ETSAP Strategic Plan
(2009-2013)

1. Mission

Under the pressure of the first oil crises the ETSAP Implementing Agreement started thirty years ago under the aegis of the IEA with the aim of carrying out a joint Program of Energy Technology Systems Analysis.

ETSAP's strategy in achieving the objectives is twofold.

- Through a common research programme, ETSAP established, maintains and enhances the flexibility of consistent multi-country energy-engineering-economy-environment analytical tools and capability.
- ETSAP members also assist and support government officials and decision-makers by applying these tools for energy technology assessment and analyses of other energy and environment related policy issues.

2. Achievements

ETSAP has developed and holds the Intellectual Property rights for two technical-economic model generators, MARKAL and TIMES. The original conceptual framework, the mathematics and the code of MARKAL were developed at BNL and KFA-Juelich in 1978-9. The Integrated MARKAL EFOM System (TIMES) was developed by an ETSAP team nearly ten year ago. Dozens of experts with ETSAP budget and MARKAL/TIMES users have improved them during thirty years of common work.

ETSAP has contributed with Annex funds and ideas to the development of the users' interfaces ("shells") VEDA-FE/BE (owned by KanORS) and ANSWER-TIMES (owned by Noble-Soft Systems). In addition, various key undertakings employing the ETSAP Tools have also contributed directly to the advancement of the functionality of the "shells" to the benefit of all users.

The MARKAL and TIMES model generators are distributed free of charge. The ETSAP partners have ready access to the user's "shells" and to ETSAP-TIAM. Other interested parties access ETSAP-Tools and the ETSAP-TIAM model at a fee.

Making use of ETSAP tools experts prepared hundreds of technical-economic energy models, compiled many more long term energy environment scenarios, carried out policy impact evaluations at the global, multi-regional, national and local level. A compilation of the most recent achievements is summarised in the Annex X draft final report, downloadable from www.etsap.org.

All the models built employing the ETSAP tools and their data bases are owned by the institutions / individuals that develop them. ETSAP owns only the multi-regional global TIMES Integrated Assessment Model (ETSAP-TIAM).

The success of this Implementing Agreement is measured by the number of ETSAP tools users – 230 in nearly 70 countries – more than a tenfold increase over the original contracting parties, and the impact of the scenario analyses carried out with them (as illustrated in the Final Report of Annex X).

3. Challenges

A joint international programme of energy systems analysis seems now even more necessary than thirty years ago.

The continuous increase of energy prices and the volatility of global energy markets reflect the rigidity of the final energy supply systems and the risks to security of supply perceived by final energy users, who demand increasing amounts of energy services worldwide. The anthropogenic origin of climate changes has been made clearer and more evident by the scientists of the Intergovernmental Panel of Climate Change in their recent Fourth Assessment Report. The Working Group III of the IPCC highlights[1] difficulties and uncertainties of global mitigation paths towards stabilization: stabilising at 2.0-2.4 degrees centigrade above pre-industrial levels requires peaking emissions not later than 2015 and reducing them to 50%-15% of 2000 emissions by 2050 and even more at the end of the century. However the cost of heading towards new 'no / low carbon' energy systems is at least an order of magnitude lower than the damages that the world risks if climate changes are not timely mitigated[2].

The important news is that, pushed by this cumulative evidence and the pressure of the public opinion, decision makers recently started to consider policy objectives and practical measures on a longer time perspective. The Member States of the EU took the year 2020 as time horizon for increasing to 20% the contribution of renewable energy sources to their energy balance and reducing by 20% their greenhouse gas emissions below the 2000 level. The final communiqué of the G8+5 summit states that participants "will consider seriously the decisions made by the EU, Canada and Japan, which includes at least a halving of emissions by 2050. ... [and] commit to achieving these goals and invite the major emerging economies to join [them] in this endeavour."

ETSAP is well equipped to carry out studies in the field of mitigation as well as security of supply pathways and associated costs/impacts, looking to provide decision makers with global / national highly differentiated paths / scenarios towards new energy systems through the development and deployment of better technology chains.

4. Objectives

Building on previous achievements and tools, which will be maintained, this Implementing Agreement proposes to continue research in systems analysis and modelling and carry out new common analyses.

(a) Co-ordinated Analyses and Studies

The main objective of this task is to carry out joint developed – developing global / regional / national energy systems studies with technological details for policy impact evaluation. The natural umbrella for reaching this objective is the IEA secretariat and its ETO office.

The main common effort will be devoted to establish an Energy Technology Data Source (E-TechDS), in collaboration with the IEA secretariat and other IEA Implementing Agreements, to be used directly by models built with ETSAP tools and for policy analyses.

This objective includes studies and reports complementing the Energy Technology Perspective project (ETP) with national / regional analytical details and all other outreach activities related to the IEA-G8-POW.

By making use of the multi-regional global ETSAP-TIAM model, several contracting parties are planning to study the national implications of climate change mitigation and energy security policies.

[1] In table 5 of the Summary for Policy Makers
[2] As shown in the Stern report

(b) Research and Development

This objective aims at continually advancing the state-of-the-art with respect to energy systems analyses and integrated energy / economic / environmental / engineering modelling through:

- continued advancement of the methodology underlying the analysis of present energy systems;
- two way coupling of MARKAL-TIMES models with general equilibrium models;
- extension of the general equilibrium properties to sectoral production functions;
- inclusion of energy security and technological risk parameters and definition of an auxiliary global risk objective function for trade-off analyses;
- simulation of non-competitive oil market;
- inclusion of consumer choice and multiple consumers in the economic equilibrium framework;
- addition of a feedback loop from climate to the energy system to the present direct impact of the energy-emission system on the climate in TIMES; and
- advancement in "myopic foresight" optimization.

It is also planned to continue working with the global multi-regional ETSAP-TIAM: in order for instance to update to new statistical data, to detail the regional aggregation (EU27+, Russia as separate regions), to include GHG emissions of non energy sectors, to improve the representation of end use devices.

(c) Capacity building

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

- analysing of energy systems – markets and technologies,
- modelling their possible long term development paths,
- building consistent energy / engineering / economic / environment scenarios, and
- evaluating policies towards economic sustainability, energy security, environment protection, global climate mitigation and technical feasibility.

Training new groups in the methodologies of quantitative impact analyses using the ETSAP Tools brings to the Contracting Parties the advantages of establishing tighter collaborations with energy systems analysis groups in developed as well as developing countries, building compatible models to facilitate cross-country comparisons, sharing experiences, and improving the international dimension of their own analyses.

(d) Tools maintenance and improvement

ETSAP plans to maintain both model generators (MARKAL and TIMES) and both users' interfaces (ANSWER and VEDA-FE/BE). It is planned to increase the support to users and the diagnostics.

It is planned to improve the "user-friendliness" of the model "shells" (ANSWER/VEDA) both for advanced users as well as new user. It is planned as well to increase the capabilities of users' interfaces in checking input data before solving the models and enhancing the post-optimal sensitivity analyses.

Further to the continuous update of the users' guides, new "getting started" manuals are planned in the field of quantitative energy systems analysis, representation of the system in models, scenario building and benchmarking, impact evaluation of energy related policies.

5. Means

This task / cost sharing Implementing Agreement shall achieve the objectives through several means.

At the ETSAP bi-annual workshop senior and junior experts propose improvements, discuss priorities and find out ways to implement new features. Activities which exceed the possibility of in kind contributions are funded by the common budget, under the supervision of the Executive Committee.

Objectives which extend beyond the capabilities of ETSAP experts, for instance the compilation of an Energy Technology Data Source, will be sub-contracted to external groups, making use of the common budget and voluntary contributions.

As in the past few years, ETSAP funds will be used also to leverage from international and national research institutions and collaboration to reach the [much higher] funding level needed to carry out the activities planned in the years to come.

With the support of the IEA secretariat, the Energy Technology Perspective (ETP) project and the initiative for a Network of Expertise in Energy Technology (NEET), efforts are underway and will continue in order to increase the number of participants to this Implementing Agreement (see the following Appendix).

Appendix: Participants

The Countries and Contracting Parties which are Participants in this Task, or have participated to previous Tasks, are the following (Annex XI is the ongoing task, 2008-2010):

	IA Date of signature	Contracting Party	Participating till Annex:
Member Countries			
Austria	19.12.80	EVA	V; invited in 2008
Australia	13.11.80	ABARE -	X; invited in 2008
Belgium	08.09.81	The Government	XI
Canada	07.07.82	NRC	XI
Czech Republic			
Denmark	04.12.80	DEA	X; invited in 2008
EC	11.01.82	DG Research	XI
Finland	09.01.02	TEKES	XI
France	29.01.08	ADEME/EMDP/DGEMPEDAD	From XI
Germany	13.11.80	IER	XI
Greece	01.12.80	CRES	XI
Hungary			
Ireland			Invited, 2008
Italy	13.11.80	IMAA/CNR	XI
Japan	17.09.81	The Government	XI
Korea	15.05.96	KEMCO	XI
Luxembourg			
The Netherlands	02.04.82	ECN	XI
New Zealand			
Norway	13.11.80	IFE	XI
Portugal			Invited in 2008
Spain	13.11.80	Centro de Estudios Energia -	III; invited in 2008
Sweden	18.11.80	The Government	XI
Switzerland	01.04.81	Paul Scherrer Institute	XI
Turkey	22.03.96	Kocaeli -	X; invited in 2008
United Kingdom	09.06.81	The Government	XI
United States	13.11.80	DOE	XI
Non Member Countries			
Brazil	Nov 2007		Invited
China	Nov 2007		Invited
India	Nov 2007		Invited
Indonesia	July 2008		Invited
Kazakhstan	July 2008		Invited
Mexico	Nov 2007		Invited
Russia	Nov 2007		Invited
South Africa	Nov 2007		Invited
Other Organizations			