industry



5 targets with different requirements

3 key targets for manufacturers...

SMI - Small and Medium Industries
~ 40,000 sites
40% of consumption
90% of jobs

SMI

EII - 9 energy-intensive industries
280 sites
60% of consumption

EII

...and 2 other targets to mobilise

Equipment manufacturers

Equipment manufacturers (solution providers)

R&D and innovation
R&D Innov.

36% of GHG 29 MtCO_{2eq}
40% of energy consumption (ex. raw materials) 144 TWh
90% of industrial jobs

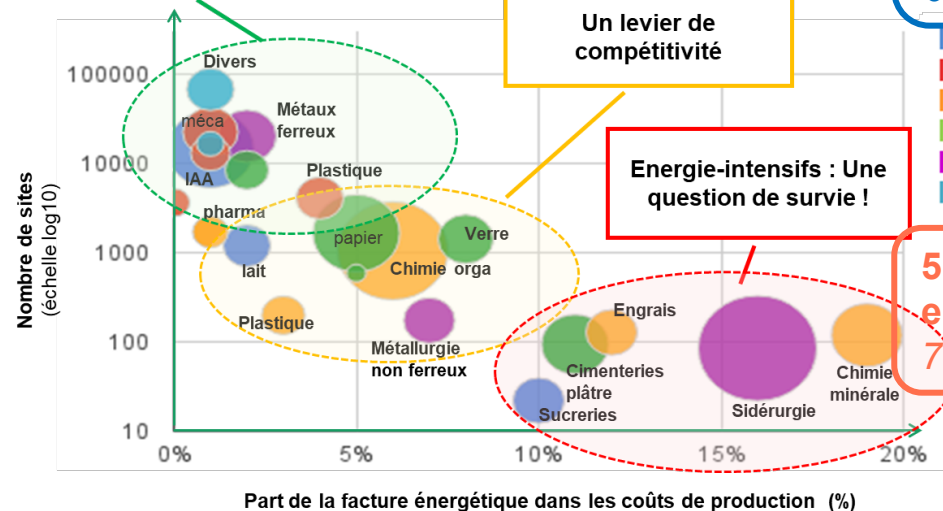
Un enjeu souvent négligé...

Un levier de compétitivité

Energie-intensifs : Une question de survie !

50 sites with the highest emissions
75% of industrial GHG

50 GHG++ sites



Source : ATEE d'après INSEE

Focus on the Dunkirk industrial zone

73% of the region's direct CO₂ emissions

The CUD, a powerful industrial port area

- The Dunkirk Urban Community (CUD) includes the Grand Port Maritime in the Hauts-de-France Region. The port covers 7,000 hectares over 10 communes
- Home to some of the world's largest companies, including ArcelorMittal, Aluminium Dunkerque, Astra Zeneca and around fifteen energy-intensive sites
- A major energy platform:
 - Europe's largest nuclear power station: 5.4 GW
 - a LNG terminal - the second largest in Europe
 - DK6 combined-cycle gas turbine power plant: 790 MW, 50% of production from recycling steelmaking gas
 - the arrival of gas from Norway: capacity of 19.6 billion m³ per year
 - biofuel producers
- An attractive region with future top-class sites (H2V, VERKOR, EPR2, etc.)

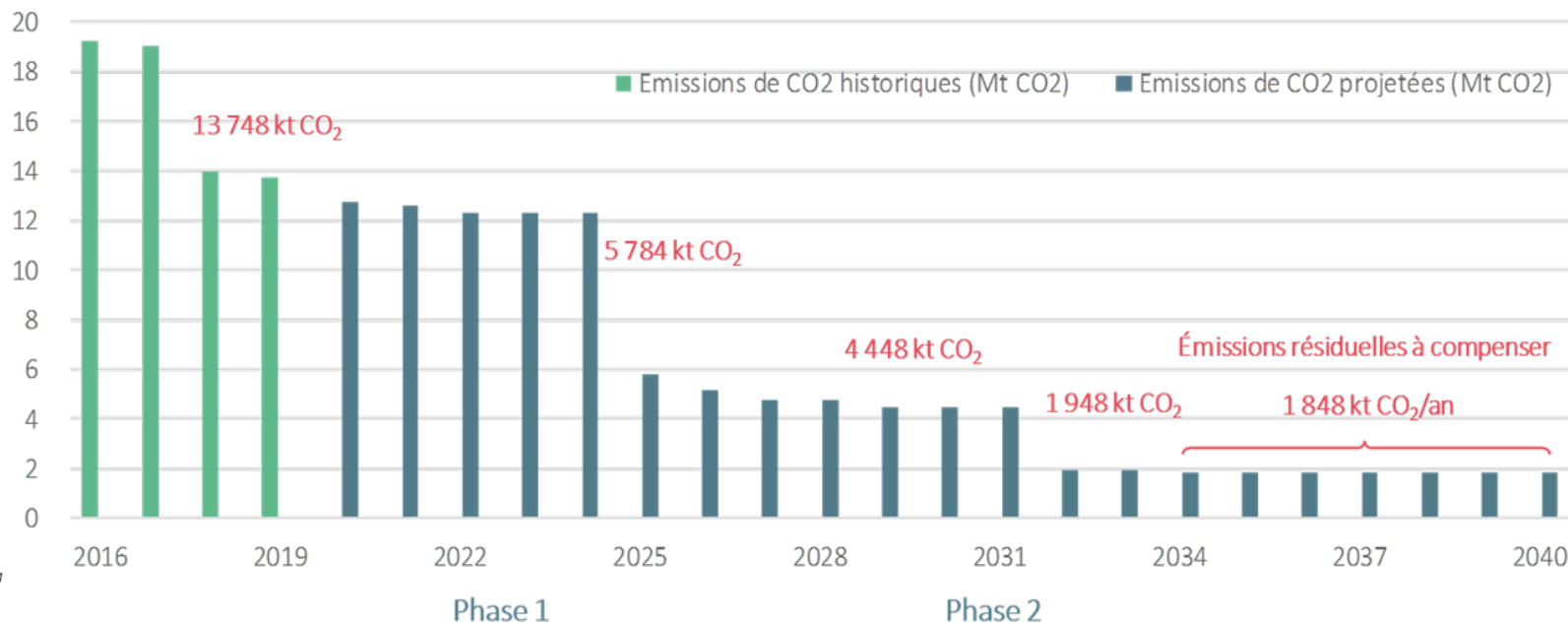


...But still in the process of reorganisation

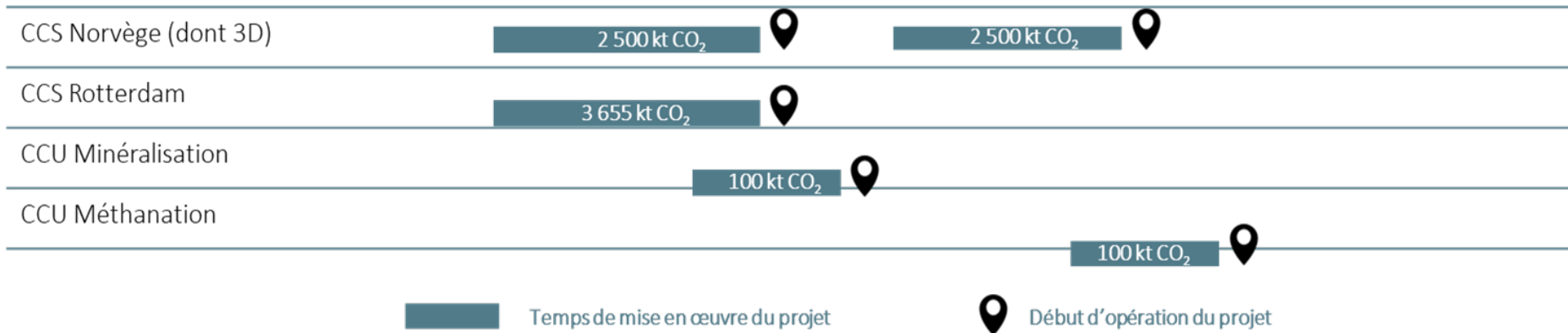
- Two major refineries have closed
- Unemployment in the urban area is higher than the national average, while industrial jobs are in short supply
- the Dunkirk area is still the **largest emitter of CO₂ in France** with 13.7 MtCO₂e/year, and is **highly dependent on carbon-based energies**

Dunkirk, an ambitious roadmap

Trajectoire de réduction des émissions de CO₂ de la plateforme dunkerquoise de la feuille de route* [Mt CO₂]



* Volumes correspondant aux émissions des 6 acteurs industriels de l'étude (90 % des émissions de la plateforme dunkerquoise)



Projects in progress: €4.5 billion, including €1 billion for Arcelor (DRI)

Electricity requirements: 1 GW

EPR2: 2035?

Verkor: installation 2025
H2V: 2025
Prologium..

€13 million support for studies and engineering granted to the low-carbon industrial zone (ZIBAC) winning project

+16,000 jobs over 10 years

Dunkirk, H2 and CCS projects on an unprecedented scale

DRI (Direct Reduced Iron) project: ArcelorMittal and Air Liquide have joined forces to develop a low-carbon steel production project. It is based on a direct iron reduction process using hydrogen. A 420 MW electrolyser is planned to supply the site.

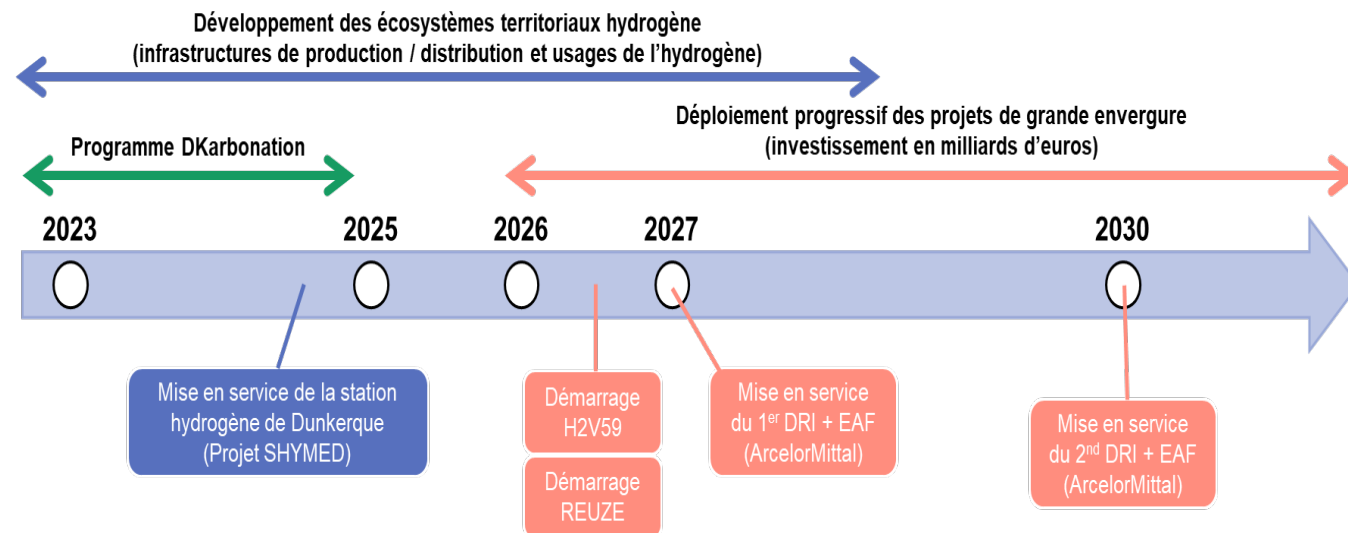
REUZE: Engie and Infinium (a company specialising in the production of biofuels) have developed a partnership with the aim of producing sustainable fuels for air and sea transport. The production technology in question will involve capturing CO2 from ArcelorMittal's steelmaking activities and supplying hydrogen from a 400 MW electrolyser assembly.

H2V59: H2V is a company which aims to deploy several large-scale hydrogen production units using water electrolysis. Near the LNG terminal, H2V would like to deploy electrolysers with a total capacity of 200 MW to produce renewable hydrogen and inject it into the natural gas network.

K6 EQIOM CEMENT PLANT: A project to capture CO2 and partly shipped and store in the North Sea and partly integrated into concrete.

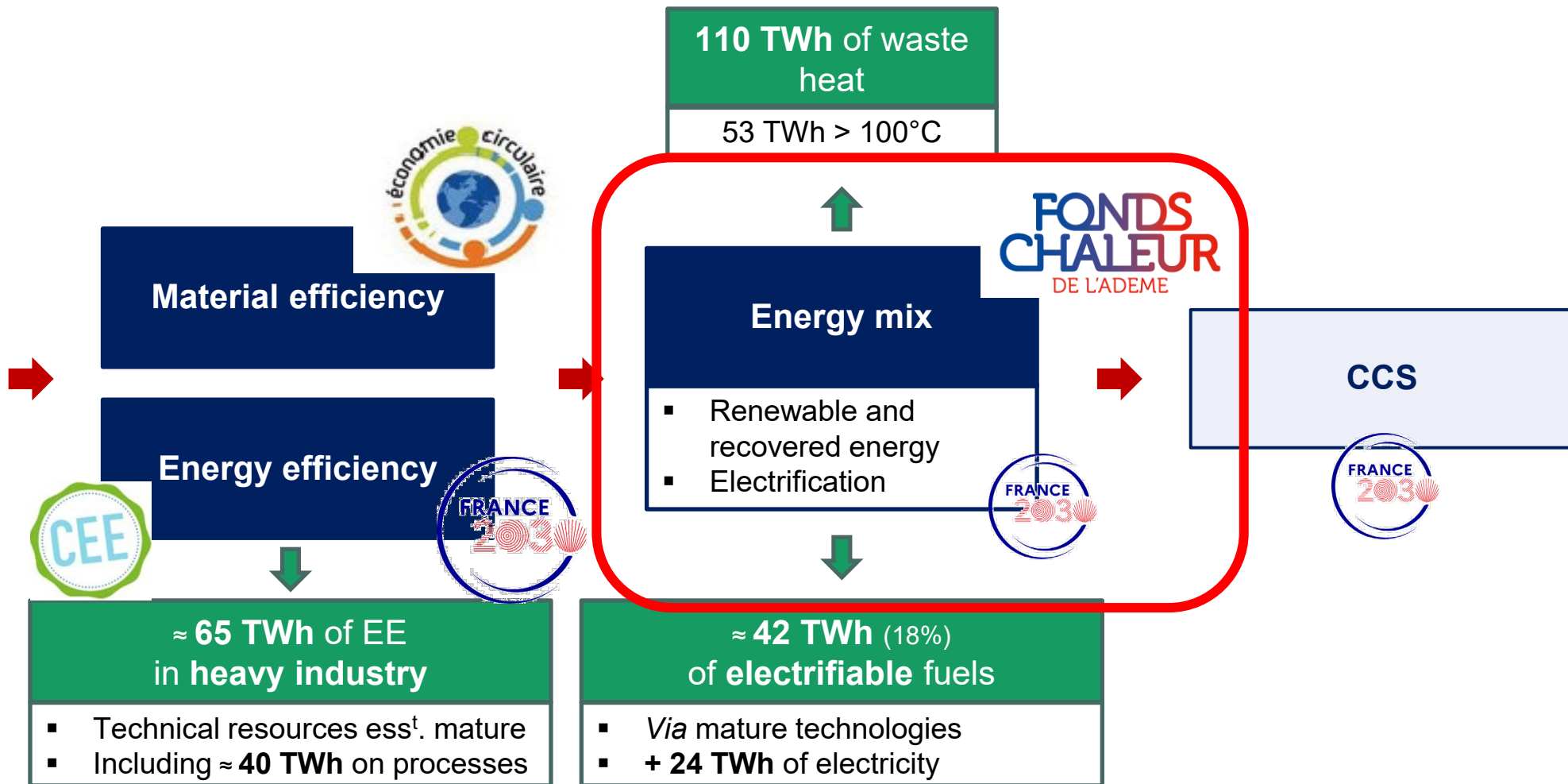
DARTAGNAN PCI CO2 HUB

Multimodal CO2 Hub project with objective to connect the main industrial emitters in the port and hinterland (EQIOM Lumbres) to capture the CO2 emitted, which would then be transported and stored in the North Sea.



Five levers for decarbonising industry

Illustrations of potential (technical & non-cumulative)



Transition(s) 2050: an exercise in exploiting these resources in 4 different scenarios

ADEME's involvement in RE

Stage 1: Know the consumption

Stage 2: Sufficiency & Energy efficiency

Stage 3: Substitute RE energy

Flagship schemes:

LOW-CARBON HEAT

ADEME Heat Fund

ERDF

Biomass
Geothermal
Solar thermal
Waste heat
Anaerobic digestion

Funding: between 30% and 70%



DEVELOPMENT OF RENEWABLE ENERGY

Call for solar PV projects

Innovative project



ADEME's involvement in H2

- The hydrogen strategy has been allocated funds as part of France Relance and France 2030, totalling more than €9 billion up to 2030.
- These funds are spread over various support schemes, including ADEME's calls for projects for “Territorial Hydrogen Ecosystems” and “Technological Bricks and Hydrogen Demonstrators”.
- These calls for projects have been relaunched in 2023, benefiting from France 2030 funding (€175m and €250m respectively). The French government also supports Important Projects of Common European Interest (IPCEI) in hydrogen, some of which are located in the Hauts-de-France region.

Hauts-de-France

SHYMED Dunkerque

Un électrolyseur de 1,25 MW situé à proximité du centre de valorisation énergétique de la Communauté Urbaine de Dunkerque utilise de l'électricité d'origine renouvelable pour produire 500 kg d'hydrogène par jour. Cette production permet d'alimenter une ligne de 10 bus, ainsi que 4 bennes à ordures ménagères et 3 véhicules lourds de collecte des déchets, via une station de distribution à deux bornes. L'hydrogène alimentera également d'autres types de camions poids-lourds ainsi que les systèmes de refroidissement de la centrale nucléaire de Gravelines.



Budget total

18,19 M€
Aide ADEME :
5,56 M€



Principaux partenaires

Hynamics, Communauté Urbaine de Dunkerque, Centrale nucléaire de Gravelines, Transdev, Banque des Territoires, ADEME.



Chiffres clés

plus de 1 137 t CO₂
évités par an.



Mise en service

à partir de 2024.

Contact : thomas.bertheau@ademe.fr

To sum up, it is important to

Built a local roadmap for decarbonation to consider all levers in a good timeframe (ZIBAC)

Focus on the best uses of hydrogen (France 2030)

not everything is effective (e.g. electric vehicles vs. hydrogen, boilers, etc.)

Consider energy supply.. with new energy consumption (Fonds Chaleur...)

the orders of magnitude of prospect electricity consumption are out of proportion to new generation projects in the coming decade.

Only renewable energy sources will be able to meet new requirements, or efficiency and sobriety will generate additional TWh of decarbonised energy, and electricity

