

The development of technology assessment (TA) methods was driven by multiple factors: concern about the consequences of new technologies, a desire to provide 'objective' information about such impacts at an early stage and ideally avoid unfavorable side effects, as well as the need for ex-ante assessments of technological government projects. "TA was conceived as an analytic activity, aimed at providing decision makers with an objective analysis of the effects of a technology" (Van Eijndhoven 1997). Technology assessment makes use of various methods and conceptual approaches and aims to integrate technological, environmental, economic, as well as social and ethical aspects into the assessment of technologies.

There are many methods of technology assessment. In the frame of this module the basic idea of Life Cycle Assessment will be introduced more precisely. It will be shown how SSH issues can be taken up within the method of LCA. Throughout the units of the module theoretical and methodological aspects will be linked to examples of energy research and energy technology development. Based on group works students will work out some of the contents.

3. Complete SSH problems description

- It has been observed for centuries that technological change always impact societies and creates winners and losers. Each technology (or family of technology) has unforeseeable implications for society. Nowadays it is considered that impacts of technologies on society have to be analyzed, assessed and evaluated.
- Since the 1970s the assessment of technologies has developed as an interdisciplinary research of technological impacts on society. TA became institutionalized in many countries to generate knowledge for public discourse and policy advice. TA institutions play a crucial role and shape research on and development of energy technologies.
- A basic understanding of assumptions, principles, and main goals of TA as well as its functions in society and policy is useful for those who do research and develop energy technologies.
- A major challenge for TA is: how to integrate societal perspectives into the assessment of technologies. Methods and approaches to deal with this issue will be part of the module in order to trigger awareness to this point.

4. Prerequisites and Contextual knowledge

There are no prerequisites except the interest for the topic. The module addresses master and PhD students, but bachelor students would also be able to attend.

5. Learning outcomes

A) KNOWLEDGE

The students will learn about the idea, concept, role and institutions (actors) of technology assessment and how it applies to energy technologies. The module will allow the students to expand their knowledge about the methods, basic assumptions, main goals and TA's role in and for society and policy. This includes knowledge about the relation and difference between TA and risk assessment, current trends in TA, and some specific methods such as sLCA.

B) SKILLS

The content of the module will enable the students to apply their newly gained knowledge on TA in further studies of energy issues. They will become aware of the importance of technology assessment for a socially acceptable technological development. By practical exercises and work with TA reports students will acquire skills in analyzing reports and deriving relevant information from texts. Students will learn how to apply knowledge to examples from practice.

C) SOCIAL COMPETENCIES

Through practical exercises and group work students acquire social competencies such as collaborative work.

6. Form of classes

- The module will consist of 3 sessions (see point 8) of 1,5 hours each. These lessons can be taught connectedly on one day or on three single days. If the module is taught on one day it is required to have breaks between the sessions and a bigger break between the second and third session.
- All sessions will combine group work exercises, traditional lecture formats to introduce the issues of technology assessment and discussions.
- There is homework to be done by the students (two texts should be read) between the first and the second session. If you want to teach the module in one day they should be read before the module.

7. Teaching methods

- Lectures
- Power Point Presentations
- Group works
- Interactive Brainstorming
- Discussions

8. Class plans

1. Session – History and functions of technology assessment (Group work, lecture supported by PowerPoint Slides)

Time: 1,5 hours

- 10 minutes introduction by the teacher (introduction to the overall goal of the module and introduction to the group work)
- 20 min group work
- 35 min discussion of the group work results
- 25 min lecture on the history and functions of technology assessment

Description of the tasks

In this session the teacher introduces the overall goal and the agenda of the module and briefly explains the content of the three lessons. The teacher chooses one of the two examples described and introduces the following group work. Regardless of which example is chosen, the students form groups of 3-4 people. The students are asked to take notes during the group work, so that they can document the main points of the discussion. After the group work, the students come together and briefly present the main points of the discussions they had in the working groups. The following joint discussion is guided by the teacher to ensure it covers central aspects that have to be taken into account when assessing technologies. After the joint discussion the teacher will give a lecture on the history and functions of technology assessment, whereas the experience of the discussion can be used as a starting point.

Material needed

- TM5-S1-RM-01_ppt_introduction TA
- TM5-S1-RM-02_EU_Energyroadmap_2050
- TM5-S1-RM-03_Introduction EU roadmap_teacher
- TM5-S1-RM-04_Handout_EU roadmap
- TM5-S1-RM-05_Introduction new heating system_teacher
- TM5-S1-RM-06_Handout_New heating system
- TM5-S1-RM-07_Handout_New heating system_teacher
- TM5-S1-RM-08_ppt_history TA
- TM5-S1-RM-09_national energy plan 1977
- TM5-S1-RM-10_report Chernobyl nuclear power plant

Teacher-student / student-student interaction

- Traditional lecture
- Group work
- Presentation and discussion

2. Session – Technology Assessment today – Dimensions of TA: Group work exercise, lecture supported by PowerPoint Slides

Time: 1,5 hours

- 10 min introduction
- 35 min text based group work
- 30 min discussion of the group work
- 15 min lecture on the dimensions of technology assessment

Description of the tasks

The teacher briefly introduces the content of this session. He/she explains the starting point of this session: a group task about policy briefs that provide condensed technology assessments related to an energy issue. The students are asked to form groups of three or four people. Each group discusses one of the policy briefs: environmental impact of tidal energy barrages (POST 2013) OR energy-efficient office buildings (ITA 2016). The students are asked to take notes in order to document the main points of the discussion. The discussion is guided by the teacher, who encourages the students to reflect on and discuss the content of the previous group work. If both policy briefs have been discussed, two students should briefly summarize the content, goal, target audience, knowledge base, and methods used in each policy brief. Each group should summarize the central points they discussed in the groups (about five minutes for each group). After the discussion the teacher will give a short lecture on the dimensions of technology assessment, whereas the experience of the discussion can be used as a starting point.

Material needed

- TM5-S2-RM-00_Session scope
- TM5-S2-RM-01_POST_Environmental Impact of Tidal Energy Barrages
- TM5-S2-RM-02_ITA_Energy-efficient Office Buildings
- TM5-S2-RM-03_Handout_POST
- TM5-S2-RM-04_Handout_ITA
- TM5-S2-RM-05_Discussion questions_teacher
- TM5-S2-RM-06_ppt_dimensions TA

Teacher-student / student-student interaction

- Traditional lecture
- Group work
- Presentation and discussion

3. Session – Actors and Methods of Technology Assessment

Time: 1,5 hours

- 55 min lecture on the actors and methods of TA
- 10 min brainstorming
- 15 min discussion of the brainstorming
- 10 min summary

Description of the tasks

Information on the content of this lecture can be found in the E-book.

At first the teacher gives a lecture about the actors and methods of technological assessment with a deeper insight in social life cycle assessment. The lecture ends with the introduction of the UNEP-Scheme of social LCA (UNEP 2009: 45). The following task is based on this scheme. Ask the students to find a partner and brainstorm in pairs about the given questions. The students are asked to come up with an sLCA concept for shallow geothermal energy installations that is based on the UNEP guidelines for social LCA. In the following discussion guided by the teacher, the students should share the ideas they came up with during the brainstorming session. In the end the teacher summarizes the content taught during the module and highlights the central points of the exercises and discussions.

Material needed

- TM5-S3-RM-01_ppt_actors & methods of TA and sLCA
- TM5-S3-RM-02_UNEP-Scheme_sLCA
- TM5-S3-RM-03_Handout brainstorming
- TM5-S3-RM-04_Handout brainstorming_teacher
- TM5-S3-RM-05-ppt_last slide

Teacher-student / student-student interaction

- Traditional lecture format
- Discussion student-student and student-teacher

9. Literature

Cited literature:

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Further reading:

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