

## **ENERGY SOURCES AND VECTORS: A FOCUS ON HYDROGEN**

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The world is heading toward the decarbonization of the energy sector, and hydrogen has been identified as one of the key players in this scenario, meaning that its production must keep pace with the foreseeable surge in demand.

The key objective of the lecture will be to provide an overview of energy sources and vectors, in the framework of the transition from fossil to renewable sources and of the decarbonization.

First part will deal with a general introduction on current situation of energy production, transport, and use with its pros and cons, such as the positive role of energy availability in improving human development, and the negative effects on environments and human health.

Then it will be focused on the use of hydrogen as an energy carrier, with some specific information on innovative materials for the sustainable production of green / decarbonized hydrogen. While electrocatalytic production can directly harness sustainable energy inputs, thermocatalytic processes will be as critical due to their easier scalability and lower capital costs. Despite their obvious differences, the two processes share the common need to employ robust and cheap catalysts, limiting, or even eliminating, noble metals without scarifying activity and stability.