NUCLEAR ENERGY AND SUSTAINABLE DEVELOPMENT: TOWARDS A BETTER SUPPORT FOR DECISION-MAKING

Background

It is a well-known problem for decision makers to clearly indicate what is meant by 'sustainable development'. Scientific research approaches in the field seem to be divided between the 'objective' approach of the subject (argued to be based on 'hard' scientific facts, e.g. risk assessment, environmental impact assessment, various indicator systems, etc.) and more 'subjective' or 'participatory' approaches (argued to incorporate 'ethical values', 'worldviews', 'cultural perspectives', etc.). Another (related) division seems to be between approaches which acknowledge and conceptualise their role in the political sphere, and others which deny, pass over or minimise such a role.

In this PhD research project, we go beyond this unproductive distinction between 'objective' and 'subjective' approaches. Our approach is based on the insight (and demonstration) that actually both approaches represent a particular interpretation of more general schemes of justification (and are both inherently political). This does not mean that we abandon every hope of a rational discussion, but rather that we have to abandon all pretensions of one 'transcendental' and 'correct' viewpoint (i.e. based on 'hard' criteria and targets) from which we could judge whether or not a certain development is sustainable. In order to substantiate this point of view, we investigate the relevant literature on both 'objective' and 'participatory' approaches, and consider concrete applications in the context of the nuclear energy debate. Throughout these different research phases, we aim not only to evaluate present-day practices in the context of energy policy making (concerning both 'processes', i.e. rules of interaction, participation, etc. - and 'products' - i.e. the results), but also propose a new combined scientific/political practice.

Objectives

The overarching research objective was finding an answer to the following overarching question:

Can nuclear energy contribute to a development process leading to sustainability – if so, how; and how can this question be answered?

From which the following sub questions were derived:

- *Which meanings can sustainability acquire in general and in particular in the context of energy?*
- *Which scientific approaches and theories have been advocated and to what extent do they address the full scope of questions (including public policy making) raised by sustainability? What are the strong points of these approaches; which lessons can be learnt?*
- *What then is an 'appropriate' scientific/political methodology or procedure to address sustainability questions?*

Principal results

Throughout the research, we followed four research tracks:

Firstly, we reflected on sustainable development, the different meanings attributed to the concept and different theoretical perspectives. An investigation of different theoretical perspectives of course poses questions on a meta-theoretical level. We argue that constructivism can provide an adequate meta-theoretical foundation for our research. More precisely, within the broad tradition of constructivism (with Bruno Latour as one of the leading exponents), we will rely on insights ranging from 'risk society' (Ulrich Beck) to certain ideas on justification as developed by the French sociologists Luc Boltanski & Laurent Thévenot. Such an approach ensures enough flexibility to address both theoretical constructs and actual stakeholder visions confronted with real-life situations and context.

Secondly, we turned our attention towards the way in which the operational link between sustainability and public policy making has been conceived. Firstly, we analysed four ideal-typical governance strategies, all of which embody particular ideas about structuring the policy problem posed by (nuclear) energy in a sustainable development perspective and translating these ideas into political action. Secondly the ExternE study (by the European Commission) is examined in great depth. The ExternE study presents a uniform method for the calculation of energy 'externalities'. It can be seen as a hybrid politico-scientific method stemming from quantitative environmental sciences (Life-Cycle Analysis) and formal decision theory (Cost-Benefit Analysis). Adopting a constructivist stance allows us to show that fundamental questions can be raised over the clarity and practical efficacy of these orthodox methods. The problems are shown to relate directly to the rational choice theory and value systems underpinning the methods. Thirdly, the policy

development cycle in the context of the phase out of nuclear power in Belgium was analysed as a concrete case of decision making.

In the **third** phase of research, we employed participative technology assessment methodologies to map the fundamental problem definitions underlying the combination of sustainability and nuclear energy. This was done through interviews with members of the Belgian FRDO ('federal council on sustainable development') (including electricity utilities, syndicates, environmental NGO's, scientists, representatives of government, employers' organizations, etc.). We investigated how science has been brought into the debate so far, and how different actors use this knowledge. The analysis allows a clearer perspective on the 'added value' of our proposed scientific approach. Briefly, we concluded that problems are encountered due to:

- Different methodological approaches (bottom-up vs. top-down analysis of energy system);
- Lack of data (to perform the bottom-up analysis);
- Different perceptions of relevant time scales (or how to link short term issues with long term issues);
- Different framing of the problem (electricity vs. energy system);
- Institutional barriers (e.g. to develop the needed long-term vision);
- Lack of communication (between political decision makers and scientists, between scientists and stakeholders);
- Strategic use of scientific assessments by different stakeholders, or
- Insufficient knowledge of scientific assessments and methods.

Combined insights (from the theoretical investigations and the case studies) then lead us to the consideration of a more inclusive form of governance in the context of sustainability that incorporates both a scientific basis and recognition of an irreducible plurality of values. Furthermore, we made an attempt to put the first stages of this new governance model into operation through the construction of a 'value tree' and different scenarios containing long-term options for Belgian energy policy.

In a **final** (experimental) phase, this new form of decision aid was put to the test in a limited 'pilot' exercise – i.e. the results of the scenario exercise were critically examined by the representatives of the FRDO and scored with an MCDA – technique ('Multi-Criteria Decision Aid).

Future work

The theoretical background on justification, governance and participation will be valorised in contract work for EFDA ('European Fusion Development Agreement') and various FP7 projects on long-term radioactive waste governance (COWAM, ARGONA). We also plan to publish selected parts of the PhD research in relevant international peer-reviewed journals.

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Main reference

Laes, E. (2006), Nuclear energy and sustainable development. Theoretical reflections and critical-interpretative research towards a better support for decision making, PhD thesis, KULeuven, Leuven.
http://www.sckcen.be/sckcen_nl/publications/theses/eriklaesthesis_oct2006.pdf