Course: Energy Transition: Context, Policy and good Practices — credits: 5

Course code	SUVM23ETCPP
Name	Energy Transition: Context, Policy and good Practices
Study year	2025-2026
ECTS credits	5
Language	English
Coordinator	W.P. van der Gaast
Modes of delivery	Teaching method 1
Assessments	Energy Transition: context, policy, good - Report

Learning outcomes

Objective of the module:

The module enables students to consider aspects of climate change as the main driver for the energy transition. Consequently, the energy system which has been built up around abundant availability of fossil fuels, with the objective to transfer these efficiently from source to end user, must change under pressure of UN-, EU- and national-level climate policies and targets. This triggers innovations, but the challenge of the energy transition is to deploy these successfully in the market for a modified energy system. The module introduces this multi-level perspective of the energy transition, mostly taking a political, energy and legal perspective.

The students will work on the following learning objectives:

- The student can, in the role of policy analyst, explain energy and climate policy dimensions and dynamics at the level of the UN, the EU and nations for policy advice to energy system actors.
- The student can, in the role of an energy system decision maker, assess a range of technology options for a country's energy transition against economic, social, and environmental criteria in a matrix for multi-criteria decision analysis.
- The student can, in the role of policy analyst, using the concept of Multilevel perspective, identify required energy system changes considering longer-term policy 'landscape' developments in the form of advice to policy makers.
- The student can, in the role of policy maker, assess the efficacy of individual policy instruments towards an energy and/or climate goal and prepare policy packages at different policy making levels whereby policy instruments reinforce each other, and negative interactions are avoided.
- The student can, in the role of policy maker, assess the extent to which energy transition decisions are resilient to potential impacts of climate change, as input to a 'climate-proofing' policy package.
- The student can, in the role of policy analyst, write a document about a sustainable energy strategy for a given context or location thereby considering the above learning outcomes.

After completion of this module the student is able to:

1. Evaluate (identify and prioritise) (technology) solutions for sustainable, low-emission energy systems in light of countries' societal, economic and environmental strategies.
2. Understand energy system dynamics, including barriers and enablers for prioritised solutions.
3. Create a basic plan for implementing a sustainable energy solution at the scale of a community or a country, including a business plan and stakeholder consultation process.
4. Understand the effectiveness of energy and climate policy and what factors determine this.
5. Evaluate climate resilience of sustainable energy solutions in light of climate change impacts.
6. Remember the different legal systems (common law, civil code) and how law functions within the European Union.
7. Analyze different sources of law and the different disciplines of law (e.g. consumer law, contract law, administrative law)

Content

Content of the module:

The module Overview elaborates on how clean energy innovations can be technically developed within a niche but needs to match with other economic and social goals and priorities that a country may have and which needs to be balanced by actors in the energy system. The weights that the energy system actors add to the importance of clean energy solutions in its turn depends on what the landscape for climate actions looks like, such as based on new scientific insights on climate change and its impacts on societies and, for example, international climate agreements. The point to be made, with help of such concepts as multilevel perspective, is that the success of energy transitions does not only depend on the technical functionality of a low-emission solution, but also on its economic affordability and social acceptance.

Based on these insights – what are prioritised, socially realistic energy technologies and what needs to be done for their implementation at desired scales – policy targets and instruments can be formulated as concrete actions to shape energy and climate strategies. The module will highlight examples of the complexity of policy making. After all, policy making does not take place in laboratories, where contexts can be controlled, but are implemented in overly complex environments, where they co-exist with other policies, that target the same consumers and enterprises, possibly in contradictory ways. The module will address these complexities by explaining potential policy interactions (e.g., between energy and climate policies) and how these can affect the effectiveness of individual policies.

For that, it starts with climate policy making at the level of the UN as the overarching policy context for energy transitions. This discussion will explain how politics by the UN is driven by countries' sovereign priorities and that reaching consensus on a UN agreement requires negotiations to keep countries on board of the eventual policy outcome. At the level of the EU, politics are driven by member state and community priorities and concerns, driven by the interplay between European Commission, European Council and European Parliament. The third policy context to be discussed is that of individual member states who incorporate these policy instruments into their national policies.

Also, the module provides an introduction into European law, for better understanding of how EU-level energy and climate policy making works; a more detailed programme on European law will then follow in Module 3.
Finally, the module extends the context for (renewable) energy decisions to climate resilience of energy systems. The rationale for adding the latter is the increasing importance of climate change adaptation. Naturally, SESyM has a focus on low-emission energy solutions which contribute to reducing greenhouse gas emissions. However, there is a growing concern that the effectiveness of low-emission energy systems can be affected by climate change impacts, such as solar PV becoming less efficient with higher temperature, wind turbines increasingly switched off due to heavier storms and small-scale hydro plants threatened by lower water levels due to

lower precipitation levels. Consequently, robust energy systems require consideration of climate change impacts and solutions to adapt to these.

Included in programme(s)

European Master in Sustainable Energy System Management

School(s)

Institute of Engineering

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