



UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

Socio-Political Aspects of Modern Energy Plants

2627-2-F7603Q012-F7603Q01202

Learning objectives

The module provides students with conceptual tools from the social sciences to analyse the energy transition as a sociotechnical, political, and territorial process, rather than merely a technological issue. In connection with Advanced Technologies for Renewable Energy Concepts, the module examines the social acceptability of energy plants, energy justice implications, territorial conflicts, shared governance models, and the role of artificial intelligence in energy systems.

By the end of the module, students will be able to:

- recognise the sociotechnical nature of energy infrastructures;
- distinguish between energy poverty and energy justice, applying their main analytical dimensions;
- interpret social acceptance conflicts related to energy plants;
- analyse shared governance models, with particular attention to energy communities and energy commons;
- critically discuss the role of artificial intelligence in energy systems;
- distinguish between efficiency-oriented and sufficiency-oriented approaches;
- integrate socio-territorial analysis into a technical energy project.

Contents

The module addresses the social, political and territorial dimensions of the energy transition. The main topics covered include: energy and socio-technical systems; poverty and energy justice; social acceptability of plants and territorial conflicts; renewable energy communities, energy commons and Positive Energy Districts; artificial intelligence, data and governance of energy systems; transformations of consumption, energy efficiency and sufficiency.

Detailed program

The module, for a total of 16 hours, introduces theoretical and applied tools to understand the energy transition as a sociotechnical, political, and territorial process. Teaching activities may combine in-person and remote sessions, lectures, guided discussion of readings, case analysis, and explicit connections with Advanced Technologies for Renewable Energy Concepts.

The module will address the following thematic areas: energy as a social and political infrastructure; sociotechnical systems and energy democracy; energy poverty, inequalities, and energy justice; social acceptance of energy plants, risk perception, and territorial conflicts; renewable energy communities, energy commons, PED and urban-territorial governance; artificial intelligence, data, automation, and regulation in energy systems; changing energy consumption patterns, energy practices, efficiency, and sufficiency.

The module also supports students in integrating socio-territorial aspects, social acceptability, energy justice implications, and possible forms of shared governance into the technical energy project developed within the course.

Prerequisites

No specific background in sociology is required. Basic familiarity with the main issues of environmental sustainability and the energy transition is useful and may have been acquired through other courses in the programme.

Teaching methods

The module consists of 16 hours of teaching activities, which may be delivered partly in person and partly online. Teaching methods may include lectures, guided discussion of readings, case analysis, applied exercises, and discussion of students' project work.

The combination of in-person and remote activities will be used to alternate theoretical framing, collective discussion, and application to technical energy case studies

Assessment methods

Assessment for this module is integrated with Advanced Technologies for Renewable Energy Concepts (prof. Acciarri) as part of a joint examination.

Students will develop a technical energy project, complemented by an analysis of the socio-territorial aspects of the case. This analysis should consider, where relevant, the community or territory in which the intervention is situated, its social acceptability, energy justice implications, and possible governance arrangements.

The project discussion will assess students' ability to critically connect the theoretical contents of the module with the technical-energy aspects of the case analysed.

Assessment criteria for the socio-political component include:

- command of the main theoretical frameworks;
- ability to apply them to the project case;
- autonomy of judgement in analysing social, territorial, and governance implications;
- clarity of presentation and appropriate use of language.

The final grade for the integrated course is expressed out of thirty.

Textbooks and Reading Materials

Texts to study:

- Burke, M.J. & Stephens, J.C. (2017). Energy democracy: Goals and policy instruments for sociotechnical transitions. *Energy Research & Social Science*, 33, 78-93. DOI: 10.1016/j.erss.2017.05.024.
- Jenkins, K.E.H., McCauley, D., Heffron, R., Stephan, H. & Rehner, R. (2016). Energy justice: A conceptual review. *Energy Research & Social Science*, 11, 174-182. DOI: 10.1016/j.erss.2015.10.004.
- Wüstenhagen, R., Wolsink, M. & Bürer, M.J. (2007). Social acceptance of renewable energy innovation: An introduction to the concept. *Energy Policy*, 35(5), 2683-2691. DOI: 10.1016/j.enpol.2006.12.001.
- Bernardi, M. (2025). En-communiting: framing renewable energy communities as territorial asset for environmental and social well-being. *Renewable and Sustainable Energy*, 3, 1-25. DOI: 10.55092/rse20250002.
- Darby, S. & Fawcett, T. (2018). Energy sufficiency – an introduction: A concept paper for ECEEE. European Council for an Energy-Efficient Economy.
- Zhu, R.R. & Ma, J. (2026). Artificial intelligence and the energy transition: Towards ethical and equitable future power systems. *Energy Research & Social Science*, 132, 104564. DOI: 10.1016/j.erss.2026.104564.

Additional materials, articles, documents, case studies, may be suggested as in-depth studies during the module

Sustainable Development Goals

AFFORDABLE AND CLEAN ENERGY | INDUSTRY, INNOVATION AND INFRASTRUCTURE | SUSTAINABLE CITIES AND COMMUNITIES | RESPONSIBLE CONSUMPTION AND PRODUCTION | CLIMATE ACTION | PARTNERSHIPS FOR THE GOALS
