Sustainable Energy Research Group

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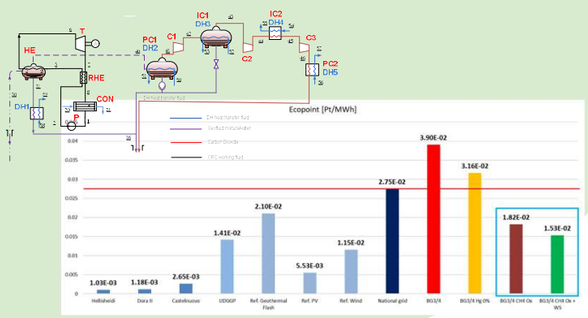
PhD program in
Industrial Engineering

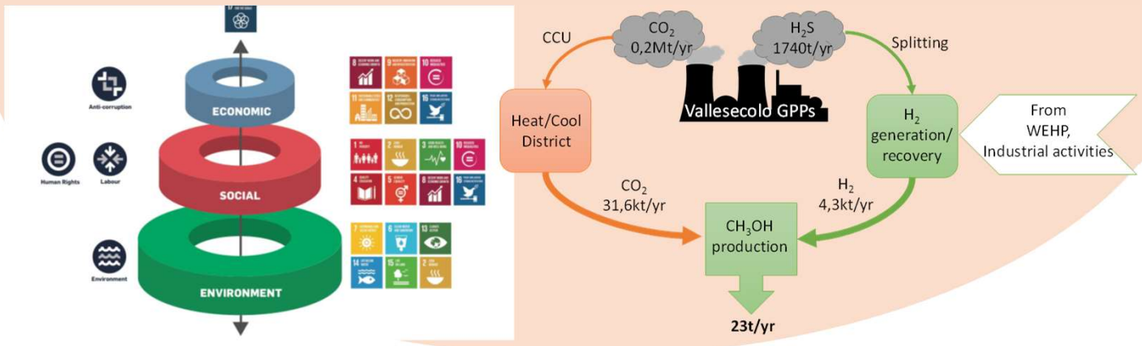
Sustainability

Life Cycle Assessment of several energy systems (ES) from renewable sources and comparison with conventional ES. In particular, the analysis of standard geothermal systems and technologically innovative configurations.



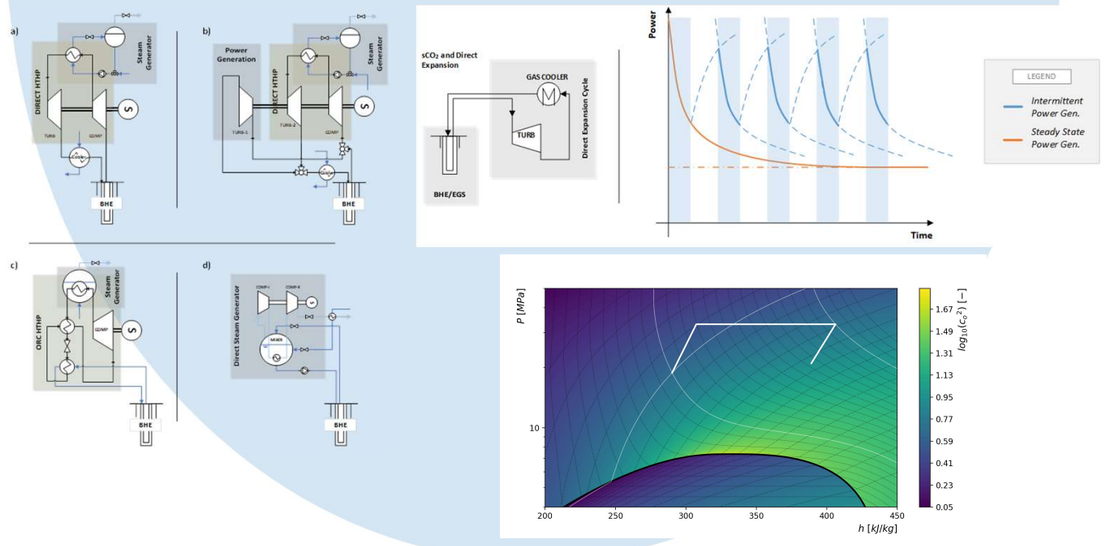
Geothermal CO_2 emissions

The research aims to evaluate the circular use of geothermal emissions to produce energy, hydrogen, methanol, and other possible products, promoting a circular and eco-friendly energy system. It's a multidisciplinary study that includes environmental, economic, exergetic, and social analysis.



CO_2 for Geothermal Systems

In recent years, CO_2 has become very appealing as a replacement for water as a working fluid in geothermal systems, the first proposal being drafted by Brown in 2000. The advantages of CO_2 lies in its **non polarity** which significantly reduce the **viscosity** and the **scaling** in the system (as it **does not dissolves salts**). Moreover, in typical geothermal condition, CO_2 usually produce an impressive **chimney effect** drastically reducing **the amount of power required for pumping**. In the last year our group has performed extensive research on the field **analyzing different plant schemes** that can work with such system.



Prof. *Giampaolo Manfrida*
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