



GEOHERMAL ENERGY: RESOURCE ASSESSMENT, PLANTS, AND ENVIRONMENTAL IMPACTS

This initiative is aimed at students currently enrolled in **Master's degree** courses in the following fields:

- Chemical Engineering,
- Mechanical Engineering,
- Engineering Geology,
- Environmental Engineering,
- Geology,
- Geo-resources / Geo-energy / Petroleum and Mining Engineering,
- Energy Engineering

4 May – 26 June 2026 Online Virtual part
13-17 July 2026 In presence part (Larderello Italy)

Program:

1. Team working utilizing dedicated software, technical lectures, group presentations
2. Lecture from ENEL Green Power experts
3. Guided visits:
 - Visit to Exergy company, the second leading player in geothermal binary plant installations worldwide (Milan area)
 - Visit at the Museum of geothermal energy (Larderello)
 - Visit to the Central Plant of Enel Green Power (Larderello)
 - Visit the Geomuseum of the Biancane (Monterotondo Marittimo) and tour in the nearby area rich of geothermal manifestations on the surface
 - Visit to the geothermal area of Sasso Pisano and to the “Vapori di Birra” brewery that used geothermal energy for beer production
 - Visit to the Podere Paterno farm that uses geothermal energy in the cheese making process.

Abstract:

The use of geothermal resources for electricity production is steadily expanding worldwide, creating valuable career opportunities for graduates in geology, civil and environmental engineering, and energy engineering. The BIP program combines online and in-person lectures, group work, and technical visits in Larderello, Italy to provide a comprehensive overview of geothermal energy systems. Students gain foundational knowledge in geology, hydrogeology, and applied geophysics for reservoir characterization. Different geothermal reservoir types and plant technologies are presented, with particular focus on binary plants and Organic Rankine Cycle (ORC) systems. The course also explores the reuse of depleted oil and gas wells for geothermal applications. Simplified techno-economic models are introduced for preliminary feasibility assessment. Flow and heat transport in porous and fractured media are explained and applied through practical training with the FEFLOW finite element code. Environmental aspects such as micro-seismicity and subsidence are discussed. Students work in teams on a feasibility study and well-field simulation. The in-person activities in Larderello area include guided visits to industries operating in the geothermal sector, geothermal plants, the geothermal museum, local industries using geothermal steam, and key surface geothermal manifestations.



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