EN/07

SEPIA - Results

Sustainable Energy Policy Integrated Assessment
A normative contribution to decision support

DURATION OF THE PROJECT
15/12/2007 – 30/06/2011

BUDGET
599.414 €

KEYWORDS
Sustainability assessment, long-term energy scenarios, multi-criteria assessment, participation

CONTEXT

Enabling the transition towards a more sustainable energy future represents a huge challenge requiring strategic scientific information. Scientific support of opinion formation and decision making on sustainable development has however important different characteristics than the ones of 'traditional' science for policy. Sustainability's normative character, inseparable connection with deep-rooted value patterns, long-term nature of most relevant developments, and necessary inclusion of societal actors, result in specific demands on science for sustainability. SEPIA addresses such needs in the field of long-term energy policy. Although part of the project results were contingent on specifics of the Belgian context, the project is embedded in the wider context of European and global energy system governance debates.

OBJECTIVES

The goal of the study is to make accessible and discuss the feasibility of performing an integrated sustainability assessment of Belgian long-term energy system development, in order to identify consensus and dissent in the possible integrated sustainability assessment design among different stakeholder groups, and thus to provide the basis for an integrated sustainability assessment procedure adapted to the context of Belgian energy governance (as embedded in a multi-level governance structure). The SEPIA project is guided by the following methodological principles:

- Long-term energy foresight from a normative perspective (using a back-casting approach);
- **Planetary scope** by using the global perspective as the point of departure for defining sustainability criteria;
- Stakeholder participation in all project phases (from problem definition to evaluation of policy proposals);
- **Integrated energy system assessment** – from energy services to primary energy demands, covering full life-cycle stages of energy technologies;
- **Interdisciplinary** by integrating expertise in economics, engineering, sociology and ethics;
- **Systematic attention for uncertainties**.

The SEPIA methodology unfolded in three phases:

In a **first phase**, we analysed the methodological 'state of the art' in the domains of (international, European, national or regional) energy foresight, criteria & indicators of sustainable development (necessary for 'measuring' energy system progress towards a more sustainable state) and the development of an integrated 'value tree' of sustainability criteria encompassing arguments stemming from diverse value premises.

A **second phase** led to the (qualitative) definition of a 'manageable' number of representative long-term energy scenarios for a sustainable development of the Belgian energy system by a group of expert scenario builders. This phase was supported by a series of in-depth deliberative discussions (workshops) using a range of qualitative research techniques (expert panel, scenario workshop, focus group) involving both stakeholders and energy experts.

In a **third phase**, the scenarios and the integrated value tree were used together in a multi-criteria evaluation by the stakeholder panel. Two transparent, user-friendly and real-time tools contributed to the project in a participative way: an energy accounting simulation model (LEAP) and a multi-criteria group decision support tool (DECIDER).
In parallel to phase 1-3, a case study was elaborated on the past, present and possible future of Belgium's nuclear energy policy.

CONCLUSIONS

Sustainability assessment of energy policy strategies is performed at the interface between scientific theory-building and political practice. Therefore, practical sustainability assessments are judged by criteria like scientific soundness, political legitimacy and practicability (in a real political setting). In this section, we offered a reflection on how such criteria could be met by a discursive approach using a combination of decision support tools. However, the 'burden of proof' for such a discursive approach is heavy. Indeed, we hereby presume that deciding on an appropriate (i.e. sustainable) long-term energy strategy is at least a suitable 'test case' for a more deliberative (discursive) governance arrangement, *ergo* that it is not *a priori* better handled by alternatives such as (a combination) of free market competition, lobbying and/or direct government regulation (top-down 'government' as opposed to bottom-up 'governance').

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Further in-built presuppositions include that some particular composition of actors is thought to be capable of making decisions according to (voluntarily accepted and consensually deliberated) rules, that will resolve conflicts to a maximum extent possible and (ideally) provide the resources necessary for dealing with the issue at hand. Moreover – next presupposition – that the decisions once implemented will be accepted as legitimate by those who did not participate and who have suffered or enjoyed their consequences. All together, substantiating the quality of the SEPIA approach is challenging, in theory and in practice, as documented by the following observations.

On a theoretical level, the SEPIA methodology aligns with insights derived from ecological economics, decision analysis, and science and technology studies, favouring the combination of analytical and participatory research methods in the field of 'science for sustainability'.

This view is motivated by sustainability problems being multi-dimensional (thus limiting the use of only monetary cost-benefit analysis), of a long-term nature (thus involving significant uncertainties) and applying to complex socio-economic and biophysical systems (thus limiting the use of mono-disciplinary approaches).

SEPIA shows the advantages of combining a (hybrid backcasting) scenario approach with a (fuzzy logic) multi-criteria decision aiding tool. Scenario exploration allows taking into account the (socio-economic and biophysical) complexities of energy system development so that uncertainties on the long term can be explored. Multi-criteria methods, and especially those based on fuzzy-set theory, are very useful in their ability to address problems that are characterised by conflicting assessments and have to deal with imprecise information, uncertainty and incommensurable values.

Both methods are supported by a large body of scientific literature, ensuring that an effective check of 'scientific soundness' can be made through the peer review process. However, the application of these methods, and especially their participatory nature, are challenging in practice.

For instance, the combination of narrative scenario building and quantitative modelling in theory necessitates the need for a deliberative consensus on all parameters used in the model, which in practice turns out to be impossible to organise (the LEAP model requires hundreds of inputs).

The scenario development phase as it was already turned out to be time intensive for stakeholder participants. We struggled with non-participation and dropouts of stakeholders; without proper investigation we cannot explain why participation fluctuated as it did. However, at least part of the explanation can probably be found in the general impression that the potential players in the Belgian energy system transition landscape – how limited their number may be – are rather scattered.

In Belgium (as in many other countries), energy problems cross a varied set of policy domains and agendas, such as guarding the correct functioning of liberalised energy markets, promoting renewables, environmental protection, climate policy etc. These are dealt with by different administrative 'silos' and analysed by separate groups of experts and policymakers.

As a result of this fragmentation, a lot of the key players struggle with overloaded agendas, organisation specific expectations and performance criteria and hence find no time for explicit reflective/exchange moments in the context of a scientific project not directly connected to any actual decision-making process. There may be many contacts on the occasion of events and by communication means, but there is not a structured exchange of experiences, knowledge and mutual feedback ('structured' in the sense of embedded in a culture of working methods).

This impression of fragmentation sharply contrasts with the high priority assigned to institutionalised networks and collaboration as advocated in the above-mentioned theoretical strands of literature. Perhaps the best way to sum up the findings so far is: assessing scenarios in the form of transition pathways towards a sustainable energy future with the aid of a participatory fuzzy-logic multi-criteria decision aiding tool certainly has the potential to support a more robust and democratic decision-making process, which is able to address socio-technical complexities and acknowledges multiple legitimate perspectives.

However, these methods are time- and resource intensive and require the support of adequate institutional settings for a proper functioning in real political settings. Participation in integrated energy policy assessment should therefore not be taken for granted. We hope that the experience gained so far in the context of the SEPIA project will allow future initiators of similar participatory projects to level the project objectives, the participants' expectations and the political backing with each other, a prerequisite for successful participation in foresight exercises.

CONTRIBUTION OF THE PROJECT TO A SUSTAINABLE DEVELOPMENT POLICY

Project results include a structured value tree to assess the sustainability of energy system development; a set of visions and scenarios for sustainable energy development and a reflection on the policy measures which could be implemented to realise those visions. In addition, the project delivered important methodological insights in the field of sustainability assessment. Also, in the course of the SEPIA project, a LEAP-based model of the Belgian energy system was built.

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