

DEALING WITH UNCERTAINTY TOGETHER

Energy Systems Analysis for the Framework Convention on Climate Change: Working Together on Coherent, Comparable Analyses

Annex 6

to the Implementing Agreement of the International Energy Agency
for a PROGRAMME OF ENERGY TECHNOLOGY SYSTEMS ANALYSIS

1. Aims

The result of a successful Annex VI will be a substantial contribution to the work conducted by national governments and in international fora for the United Nations Framework Convention on Climate Change (FCCC), and continuing service to the formulation of national policies and strategies for energy and for science and technology. This will include:

- the widespread and successful use of ETSAP networks, methodologies, data services and knowledge by the governments of the ETSAP Contracting Parties;
- the constructive use of ETSAP tools by OECD Member and non-Member countries as well as international organizations in multi-lateral discussions and negotiations;
- the establishment of ETSAP networks for analytical support;
- the demonstration of new methods
 - to evaluate common actions implemented by groups of countries, and
 - to treat uncertainties in technological developments, in environmental requirements, and in levels of economic activity.

The overall goal of this Annex is thus to serve national governments and work in international fora by fostering and supporting the development of constructive policy options, that are economically and technologically informed, in particular for the reduction of emissions of greenhouse gases and for the development and deployment of appropriate energy technologies.

2. Background

The FCCC acknowledges that the global nature of climate change calls for the widest possible cooperation by all countries and their participation in an effective and appropriate international response. ETSAP has developed tools by which countries can identify cost-effective measures to reduce emissions. It has the capability to calculate marginal costs in different countries in a consistent and comparable manner. The network of expertise and the accumulated knowledge of the partners make ETSAP uniquely well equipped to serve the needs of the Parties to the FCCC, in particular, the need for comparable and transparent methodologies for prediction of emissions and for the assessment of the effectiveness of policies.

The ETSAP tools are available not only in most OECD countries, but in many other countries, in Eastern Europe and the developing world. The advantages of acting jointly have already been calculated for three European countries. ETSAP has the capability to estimate the cost savings of common actions implemented by wider groups of nations -within the industrialized world or developing countries, or between them. It is

also able to address an important emerging issue, namely, dealing with uncertainties in the need for reductions in emissions and in the many other factors that bear on the economic activities of the nations of the world, including trade.

ETSAP provides powerful support to the participating users of its methodologies and tools. It has established and continues to nurture a network of nations and expert analysts that cooperate in developing technologically informed options and calculating the cost of restricting emissions of greenhouses or other pollutants. The family of ETSAP models use consistent formulations and data on technologies that use, transform, or produce energy. The ability to calculate the marginal costs of increasingly stringent reductions in emissions makes it possible to propose distributions of agreed levels of emissions among the countries that minimize the total costs.

The evolution of the research conducted during Annex V by the ETSAP research partnership, including the development of linked technological and economic models and the construction, especially, of MARKAL-MACRO models in many non-OECD Member countries has put ETSAP into a strong position to make a significant contribution to the work of the parties to the FCCC.

3. Services and Objectives

The principal services that ETSAP provides to its Participants are:

- an analytical facility for constructively studying
 - greenhouse gas abatement policy, and
 - energy technology strategy;
- a user group to fully support the use of the methodologies employed by ETSAP and related tools.

The specific objectives of this Annex are:

1. *Analysis of national energy systems*: to develop and control the quality of data needed by ETSAP tools used in support of decision-making; to make these data available for use in other applications as may serve the goal of this Annex; and to improve linkages between technological and non-technological factors in ETSAP tools.
2. *Expansion*: to expand the availability and application of ETSAP methodologies in countries that are party to, or considering becoming a party to the FCCC.
3. *Analysis of groups of national energy systems*: to maintain consistent national databases and to develop methodologies for combined optimization of groups of national models, in order to analyze the role of energy demand, conversion and supply technologies in balancing national or multi-national energy budgets while collectively meeting environmental requirements.
4. *Hedging -treatment of uncertainty*: to provide a foundation for strategies for the abatement of emissions under conditions of uncertainty in the levels of abatement to be sought, in demands for energy, in the development of energy technologies, and in other parameters.
5. *Develop advanced tools*: to continue to foster the advancement of tools to enable national and international authorities to better address the complex questions associated with energy and environmental issues.

4. Means

The objectives shall be achieved by:

1. *Combined Optimization*: combined optimization of models for several pairs or small groups of countries, starting with FCCC Annex 1 countries; and by the development of methods and techniques for simultaneously treating larger sets of countries;
2. *Stochastic Methods*: using stochastic programming, or other techniques, to address uncertainties in environmental requirements, in the technical potential and costs of emerging technologies, or in levels of economic activity;
3. *Data Sets*: discussing and jointly validating data developed by the ETSAP Contracting Parties, by making non-proprietary data available to others, and by developing default data sets to facilitate initial application of ETSAP methods in new countries;
4. *Internal Peer Review*: doing internal peer review of each others model formulations and data bases to ensure that combined results are consistent among countries;
5. *External Review*: inviting outside experts, including policy analysts and those who use other methods, to discuss methodologies and to review results before the Annex is completed;
6. *Reference Groups*: using national and multi-national reference groups for the development and analysis of the models and linkage to users;
7. *Workshops*: organizing workshops and seminars to exchange information and experience in the areas of work covered by this Task, participating in joint meetings with related international projects, making a concerted effort to communicate with the wider professional community, and by otherwise involving decision-makers;
8. *Twinning*: twinning established ETSAP Contracting Parties with new countries and by providing materials to guide new and recent users of ETSAP methodologies.
9. *Other Activities*: carrying out such other activities as may be agreed in the Annual Programme of Work.

5. Programs

There will be three principal programs in this Annex:

1. *National Programs*: National programs of work, appropriate to and funded by the individual Participants, aimed at supporting the objectives of Annex VI, with guidance from national reference groups.
2. *Twinning Programs*: program of expansion intended to further extend the network of countries using ETSAP methods for analysis and policy work in OECD Member and non-Member countries.
3. *Common Program*: A common program of work in which the national and multinational analyses will be integrated to draw conclusions regarding cooperation in the control of greenhouse gas emissions by OECD Member and non-Member countries.

6. Operating Agent

The Operating Agent is the Netherlands Energy Research Foundation (ECN), acting through the Policy Studies Unit.

7. Specific Responsibilities of the Operating Agent

In addition to the obligations enumerated in Article 4 of this Agreement and for the purposes of carrying out the above Objectives, the Operating Agent shall establish:

1. *Project Staff*: For the purpose of carrying out the above objectives the Operating Agent shall establish, within sixty days after the Annex has entered into force, a Project Staff composed of a project head and such additional assistance as may be required, including external staff, to fulfill the Task.

Activities requiring common work may include quality assurance review, development of the procedure for comparing and integrating the national models, preparing the final conclusions and report of the Task, and other activities that may be decided upon by the Operating Agent or the Executive Committee.

The common work may be performed by the Project Head, by other Operating Agent staff, or by organizations or professionals from the participating countries.

The appointment of the Project Head will be agreed by the business unit Policy Studies of the Netherlands Energy Research Foundation (ECN) and the Executive Committee, as may be necessary from time to time. The Project Head will devote at least two-thirds of his or her time to the Task. The Paul Scherrer Institute will support the Operating Agent by coordinating multi-country optimization work in the program of common work.

2. *Workshops and seminars*: At the request of the Executive Committee, the Operating Agent shall organize workshops and seminars.
3. *Validation*: At the request of the Executive Committee, the Operating Agent shall coordinate the work of a small group of experts charged with reviewing the consistency and accuracy of input data, national models, and the main findings.
4. *Preparation of Draft Programme of Work and Reports*: The Operating Agent shall prepare and submit to the Executive Committee, prior to its first meeting, a draft programme of work for the three-year period of the Task. The Operating Agent shall report to the Executive Committee at least once a year on the progress of the activities under this Task. Upon termination of this Annex, the Operating Agent shall prepare and submit to the Executive Committee for approval, a draft final report on the activities carried out during the period of this Annex. Following approval, the Operating Agent shall transmit the report to the Agency and to the members of the IEA Committee on Energy Research and Technology.

The Committee on Energy Research and Technology may, during this Task, propose additions to the Programme of Work. The Executive Committee shall decide whether these proposals will be added to the Programme, provided such additional work can be carried out within the resource levels set out in paragraph 9 below.

The Operating Agent shall be responsible for overall coordination of the Task. The main responsibilities will be:

- to manage the common tasks,
- to assure appropriate communication among the Participants,
- with the approval of the Executive Committee, to represent ETSAP in various international conferences, bodies, and groups, and
- to prepare and distribute material on the work of ETSAP for distribution through a newsletter or the World Wide Web.

8. Specific Obligations, Responsibilities and Rights of the Participants

Participants shall carry out, to the extent possible, the following activities and the results will be communicated to the Operating Agent:

1. Collection of national data on emission release and emissions control technologies;
2. Collection of information on energy system structure and related data;
3. Establishment and validation of data on technology characterizations and related data;
4. Performance of national and cooperative, multi-national scenario analyses using energy systems models;
5. Establishment of national and multi-national reference groups to discuss and advise on data bases, assumptions, methodology, model results and their application to the development of policy, especially under the auspices of the FCCC.
6. Contribute to the development of ETSAP models and tools, including testing of newly developed versions of software.

Participants have special rights to the results of the joint work, not available to non- participants, as may be decided by the Executive Committee from time to time, subject only to the limitations laid out in Section 11. This includes privileged access to the MARKAL Users Support System and related services contracted on behalf of ETSAP by the Operating Agent.

9. Funding

1. Common Financial Obligations

The Expansion Program and the Common Program will be funded through the Operating Agent. The actual costs of the Operating Agent's activities during this Annex will be divided equally among all Participants. If the number of Participants changes, the Executive Committee will decide whether or not to adjust the budget and fees. New Participants will pay a full share of the costs beginning in the Task year in which they become Participants. The 1996 budget of the Operating Agent for the core programme will be Dfl 504,000, based on 12 Participants at Dfl 42,000 each. If and when additional participants join, the Executive Committee will re-examine the budget, taking account of the benefits of supplementary work by the Operating Agent or its sub-contractors. The Executive Committee will decide the annual budget for subsequent years based on this amount, and taking into account inflation and any agreed changes in the work of the Operating Agent.

2. Individual Financial Obligations

In addition to the contributions set out in 9.1 above, each Participant shall bear all costs it incurs in carrying out this Task, including the costs of its National Program and participation in workshops and seminars.

10. Time Schedule

This Annex will enter into force on January 1, 1996 and will remain in force for a period of three years. It may be extended by agreement of two or more Participants acting in the Executive Committee and taking into account any recommendation of the Agency's Committee on Energy Research and Technology concerning the term of this Annex, which shall thereafter apply only to those Participants.

11. Information and Intellectual Property

In addition to the provisions of Article 7 of the ETSAP Agreement:

1. *Executive Committee Powers:* The publication, distribution, handling, protection and ownership of information and intellectual property arising from this Annex shall be determined by the Executive Committee acting by unanimity in conformity with this Agreement and the laws of the countries of the Participants and of the Operating Agent.
2. *Right to Publish:* Subject only to copyright restrictions, the Participants in this Annex (referred to in this Annex as the "Participants") shall have the right to publish all information provided to or arising from this Annex except proprietary information, but they shall not publish it with a view to profit, except as agreed by the Executive Committee, acting by unanimity.
3. *Proprietary Information:* The Operating Agent and the Participants shall take all necessary measures in accordance with this Annex, the laws of their respective countries, and international law to protect proprietary information. For the purposes of this Annex proprietary information shall mean information of a confidential nature such as trade secrets and know-how (for example, computer programmes, design procedures and techniques, chemical composition of materials, or manufacturing methods, processes, or treatments) that is appropriately marked, provided such information:
 - Is not generally known or publicly available from other sources;
 - Has not previously been made available by the owners to others without obligation concerning its confidentiality; and
 - Is not already in the possession of the recipient Participant without obligation concerning its confidentiality.It shall be the responsibility of each Participant supplying proprietary information to identify the information as such and to ensure that it is appropriately marked.
4. *Production of Relevant Information by Governments:* The Operating Agent should encourage the governments of all Agency Participating Countries to make available or to identify to the Operating Agent all published or otherwise freely available information known to them that is relevant to the Task. The Participants should notify the Operating Agent of all pre-existing information, and information developed independently of the Task known to them which is relevant to the Task and which can be made available to the Task without contractual or legal limitations.
5. *Production of Available Information by Participants:* Each Participant agrees to provide to the Operating Agent all previously existing information and information developed independently of the Annex which is needed by the Operating Agent to carry out its function in this Task and which is freely at the disposal of the Participant and the transmission of which is not subject to any contractual and/or legal limitations:
 - If no substantial cost is incurred by the Participant in making such information available, at no charge to the Task;
 - If substantial costs must be incurred by the Participant to make such information available, at such charge to the Task as shall be agreed between the Operating Agent and the Participant with the approval of the Executive Committee.
6. *Use of Proprietary Information:* If a Participant has access to proprietary information which would be useful to the Operating Agent in conducting studies, assessments, analyses, or evaluations, such information may be communicated to the Operating Agent in accordance with an agreement between the Operating Agent and the specific Participant setting forth the terms and conditions for such acceptance, but the proprietary information shall not become part of reports, handbooks, or other documentation, nor be communicated to the other Participants except as may be agreed in writing between the Operating Agent and the Participant which supplied such information.

7. *Acquisition of Information for the Task:* Each participant shall inform the Operating Agent of the existence of information known to the Participant that can be of value to the Task, but which is not freely available, and the Participant shall endeavour to make the information available to the Task under reasonable conditions, in which event the Executive Committee may, acting unanimously, decide to acquire such information.
8. *Reports on Work Performed under the Task:* The Operating Agent shall provide reports on all work performed under the Task and the results thereof, including studies, assessments, analyses, evaluations and other documentation, but excluding proprietary information, to the Participants.
9. *Copyright:* The Operating Agent may take appropriate measures necessary to protect copyrightable material generated under this Task. Copyrights obtained shall be the property of the Operating Agent in trust for and for the benefit of the Participants, provided, however, that Participants may reproduce and distribute such material, but shall not publish it with a view to profit, except as otherwise directed by the Executive Committee.
10. *Authors:* Each Participant shall, without prejudice to any rights or authors under its national laws, take necessary steps to provide the cooperation with its authors required to carry out the provisions of this paragraph. Each Participant will assume the responsibility to pay awards or compensation required to be paid to its employees according to the laws of its country.

12. Results

The results of this Task shall be:

- Maintenance and improvement of an international capability for the analysis of energy technologies and their future prospects and extension of such a capability within the context of energy and the environment, and in particular climatic change;
- Periodic reports on workshops or seminars and on analytical studies undertaken in connection with the Task; and
- A final report on the activities carried out under this Annex.

13. Participants

The Contracting Parties that are Participants in the Task are the following:

(List of parties to be added following their notification to the Executive Director of the IEA)