

Report:

Energy Options in Technical and Cultural Contexts: An Interdisciplinary Workshop

Kloster Eberbach, Germany
May 14-16, 2012

Opening statement (Sonja Schmid)

Previous VT/TUD Initiatives

- VT CLAHS delegation, summer 2009
- Nordmann visit at VT
- Grad student at TUD (IREP)
- Faculty member on research grant at TUD
- “STS connect” research seminar (video conference)
- Workshop idea: beyond conversation, toward actual collaboration

Workshop Motivation

Interdisciplinarity

Energy research is by definition interdisciplinary: it always and inevitably takes place in the context of energy policies which, in turn, reflect cultural contexts, tacit or explicit agreements about what constitutes a problem, and what are considered acceptable ways to approach this problem.

“Critical mass” of energy research at both TUD and VT

At both the TUD and Virginia Tech, not only engineers and scientists are actively engaged in energy research (very broadly conceived), but also social scientists and humanities scholars. There is for example ongoing research on nuclear fusion, biofuels, electricity markets, smart grids, passive buildings, and engineering education, and by no means only on the technical side. My own field, the young discipline of Science and Technology Studies (STS), in many ways leads the way in thinking together in truly interdisciplinary ways complex scientific and technical questions with sociological, cultural, and historical problems. Specifically, STS looks at both the impact that scientific and technical developments have on our societies, but also how our societies form, enable, and constrain which scientific questions get to be asked in the first place, and which technical innovations appear legitimate (or not).

This workshop is an attempt to move beyond the model of adding a single social scientist to a technical grant proposal (and let’s be honest, we’ve probably all been part of such proposals), and toward a model where initial research questions and programs are jointly developed by scientists, engineers, and social scientists and humanities scholars. We know that we have a lot to learn from one another, and we have not sufficiently tapped this resource, and brought interdisciplinary collaboration to its full potential.

Fundamental tension: block out differences / keep in mind context-specificity

For the days ahead, Alfred Nordmann has suggested to openly acknowledge, and to positively engage with, a fundamental tension that emerges when we attempt truly creative, interdisciplinary conversations: a tension between on the one hand setting aside and ignoring (for the time being) difference as one addresses a technologically well-defined problem, and on the other hand constant reminders of the many questions that precede, surround and follow problem-definitions and solutions. This tension always exists but it becomes “tangible” in our specific US-German constellation.

Our universities are positioned in unique ways for interdisciplinary research initiatives of this kind: the cultural and policy contexts in Germany and the US are so different that a comparative perspective brings out the specifics of the situation in each country – this may help focus interdisciplinary research questions.

Plan: fundable proposal(s)

We have strong existing networks between scholars at VT and TUD, and since there also appears to be significant interest clustered around the theme of energy research, we see this workshop as a concerted effort to set up such interdisciplinary comparative research and transatlantic collaboration in the form of one or more fundable research proposals.

Expectations: Energy R&D

There is general, perhaps universal recognition that the prospects of resource-depletion, population growth, the accelerating expansion of the economies in the so-called developing world, environmental degradation e.g. from power plant emissions, and climate change place enormous pressure and high expectations on energy R&D, broadly conceived. This includes

- i. making current technologies more energy efficient and less resource intensive,
- ii. developing and improving alternative forms of energy production, ideally from renewable sources, and
- iii. creating new infrastructures for the storage, distribution, and “recycling” of energy.

All of these approaches are simultaneously technical and socio-political:

- i. More energy efficient technologies are often compensated by increased consumption (people buying bigger refrigerators because refrigerators have become more energy efficient) – in order to benefit from the technical advance, consumption patterns will have to be addressed as well, be it by way of education campaigns or through pricing policies, regulatory measures etc.
- ii. The debates surrounding biofuels and nuclear energy are only the most prominent examples of the global, national, and local politics that surround the development of just about any source of energy
- iii. New infrastructures for the storage and distribution of energy clearly involve not only such things as wearable textiles that incorporate solar cells but also new forms of e.g. decentralized governance.

Comparative Perspective

Distinct national character of socio-technical scenarios

Moreover, the socio-technical scenarios for each of these dimensions may well look very different in Germany and the US (and, by implication, other countries and regions of the world as well):

- i. There is in Germany and the US at this point a difference in attitude regarding the acceptability of regulatory measures and pricing policies designed to curb or redirect consumption
- ii. Germany recently rededicated itself to a complete exit from nuclear energy (nuclear phase-out) within the next 10 years; it is also dedicated to a reduction of CO2 emissions, and the notion that the focus on renewable energy technologies will be a major area of economic growth; it uses national “ethics commissions” to articulate broad political consensus on this; and it maintains continued energy-production from coal as a blind-spot in the concert of these policies – the technological optimism that underwrites these initiatives is exemplified by a TUD research initiative for “zero-emission plants”; here, the US is positioning itself very differently, culturally and politically (renewed US commitment to nuclear future)
- iii. New infrastructures always run up against existing infrastructures that are more and less firmly entrenched (locked in) not only technologically but also institutionally, administratively, politically – here it is an open question how and where spaces for creativity and change will emerge, whether the US or Germany offers greater opportunities at the various scales of social organization.

Program Overview

Monday: Introductions

Tuesday: Common Concerns – across disciplines / across the Atlantic

- What’s on the Map?
- Real-World Experiments
- Integrations of Knowledge
- Building Blocks

Wednesday: Where from here?

Tuesday, 15 May 2012: Common Concerns – across disciplines and across the Atlantic

Session 1: What's on the Map?

This first session serves primarily for each one of us to reflect on the landscape in which we do our research and then, of course, to see how these landscapes differ among us. The question is simply: when we actually engage in (rather than think about) our research, what are the relevant places and people and debates that we are aware of and that we pay heed to: There are colleagues and students, of course, in our own universities and in peer institutes, there are funding organizations, there is Washington and Berlin and perhaps Fukushima or Rio and Kyoto, and perhaps there those who work on various alternative forms of energy production, or a peace activist and whistleblower or... It might be most illuminating to see how different people “answer” in their research to different demands from different places.

Session 2: Real-World Experiments

This second session uses a social science concept that was born in the wake of Chernobyl not only to reflect but also to identify what competencies (or skills, capabilities) we, our peers, fellow citizens and students need in order to participate in debates about energy and technological development. That social science concept is „real-world experiment“ or "collective experiment," and this is the idea behind it: New technologies are tried out in the midst of societies and require a process of collective social learning in order for a reasonable and robust and safe integration of that technology into society. What is necessary (in terms of education, in terms of institutions, in terms of communication) to ensure that citizens can participate and contribute meaningfully to this collective learning process?

Session 3: Integrations of Knowledge (“Wissenssynthesen”)

This third session would take us beyond reflections about the world(s) we act in and general competencies for dealing with its complexities. It would ask more specifically how knowledge from economists, environmental scientists, energy engineering researchers, political theorists, policy-consultants (technology assessment, life-cycle analysis) can become usefully complementary. How can one “synthesize” the many kinds of knowledge with their different levels of certainty? The word “interdisciplinarity” probably doesn't help much here. (And of course, this knowledge is being synthesized in grey literature/policy papers, decision making situations or TV documentaries – what are good models for this?)

Session 4: Building Blocks: What do we already have that we can work with?

After spending much of the day identifying desiderata (competencies to acquire, heterogeneous knowledge to be synthesized), we might finally ask: what do we already have that we can work with? Looking around our universities, cities, countries, we can identify initiatives in teaching and public engagement and scientific advocacy that have worked or are not working. This can draw on the very first discussion in the morning and prepare the ground for our discussion on Wednesday morning.

Results from the VT-TUD workshop in Kloster Eberbach

(Alfred Nordmann)

i. immediate

- reciprocal meeting of interdisciplinary group from Darmstadt at/near VT
- date: (first week of April or) week of April 8, 2013
- place: Inn@VT or in Roanoke
- funding through DFG (Initiierung und Vertiefung bilateraler Kooperationen)
- goals
 - after the open discussions in Eberbach, this meeting will be more results-oriented
 - looking at teaching-options esp. added value to present TUD-VT exchange (how can one make the cultural dimensions and the experience with different policy contexts count) – ranging from team-taught courses (transatlantic) to certificate-option or the like for participants in the Darmstadt-Blacksburg exchange
 - looking to realize particular research collaborations and steps towards long-term vision (see ii) and iii) below)
- Markus Lederer and Bob Hendricks explore „teaching dimensions“ e.g. by identifying courses currently offered that might become part of a certificate program (perhaps a 9 to 12 CPs graduate program on international energy policy and politics, conceived as an add-on certificate for engineering and political science students who are already participating in the VT/TUD exchange)
- two or three open video conferences (for all who are interested and have time) in preparation of the meeting, the first of these Oct/Nov of 2012
- open questions
 - who is DFG Antragsteller (Markus Lederer?)
 - future role/involvement of FiF
 - who will work up which idea from ii) and iii) below for further development in Blacksburg
 - how to identify as quickly as possible (for the purpose of the DFG application) a group of 10 to 15 senior researchers from Darmstadt to come to Blacksburg (Hampe, Schebek, Jägermann, Nordmann, Lederer ... and?)
 - similarly from VT, whether and how to expand participation beyond the “nuclear engineering” faculty

ii. Intermediate options for smaller and larger fundable research collaborations (listed in no particular order)

1. Daniel Breslau, Markus Lederer, Sonja Schmid (and others) on energy (incl. carbon) markets
2. Matthias Englert, Anne Harrington (ind. scholar), Wolfgang Liebert, Alfred Nordmann, Sonja Schmid (and others) on „nuclear philosophy“, a review and development of philosophical responses to nuclear armament issues (identifying needs for post cold-war nuclear philosophy)
3. IGERT (a collaborative scheme with a focus on teaching, cf. also existing IREP schemes)
4. CSPO (Center for Societal and Policy Outcomes) at Arizona State University has links to scholars in Blacksburg (esp. Sonja Schmid) and Darmstadt (esp. Alfred Nordmann) – opportunity for trilateral collaboration by engaging with laboratory research at VT and TUD campuses (this might be a contribution to the development of the EC policy concept “responsible innovation”)
5. “social life cycle-assessment”: a concept in need of development – integrating societal considerations into life-cycle assessment methodologies (Liselotte Schebek and others)
6. “nuclear aftermath task force” – an international group of “first expert responders” in cases such as the Fukushima accident: the need for such a group has been identified but so far it has not been possible to establish it (associated with other difficulties of learn internationally in the aftermath for a disaster) – aside from advocating, even developing such a group, this might involve a study of how international learning has been hindered and advanced in the past (Sonja Schmid)
7. the NSF has some cross-cutting topics/funding programs which may be worth looking at to identify tie-in for Blacksburg scholars with German affiliates: PIRE Partnerships for International Research and Education *or* Sustainable Energy Pathways *or* The Science of Science Policy [verify at NSF website]
8. of course, one way to strengthen our collaboration and its international standing would be to exchange faculty e.g. on prestigious Humboldt fellowships
9. moving towards the long-term vision
 - a. the development of “culturally sensitive indicators for the evaluation of competing energy technologies” could be a campus-wide effort at both universities (such indicators have been proposed for climate engineering approaches) – it would involve learning about the ways in which “the science of science policy” is practiced in the US and Germany/the EU and it would involve a multi-disciplinary research contribution (including student-researchers) towards the actual development of such indicators
 - b. in the spirit of “stakeholder engagement” and the engagement of publics, a multi-disciplinary research project might study how people in Darmstadt and Blacksburg deliberate the future of energy in their own backyard, e.g. the siting of windmills and transmission lines
 - c. more narrowly campus-focused would be a collective design-project to model, communicate, and improve energy throughput (generation, consumption/use, waste) at each campus (model for this is the “sustainable university” concept, this might fit with the KIVA initiative in Darmstadt?)

iii. long term (the grand vision that is implemented early on and inspires the particular medium-term fundable projects)

Virginia Tech and TU Darmstadt are each in their own way qualified to produce an “energy-literate campus” (again, modeled a bit on the “sustainable universities” concept). This in itself deserves consideration since it marks a way in which each university can enhance its profile and “capitalize” on its long history of interaction between social and natural sciences, humanities and engineering – and do so even more if this is identified as a transatlantic commonality.

This is also the basis, however, from which two experiments can be observed and systematic social learning can take place. These two experiments are “real-world” or “collective” experiments that take place in our societies at large: One is the “Experiment Atomausstieg” or “Experiment Energiewende,” namely the German experiment to pull out of nuclear and coal energy and shift towards renewables. The other experiment might be called “Nuclear 2.0” and seeks a renewal of nuclear energy options in the US. The outcome of both experiments is unclear and depends on many factors. Systematic observation and learning from these experiments thus requires information-flows, multiple perspective and expertise (the German experiment has been referred to as a “Black Swan” to highlight its potential international ramifications). The two energy-literate campuses could function like two large expert panels that evaluate the progress of these experiments in an ongoing manner, e.g. in the form of yearly meetings (a week of discussions and events and a process of formulating conclusions, including dissenting opinions), each looking at both experiments. The publically visible assessments, i.e. outcomes of each of these yearly events disseminated through press-releases – the authority stemming from the expertise of scientists who are involved and the process to which it was submitted, a process that involves students, classroom activities, political activism on campus etc. (In sum, this might function like the “doomsday clock” from the Bulletin of Atomic Scientists which tells us every year how close the world is to nuclear war.) In the meantime, this functions as a large-scale public engagement exercise and furthers energy-literacy on the energy-literate campus. [There is theoretical background to the involvement of such panels or “observatories” that was developed at TUD.]

More concretely, *Energy Campus USA/Germany* develops novel deliberative formats that draw in the entire campus community (“learning from the Pirates” – using social networks and ICTs in original ways to gain transparency and to promote engagement). With ongoing activities throughout the year, there is once a year a time of taking stock where each campus serves as an observatory that makes sense of information (translating from disciplinary to a general discourse; bringing together information from science and engineering, social and political science, geography and anthropology, and science studies; translating judgements and sentiments of the observers back into scientific research programs). The campus community as a whole thus becomes something of a sensor or measuring instrument, a detection system and, in short,

monitor. Each year might single out a special question/issue or concept: sustainability, food crops/bio fuels, carbon trading, etc. (and this might work like annual debate-club theme or like the “first year reading experience” which is now emulated also by TUD’s KIVA initiative). Throughout, the question is also brought to the campus itself: “how are we doing by way of producing, consuming, wasting energy?”

Action points:

- once there is resolve to embark on this, it can be accomplished on rather short notice and without great financial or institutional effort (though, positions of coordinator would be required at both universities)
 - however, the resolve itself has to be broadcast from the University as a whole, it is a program of action to become an energy-literate campus and assume the role of observatory for the experiments – so, ultimately, *Energy Campus US/Germany* will have to be announced by the Presidents of our universities
 - there may well be foundations willing to sponsor this initiative (Max Kade?) – and we might need to invest some time and effort to research this question
- iv. **another idea** would be to revive the plans for a Transatlantic Research and Education Alliance (TREA) consisting of DLR, VT and TUD as planned a number of years ago under the stewardship of Jan Wörner (the idea was developed quite already, had less of a social science/humanities component and relied at the time on support or collaboration from NASA)