



COST ASSESSMENT FOR SUSTAINABLE ENERGY SYSTEMS

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Newsletter of the CASES project

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Editorial

High and volatile oil prices, pollution that affects human health and ecosystems, climate change, and electricity blackouts are serious problems, all related to energy production that affect the overall economy and the wellbeing of all EU citizens.

In what ways do alternative fuels cause these problems, and how does their impact depend on the technologies adopted to convert the fuels into useful energy? How effective are different policies in mitigating the negative effects of energy production and what can we do to reach a sustainable energy system?

To give an appropriate answer to these questions we need to integrate the analysis of industrial production costs with the assessment of external costs, which are those costs that are not normally accounted for in the commercial decisions about the use of different fuels and technologies. They include costs arising from the health and ecosystem impacts of energy use, as well as those associated with energy insecurity.

With CASES, 23 European Institution joined with three research centres from developing countries to assemble all existing knowledge in

this field. The aim is to determine the full cost of production for different energy sources at the national level for the EU-25 Countries and for some others under well defined energy scenarios to 2030. With the support of a complete cost database, policy instruments will be evaluated to choose the best ways to improve an energy system sustainable from an economic, social and environmental point of view.

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What is CASES?

CASES is a coordination action funded by the European Commission (FP6, Sustainable Energy Systems, 2006-2008). It evaluates policy options for improving the efficiency of energy use. Underpinning this evaluation is a consistent and comprehensive database of the full cost of energy. One of the objectives of the project is to make this crucial knowledge available to all stakeholders.

In particular CASES is compiling a complete and detailed estimate of both private and external costs - including energy security costs - of energy production for different energy sources at the national level for the EU-25 Countries and some non-EU25 Countries under well defined energy scenarios to 2030. Hence, the integration of private and external costs is built within one dynamic framework, to arrive at agreed ranges of estimates for different countries of the full cost of each energy source, which includes the external cost plus the private cost.

The cost database will provide a crucial quantitative support to the assessment of alternative policy options in the perspective of improving the efficiency of energy use. CASES, in providing a set of recommendations on the use of different policy instruments for the internalisation of the external costs of energy production, contributes directly to policy and provides an information base on the effectiveness and on the consequences of the use of different instruments. In addition the assessment of the full cost estimates of energy production allows policy-makers to become more aware of the consequences that different fuels and technologies have on human health, the environment and society.

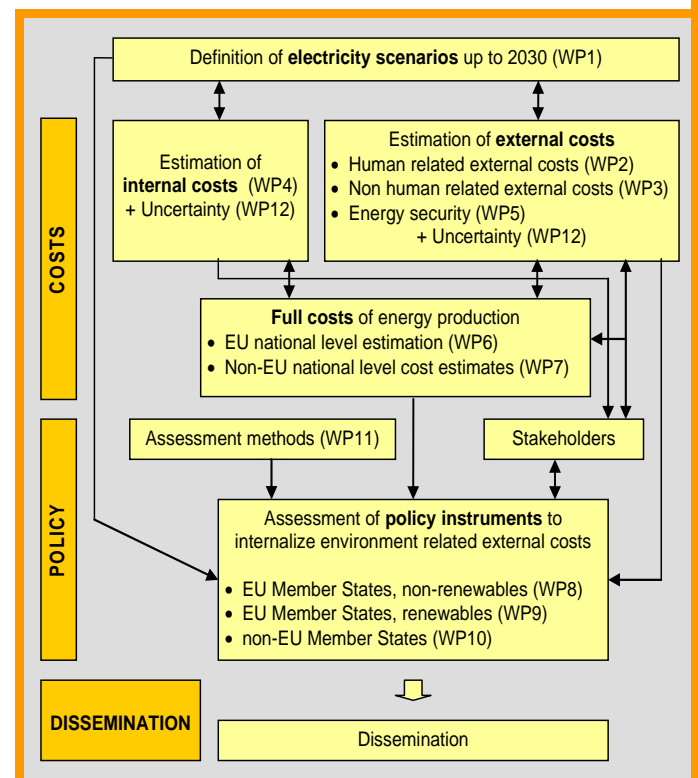
The project underlines also the greatest uncertainties and it indicates where future research effort should be concentrated.

Finally the project will disseminate research findings to energy sector producers and users, and to the policy-making community. Dissemination consists of a set of

activities ranging from publication of articles in the peer reviewed literature (more policy-oriented rather than purely scientific); project workshops and conferences involving key stakeholders and policy makers; seminars and presentation of key results at additional meetings, including presentation at meetings organised by the European Commission; presentations and open discussions with energy producers and user organizations.

Work in progress

The structure of the project is divided in two main research areas: one concerns cost assessment and the other policy evaluation. More in detail CASES is built as a series of "Work Packages" (WP) each corresponding to a specific topic, which are strictly connected as it is shown in the table below.



Structure of the project and interaction between the WPs.

The project started on 1st April 2006 and its duration is 30 months. During the first year of the project the work has been principally oriented to define a

homogeneous methodology for data collection and for policy analysis.

The principal results achieved in the cost assessment area are the literature review and the collection of external cost data by updating existing tools. In particular overviews of recent literature on non-human health related external costs of energy and on externalities related to energy insecurity were presented. Moreover life cycle emissions data for the period 2005/2010 were collected for a detailed set of technologies for electricity and electricity-and-heating production.

With respect to policy evaluation, the principal result achieved is the definition of an appropriate set of methodologies, which are available to assess policy instruments, by focusing on Cost-Benefit and Multi-Criteria Decision Analysis. The next steps of the project are to define a homogeneous data template detailed for country and for technology of full cost of energy, including private and all external costs, under electricity scenarios up to 2030. In addition a detailed evaluation of policy instruments for the internalisation of externalities in Europe and in some non European countries will be developed.

All these results will be widely disseminated to energy sector producers and users and to the policy making community.

Results and deliverables

During the first year of project a number of reports and databases were produced. Brief summaries of these deliverables are presented in this section. For additional details, all deliverables can be fully downloaded from the CASES website at the following address:

http://www.feem-project.net/cases/downloads_deliverables.php

Policy assessment guidelines

*Danae Diakoulaki and Christos Tourkolias*ⁱⁱ

Policy and project appraisal usually involves the consideration of alternative courses of action along multiple decision aspects, such as their cost of implementation and their positive and negative effects on the social and natural environment. In order to provide a basis for selecting among the alternatives, all these effects need to be expressed in comparable 'value' terms. Although the term 'value' has different meanings in different disciplines, a simple definition is that value shows 'the difference a good or service makes' while a more comprehensive one refers to 'the contribution of a good or service to specific goals, objectives or conditions' (Costanza, 2000). For non-traded goods, such as environmental quality or human health, 'values' do not exist in the marketplace and have to be elicited or uncovered through appropriate value elicitation techniques.

One can distinguish two main valuation approaches, which in turn specify two different assessment frameworks applicable in environmental policy making. The first valuation approach is based on neo-classical economics and provides the value information needed in Cost-Benefit Analysis (CBA). The second valuation approach is part of the Multiple Criteria Decision Analysis (MCDA) framework, which is increasingly applied during the last 30 years for aiding decisions involving several actions compared along multiple competing criteria.

Following a short description of CBA and MCDA, the present document includes basic guidelines for the proper implementation of the two assessment frameworks and a comparative examination of their strengths and weaknesses.

External cost estimates database

*Onno Kuik, Luke Brander and Nataliya Nikitina*ⁱⁱⁱ

Ståle Navrud and Kristin Magnussen^{iv}

El Hadji Fall^v

This report presents an overview of recent literature on the external costs of energy-related impacts on land use change, acidification, eutrophication, visual intrusion and climate change across Europe and for selected non-EU countries. A brief description of the database is given for each of these areas.

Database on life cycle emissions for electricity and heat generation technologies 2005/2010

Markus Blesl^{vi}

This database contains all emission for electricity and heat generation technologies for the following life cycle stages: construction, operation, dismantling and fuel. The data are average value for all Europe and cover the period 2005-2010. The technology analysed belong to the following groups: nuclear, fossil fired power plants, renewable and CHP. The emissions' list includes air, water and soil pollutants, in addition to land use change.

New estimates of energy supply externalities

Steven Arnold and Alistair Hunt^{vii}

This report presents our preliminary findings related to the objective "To derive estimates of externalities related to energy supply insecurities for EU and other selected countries". It builds upon the methodology we utilised in the EC ExternE – Pol research project that reported in 2004, (Hunt and Markandya, 2004), and updates the estimates derived on the basis of new empirical evidence.

We define energy security as "a state in which consumers and their governments believe, and have reason to believe, that there are adequate reserves and production and distribution facilities available to meet their requirements in the foreseeable futures, from sources at home and abroad, at costs which do not put

them at a competitive disadvantage or otherwise threaten their well-being. Insecurity arises as a result of physical failure of supplies or as a result of sudden and major price changes", (Belgrave, 1987 cited in Lockwood, 1997). This accords with the International Energy Agency definition as being the "availability of regular supply of energy at a reasonable price" (IEA: 2001).

Matrix of parameters influencing the evolution of the electricity demand

Rabea Ferroukhi^{viii}

This report provides an overview of the main drivers of the European electricity sector. The overview constitutes the background for the scenario analysis developed within the CASES project. The emphasis is on the most important supply and demand drivers in the electricity market, such as:

- Economic factors (growth rate, income, etc)
- Prices (electricity, fuel costs, etc.)
- Subsidies (for certain technologies, alternative energy sources, etc.)
- Structure of electricity demand
 - Demand level
 - Peak load & seasonal variation
 - Energy intensity
- Industry structure
- Potential for energy savings and DSM

The report distinguishes between drivers for demand and drivers for supply. We would, however, like to emphasize that some drivers impact on both the demand and supply side of the market, or, for example, impact supply via driving the demand.

Past and forthcoming events

Kick-off Meeting in Milan

The starting point of the project was to meet up and get to know all partners and to share our understanding of the overall objectives, scope and content of CASES. For this reason FEEM organised the Kick-off Meeting of

the Project, which was held in Milan on 15 and 16 May 2006, with the participation of almost all partners' representatives. The first meeting of the Project Steering Committee was held during this event.



Partners of the consortium during the Kick off meeting

Meeting on private and external costs assessment

The leaders of Work Packages concerning costs estimates meet the 15th February in Prague. The meeting was organised by CUEC at the Charles University to discuss the methodologies for assess private and external costs of energy production.

Meeting on assessment of policy instruments

The leaders of Work Packages concerning policy assessment meet the 21st February in Brussels. The meeting was organised by VITO to discuss the technical requirements and coordination to assess policy instruments.

Forthcoming events

- Mid-term Project Meeting (first Annual Review), including second Project Steering Committee meeting, scheduled in July 2007, hosted by CEPS, Brussels (BE).
- First Stakeholders Workshop on “Cost of Energy Assessment”, including third Project Steering Committee meeting, scheduled in January 2008, hosted by USTUTT/IER, Stuttgart (D).
- Seminar to present methods and user guidelines, scheduled in January 2008, hosted by NTUA, Athens (GR).

- Second Stakeholders Workshop on “policy assessment”, and Mid-term Project Meeting (second Annual Review) including forth Project Steering Committee meeting, scheduled in April 2008, hosted by VITO, Geel (BE).
- Final Conference and final Project Meeting, including fifth Project Steering Committee meeting, scheduled in August 2008, hosted by ISIS, Rome (IT).

Partners' list

The Consortium of the CASES' Co-ordination Action is lead by Fondazione Eni Enrico Mattei (FEEM) and it is composed by twenty-six partners established in twenty States, it covers the whole European area and also involves three institutions in two developing continents (Asia and South America).



Most of the institutions are established for research activities (11) and for higher education (9). The other participants are not qualified in one particular activity but they provide a scientific expertise and carry out complementary activities necessary to achieve the objectives of this Co-ordination Action.

Project co-ordinator

1. Fondazione Eni Enrico Mattei (FEEM)

Project Consortium

2. University of Bath (UBATH)
3. National Technical University of Athens (NTUA)
4. University of Stuttgart – Institute of Energy Economics and the Rational Use of Energy (USTUTT/IER)
5. Flemish Institute for Technological Research (VITO)
6. Risoe National Laboratory (RISOE)
7. Observatoire Méditerranéen de l'Energie (OME)
8. University of Flensburg (UFLENS)
9. Energy Research Centre of the Netherlands (ECN)
10. Vrije Universiteit Amsterdam-Institute for Environmental Studies (VU/IVM)
11. ECON Analysis AS (ECON)
12. Fundação COPPETEC (COPPETEC)
13. SWECO Grøner as (SWECO)
14. Lithuanian Energy Institute (LEI)
15. Indian Institute of Management Ahmedabad (IIMA)
16. Energy Research Institute (ERI)
17. Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas (CIEMAT)
18. Univerzita Karlova v Praze - Charles University Environment Center (CUEC)
19. Stockholm Environment Institute (SEI)
20. Centre for European Policy Studies (CEPS)
21. University of Warsaw - Warsaw Ecological Economic Center (UWARS)
22. Energy Agency of Plovdiv (EAP)
23. Türkiye Bilimsel ve Teknik Arastirma Kurumu - Marmara Research Center, Institute of Energy (TUBITAK)
24. Wageningen Universiteit (WU)
25. Istituto di Studi per l'Integrazione dei Sistemi (ISIS)
26. Paul Scherrer Institut (PSI)

Contacts

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