

## **Strategies for the CO2 valorisation at the Center for Sustainable Future (IIT)**

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The growth of the global population to over seven billion people, which has increased energy consumption and in turn natural resource depletion, pollution, waste disposal and anthropic CO<sub>2</sub>, has made “energy transition” and “circular economy” the essential challenges for the future. The talk will be focused on the strategy of the Center for Sustainable Future Technologies of the Italian Institute of Technology to develop a future generation of nanomaterials, processes and systems to limit the environmental impact of production, distribution and use of energy from the perspective of a sustainable and circular economy.

The following main topics will be faced: 1. Nanomaterial production and transformation into devices for green energy, green fuel production, energy management and CO<sub>2</sub> valorization; 2. Design and Development of Microbial Platform for bio-production from CO<sub>2</sub>; 3. Technologies for the realization of devices and systems integration in an energy transition perspective.

An overview of technologies and facilities of the Center of Research (<https://www.seastar.center/>) will be provided across the production of materials for catalysis, electrodes, membranes, photovoltaics, and for combustion, hydrogen, green fuels. The Center provide also top-level knowhow on micro- and nano-scale structural, compositional, optoelectronic, in-situ and in-operando characterization. Technologies and processes on power electronics, sensing, fuel cells, photovoltaics, batteries, supercapacitors, engines/combustion systems, waste valorization, (photo)catalysis, recyclability and durability of materials, new fabrication technologies with reduced environmental and energy impact, recyclability and durability of materials will be covered.