

9-perspectives

A road map for carbon recovery time scale 2010 to 2050

- 1) CCS pilot to industrial scale :25 years 1

billions/plant

- That mean 500 billions capex question:storage cost

Proposals:oil recovery and carbon feedstock for
the futur of our civilization

- 2)Decarbonated energy development 30 years

- that mean **energy storage** and **H2** from **electrolysis**

- 3)carbon recovery and synfuel :

- **industrial fisher-tropsch for synfuel and polymer industry**

European research road map for valorization of carbon dioxide

- 1) carbon recovery that mean : research for new catalysis without expensive metals**
new nanostructures with specific adsorption properties (selectivity,energy efficiency,cost)
- 2)Creativity for new molecules and materials** from CO2 including biodegradable polymers, insulating materials ,fireproof materials..
- 3)New biomass cultures** from microalgae for foods ,proteines ,and biogas

Industrial researchs in chemical engineering and economic simulations

- 1) New safety industrial reactors design with catalysis process (fixed or fluidized bed)
- 2) Electrochemical catalysis processes for a direct electrical storage including **plasmas** and **electrolysis**
- 3) Mathematical simulation to determine the **energy efficiency** of each technical solution
- 4) Economical optimization of each route depending of the raw materials and the byproducts