CCU for the decarbonization of industry and transportation

1. Context

EDF« Raison d'être »:

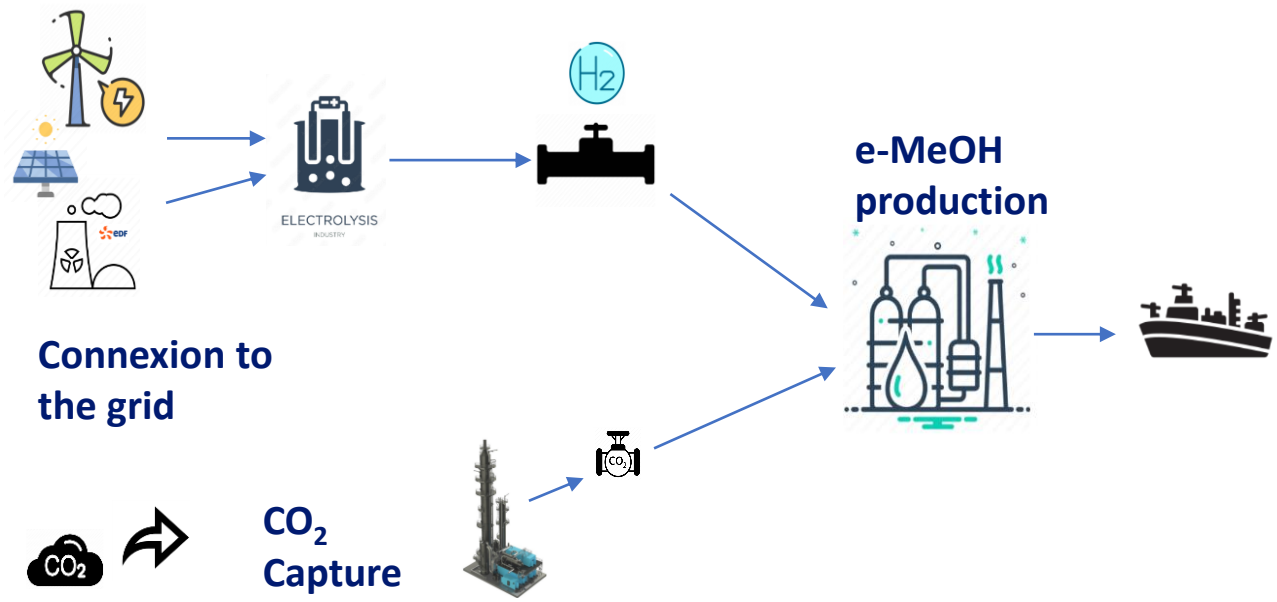
Build a net zero energy future with electricity
and innovative solutions and services,
to help save the planet
and drive wellbeing and economic development.

- Decarbonization of electrical production: more than 95% decarbonized in France

- Accompany decarbonization of industry and French territories
  - Energy efficiency
  - Process electrification
  - Low Carbon H_2
  - CCU

2. CCU Projects

- Decarbonization of industry and transportation
  - E-methanol
  - E-kerosene
- Hynovi by Vicat and Hynamics
- 2 other projects under development
  - With a global vision from the production to usage
  - With industrial partners including transportation companies



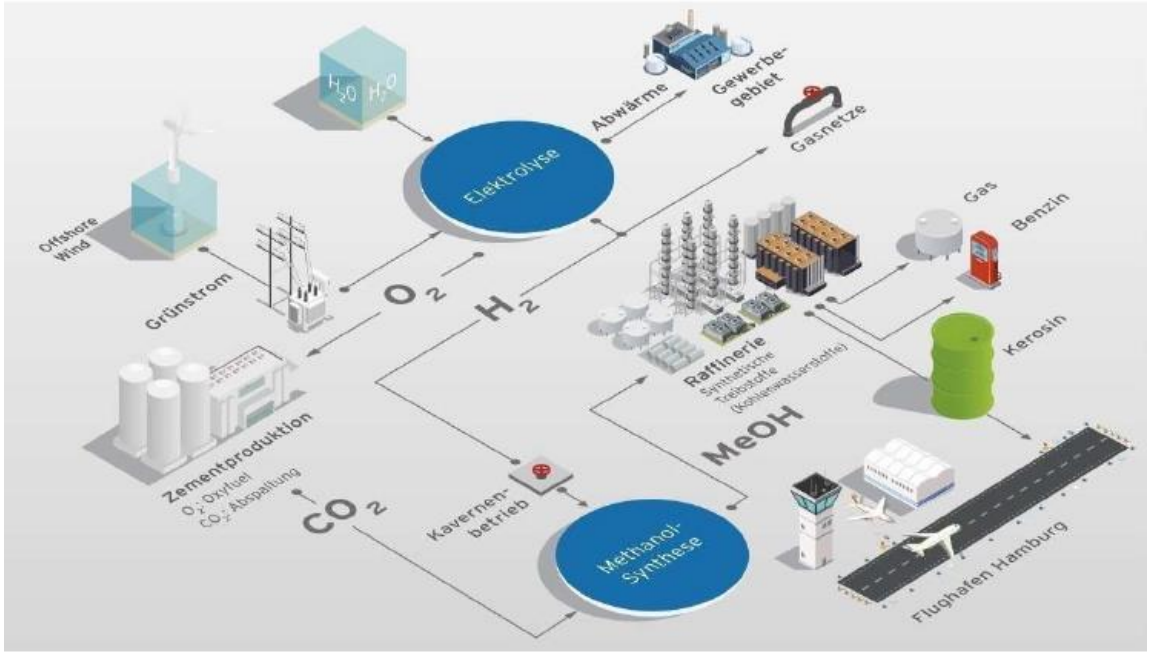
3. Strength and obstacles

Strength:

- Reduction of SO_2 and NO_x
- Light investments for vessel adaptation
- Easy logistic and storage issues
- Energy independency

Obstacles:

- ETS does not allow sufficient return on investment
- Need for support mechanism (CAPEX and OPEX)
- Major uncertainties of the regulation
  - Criteria for a low carbon H_2
  - Restrictions for RFNBOs



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4. EDF Group involvement

- Le Havre Capture Pilot (2010-2014)
  - Partially funded by ADEME
  - Technology Owner: ALSTOM,
  - Solvent supplier: DOW
  - 1t/h CO_2 capture from coal flue gas
- R&D CO_2 plateform
- Hydrogen
  - Auxhygen: 1 MWe
  - WestKüste 100: 30 MWe
  - Hynovi : 300 MWe

Thank you