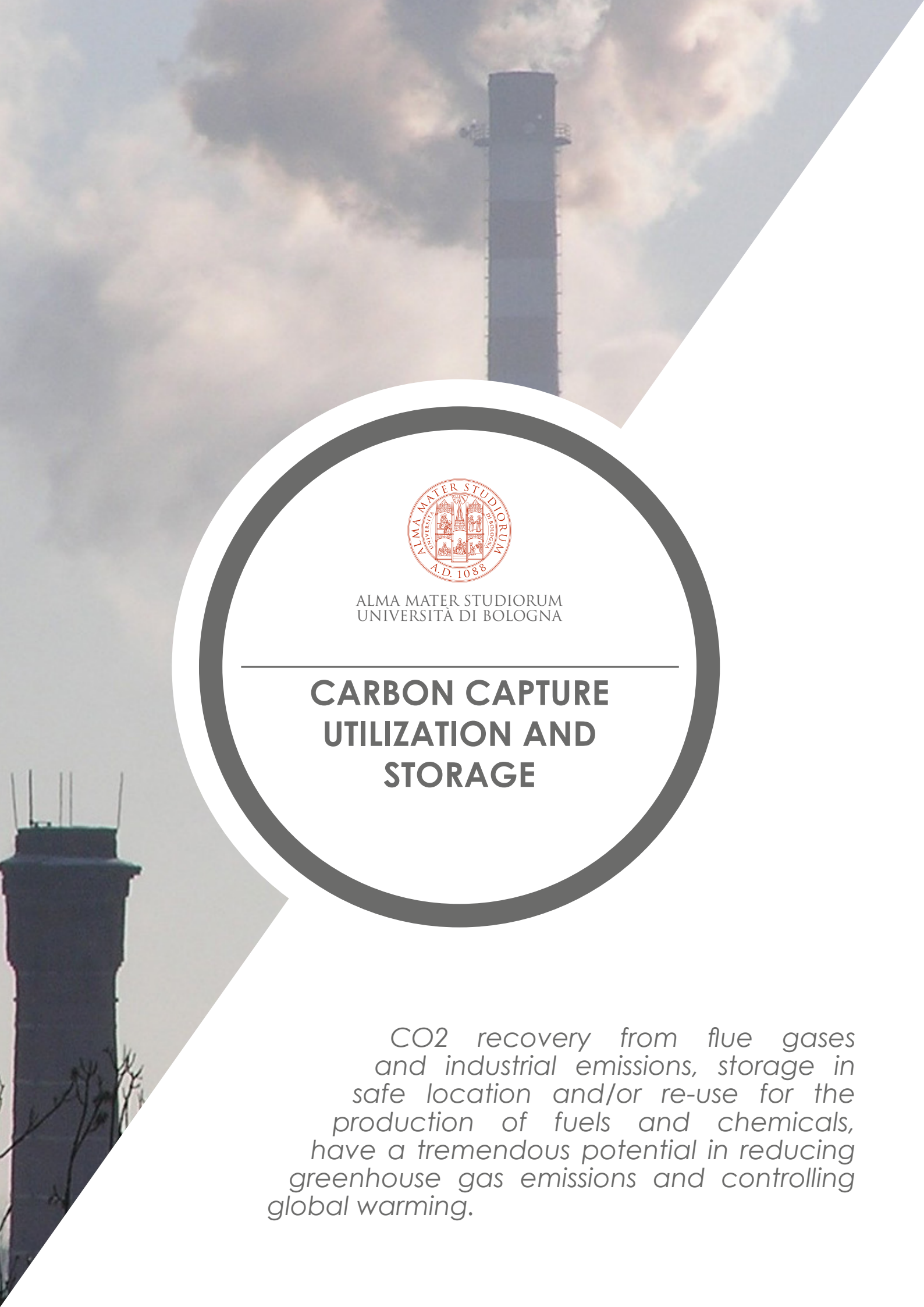
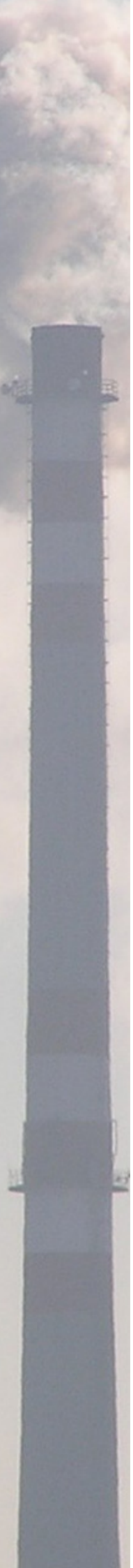


ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

CARBON CAPTURE UTILIZATION AND STORAGE

CO2 recovery from flue gases and industrial emissions, storage in safe location and/or re-use for the production of fuels and chemicals, have a tremendous potential in reducing greenhouse gas emissions and controlling global warming.



CCUS covers a vast area of research and application which involves extremely different expertises and topics. Thanks to its multidisciplinarity, the University of Bologna covers most of them.

- **Membrane** based technologies for Pre and post combustion CO2 capture and purification
- **Development of catalysts and catalytic processes** the production of fuels and chemicals from captured CO2
- Incorporation of CO2 into added value organic compounds by means of **metal metal-free and photo-catalytic protocols**
- **Biotechnological processes** for CO2 microbial reduction to biomethane and/ or fixation into biomolecules
- **Thermo, electro and photoelectro-activation** and reduction of CO2 to chemicals and fuels
- **Switchable solvents** and surfactants for CO2 capture and utilization
- **Safety and Risk Analysis of CO2 transportation and storage** in CCUS applications
- Flue CO2 fixation by using **algal cultures** for biomass production
- **Conversion of CO2 to CH4 through Sabatier reaction** by using hydrogen from renewables sources

HIGHLIGHTS

The **Catalytic Processes Development Laboratory** holds experience in using CO2 as an alternative carbon source for the production of fuels and chemicals. Advanced sustainable processes are developed by using organic carbonates for the gas-phase reduction of CO2, as well as catalytic and photo-electrochemical processes for CO2 valorisation to provide low carbon fuels and chemicals.

Membrane laboratory (MEMLAB) has strong experience in CO2 Capture thanks to several collaborations with companies dealing with biogas upgrading, natural gas sweetening and hydrogen purification. Membrane properties and performances can be tested in a wide range of operative conditions thus addressing both pre and post combustion carbon capture, as well CO2 removal from different industrial streams.

The **Laboratory of Algal Biology** has a specific experience in algal cultivation for industrial purposes. Residual CO2 from methane upgrade is used to grow algae in pilot photobioreactors.

European Projects

NANOMEMC2 - *NanoMaterials Enhanced Membranes for Carbon Capture Development of innovative CO2 selective membranes with high flux and selectivity suitable for application to both Pre and Post-combustion Capture processes* H2020.