

Annex XIII

Summary

Title: Tools for Analysis of a Future Energy Revolution (TAFER)
Subtitle: Methodologies, Tools and Data Bases

Duration: 2014 - 2016

Objectives:

(a) *Maintenance of the base tools*

The minimum objective of this Annex is to maintain and update the ETSAP model generators (MARKAL, TIMES), the users' interfaces (ANSWER, VEDA), and the Energy Technology Data Source (E-TechDS)

(b) *Capacity building*

Best practice examples, manuals, online forum and hands-on training opportunities will be offered with the aim of maintaining/improving international/national capabilities for conducting energy systems analyses and the effective use of ETSAP tools.

(c) *Research and Development*

The underlying objective is to continually advance the state-of-the-art with respect to energy systems analyses, integrated energy / economic / environmental / engineering modelling and long term scenario analysis of critical issues facing IEA member countries and all sharing this planet.

Budget: Each Contracting Party contributes with an annual fee of €20,000 the first year and not more than that in the following years. The Executive Committee will decide the annual budget, and thereby the participation fee taking into accounts the number of participants.

Operating Agent: The Centre for Renewable Energy Sources and Energy Saving (CRES, Greece)

Annex XIII (2014-2016)

Tools for Analysis of a Future Energy Revolution (TAFER) **Methodologies, Tools and Data Bases**

1. Introduction

The first oil crisis almost forty years ago made policy makers and the public at large suddenly aware of the need to find alternatives to oil. Since 1972 concerns over economic sustainability, climate change, energy security, environment protection and social safety call for an energy revolution with increasing urgency. Decision makers need robust policy analyses that encompass the relevant global, regional national and local factors with increasing detail. Policy-makers are looking at the critical role of technological options with new interest and hope. The critical need now is identifying the key technologies and the programs and policies that will bring them to the market.

A joint international programme of energy systems analysis seems now even more necessary than thirty five years ago, when ETSAP started under the aegis of the IEA in response to the pressures arising from that first oil crisis. ETSAP is well equipped to provide experts and tools for these analyses.

2. Objectives

Acknowledging that ETSAP tool users independently offer to national and international organizations their capabilities of building energy models, compiling scenario and conducting analyses, the Contracting Parties to this Implementing Agreement participating in this Annex aim at carrying out the following range of cooperative activities for their mutual benefit and to support their independent activities.

(a) Tools maintenance

Maintaining, updating and improving ETSAP Tools and methodologies is the minimum objective of the Annex. This includes

- Maintenance of MARKAL
- Maintenance, update and improvement of TIMES, with a special attention to the improving the documentation
- The continuous effort to make the model “shells” (ANSWER and VEDA) more ‘user-friendly’ and well documented
- Maintain and update the models provided via the ETSAP platform (ETSAP-TIAM)
- Maintain and update the Energy Technology Data Source (E-TechDS), with attention to its direct potential contribution to modellers and integration with the other tools.

studies carried out by the Contracting Parties and other users of the ETSAP Tools.

(b) Capacity building

This objective, strictly related to the previous one, aims at maintaining and improving international and national capabilities, across developed and developing countries, for

- using properly the ETSAP Tools;
- analysing energy systems – markets and technologies;
- modelling possible long term development paths with ETSAP tools;
- building consistent energy / engineering / economic / environment scenarios, and
- evaluating energy related policies in view of an energy revolution.

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Concretely, the activity will include:

- improvement of the users' guide and "getting started" manuals;
- improvement and enhancement of the global ETSAP-TIAM model with respect to the representation of its region-specific particularities
- availability of online web support systems;
- regular offering of training courses, and
- regular organisation of two workshops per annum.

(c) *Research and Development*

To the extent possible by common fund, ETSAP aims to support activities that continually advance the state-of-the-art of energy systems analyses and integrated energy / economic / environmental / engineering modelling.

Concretely, the activity will include:

- improvement of the interaction between the energy system and the economy;
- improved incorporation of behaviour into energy systems modelling;
- improved incorporation of technical and financial variability including contribution to job creation.
- other emerging topics as they arise.

3. **Means**

The Participants shall achieve the objectives through the following means:

- (a) Carrying out common analyses on key aspects of present energy technology systems and their possible future developments;
- (b) Collecting, analysing and disseminating information and consistent data related to energy systems, energy technologies, energy and environment models and scenarios;
- (c) Promotion of common research on energy systems analysis, integration of existing tools in the present methodology and development of new tools, together with other groups active in the field;
- (d) Enhancement of existing ETSAP Tools and implementation of new ones, also by linking ETSAP methodology to other approaches;
- (e) Improvement of ETSAP Tools documentation and dissemination of representative analyses carried out with them;
- (f) Organization of semi-annual meetings of experts, as appropriate, to exchange information and experience in the area of work covered by the Agreement;
- (g) Participation in joint meetings with related international projects, making a concerted effort to communicate with the wider professional community, and by otherwise involving decision-makers;
- (h) Promotion of, and participation to, relevant common projects;
- (i) Organization of training courses to inform new experts or to widen the analytic capabilities of existing experts domestically, locally and in outreach activities, including "in-reach" capability building for participants in the use of the global models;

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- (j) Exchange of specialists, experts and students active in the sector;
- (k) Using national and multi-national reference groups for the development and analysis of the models and linkage to users;
- (l) Twinning established ETSAP Contracting Parties with new countries, providing materials to guide new and recent users of ETSAP methodologies, as part of “Outreach” initiatives;
- (m) Carrying out such other activities as may be agreed in the Annual Programme of Work.

4. Deliverables

- (a) Peered reviewed publications in journals and conference proceedings
- (b) Publications of independent analyses and background material resulting from the studies carried out towards the achievement of the above objectives; this will materialise in a common report / book as well as contributions to journals and other reports;
- (c) Technical reports on the feasibility or actual extension of ETSAP tools in general to neighbouring fields;
- (d) Updated common tools for energy systems analysis, including improved versions of users’ manuals and guides for the use of ETSAP tools;
- (e) An improved website to better support the global community of ETSAP Tool users, including a password protected area with models and data accessible only to Contracting Parties and others approved by the OA/ExCo;
- (f) Periodic reports on workshops or seminars, and on analytical studies undertaken in connection with the Annex, and
- (g) A final report on the activities carried out under this Annex.

5. Specific Obligations, Responsibilities and Rights of the Participants

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

- (a) Performance of national and co-operative, multi-national scenario studies using ETSAP Tools and energy systems analyses in general;
- (b) Collection and validation of national/regional quantitative data on flows of energy commodities, and the capital stock of technologies consistent with the national energy balances, emissions of pollutants and greenhouse gases consistent with existing inventories, status of emission control technologies, economic value of energy systems consistent with national accounts, any other information on energy system structure and related data;
- (c) Establishment of [multi-]national reference groups to discuss and advise on data bases, assumptions, methodology, model results and their application to the development of energy related policies;

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- (d) Participation to the development of ETSAP models and Tools, including testing of newly developed versions of software, as well as the review of the Energy Technology Data Source (ETSAP-E-TechDS), and
- (e) Contribution to the efforts of disseminating the methodologies and their use in assessing local, national, regional or multi-regional global systems, offering lessons and courses, carrying out “Outreach” activities.

Participants have special rights to the results of the joint work, not available to non-participants, as may be decided by the Executive Committee, subject only to the limitations laid out in paragraph 10 below. This includes privileged access to ETSAP Tools, the support systems and related services contracted on behalf of ETSAP or made available to Participants by the Operating Agent acting on decisions taken by the Executive Committee. This includes:

- (a) Small group (5-user) license to the ANSWER and VEDA model management systems for MARKAL and TIMES;
- (b) Access to ETSAP models at no charge;
- (c) Discounted fees for the GAMS language in which the MARKAL and TIMES model generators are written for own and Outreach purposes;
- (d) Participation free of charge to the training courses organised by ETSAP.

6. Specific Obligations and Responsibilities of the Operating Agent

In addition to the obligations and responsibilities enumerated in Article 4 of the Implementing Agreement, the Operating Agent shall perform or engage in the activities noted below.

- (a) *Establish the Project Staff*
For the purpose of carrying out the above objectives and to fulfil this program of work the Operating Agent shall establish a project staff and such additional assistance as may be required, including external staff.

Following guidance and instructions from the Executive Committee, the Operating Agent shall give secretarial and administrative support to establishing activities of Contracting Parties on a task-sharing basis, subject to specific budgets made available for those purposes by the Executive Committee.

- (b) *Prepare the Program of Work and Reports*
The common program of work will be proposed by the Operating Agent for approval by the Executive Committee. The common work may be performed by the Project Head, other Operating Agent staff, or organizations or professionals designated by the Operating Agent, according to the work plan(s) established by the Executive Committee.

The Operating Agent shall submit yearly to the Executive Committee a draft Programme of Work, with an accompanying task-level budget, for the following year. The Operating Agent shall report yearly to the Executive Committee on the progress of the activities under each task.

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Upon completion 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 IEA secretariat and to the members of the IEA Committee on Energy Research and Technology.

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

(c) *Coordinate the Task and Manage the Program of Work*

The Operating Agent shall bear the following main responsibilities:

- (1) To manage the agreed upon common program of work;
- (2) To supervise the maintenance of the ETSAP tools;
- (3) To assure appropriate communication among the Participants;
- (4) With the approval of the Executive Committee, to represent ETSAP in various international conferences, bodies, and groups;
- (5) To prepare and distribute material on the work of ETSAP through the Internet;
- (6) In co-ordination with the Participants, to use its best efforts to avoid duplication of activities with other related programmes and projects implemented by or under the auspices of the IEA or of other competent bodies;
- (7) To provide the Participants with the necessary guidance for the work they carry out, assuring minimum duplication of effort;
- (8) At the request of the Executive Committee, to organize workshops and seminars, and
- (9) At the request of the Executive Committee, to co-ordinate the work of a small group of experts charged with reviewing the consistency and accuracy of input data, national models, and the main findings.

7. Operating Agent

The Centre for Renewable Energy Sources and Saving (CRESS, Greece) is designated ETSAP Operating Agent, under the leadership of Mr. George Giannakidis.

8. Time Schedule

This Annex shall enter into force on January 1, 2014 and shall remain in force till December 31, 2016. Within the limits of the term of the Agreement, this Annex may be extended by two or more Participants, acting in the Executive Committee, and shall thereafter apply only to those Participants.

9. Funding

(a) *Common Financial Obligations*

The Common Program will be funded by contributions by the Participants and managed by the Operating Agent. The actual costs of the Common Program 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 the annual fees. New Participants will pay a full share of the costs beginning in the year in which they become Participants.

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The annual fee for 2014 is to be €20,000 per participant, and not more in the following years. The Executive Committee will decide the annual budget taking into account the number of participants. The Executive Committee will decide the annual budget for subsequent years, taking into account the actual number of Participants, inflation and any agreed changes in the Common Program.

(b) *Individual Financial Obligations*

In addition to the contributions set out in subparagraph (a) above, each Participant shall bear all costs associated with carrying out this program of work, including the costs of its national team to carry out the program and their participation in workshops and seminars.

(c) *Additional contribution*

Any fees collected for carrying out training programs and for licensing the use of the ETSAP models, as well as those secured from ETSAP's share of commissions associated with new distributions of the ETSAP tools, will add to the ETSAP budget.

Voluntary contributions from participants and other possible sponsors, if any, are welcome and will be used to more actively pursue the objectives and goals for the program of work, as approved by the Executive Committee.

ETSAP may provide seed money for (large) capacity building and analysis projects, to be decided on a case-by-case by the ExCo. In addition the Operating Agent and the Contracting Parties are urged to seek funding sponsors ready to co-finance projects for training and analysis based on ETSAP tools, similarly to what presently happens with competing modelling tools.

With the approval annually of the Executive Committee, ETSAP will continue to be a sponsor of the International Energy Workshop, which in 2011 will be celebrating its 30-year anniversary, during which time ETSAP partners have continually been contributors and participants.

10. Information and Intellectual Property

(a) *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.

(b) *Right to Publish*

Subject only to copyright restrictions, 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.

(c) *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:

- (1) Is not generally known or publicly available from other sources;
- (2) Has not previously been made available by the owners to others without obligation concerning its confidentiality; and

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- (3) 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.

(d) *Production of Relevant Information by Governments*

The Operating Agent should encourage the governments of all IEA 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 program of work. The Participants should notify the Operating Agent of all pre-existing information, and information developed independently of the program of work known to them which is relevant to the Annex and which can be made available to the Annex without contractual or legal limitations.

(e) *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 Annex 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:

- (1) If no substantial cost is incurred by the Participant in making such information available, at no charge to the Annex, and
- (2) If substantial costs must be incurred by the Participant to make such information available, any such charges to be reimbursed from the Annex as shall be agreed between the Operating Agent and the Participant with the approval of the Executive Committee.

(f) *Use of Proprietary Information*

If a Participant or ETSAP collaborating institution 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/collaborating institution 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 others except as may be agreed in writing between the Operating Agent and the Participant/collaborating institution which supplied such information.

(g) *Acquisition of Information for the Annex*

Each Participant shall inform the Operating Agent of the existence of information known to the Participant that can be of value to the Annex, but which is not freely available, and the Participant shall endeavour to make the information available to the Annex under reasonable conditions, in which event the Executive Committee may, acting unanimously, decide to acquire such information.

(h) *Reports on Work Performed under the Task*

The Operating Agent shall provide reports to the Participants and to the Executive Committee on all work performed under the Annex and the results thereof, including studies, assessments, analyses, evaluations and other documentation, but excluding proprietary information.

(i) *Copyright*

The Operating Agent may take appropriate measures necessary to protect copyrightable material generated under this Annex. 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.

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(j) Authors

Each Participant shall, without prejudice to any rights of authors under its national laws, take necessary steps to provide the co-operation 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.

(k) Intellectual Property Rights held by ETSAP

The Operating Agent, in trust for and for the benefit of the Participants, as directed by the Executive Committee, holds the Intellectual Property Rights of:

- the MARKAL and TIMES model generators;
- the official version of ETSAP-TIAM;
- the Energy Technology Data Source, E-TechDS;
- the two web sites: www.etsap.org and www.iea-etsap.org; and
- the ETSAP final reports and NewsLetters.

(l) Assignment of ETSAP IPR to another organisation

With a majority vote, the ExCo can assign such rights to another organisation based on future events.

(m) New Intellectual Property Rights

New IP created during this Annex will be held by the Operating Agent, in trust for and for the benefit of the Participants, as directed by the Executive Committee.

11. Participants

The Contracting Parties which are Participants in this Annex are the following:

[For the record, Countries and Contracting Parties to Annex XII or previous annexes are listed below.]

Country	IA Date of signature	Contracting Party	Participating till / from Annex:
IEA			
Austria	19.12.80	EVA	V/
Australia	13.11.80	ABARE -	X/
Belgium	08.09.81	The Government	Current
Canada	07.07.82	NRCan	Current
Czech Republic			
Denmark	04.12.80	DEA	Current
EC	11.01.82	DG Research	Current
Finland	09.01.02	TEKES	Current
France	29.01.08	ADEME/EMPT	/XI Current
Germany	13.11.80	IER	Current
Greece	01.12.80	CRES	Current
Hungary			
Ireland	01.05.09	SEAI	/XI Current
Italy	13.11.80	IMAA/CNR-ENEA	Current
Japan	17.09.81	The Government	X
Korea	15.05.96	KEMCO	Current
Luxembourg			
The Netherlands	02.04.82	ECN	Current
New Zealand			
Norway	13.11.80	IFE	Current
Portugal			
Russian Federation	15.09.2010	ERIRAS	XI Current
Spain	01.07.2010		VIII/ /XI Current
Sweden	18.11.80	The Government	Current
Switzerland	01.04.81	PSI	Current

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Turkey	22.03.96	Kocaeli -	X/
United Kingdom	09.06.81	The Government	Current
United States	13.11.80	DOE	Current

Others

Invited to join / rejoin ETSAP:

52 nd meeting, Brasilia, November 2007:	Turkey, China, India, Mexico, South Africa, Brazil
53 rd meeting, Paris, July 2008:	Australia, Austria, Indonesia, Kazakhstan, Portugal
55 th meeting, Venice, June 2009	Croatia
62 nd meeting, Lisbon, December 2012	China, Ukraine
63 rd meeting, Paris, June 2013	Mexico, Czech Rep. Singapore