Workshop Science behind Climate Change

CERE - Center for Energy Resources Engineering, DTU Building 229

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Climate change is the greatest challenge of our time. Human activity has already warmed the planet, and we are feeling the effects through record heat waves, wildfires and flooding. If we continue to emit CO_2 at the same rate to the atmosphere, the planet will become too hot to live by 2050.

We need to understand the science behind climate change in order to solve the broader environmental, societal and economic changes that global warming is bringing.

Join the CERE team at DTU to learn about the basic scientific principles of climate systems and the scientific efforts to mitigate global warming. You will have the unique opportunity to visit our modern laboratory facilities as well as the pilot plant. Our researchers will present the latest technologies in carbon capture and storage, energy storage, gas hydrates and water science, and show how they are contributing to fight the climate change.

By the end of this workshop, you will understand:

- **HOW** and **WHY** the climate system is changing
- **WHO** and **WHERE** the climate change will affect
- **WHAT** the science is doing to fight the climate change

The program of the day is as follows:

- **Introduction to carbon capture and storage** by Ass. Prof. Philip Fosbøl, PhD. (In Danish)
- **Short safety introduction** by Zacarias Tecle (In Danish)
- Visit to CERE facilities:

a. Could Water become the new Wind? by senior researcher Nikolaj Blom, PhD.
Water has many mysterious properties that we cannot fully explain. The **floating water bridge** is a perfect example: pure water can adopt a very unusual and semi-solid structure capable of holding its own weight in free air. New discoveries around water may enable us to use it as a power source.

b. Wetted Wall Column (WWC) by researcher Humbul Suleman, PhD.
The WWC allows us to test the solvent candidates for their rate of CO_2 absorption at lab scale. It determines the best process conditions for the fast absorption of CO_2 and for sizing the industrial equipment. Speedy solvents are identified and sent to the pilot plant.

c. Vapour-liquid-equilibria by researchers Lucas Corrêa and Athanasios Varsos.
The most common way of removing CO_2 from a gas mixture is to trap it in a liquid solvent. We will show the first step taken to determine the efficiency of this solvent. This involves mixing both gas and liquid together and measuring the amount of CO_2 removed from the gas.

d. New batteries by researcher Yingjun Cai.
You will see the interior structure of a lithium battery (cathode, anode, membrane and electrolyte). You will learn how to assemble a lithium battery and the importance of ionic liquid electrolyte.

e. Gas hydrates by researcher Meng Shi.
What is a gas hydrate? You will learn about the different types and applications, gas hydrates formation and exploitation experiments, and also the setup and procedure for hydrate formation and production.

- **Visit to the pilot plant** by researcher Susana Almeida, PhD.
This equipment allows eliminating the CO_2 from a current of gas using a liquid. It is a 10 m vertical glass column, filled with a metal to help to disperse the liquid inside. Liquid comes from the top of the column and gas from the bottom. In the end, most of the CO_2 leaves the gas and is now involved in the liquid.

***IMPORTANT: Participants in this workshop must wear long trousers and closed shoes.**