TM7

Conflict Management

Understanding and managing conflicts about energy technologies

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Introduction

Public controversies and conflicts about innovative technologies are part of technology development. In many European countries and other places around the world, energy technologies—like other technologies—are often confronted with society's increasing sense unease in relation to science and technology development.

» *CONFLICTING INTERESTS, VALUE SYSTEMS AND RISK PERCEPTIONS LEAD TO CONTROVERSIES ABOUT ENERGY TECHNOLOGIES.*

Controversies often occur at the local and regional level when it comes to large-scale energy infrastructure such as nuclear power plants, geothermal facilities or high-voltage power grids. The most visible expressions of such controversies are protest camps or demonstrations. However, conflicts can take many other forms. They can last for decades (e.g. the conflict surrounding nuclear power in Germany) and they can have intense, widely visible phases and phases of low intensity that make the conflict invisible. Conflicts evolve and modify over time and may become institutionalized.

Conflicts about energy technologies that take the form of protest by are perceived by the proponents of energy technologies as annoying, as they endanger the realization of intended projects. In such situations,

» *ENGINEERS AND SCIENTISTS OFTEN HAVE TO DEAL WITH THE CONTROVERSIES AND ARE USUALLY NOT FAMILIAR WITH THE CONCEPTS AND STRATEGIES REQUIRED TO UNDERSTAND AND RESOLVE THE SITUATION.*

Those who want to construct the energy infrastructure—industry, scientific experts, politicians—often view protesters as irrational (even stupid), reluctant, technophobic and selfish. Such conflict situations are commonly referred to as the NIMBY phenomenon: Not In My BackYard (Devine-Wright 2011). The approach that seemingly provides a solution is to generate public acceptance for the new technologies. However, this understanding and both concepts—NIMBY as well as public acceptance—fall short.

» *A SOCIAL SCIENCE PERSPECTIVE MAKES IT POSSIBLE TO UNDERSTAND THE LOCAL INTERESTS AND VALUES THAT UNDERLIE PROTEST AND CRITICISM.*

 Local interests are societal interests comparable to the interest in producing and providing energy. Furthermore, a social science perspective highlights the role of power struggles and enables people to consider the position of the experts and industries. Such actors do have interests, but their interests are presumed to be societal interests: providing energy, conducting research, etc.

Social sciences aim to understand the causes of conflicts, their dynamics and, based on that, suggest how to deal with conflicts. Conflicts related to energy technologies have always been a topic of social science research.

» OVER THE LAST DECADES, THE ISSUE OF RENEWABLE ENERGY AND RELATED CONFLICTS FOUND ITS WAY INTO THE SOCIAL SCIENCES IN MANY COUNTRIES AROUND THE WORLD.

Research mostly focuses on conflicts related to siting energy technologies such as wind turbines or geothermal power plants (cf. Devine-Wright 2011; Kousis 1993; Pellizzone et al. 2017).

Social science analyses of conflict focus on the dimensions that come into play, such as power struggles, struggles surrounding knowledge, and the role of science and expertise in socially relevant issues like energy provision. Another field of social science research is conflict management. Social sciences ranging from sociology and geography to law and economics are all contributing to the development of approaches such as mediation and compensation.

The teaching module is composed of 3 successive sessions:

1

Session 1: Why and how do we talk about technological controversies?
A general introduction to a social science perspective on technological controversies.

🕐 *60 minutes*

2

Session 2: Role play panel discussion about a geothermal energy facility
Students will be taught the necessary techniques for revealing and understanding the different interests, objectives, and values of (groups of) actors that come into play in technological controversies.

🕐 *90 minutes*

3

Session 3: Key questions for understanding conflicts and an introduction to conflict management approaches
is devoted to developing central questions that should be posed in order to analyze and understand a technological controversy. It ends with a short introduction to conflict management approaches.

🕐 *90 minutes*

Session 1:
Why and how do we talk about technological controversies?

a) Session objectives

This session provides a general introduction to social science perspectives on technological controversies. It also aims to equip students with basic knowledge about how conflicts are defined and conceptualized in the social sciences.

b) Session scope

The notion of conflict refers to a situation in which two or more actors disagree on something, such as the division of resources, what decision to take in a given situation (rules of decision making), the importance of different values in decision making, or goals for future development (Crouch 2015).

» *UNLIKE OUR EVERYDAY PERCEPTION OF CONFLICTS, WHICH OFTEN FRAMES CONFLICTS AS SOMETHING NEGATIVE, A CONFLICTING SITUATION IS NOT NECESSARILY POSITIVE OR NEGATIVE.*

Instead, it is simply a situation of social struggle and, consequently, it is a specific social relationship that requires the interaction of the struggling parties. However, in social science there is no general theory or concept about what a conflict is. In social science, there are two basic perspectives and assumptions about conflicts: 1) conflicts as exceptional situations that reveal malfunctions in social systems and institutions and 2) conflicts as a normal and integral part of social relations that form the basis of social change and development (cf. Crouch 2015).

Techological controversy

A technological controversy is a disagreement between actors about aspects of technologies, such as their risks and potentials, their usefulness for society, the values linked to them, related knowledge, the power that might be exerted by using them, as well as technology-related decision making (Hennen 1999). NOTE: The terminology in social science is not consistent. You will find terms such as "technology controversies", "technological controversy", "controversy about technology", "controversial technology", or "controversial technology issues". Although it is unusual to refer to a disagreement between actors about aspects of technologies as a "conflict", a technological controversy is indeed a specific type of social conflict.

Technological controversies may occur throughout a technology's entire life cycle: early stages of development, implementation, utilization, and end of use. These controversies usually gain public attention when divergent perspectives, interests, and values are articulated through various forms of protest (as illustrated by the introductory video sequence). This often happens when locations are being selected for new energy infrastructure that is visible and affects the shape of the landscape (e.g. wind turbines, power plants) (Devine-Wright 2011).

Consequently, conflicts about energy technologies usually occur at either the meso level or the macro level. In the context of local conflicts about energy infrastructure, even the micro level comes into play.

Understanding and analyzing conflicts

In order to understand and analyze conflicts, social scientists focus on various different aspects. Three of these aspects will be dealt with within this session: dynamics of conflicts, dimensions that underlie each conflict: interests, knowledge, values, effects of conflict: positive and negative aspects.

The term "the dynamic of conflict" is used to draw attention to the fact that a conflict may evolve and change over time. The analysis of the dimensions makes it possible to identify exactly what motivates the conflicting parties to enter into a dispute. Usually all three dimensions are present—to varying extents—within a conflict. The effects of technological controversies can be positive or negative depending on the position and perspective of the actors within the controversy. The effects also depend on how the controversies are dealt with and how they are solved.

Source:
https://www.euractiv.com/section/climate-environment/news/german-anti-coal-demonstrations-were-running-out-of-time/

» *A PROFESSIONAL APPROACH TO CONFLICT MANAGEMENT CAN TRANSFORM THE NEGATIVE DYNAMICS OF A CONFLICT INTO POSITIVE DYNAMICS AND ACHIEVEMENTS.*

Some approaches to conflict management will be discussed in the third session of this module.

c) Pre-reading

No.	Author and title	Description
1.	Crouch, Colin. 2015. Conflict Sociology. In: Wright, James (ed.) International Encyclopedia of Social and Behavioral Science. Elsevier, pp. 2554–2559.	This article provides a very short overview about how conflicts are understood in social sciences. It is structured according to four variables: conflict as exceptional or endemic and as momentous or mundane.
2.	Hård, Mikael. Beyond Harmony and Consensus: A Social Conflict Approach to Technology. „Science, Technology & Human Values" 1993, Vol. 18, Issue 4. DOI: 10.1177/016224399301800402	This article presents a sociological perspective that suggests that technology should be seen as a means for groups to retain or rearrange social relations. It contains two main arguments. Firstly, it claims that the sociotechnical systems approach in technology and society studies often tends to portray harmony and cooperation as the ideal outcome. Secondly, while central social constructivists tend to interpret closure and stabilization processes in terms of consensus, this article argues that technology should instead be regarded as the outcome of conflicting interests and ideas. To make this perspective plausible, a number of analytical concepts are put forth and illustrated. Some case studies are reinterpreted in conflict language, and a few tentative research hypotheses are formulated.

d) Session activities

Activity 1:

Video input

Methods	Video presentation
Keynotes	If the number of participants is 10 or less, a short round of introductions is recommended (e.g. name and field of study and research).
Materials	**TM7-S1-RM-01-video**
Required accessories	Computer + projector
Time allocation	10 min
Learning outcomes	Students will gain an idea about the forms that conflicts against energy infrastructure projects may take (e.g. protests).

This introductory task presents a short video sequence to give an idea about the forms that conflicts against energy infrastructure projects may take (e.g. protests). The teacher should briefly contextualize the video if this is not clear in the video itself (where, who, what issue, etc.).

It is important to stress that critiques of energy technologies can take many more forms than the protests shown in these videos. The videos simply illustrate a very visible expression of conflicts about energy technologies. However, this input can be used to start a discussion about the students' own experiences and perception of conflicts, and to guide their thinking towards the issues covered in the lecture that follows.

Activity 2:
Exploration task

Methods	Guided discussion
Keynotes	If possible, the teacher should write down a few important points (e.g. on small cards to be pinned on a pin board), so that these can be referred to later on. Alternatively, you could give the students time after the video to write down up to 3 impressions on idea cards – these than can be put on a pin board as well.
Materials	**None**
Required accessories	Possibly idea cards, pin board
Time allocation	10 min
Learning outcomes	Students will become aware of the causes of conflicts and the mechanisms and actors involved in conflicts. They also will acquire knowledge about the forms that conflicts about energy technology and energy infrastructure may take.

The idea of this task is for students to become aware pf the causes of conflicts and the mechanisms and actors involved. The students are asked to comment of the film they have watched in activity 1. Mechanisms and actors should be identified. The teacher should guide the students to reach conclusion what forms of conflicts may occur in the field if energy technology.The following questions can be posed to the students after showing one (or two) of these video inputs:

- *What did you see? What did the video show?*
- *What arguments are brought forward? By whom? Who is criticized?*
- *What was (not) surprising?*
- *What are the goals of the protestors? (e.g. symbolic action, raising awareness about the issue of sustainability in relation to energy technologies and energy sources) Which issues are raised? (e.g. responsibility of public research institutions, public health issues)*

Activity 3:

Lecture

Methods	Lecture using PowerPoint slides
Keynotes	The terminology in social science is not consistent. You will find terms such as "technology controversies", "technological controversy", "controversy about technology", "controversial technology", or "controversial technology issues". Although it is unusual to use the word "conflict" to refer to a disagreement between actors about aspects of technologies, a technological controversy is a specific type of social conflict.
Materials	**TM7-S1-RM-02-ppt_lecture_technological controversies_lecture_technological controversies**
Required accessories	Computer, projector
Time allocation	40 min
Learning outcomes	Students will gain basic knowledge about the definition, understanding and concepts of technology conflicts in social sciences.

The idea of this introductory lecture is for the students to gain basic knowledge about the definitions related to conflict. The concept of is introduced and commented. The teacher presents and discusses what is technological controversy and how to such controversies arise. Next, stress is put on the process of conflict evolve and development. Students are presented with dimensions (analytical) of conflict wich can be identified. Finally, implication and effects of technological controversies are presented and discussed.

e) Additional resources

No.	Author and title	Description
1.	TM7-S1-RM-00-ppt_Module overview	A general presentation of the whole module.

Session 2: Role play panel discussion about a geothermal energy facility

a) Session objectives

This session is designed to be a working session focused on individual and group work and development. It is conceptualized as a type of role play, however it does not go into great personal detail regarding roles of the actors. The students take on the roles of different actors within a discussion about a technological controversy. This gives them the opportunity to reveal and understand the different interests, objectives and values of (groups of) actors that come into play during technological controversies.

b) Session scope

A role play will be carried out, based on a fictive conflict setting.

c) Pre-reading

No.	Author and title	Description
1.	Craciun, Dana. Role-playing as a creative method in science education. „Journal of Science and Arts" 2010, Vol. 10, Issue 1. http://www.icstm.ro/DOCS/josa/josa_2010_1/c.11_role_playing_as_a_creative_method_in_science_education.pdf	Both articles provide an overview about the role play method in higher education, its aims, characteristics, challenges, and effects.
2.	Skelton, John et al. 1999. Role play as a teaching methodology. Barmingham: University of Birmingham. https://ler.letras.up.pt/uploads/ficheiros/6089.pdf	

d) Session activities

Activity 1:

Introduction

Methods	Lecture using PowerPoint slides
Keynotes	None
Materials	**TM7-S2-RM-01-method_of_roleplaying** **TM7-S2-RM-02-description_of_the_case** **TM7-S2-RM-03-ppt_illustration_of_the_case_description**
Required accessories	Computer, projector, hand-outs
Time allocation	10 min
Learning outcomes	The students learn about the role play teaching method as it is used in this module. They also gain an understanding about the controversy used for the role play.

The aim of this activity is for the students to familiarize themselves with role playing teaching methods. The teacher introduces the group work and briefly describes the methodology of the role play, the idea behind it and the aims of the activity (understanding divergent positions regarding a technological project; discovering how and why a conflict gains momentum (or not); understanding what a conflict feels like). Next, the scenario that forms the starting point and background for the role play is introduced. The students should be reminded about the details of the scenario by referring to the activity hand-out.

Activity 2:

Preparing the panel discussion

Methods	Group work
Keynotes	None
Materials	**TM7-S2-RM-04-Role_of_the_moderator** **TM7-S2-RM-05-Role_Cards** **TM7-S2-RM-06_Handout groupwork_preparation_role_play**
Required accessories	**Preparation of the room** While the students prepare their roles, the teacher prepares the room for the panel discussion: • Place chairs in a U-shape for the audience • Place two tables at the open end of the U-shape with four chairs for the representatives of the groups and one chair for the moderator • Put name cards on the tables that feature the names of the groups (local politicians, project developers, citizens, environmental administration) as well as the names of the representatives
Time allocation	30 min
Learning outcomes	Familiarization with the differing positions of the actors within the conflict. Students should also recognize some of the points highlighted in the first session of the module.

This activity familiarize the students with different positions of actors within a conflict. The students are asked to form four groups that represent four different actors: 1) local politicians (city council, mayor), 2) project developers, 3) citizens, 4) local/regional environmental protection agency. All four groups are important for the discussion. Scientists do not form an own group because each of the aforementioned

groups can rely on scientific expertise and advice that support their position. Therefore, the information provided on the hypothetical case (see below) does not clearly state whether the scientists are for or against the geothermal energy facility. If there are not enough students to form one group per actor, then actors can be represented by individual students to ensure that no actors are left out. Each group discusses the perspective (interests, capacities, etc.) of the respective actor. The students should prepare a short opening statement that describes their group's point of view. These statements are read out at the start of the panel discussion.

Once the role cards are distributed, any remaining questions about the role play should be clarified by the teacher. The cards intentionally contain some ambiguities regarding the roles of the actors – this gives the students greater freedom to interpret the roles for themselves and choose which aspects to focus on. Students who prepare this role can decide which position they will take within the role play. If students feel uncertain, you should help them to prepare for their role.

Activity 3:

Panel discussion

Methods	Role play in the form of a panel discussion
Keynotes	A fully-fledged role play aims to bring the students' emotions to the fore. After the role play, students should be encouraged to reflect on their emotions. This can be quite demanding. If you do not feel comfortable carrying out this task, you should guide the role play in such a way that it doesn't become overly emotional.
Materials	**None**
Required accessories	None
Time allocation	35 min
Learning outcomes	Understanding actors' different interests, objectives, and values within technological controversies. Students are given the opportunity to empathize with positions that are not familiar to them and develop awareness for diverging perspectives.

With this activity, the students gain basic understanding of actors different interests, objectives and values within technological controversies. The roleplaying game is started by the moderator who introduces the scenario and the panelists, and ask the panelists to present their position within the conflict. Each group explains their perspective on the issue at hand, their interests, goals, and expectations regarding what decisions should be taken. They also explain how they plan to articulate their interests, goals etc. (e.g. striving for a public debate, organizing protests, bringing in additional expertise, etc.). The moderator ends the discussion after about 20 minutes and summarizes the debate.

Activity 4:
Reflection

Methods	Joint discussion
Keynotes	If possible, write down the arguments brought forward by the students during the reflection. Guide the discussion by summarizing and clustering arguments that the students make and by referring to conflict-related issues and categories that were introduced and/or discussed in the first session.
Materials	**None**
Required accessories	Idea cards, pin board
Time allocation	15 min
Learning outcomes	The students learn to reflect on the diversity of arguments and perspectives in the context of a socio-technical conflict, as well as the means used by actors to promote their arguments. Students should try to understand the reasons behind this diversity.

The aim of this activity is for the students to reflect on the diversities of the conflict students should be able to identify some points from the first session, such as differences regarding interests, values, and knowledge. The discussion may have revealed differing approaches

regarding the rules of decision making (e.g. who should decide where the geothermal energy facility should be located?) and problems regarding trust (e.g. loss of trust as a result of the local council's press release). Depending on how creative the students were in preparing and presenting their roles, it might also be possible to discuss the question of conflict intensity and the means actors choose to support their own positions, as well as the role played by local history (e.g. industrialized area vs. rural area, previous experience with large-scale energy technologies).

The following questions can be used to start the reflection:

- Was it difficult to prepare the role? Why/why not?
- What happened during the discussion?
- What was the discussion about?
- Which arguments were raised and by whom?
- What are the interests of each group?
- What seems to lie behind the interests of each group?
- How did the groups of actors interact with each other?
- If applicable: Which methods or means (e.g. aggression) did the groups use to support their own positions and influence the debate? How did the other groups perceive and evaluate these methods?
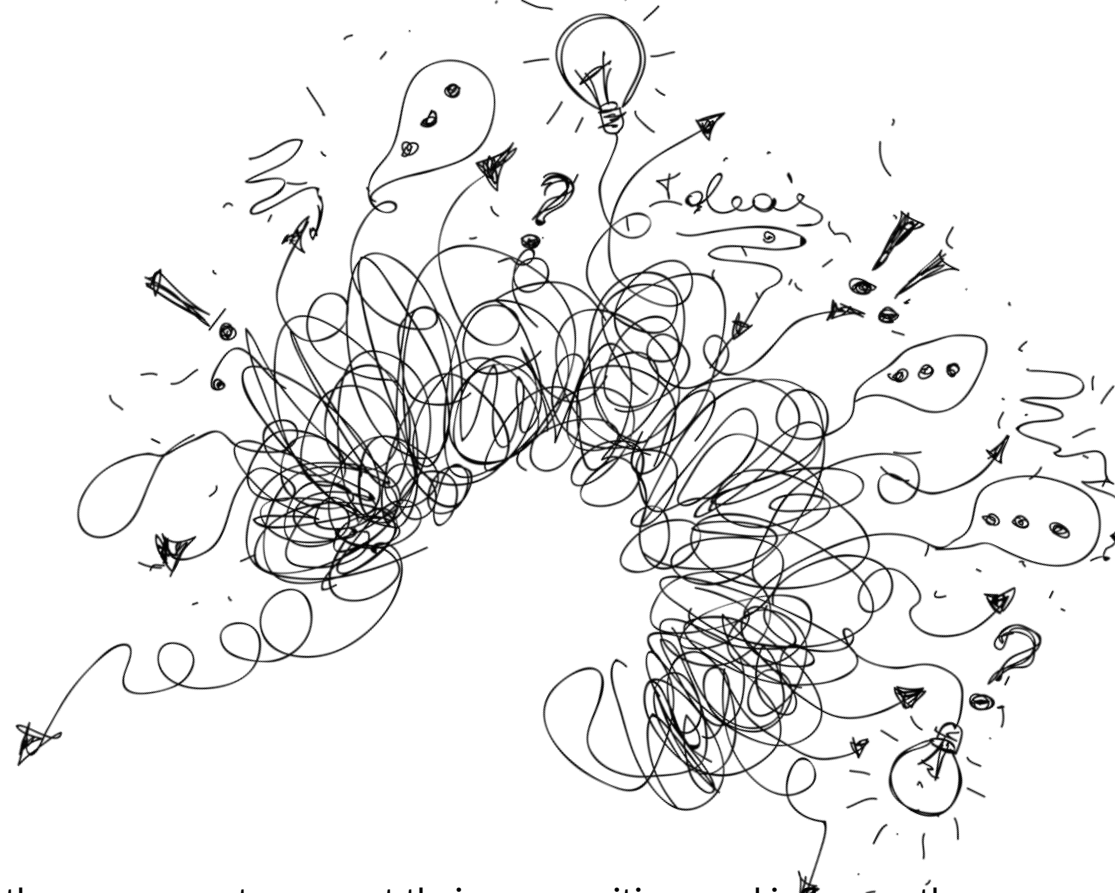
Session 3:
Key questions for understanding conflicts and an introduction to conflict management approaches

a) Session objectives

In the third session, students are encouraged to develop central questions that can and should be posed when trying to analyze and understand technological controversies. This knowledge will be applied directly during a short group exercise about another technology conflict case. The session ends with a brief introduction to conflict management approaches.

b) Session scope

Dealing with a conflict – Approaches for conflict management

Generally, conflict management aims to deal with conflicts in a way that minimizes any effects that might hinder decision making. Regardless of which methods are used in a specific case, the main aim is always to initiate and facilitate communication between the conflicting parties, ensure communication takes place on equal terms, and create mutual understanding about the various positions.

In order to develop a strategy for managing a conflict, it is important to fully understand the conflict. During this session key questions are derived that allows understanding conflicts. Once the conflict is properly understood, it is possible to develop an appropriate strategy for dealing with it. Strategies and approaches are always case specific. Some examples of conflict management approaches are provided within this session, however please note this is not a comprehensive overview of all the possible approaches and strategies.

In the first session of this module, three types of conflicts were introduced: interest, value, and knowledge conflicts. This particular typology was selected as it is closely related to the question of how to manage conflicts (Ziekow et al. 2014). Arguments about interests and the (unfair) distribution of resources require a different approach to arguments that refer to basic values or arguments that refer to knowledge claims.

» IDENTIFYING CONFLICT TYPES AND APPLYING APPROPRIATE METHODS TO DEAL WITH THEM MAY SEEM SIMPLE. HOWEVER, THE TASK IS NOT THAT EASY AS CONFLICTS ARE ALWAYS MULTIDIMENSIONAL AND FEATURE ASPECTS OF ALL THREE TYPES OF CONFLICT (KNOWLEDGE, INTEREST AND VALUE).

Furthermore, the relative importance of the different types may change over time. This also has to be considered when developing a strategy for dealing with conflict.

Success of conflict management

» SUCCESS OF CONFLICT MANAGEMENT ALWAYS DEPENDS ON THE PERSPECTIVE OF THE CONFLICTING PARTIES AND THE PARTICIPANTS INVOLVED IN THE CONFLICT MANAGEMENT PROCESS.

Therefore it is important to distinguish between the success of the management approach, i.e. the process itself, and the success of the result/resolution produced by the conflict management. A useful indicator for the success of the process is the number of participants who are satisfied with the process despite being dissatisfied with the result/solution/outcome. The compliance of those who oppose in relation to the outcome indicates the quality of the process.

c) Pre-reading

No.	Author and title	Description
1.	Clarke, Tracylee, Tarla Rai Peterson. 2016. Environmental Conflict Management. SAGE Publications. DOI: 10.4135/9781483399522	This book is an introduction to the research and practice of environmental conflict management. Its content can easily be adopted for the content of this module. In particular, it is highly recommended that students read chapters 1 and 4 before commencing the module. The book provides a step-by-step process for engaging stakeholders and other interested parties in the management of environmental disputes. In each chapter the authors first introduce a specific concept or step of the process, and then provide exercises, worksheets, role plays, and brief case studies that enable students to directly apply what they have learned. The appendix includes six additional case studies for further analysis. These practical steps for understanding and managing conflicts are designed to help students make more informed decisions. The book also helps students to develop techniques for public involvement and community outreach, and includes strategies for effectively managing meetings, negotiating methodologies for communicating concerns and working through differences, as well as outlines for implementing and evaluating strategies for maintaining positive community relations.

d) Class activities

Activity 1:

Reflection

Methods	Repetition
Keynotes	It is important to bear in mind that none of the students' reflections are "wrong"—everything they say should be treated as an interesting point of view.
Materials	**None**
Required accessories	None
Time allocation	10 min
Learning outcomes	Reflecting on the experience of the role play activity.

The idea of this task is for the students to reflect and comment on the role play activity from the previous session. The teacher should use the notes taken in the previous session to compare the students' viewpoints and reflect them back to them. A chart with categories should be created that helps the students to understand the content.

- Different groups have different interests, values and knowledge
- Divergent perceptions of the rules of decision making
- Power relations between the actors; who is able to do certain things or act in certain ways? Why? (What resources are necessary for the ability to act?)

- The particular history of certain conflicts
- Development of the conflict and its intensity
- Means chosen to support one's own position

Activity 2:

Deriving key questions about a conflict

Methods	Discussion
Keynotes	It is important to allow the students to express their views with proper attention to previous session reference.
Materials	**TM7-S2-RM-03-ppt_illustration_of_the_case_description** **TM7-S3-RM-01-Key questions conflict**
Required accessories	Idea cards, pin board
Time allocation	25 min
Learning outcomes	Having developed questions that need to be asked in order to understand a technological controversy.

Based on the discussion about the role play, the students are asked to work out which key questions are necessary for understanding conflicts. The teacher guides a brainstorming session, which is based on this two-part question: What should you take into consideration if you want to understand a technological controversy and which questions would you ask? The students' answers should be noted on a idea cards and put on the pin board. The teacher should ask key questions on conflict to stimulate the discussion.

Activity 3:

Applying key questions to another case

Methods	(Reading), analyzing, discussion
Keynotes	**There are two options for carrying out this activity:** 1. Use the following newspaper article, published in The Guardian in: TM7-S3-RM-02-Vaughan_2017_ newspaper_article_fracking_Wales. The article is about a hydraulic fracturing conflict in Wales (UK). This conflict was featured in one of the video inputs from session 1: "Protest against research on fracking carried out at a University in UK" (see TM7-S1-RM-01-video). 2. Ask the students if one of them has an example of technological conflict from their own personal experience or from the media. The student who has a suitable example shall briefly explain the example to the group.
Materials	**TM7-S3-RM-02-Vaughan_2017_newspaper_article_fracking_Wales**
Required accessories	None
Time allocation	20 min
Learning outcomes	Learning to transfer of previously acquired knowledge to a new case and thereby internalizing it.

During a discussion guided by the teacher, students are asked to answer the key questions that were developed during the previous activity:

- Actors and interactions
- Issues and history
- Handling the conflict

The students should be asked to apply the key questions in order to understand the conflict (either the conflict described in the newspaper article, or the one suggested by a student). In most cases not all the answers will be available, so students should at least realize that there is information missing. The teacher could ask the students where they think they could find the missing answers.

This task can be done with all the students, or split into smaller groups. If the teacher decides to split students up, then at the end a global summary of the whole discussion should be done.

Activity 4:

Lecture

Methods	Lecture using PowerPoint slides
Keynotes	None
Materials	**TM7-S3-RM-03-ppt_lecture_conflict management**
Required accessories	Computer, projector
Time allocation	15 min
Learning outcomes	Gaining basic knowledge about conflict management.

This activity is the main lecture of the whole module. It is designed to introduce to the students the basic knowledge about conflict management. The teacher introduces the identification of conflict arise in a project. Next, goals of conflict management are introduced which allow to define what conflict management is. Based on the definition, approaches to conflict management are introduced. The teacher defines what are the basic principles, factors and what are the requirements of a successful conflict management process. Finally, examples of conflict management are presented.

Activity 5: Intervention

Methods	Discussion
Keynotes	It is important to guide the students and correct mistakes in understanding immediately as they appear.
Materials	**None**
Required accessories	None
Time allocation	10 min
Learning outcomes	Application of knowledge from the lecture (activity 4).

This activity is designed to allow the students to practice the knowledge they have gained. The students are asked which approach they would use to deal with the conflict discussed in activity 3. Answers might include: involving conflict management experts, trying to gain a better understanding of the situation, considering the position and interests of the investor, identifying concrete methods for bringing the conflicting parties together. The students should demonstrate that they have understood the content of the previous lecture.

Activity 6:

Summary and conclusion

Methods	Repetition
Keynotes	None
Materials	**TM7-S3-RM-04-ppt_last slide**
Required accessories	Computer, projector
Time allocation	10 min
Learning outcomes	Revision of all the content in the conflict management module.

This activity is the summary activity of the whole module. The teacher should repeat the main points and ideas and stress the most crucial aspects of conflict management. The students should be interviewed at random to confirm their understanding of the basic required concepts and principles of conflict management.

Assessment methods and final assignment

In order to assess the achievements of the students, each student has to write a reflection on the role play of 2-3 pages. Within the reflection the student shall chose an issue/observation from the role play that kept he or she occupied, reflect on it and relate to one of the topics introduced in the course.

The reflection shall contain:
  1. Short description of the observation.
  2. Reflection on the own feelings.
  3. Relation of the observation to one of the course topics (e.g. type of conflict, conflict management approaches
  etc.) by formulating hypothesis how the observation made intervene with the topic chosen.

The reflection is the basis to evaluate and grade the students achievements. Evaluate: overall structure, language, originality of the ideas, and correctness of facts.

Glossary

Actor	Within the context of the module an actor can be a single person or an institution e.g. local politicians (city council, mayor), project developers, citizens, local/regional environmental protection agency. The central point here is that an actor has a perspective on a technology controversy with its own interests, capacities to act, objectives and values, and that there are power relations existing between the actors.
Conflict(s)	The concept of a conflict refers to a situation in which two or more actors disagree about something or have different perspectives on a topic. A conflicting moment is not necessarily positive or negative.
Conflicts – dimensions of	In order to understand conflicts, social scientists identify three underlying dimensions that are independent from the issue driving the conflict. The dimension of interest addresses the mainly material advantages or disadvantages actors expect to result from energy infrastructures. In technology conflicts, the dimension of knowledge comes into play when the validity of the knowledge underlying arguments for energy projects is questioned. The final dimension addresses the values underlying actions and decision making.
Conflicts – dynamics of	This term is used to draw attention to the fact that a conflict may evolve and change over time, for example, in terms of the level at which it occurs, the spatial context, the actors involved or even its subject matter.
Conflicts – levels of	Conflicts have different social ranges, which is why they can be assigned to three types of levels for better understanding. When a conflict takes place between individuals, it plays on the micro level. Conflicts at the meso level concern relations between organizations, groups and institutions, such as environmental NGOs that criticize decisions and activities related to local policies or commercial enterprises involved in energy technologies. Conflicts at the macro level are played out within the political discourse. However, the same conflict can appear on different levels.
Conflict management	Generally, conflict management aims to deal with conflicts in a way that minimizes any effects that might hinder decision making. Regardless of which methods are used in a specific case, the main aim is always to initiate and facilitate communication between the conflicting parties, ensure communication takes place on equal terms, and create mutual understanding about the various positions.

Conflict management – success of	Success of conflict management always depends on the perspective of the conflicting parties and the participants involved in the conflict management process. Therefore it is important to distinguish between the success of the management approach, i.e. the process itself, and the success of the result/resolution produced by the conflict management. A useful indicator for the success of the process is the number of participants who are satisfied with the process despite being dissatisfied with the result/solution/outcome. The compliance of those who oppose in relation to the outcome indicates the quality of the process.
Institutionalization	Institutionalization is the process of becoming a permanent or respected part of a society, system, or organization. It regulates societal behavior and establishes thereby safety above norms and rules in interpersonal relations within a special context.
NIMBY phenomenon (Not In My Back Yard)	NIMBY is a characterization of opposition by residents to a proposed development in their local area. It often carries the connotation that such residents are only opposing the development because it is close to them, and that they would tolerate or support it if it were built farther away.
Technological controversy	A technological controversy is a disagreement between actors about different aspects of technologies. After Leonard Hennen such aspects could be their risks and potentials, their usefulness for society, the values linked to them, related knowledge, the power that might be exerted by using them, as well as technology-related decision making. It is important to know that the terminology in social science is not consistent which leads to different terms used e.g. "technology controversies" or "controversial technology issues".

Attachment: Syllabus

1 Name of the teaching module

Conflict Management – Understanding and managing conflicts about energy technologies.

2. Brief description of the subject matter

Public controversies and conflicts about innovative technologies are part of technology development. Like other technologies, energy technologies in many European countries are frequently confronted with society's increasing unease about science and technology development. Controversies about innovation often occur at the local and regional level when technologies that are developed in the context of their application, e.g. when it comes to selecting locations for large-scale energy infrastructure such as nuclear power plants, geothermal facilities or high-voltage power grids. In such situations, engineers and scientists are often not familiar with the concepts and strategies that can be used to understand and deal with the controversy.

The Conflict Management module introduces social science perspectives on conflicts. The module does not provide comprehensive conflict management training. Instead it delivers insights into how to understand technological controversies. Students learn that there are a variety of definitions, theoretical approaches and models available that can help them understand conflicts about technologies. The module introduces key questions about the functions, impact, dynamics, and potential outcomes of conflicts. Examples from the field of energy technology (e.g. nuclear energy and geothermal energy) are provided to illustrate the social science approaches.

In addition to knowledge about concepts and processes, a role play is used to provide students with an emotional understanding of conflict situations related to energy technology issues.

3. Complete SSH problems description

- Technological controversies about energy technologies and infrastructure occur frequently and are caused by conflicting interests, value systems, or risk perceptions.

- A basic understanding of how technological controversies develop, their dynamics and their (social) implications is useful for people involved in the selection of locations for technology projects.

- An awareness of the different perspectives and perceptions that come into play is important for understanding the development

of conflicts in general and controversies about technologies.

- Awareness forms the basis for an open-minded understanding that complex technological controversies are characterized by different perspectives, interests and values.

4. Prerequisites and contextual knowledge

There are no prerequisites, although students are expected to be interested in this topic. The module is mainly aimed at Masters and PhD students, but Bachelor students are also able to attend.

5. Learning outcomes

A) KNOWLEDGE

The students will learn about the extent to which a social science perspective is useful for understanding conflicts related to energy infrastructure and technologies. They will acquire basic knowledge about social science perspectives on technological controversies and learn which questions and dimensions are relevant in social science conflict analysis. This enables the students to gain a broader understanding of the key aspects of technological conflicts, to identify emerging conflicts and to undertake measures to deal with them (prevent or resolve).

B) SKILLS

Students will develop an awareness for the positions and interests of different actors in complex technological controversies related to energy issues. As a result, they will learn how to take an open-minded approach towards these different perspectives, interests and values.

C) SOCIAL COMPETENCIES

The students gain social competencies such as the ability to collaborate effectively, develop and defend the point of view of a peer group, put forward arguments within a debate, and acknowledge positions that differ from one's own point of view.

6. Module structure

The module will consist of three sessions (see point 8) that are 1-1.5 hours each. These sessions can be taught consecutively in one day

or over a period of three days. If the module is taught in one day, there must be breaks between the sessions and a longer break between the second and third sessions.

A traditional lecture format will be used to introduce the issue of technological controversies and the conceptual ideas from SSH.

Interactive elements will complement the traditional lecture format. The second session involves a role play that allows students to experience different points of view and emotions within a conflict situation related to energy technologies and infrastructure.

There are no homework tasks.

7. Teaching methods

- Lectures
- Interactive role play
- Discussions
- Group works

8. Class plans

Session 1. Why and how do we talk about technological controversies? (video input, group work, lecture supported by PowerPoint slides)

Time: 1 hour
- 10 minutes video input
- 10 minutes exploration task
- 40 minutes lecture

Description of the task
- Lesson to introduce the issue of technological controversies and related SSH perspectives:
  - *What is a technological controversy?*

- *How do technological controversies arise?*
- *What are reasons for the emergence of technological controversies (types of conflicts)?*
- *What are the implications of technological controversies?*
- *Why should we deal with technological controversies in the context of energy issues?*

Materials required

- (Additional material for a general introduction of the module: TM7-S1-RM-00-ppt_Module overview)
- TM7-S1-RM-01-video
- TM7-S1-RM-02-ppt_lecture_technological controversies

Teacher-student and student-student interaction

- Group work
- Traditional lecture

Session 2. Role play panel discussion about a geothermal energy facility (lecture, group work, role play, discussion)

Time: 1.5 hours

- 10 minutes introduction
- 30 minutes preparation of the roles
- 35 minutes role play
- 15 minutes brief reflection and summary

Description of the task

- Students are asked to carry out a role playing game. The storyline of the game is a panel discussion that brings together parties who have different positions about a planned geothermal energy project. The students play the roles of local citizens, the mayor and representatives of the local council, and the project developer/investor. A detailed description about how to organize the game is available here: TM7-S2-RM-02-description_of_the_case

Materials required

- TM7-S2-RM-01-method_of_roleplaying
- TM7-S2-RM-02-description_of_the_case
- TM7-S2-RM-03-ppt_illustration_of_the_case_description
- TM7-S2-RM-04-Role_of_the_moderator
- TM7-S2-RM-05-Role_Cards
- TM7-S2-RM-06-Handout group work_preparation_role_play

Teacher-student and student-student interaction

- The teacher prepares the game and guides the students
- The students prepare their roles and play the role play game

Session 3. Key questions for understanding conflicts and an introduction to conflict management approaches: group work and exercise combined with a lecture

Time: 1.5 hours

- 10 minutes content-related reflection about the role play (joint discussion between the students and the teacher)
- 25 minutes deriving key questions about a conflict (students guided by the teacher)
- 20 minutes applying the key questions to another case study
- 15 minutes lecture (introduction to conflict management approaches)
- 10 minutes intervention and discussion about conflict management approaches
- 10 minutes summary (of the whole module)

Description of the task

- The role play is used as a point of departure to systematize and deepen some of the aspects concerning technological controversies. After that an introduction into conflict management approaches will be given in the form of a lecture. Another

case study is introduced with the help of a newspaper article or with the help of a student and the students then apply their new knowledge to this new case study.

Materials required

- TM7-S2-RM-03-ppt_illustration_of_the_case_description
- TM7-S3-RM-01-Key questions conflict
- TM7-S3-RM-02-Vaughan_2017_newspaper_article_fracking_Wales
- TM7-S3-RM-03-ppt_lecture_conflict management
- TM7-S3-RM-04-ppt_last slide

Teacher-student and student-student interaction

- Group work
- Student-student and student-teacher discussions
- Traditional lecture format

9.   Literature

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