An ECCSEL ERIC project

Wednesday, June 16th, 2021

14.00-15.00 CET

WEBINAR

Chemical looping and gas switching combustion

REGISTER HERE

https://rebrand.ly/ECCSELwebinar5

Speakers

Maurizio Spinelli, PhD – LEAP, Senior Researcher

Stefano Stendardo, PhD – ENEA, Senior Researcher

Q&A session chaired by Robert de Kler, Energy Expert - TNO

WHAT WILL YOU LEARN

Calcium Looping technology demonstration in industrial environment: CLEANKER

CLEANKER (CLEAN clinKER production by calcium looping process) project (www.cleanker.eu) got EC support from October 2017 to September 2021 under the Horizon 2020 call "Enabling decarbonisation of the fossil fuel-based power sector and energy intensive industry through CCS" (LCE 29 – 2017) to establish the integrated Calcium looping (CaL) process as a feasible technology to reduce CO_2 emissions from cement plants. The CaL technology is a regenerative process that takes advantage of the capacity of calcium oxide-based sorbents to capture CO_2 at high temperatures. The main activity of the CLEANKER project is the design, construction and operation of a CaL demonstration system including the entrained-flow carbonator and the entrained-flow oxyfuel calciner, core elements of CaL technology.

Deep decarbonisation of hard-to-abate industry via inherently circular CCUS processes

The progressive decarbonisation of the Italian economy requires the research and development of new technologies for the safe and efficient use of renewable sources, together with the sustainable use of conventional fuels. Calcium looping (CaL) process as inherently circular process is a good candidate for capturing CO_2 from hard-to-abate sectors as steel and cement industries. The spent calcium based material used as CO_2 acceptor can be reused as flux in steel making process and raw material in cement industries.

In this presentation optimal integration of the calcium oxide-based capture process for the decarbonisation of steel and cement making processes on a large scale will be presented. Different processes will be defined and, for each configuration, the mass and energy balances along with carbon footprint will be evaluated with particular attention to the thermal integration between the CaL process, the energy-intensive industry and energy production, in order to maximize energy recovery.

For further information visit our website

http://eccsel.org/

http://eccsel.org/about-teu-grants/eccselerate/

ECCSEL ERIC (European Research Infrastructure Consortium) was established in June 2017 as a permanent pan-European distributed research infrastructure, with the main objective of enhancing European science, technology development, innovation and education in the field of CCUS, in order to combat climate change.

ECCSELERATE project is aimed at increasing the accessibility to the excellent network of facilities already established in ECCSEL ERIC for a wider user group, part of the research and industrial community.

KEYNOTE SPEAKERS

Maurizio Spinelli

Maurizio Spinelli, PhD in Energy and Nuclear Science and Technology (2016) from Politecnico di Milano, found his main research interest in the conceptualization and thermodynamic analysis of high efficiency CCS processes for the reduction of the carbon footprint of the major energy and industrial sectors responsible for climate change. Since 2011, he contributed to several public and private research projects by developing process simulation and techno-economic evaluation of CO_2 capture systems (Calcium Looping, Chemical Looping, Fuel cells) integrated to energy, oil&gas, cement and steel industrial systems.

Stefano Stendardo

is a Mechanical Engineer, with a specialization in Energy, and a PhD on modelling carbon dioxide uptake by a particulate sorbent in decarbonised energy production. He has been a researcher in the field of Energy Science in ENEA since 2004, where he was involved in the design of the pilot plant ZECOMIX, for which he is now the scientific manager. In 2017 he has been appointed as the reference person in ENEA for the activities on the CCUS processes. He is the Italian representative in the executive committee of the Research Fund for Coal and Steel (RFCS), which supports research projects in clean steel sector. Since 2019 he has participated as the Italian delegate in the collaborative technological programme of the International Energy Agency (IEA) on the Industrial and Energy-related Technologies and Systems.

WHAT IS CCUS?

Carbon capture, utilisation and storage, or CCUS, is an important emissions reduction approach that can be applied across the energy system, in both power generation and industrial sectors.

CCUS encompasses methods and technologies to remove CO_2 from the flue gas and from the atmosphere, followed by recycling the CO_2 for utilization and determining safe and permanent storage options:

- **Capture** technologies allow the separation of CO_2 from gases produced in electricity generation and industrial processes.
- After capture, carbon dioxide must be **transport**ed to the storage or utilization site. CO_2 is an inert gas and can be easily handled and transported in high-pressure pipelines. Alternatively, it can be transported in industrial tanks by ship, rail and truck.
- There are several possibilities for long-term CO_2 **storage** in safe conditions. Generally, CO_2 is stored in carefully selected geological rock formations that are typically located several kilometres below the earth's surface.
- **Utilization** technologies allow to use CO_2 to make valuable products, such as clean fuels, building materials or consumer goods. A clear example of circular economy, where the CO_2 becomes a raw material rather than a waste by-product.