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IEA OECD ETSAP news

GLOBAL ENERGY SYSTEMS AND COMMON ANALYSES FINAL REPORT OF ANNEX X (2005-2008)

1. Highlights

The final report of Annex X "Global Energy Systems and Common Analyses"[1] presents the main results of collaborative, national and group activities of ETSAP partners and others using the ETSAP tools during the period 2005-2008, with special focus on scenario studies and policy evaluations, and the advancement of the methods employed. Those who would be interested in the accomplishments of ETSAP include:

- The IEA CERT representatives, particularly from representing countries currently participating in ETSAP, along with those who have expressed interest in joining ETSAP;
- The government sponsors of the various institutions involved directly in ETSAP, and those trying to become ETSAP institutions;
- Individuals engaged in the review and consideration of methodologies involved in the IPCC process, particularly those of Working Group 3;
- Parties to other IEA Implementing Agreements;
- The wider energy and Global Climate Change (GCC) policy community;
- MARKAL/TIMES modellers around the world;
- Other (GCC) researchers and modellers, and
- University professors and their students interested in growing programs that may employ the ETSAP Tools to groom the new generation of experts.

During the course of this Annex the Implementing Agreement for a Programme of Energy Technology Systems Analysis of the International Energy Agency demonstrated the relevant nature of the analyses carried out by the ETSAP Partners and community of users of the ETSAP Tools, while evolving in several important directions.

(a) Use of the MARKAL-TIMES model enabled expert groups conducting integrated energy systems to reach new targets in quality, scope and numbers. United States, Germany, the United Kingdom, the Netherlands, Belgium, Sweden, Finland, Italy, Switzerland, and India, have issued major studies that have helped shape policy in their countries. New groups have formed in countries that are considering joining ETSAP (e.g. France, Portugal, Spain, Austria, and Norway). In addition, extremely competent teams have been established and expanded in the leading Plus-5 developing countries (South Africa, China, and India), while key countries such as Russia have also turned to the ETSAP Tools. As a result of ongoing training and internationally financed capacity building activities new groups are being established in other countries, such as Kazakhstan, the Balkan countries, and various ASEAN countries.

(b) In response to the G8 Gleneagles Plan of Action, the IEA developed the global MARKAL model, which was used to support analysis for the Energy Technology Perspectives (ETP) project in 2006/8. ETP focuses on the identification of technology pathways for achieving common IEA goals related to energy security, promotion of clean energy, and climate change.

(c) The original tools developed by ETSAP continue to improve. The Integrated MARKAL EFOM System (the TIMES model generator), an advanced successor to MARKAL, is now mature and in full production use. Two users' interface (VEDA) and (ANSWER) fully support both models generators (MARKAL and TIMES), overseeing all aspects of working with the models. The underlying strength of the technical-economic partial equilibrium paradigm, complimented by the ease-of-use of the interfaces, are the primary reasons for the heightened interest and thereby growing user community.

(d) Dozens of energy models have been built with ETSAP tools, at the global, regional, national and local scale. Some are huge multi-regional global models, such as the IEA-ETP MARKAL model and the TIMES Integrated Assessment Model (ETSAP-TIAM), others are even larger regional models such as the thirty region Pan European TIMES model (27 member states plus Norway, Switzerland and Iceland) and the US multi-regional MARKAL model. However, single-country energy and environmental analysis remains the predominant use of the model. This allows for sufficient detail to fully represent the particulars of one particular underlying energy system.

(e) The models are being used to examine various aspects of the energy, economy, and environment nexus. The IEA studies the potential role that new technologies must play if we are to change the present energy systems in order to create

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[1] The report has been completed in June 2008, and it is downloadable from: www.etsap.org/official.asp.

climate benign, economically sustainable and secure energy systems by 2050. Important EC funded research projects make use of ETSAP tools, gather multi-national teams, build multi-regional models and analyse energy related policies, as exemplified by the New Energy Externalities Development for Sustainability (NEEDS) undertaking. The Energy Modelling Forum researchers are examining robust transition policies towards climate sustainable systems after 2100 using ETSAP-TIAM. Several groups use global, multi-regional and national models to explore the impact of different post-Kyoto regimes. Pan European and member states' models are used to identify the least expensive combination of measures

Synergies achieved as a result of advanced methodology, tools and applications have raised the importance of ETSAP and its mission. The IEA ETP2006+2008 publications have a wide diffusion (more than 2,000 copies) and advise the decision-makers of the G8 on climate change mitigation issues. The results of ETSAP-TIAM studies are being included among the groups that assess climate mitigation policies through EMF and IPCC. The expert groups using the ETSAP Tools that work for the Ministries in various countries are informing decision-makers on the merits and impacts of different measures for achieving the increasingly essential objectives of the energy security, climate change mitigation, and economic affordability in response to national policies and measures.

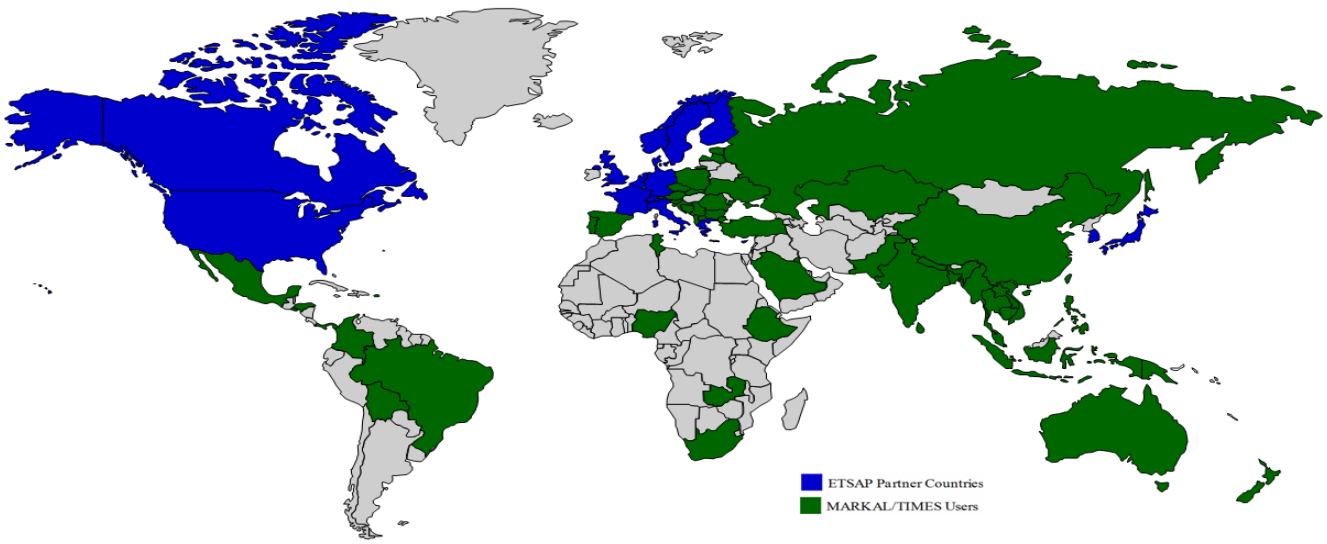
The cooperation activities of ETSAP are financed by the contracting parties (shown in blue in Figure H-1) at a level of about two hundred thousand euros per annum. This has been used mainly to leverage from international and national research institutions and collaboration to reach the [much higher] funding level needed to carry out the activities illustrated in what follows.

By the end of the Annex X there are more than 230 MARKAL-TIMES licensed institutions, of which nearly 180 are active in 69 countries (see figure H-1). Interest in ETSAP was reflected by participation in the biannual workshops where the number of attendees ranged between fifty and one hundred experts, giving between twenty and fifty presentations per workshop. Another indication of the relevance of ETSAP community is reflected by the number of articles that appeared in the scientific literature which increased from 6 during the 1998-2002 period to an average of 14 papers per year during the 2002-2007 period.

The full report illustrates all aspects of this growth by referencing the original reports, studies, papers and presentations where more details can be found.

This report underscores the increasingly dynamic and important contribution of the ETSAP community in providing state-of-the-art analytical tools and studies, leading to a greater understanding of the possibilities for meeting the critical energy and environmental challenges of this century.

Figure 1: ETSAP Partners and the Dissemination and Use of the ETSAP Tools[2]



[2] Only those countries with at least one MARKAL/TIMES modelling team active during the Annex are "painted."

2. ETSAP Objectives and Strategy

The Contracting Parties of this Implementing Agreement carry out a Programme consisting of co-operative Energy Technology Systems Analysis (ETSAP). The objective of ETSAP is to assist decision-makers in the assessment of new energy technologies and policies in meeting the challenges of energy needs and economic development, environmental concerns and technology development.

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/economy/environment analytical tools and capability (the MARKAL/TIMES family of models). ETSAP members also assist and support government officials and decision-makers by applying these tools for energy technology assessment and analyses of a wide range of energy and environment related policy issues.

In the period 2005-8 under Annex X "Global Energy Systems and Common Analyses" the main objective was

(a) to carry out common global analysis

(b) to implement a global / national modelling framework

(c) to maintain and enhance the existing capabilities and tools

(d) to expand the framework for ETSAP expertise and tools.

As illustrated by this report, numerous activities have been undertaken aimed at achieving these objectives. This report presents the main advancements, applications, and accomplishments of collaborative, national and group activities of ETSAP in the period 2005-8, with special focus on energy models, scenario studies and policy evaluations.

3. Participation and Coordination to Other Bodies

The following contracting parties (countries) have actively participated in Annex X: VITO and Uni-Leuven (Belgium), NRCan and GERAD (Canada), Risoe (Denmark), IPTS (DG RTD, Energy Office, European Commission), TEKES and VTT (Finland), Uni-Stuttgart IER (Germany), CRES (Greece), CNR/IMAA (Italy), JAERI (MEXT Japan), KEMCO (Korea), Uni-Chalmers (Sweden), PSI (Switzerland), BERR-AEAT (UK), BNL and EIA (US).

Towards the end of the Annex X IFE (Norway) and ECN (Netherlands) rejoined ETSAP and France joined for the first time. With the support of the IEA Networks of Expertise in Energy Technology (IEA/NEET) the Operating Agent of ETSAP has approached several other organizations in Austria, Brazil, China, India, Russia, South Africa, Spain, and Turkey. Some of them have also expressed keen interest in participating in ETSAP and have been invited to join by the Executive Committee.

ETSAP members work closely with users of its analytical tools. Benefits are mutual. New model users learn to understand the capability of the model in addressing issues related to energy, the environment, innovative technologies and the economy. ETSAP experts learn from new model users wider energy and environmental issues that need to be addressed in a way that is tractable analytically. ETSAP members have been working with the following organizations over the past three years:

- the International Energy Agency (IEA), for its Energy Technology Perspective (ETP) project:
- the U.S. Energy Information Administration (EIA), for the development and use of the System for Analysis of Global Energy Markets (SAGE) and its publication "International Energy Outlook;"
- the European Commission, where several contracting parties participate to various research and policy studies, including CASCADE MINTS, NEEDS, RES2020, TOCSIN, REACCESS;
- the European Fusion Development Association (EFDA) and some EURATOM associates for the assessment of new power plant concepts;
- the Energy Research Institute of National Development and Reform Commission of China, the Tsinghua University and other Institutes for the development of China energy models with ETSAP tools;
- the Indian Institute of Management, Ahmedabad (Prof. Shukla) for the development of long-term Indian energy models with ETSAP tools;
- the Brazilian Ministry of Mines and Energy (MME), Centro de Pesquisas de Energia Elétrica (CEPEL), and Empresa de Pesquisa Energética (EPE) for evaluating the use of ETSAP tools and building a multi-region Brazilian model;
- the South African National Energy Research Institute (SANERI) and the University of Cape Town for analyses related to long term energy scenarios for Africa;
- user's groups in South East Asia (Indonesia, Malaysia, Philippines, Thailand and Vietnam), supported by the Australian Agency for International Development [AusAID], and in South East Europe (Albania, BIH, Bulgaria, Croatia, Kosovo, Macedonia, Montenegro, Romania and Serbia), supported by USAID, for multi-year capability building undertaking in energy modelling and policy assessment, and
- the International Energy Workshop (IEW), formerly linked to the Institute for Applied Systems Analysis (IIASA, Vienna) and now coordinated by Stanford University/ Electric Power Research Institute (EPRI) and Resources For the Future (RFF).

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Achievment: Overview of Annex X Activities and Accomplishment

1 - International Applications Using Global Models

Title/*Group*	**Key Activities/Findings/*Contact/Tool***
Publication of ETP 2008: Scenarios and Strategies to 2050 – Scenarios and the Role of Energy Technologies (previously: ETP2006, Prospects for CO_2 Capture and Storage, Prospects for Hydrogen and Fuel Cells)	"The IEA analysis demonstrates that a more sustainable energy future is within our reach, and that technology is the key. Increased energy efficiency, CO2 capture and storage, renewables, and nuclear power will all be important." End-use efficiency and a virtually CO_2-free power sector power sector can hold 2050 emissions at today's levels; the marginal cost of abatement varies widely for different assumptions for technology advancement. Roadmaps are provided for 17 groups of technologies that cover four fifths of total emissions reductions.
IEA Secretariat, Energy Technology Policy unit	*Dolf Gielen [dolf.gielen@iea.org]; [www.iea.org]* *ANSWER-MARKAL, ETP global multi-regional model*
Hedging Strategies for Climate Stabilization with ETSAP-TIAM; Technological mitigation under capital rationing	Six long range temperature change targets from 2.1 to 3.3 ºC were analyzed [Reference increase 4.6 ºC; smallest achievable increase 1.9 ºC at very high cost.] Targets 2.1 and 2.3 ºC are difficult and very expensive to attain, while 3.3 ºC is quite easy. Analysis of future investments in electricity producing technologies in large developing countries such as China and India under various conditions of capital rationing and carbon pricing.
ETSAP	*Richard Loulou, Amit Kanudia [amit.kanudia@gmail.com], Maryse Labriet [maryse.labriet@ciemat.es]* *VEDA-TIMES, ETSAP TIMES Integrated Assessment Model*
Global Energy and Emissions Scenarios for Effective Climate Change Mitigation	Evaluation of achievement of the EU 2 ºC stabilization target; the highest marginal costs occur around 2090, when the global price of emission permits reaches 150 Euros/t CO_2 equivalent.
Finnish Ministry of Environment/ VTT Energy Systems	*Sanna Syri [sanna.syri@vtt.fi], Antti Lehtilä, Ilkka Savolainen, Tommi Ekholm* *VEDA-TIMES, ETSAP TIMES Integrated Assessment Model*
A global Perspective to Achieve a Low Carbon Society (in the frame of the UK-Japan Low Carbon Society Project	Without any reduction obligation, global CO_2 emissions in the base scenario more than double from 2000 to 2050 driven by economic growth in developing countries. Recommendations are provided to reverse this path
ETSAP-IER	*Uwe Remme [ur@ier.uni-stuttgart.de], Markus Blesl [mb@ier.uni-stuttgart.de]* *VEDA-TIMES, ETSAP TIMES Integrated Assessment Model*
The Role of Nuclear Energy in Long-Term Climate Scenarios	This study analyzes the role of Light Water Reactor (LWR), Advanced Light Water Reactor (A-LWR), Pressurized Heavy Water Reactor (PHWR), High Temperature Gas-Cooled Reactor and Fusion in long-term climate scenarios
GERAD (Quebec, Canada)	*Kathleen Vaillancourt [kathleen.vaillancourt@gerad.ca], Maryse Labriet, R. Loulou, Jean-Philippe Waaub* *VEDA-TIMES, ETSAP TIMES Integrated Assessment Model*
Studies with the Global MARKAL Model	Effects of different levels of subsidies for renewable energy and implications of a "nuclear breakthrough" in combination with carbon taxes, taking into account endogenous technology learning (learning-by-doing).
ETSAP-Paul Scherrer Institute (Switzerland)	*Socrates Kypreos [socrates.kypreos@psi.ch]* *Global MARKAL Model (GMM)*
System for the Analysis of Global Energy markets (SAGE)	Integrating framework supporting the production of EIA's comprehensive *International Energy Outlook 2007*.
USDOE/Energy Information Administration	*John Conti [john.conti@eia.doe.gov], Amit Kanudia [amit.kanudia@gmail.com]* *Global multi-regional MARKAL type, clairvoyant, VEDA*
The Global TIMES Model	Assessment of market potential for fusion to 2100.
European Fusion Development Agreement, CSU, Garching bei Munich	*Christian Eherer [christian.eherer@efda.org]* *Global multi-regional TIMES model, VEDA*

2 - ETSAP Partners Country Studies

Title/Group	Key Activities/Findings/Contact/Tool
Analysis of Post Kyoto Mitigation Options	Definition of the carbon reduction level for Belgium that is realistically achievable and under what conditions. A two-fold decrease seems achievable with a marginal cost not exceeding two-three hundred euros per ton CO2 if: the electricity generation sector compensates a slight reduction of nuclear with wind farms and biomass power plants; the transport sector halves its emission by increasing the use of biofuels, hybrid and CNG vehicles; civil sectors can reach a three-fold reduction; and the industrial sector halves its emissions by substituting electricity for other fuels, mainly natural gas.
Belgium, CES –KULeuven and VITO	*Denise Van Regemorter, Wouter Nijs, [wouter.nijs@vito.be]; MARKAL and TIMES, VEDA and ANSWER*
The Impact of the Emissions Trading on Energy Sector and Steel Industry	Examination of how the emissions trading system affects the Finnish energy and steel sector companies and their competitiveness, when production volumes and the use of energy are increased in the open markets.
Finland, VTT Research	*Koljonen, Tiina; Kekkonen, Veikko; Lehtilä, Antti; Hongisto, Mikko; Savolainen, Ilkka; TIMES*
MARKAL/TIMES CO2 Emission Reduction Scenarios	Analysis to date indicates that it is possible to achieve very stringent CO_2 reductions, although at significant cost in the more extreme cases.
France, Centre for Applied Mathematics of the "Ecole des Mines de Paris	*Nadia Maizi [nadia.maizi@ensmp.fr] TIMES – VEDA*
Investments in the German Electricity Generation Sector: Technology Perspectives and Climate Protection	Scenario analyses have shown that the significant CO_2-emission reductions can be reached without taking a strong burden on the energy system. First it has to be made sure, that the political framework for the deployment of clean coal technologies with carbon capture and storage for electricity generation will be developed. Second it has been shown, that especially nuclear-based electricity generation can contribute to the emission reduction targets at low costs.
Germany, IER	*Markus Blesl [mb@ier.uni-stuttgart.de] and Uwe Remme [UR@ier.uni-stuttgart.de] ; TIMES-D*
The M-M-Italy model for evaluating national energy environment policies	Identification of the potential contribution of different technological options to reach the EU 20-20-20 targets and impact for Italy of different implementation measures.
Italy, ENEA and APAT	*Francesco Gracceva [francesco.gracceva@casaccia.enea.it] and Mario Contaldi [contaldi@apat.it] ; MARKAL-MACRO, ANSWER*
The Italian Electricity Sector: A Regional and Multi-Grid TIMES Model	A very detailed: 5 sectors, 32 energy services and 150 end-use technologies in the demand side and about 450 power plant units in the supply side; 20 Regions, 5 electricity commodities spread over 4 types of grid for transport, transformation and distribution is modelled. Inter-regional exchange technologies are described with costs, installed capacity and efficiency of transportation. The paper presents a selection of results concerning scenarios with different role of electricity import, renewable sources, emission permit developments and "end-uses technologies."
Italy, CESI and PolITo	*Maurizio Gargiulo, [gargiulo.maurizio@gmail.com]; TIMES VEDA*
Planning for a Domestic Electricity Sector with CO2 Capture and Storage	Emission reduction: If hydrogen is introduced into the energy system, the costs to reduce one unit of CO2 decreases by 4% in 2030 and 15% in 2050, implying that hydrogen is a cost-effective reduction option given the input assumptions. How a trajectory towards an electricity sector with CO2capture and storage (CCS) can be achieved.
The Netherlands, The HyWays roadmap project	*Harm Jeeninga, [jeeninga@ecn.nl]; results are available for download at www.HyWays.de The ECN MARKAL-Europe Model, ANSWER*
Planning for a Domestic Electricity Sector with CO2 Capture and Storage	The study investigates how a trajectory towards an electricity sector with CO2 capture and storage (CCS) can be achieved, and how this depends on events such as climate policy, existing power plants replacement, CCS competitiveness, CO2 transport infrastructures, availability of CO2 sinks.
The Netherlands,	*Machteld van den Broek [M.A.vandenBroek@uu.nl], Andre´ Faaij, Wim Turkenburg; MARKAL-ANSWER*
Reducing Domestic Greenhouse Gas Emissions By 75 % by 2050	IFE has been involved in the work of the Norwegian Commission on Low Emissions to carry out technological assessments and to study alternative options to reduce greenhouse gas emission. In total, IFE has described measures, which can give more than a 75 percent reduction in Norwegian emissions by 2050.
Norway, Institute for Energy Technology (IFE), Kjeller	*Kari Aamodt Espegren, Eva Rosenberg and Audun Fidje, [Audun.Fidje@ife.no]; Norwegian MARKAL model, ANSWER*
Recent Modelling and Analysis Activities	MARKAL/TIMES have been involved in a study on CO2 reduction in Sweden comparing cost-efficiency in the stationary energy and transport sectors using the MARKAL_Nordic model, a regional modelling analysis of biomass use under different energy policies with particular focus on biomass gasification, and the development of the TIMES Sweden and Norway models.
Sweden, Chalmers University of Technology	*Erik Ahlgren (ahleri@chalmers.se), Martin Börjesson, and Anna Krook Riekkola (annak@chalmers.se); MARKAL-ANSWER, TIMES-VEDA*
The Vision of a 2000-Watt Society	Partial but significant success in meeting the vision of 2000-Watts is obtained. The results suggest that the 2000-Watt society should be seen as a long-term goal.
Switzerland, Paul Scherrer Institute, Villigen	*Socrates Kypreos [socrates.kypreos@psi.ch], Thorsten F. A. Schulz and Alexander Wokaun; The Swiss MARKAL model*
Analysis of Long Run Costs of Mitigation Targets in the UK	Marginal abatement costs increase significantly as emission reduction targets are increased. For a 60% reduction, costs were approximately £65/tCO_2 (£240/tC). These increase to £145/tCO_2 (£530/tC) under a 70% constraint and £215/tCO_2 (£790/tC) under an 80% constraint.
United Kingdom, AEA Energy and Environment, Sponsored by DEFRA, BERR	*Steve Pye [Stephen.Pye@aeat.co.uk] and Nik Hill; MARKAL-MACRO-ANSWER*
E4 (energy-economic-engineering-environment) Energy Systems Modelling (UKERC-ESM)	From 2005-2007, UKERC-ESM has built comprehensive UK capacity in modelling. It addressed a range of UK energy policy issues including quantifying long-term carbon reductions targets, and the development of hydrogen infrastructures. International activities include the Japan-UK Low Carbon Societies research project.

2 - ETSAP Partners Country Studies (Cont.)

United Kingdom, UK Energy Research Centre (ERC)	*Neil Strachan [neil.strachan@kcl.ac.uk] and Ramachandran Kannan at Kings College London, Nazmiye Ozkan at the Policy Studies Institute (PSI); MARKAL-MACRO-ANSWER*
Application of the family of MARKAL models in a wide variety of areas	The models have been used to assess the merits of government R&D programs for various DOE offices including Energy Efficiency and Renewable Energy, Fossil, and Nuclear. Other applications include a local model of the New York City electric/heat sector, and the development of a multi-region US MARKAL model.
United States, Brookhaven National Laboratory, U.S. Department of Energy	*John Lee, Paul (Chip) Friley [pfriley@bnl.gov]; MARKAL-ANSWER*
Development of a Regional U.S. Database for Energy and Emissions Modeling	Under the auspices of the U.S. Climate Change Science Program (CCSP) (a collaborative effort among thirteen agencies of the U.S. federal government, whose mission is to "facilitate the creation and application of knowledge of the Earth's global environment through research, observations, decision support, and communication."
U.S. Environmental Protection Agency [Office of Research and Development]	*Carol Shay Lenox and Dan Loughlin; EPAUS9r-MARKAL-ANSWER*
A Regional Energy/Economic Framework for the Northeast US	An integrated assessment framework has been developed around a 12-region MARKAL model tailored to represent 11 Northeast U.S. states and the District of Columbia. The model is being used to promote regional approaches to common issues, and examine specific policies of interest to individual states.
United States, Northeast States for Coordinated Air Use Management,	*Gary Kleiman [gkleiman@nescaum.org], Jason Rudokas [jrudokas@nescaum.org], Michelle Manion,; The Northeast MARKAL (NE-MARKAL) Model, ANSWER*
Biomass Resources for Energy in Ohio	Analysis of the use of biomass energy for Ohio under different policy scenarios and presentation of the economic and environmental impacts with potential limitations that the state may face in the future.
United States, Environmental Policy Initiatives (EPI), The Ohio State University, Ohio Energy Office.	*Bibhakar Shakya [bibhakar@gmail.com], Fred Hitzhusen and Gary Goldstein; OH-MARKAL, ANSWER*

3 - Other studies

Title/Group	Key Activities/Findings/Contact/Tool
Sectoral CO2 Emissions for Northern Hungary	The objectives of this study are the mid-term projection of regional scenarios focused on enhanced use of renewable energy from biomass, for showing the effects on greenhouse gas (GHG) mitigation and on regional development.
Montanuniversitaet Leoben, System Analysis & Environmental Engineering, Austria.	*Dobrosi L [dobrosi@unileoben.ac.at], Beermann M., Wolfbauer J; Borsod-Abaúj-Zemplén (BAZ) county MARKAL, ANSWER*
Model Activities at Tsinghua University	MARKAL model development for China began in 1999, and since then the model has been updated to include more advanced technologies, the model has been linked with MACRO to study the impact of carbon emission reductions, and elastic demands have been introduced into the model. The model has been used to assess future energy development scenarios, sustainable energy strategies, and carbon mitigation costs.
China, Tsinghua University, Beijing	*ChenWenying, [chenwy@mail.tsinghua.edu.cn]; MARKAL-MACRO-ANSWER*
Development of a 34 Provinces China TIMES Model	The model is intended to study how to harmonize the medium long term development of energy systems and related economic / mitigation policies among the different Chinese provinces, having in mind the national goals..
China, Energy Research Institute of the National Development and Reform Commission (ERI/NDRC)	*Yufeng YANG, [yangyufeng@amr.gov.cn], Maurizio Gargiulo [gargiulo.maurizio@gmail.com]; TIMES, VEDA*
Increased Access to Natural Gas: The Future of Natural Gas Consumption	This study explores potential drivers – including the level of sulfur dioxide emissions constraints set by the government, the cost of capital, the price and available supply of natural gas, and the rate of penetration of advanced technology on both supply and demand sides – for increased natural gas demand within the Chinese energy system and focuses on three regions: Beijing, Shanghai and Guangdong.
China Universities (Tsinghua, Shanghai Jiaotong, Guangdong),Program on Energy &Sustainable Development, Uni-Stanford	*BinBin Jiang , ChenWenying , Yu Yuefeng , Zeng Lemin , David Victor; MARKAL, ANSWER*
The Study of the Natural Gas Market in Shanghai	The objective of this research is to investigate the competitiveness of natural gas in Shanghai, the impact of governmental energy and environment policy on the competitiveness of natural gas and the volumes of gas that will be consumed under different scenarios and conditions.
China, Shanghai Jiaotong University	*YU Yuefeng, ZHANG Shurong, HU Jianyi; MARKAL-SHANGHAI, ANSWER*
Energy Systems Analyses activities	Integrated Local Planning of the Metropolitan Area of Aburra Valley (Medellín); Co-benefits on Carbon Dioxide Emissions by Reducing Particulate Matter Emissions in the Public Transport Sector in Colombia; Efficient Prices of Colombian Energy Carriers and Natural Competitiveness; Identification and Assessment of a Set of Policy Measures to Enforce Renewable Energies in the Colombian Power Sector
Colombia, University of los Andes, Bogotá	*Angela Ines Cadena [acadena@uniandes.edu.co] et al.; National and local MARKAL models, ANSWER*
Assessment of Energy Technology Scenarios for India	The long-term Indian analysis examines the impact of new and renewable energy technologies on the country's energy mix. The study deals with changes in technology mix under various scenarios and its impact on the energy mix of India. A detailed bottom up model is used for the analysis.
India, Indian Institute of Management, Ahmedabad, Max Planck Institute for Plasma Physics	*Shukla, P. R.; MARKAL, ANSWER; AIM/ENDUSE model*

3 - Other studies (Cont.)

The Val D'Agri energy system, Basilicata Region, Southern Italy	This work was focused on the reduction of the impacts of resource management strategies in a local case study, considering the whole environmental burdens of anthropogenic activities.
Italian National Operational Programme, Development of Industrial Districts for Earth Observation – COS [OT]	*Maria Macchiato; Carmelina Cosmi [cosmi@imaa.cnr.it];* *MARKAL-ANSWER, Life Cycle Assessment, Externalities*
The Development of the Kazakh Domestic Energy System between Climate Change Mitigation and Technology Improvement	The study explores the cost of mitigation by means to different options: the most important mitigation technologies are those that aim at enhancing the efficient use of coal in the heat and power sectors, and the introduction of natural gas combined cycle plants have a net benefit if the reduced damage of other regional and local pollutants is considered as well..
Kazakhstan, EC-TACIS, Enhance Economic Modelling Capacity in Kazakhstan	*Alexey Cheridnichenko, KazNIIEK, Almaty; Celine Guivarch, CIRED, Paris; Gulmira Sergazina, Climate Change Coordination Centre, Astana; GianCarlo Tosato, ASATREM srl, Rome [gct@asatrem.com];* *The MARKAL-MACRO-Kazakhstan Model, ANSWER*
Potential and Opportunities for Renewable Energy Sources	This research aims at assessing the potential of, and the demand for, renewable energy sources for electric generation (RES) in the republic of Kazakhstan, in particular wind and small hydropower plants.
Kazakhstan, Kazakh Research Institute of Ecology and Climate	*Aleksey Cherednichenko, PhD, [acherednichenko@network.kz] ;* *The MARKAL-Kazakhstan Model, ANSWER*
Energy systems analysis activities	Combining energy and environmental policy objectives: adequacy of using integrated policy approaches to electricity; Energy and Greenhouse Gases Emissions – Evaluation of Long Term Scenarios for Portugal; Renewable Energy Sources Availability under Climate Change Scenarios – Impacts on the Portuguese Energy System; Evaluation of the Energy Savings Potential of the Portuguese Households; Competitiveness of Portuguese Industry in Post-Kyoto EU CO2 Emission Trading Scheme: Estimating Sector CO2 Marginal Abatement Cost Curves
Portugal, Environment Sciences and Engineering Department (DCEA) of the New university of Lisbon	*Sofia Simões [sgcs@fct.unl.pt] and João Cleto [jfcn@fct.unl.pt];* *TIMES, VEDA for environmental and climate policy analysis*
Analysis of some new potential energy and environmental policies	The study aims at analysing the integrated energy-environment-economic implications of new potential energy options and policies.
Portugal, CEEETA for the Directorate General for Energy and Geology (DGEG)	*Manuel Fernandes,[manuel_fernandes@ceeeta.pt];* *MARKAL-Portugal, ANSWER*
Environmental and climate policy analysis	Presently the TIMES model of the Russian Federation includes detailed description of Russian power and heat sector in two variants: 1) aggregated by main technologies (combined heat and power plants, power plants, and heat plants) and fuels (coal, gas, diesel, hydro, nuclear, and others) and 2) disaggregated, which includes individual description of 1200 power and heat plants. Other energy and consuming sectors are under development.
Russia, Institute for the Economy in Transition (Moscow) and Environmental Defence NGO (USA-based)	*Oleg Lugovoy [olugovoy@hotmail.com];* *TIMES, VEDA*
Modelling Activities – Recent and Current Projects	Project are aimed at assisting local industry and government identify and assess technology and policy options. The focus is on modelling aspects unique to developing nations, where little expertise exists elsewhere. In addition to model-development ERC provides capacity building for model users within government and utilities as well as training for students.
South Africa, Energy Research Centre of the Cape Town University (UCT-ERC)	*Alison Hughes [Alison.Hughes@uct.ac.za]* *MARKAL and TIMES, ANSWER and VEDA;*
Electricity Investment Planning for Multiple Objectives and Uncertainty	A thesis aimed at developing a comprehensive framework that integrates multiple objectives and uncertainty into a transparent methodology that policy-makers and planners can use to analyze and plan for investment in the Electric Supply Industry (ESI) navigating a sustainable development path is reported on here.
South Africa, UCT-ERC	*Glen Sean Heinrich [Glen.Heinrich@allangray.co.za];* *MARKAL and TIMES, ANSWER and VEDA*

4 - Multi-regional Analysis

Title/Group	Key Activities/Findings/Contact/Tool
The New Energy Externalities Development for Sustainability (EC-NEEDS) Project, Research Stream 2a	Evaluation of the full costs and benefits of energy policies and of future energy systems for the "enlarged EU" (EU27 plus Iceland, Norway, and Switzerland) and for individual countries within this group. Follow-on EC funded projects will build on NEEDS.
European Commission, DG Research, 6th Framework Program	*CNR-IMAA, Vincenzo Cuomo [cuomo@imaa.cnr.it];[www.needs-project.org]; Member States and Pan European TIMES models, VEDA*
Studies with the EU30 TIMES-Electricity and Gas supply model	The role of combined heat and power and district heat in Europe, and the role of technology progress on investment decisions in the European electricity market.
European Commission, IER, Stuttgart University	*IER, Markus Blesl [mb@ier.uni-stuttgart.de] The European Electricity and Gas Supply model TIMES-EG*
Europe – South East Asian Energy System Modelling and Policy Analysis (ESMOPO) Project	Possible future energy solutions for Vietnam, Indonesia, and the Philippines, with focus on renewable and advanced fossil power generation.
EC-ASEAN Energy Facility, EAEF-91, Chalmers University of Technology	*Erik Ahlgren [erik.ahlgren@me.chalmers.se], Anjana Das [A.Das@iaea.org]; MARKAL ANSWER*
Technology-Oriented Cooperation and Strategies in India and China (EC-TOCSIN) Project	30 month program initiated in 2007 to improve the depiction of India and China energy systems, and regions in global models. Results limited so far.
EC, 6th Framework Program, research line "scientific support to policy	*Jean-Philippe Vial [jpvial@ordecsys.com], Richard Loulou ETSAP-TIAM VEDA, GEMINI-E3, WITCH*
The Energy Policy and Systems Analysis Project	A variety of policy studies of the region and individual countries indicates that LNG will play a major role in the region's future, renewables will likely require subsidy, and that there are clear benefits to regional [as opposed to national] strategies.
AusAID-EPSAP	*Intelligent Energy Systems, Ken Stocks [kstocks@iesys.com.au]; www.aseanenergy.org/projects/epsap/epsap.htm; Country MARKAL models, ANSWER*
South East Europe Regional Energy Demand Planning (SEE-REDP): Future Energy Scenarios in Southeast Europe and the Potential for Energy Efficiency	Major capacity building undertaking involving 8 SEE countries. Established national models and examined increased investments in more efficient end-use technologies, highlighting that these costs are more than offset by significant reductions in fuel expenditures and modest reductions in the level of new investment in the power sector.
US Agency for International Development USAID Contract EPP-I-00-03-00006-00	*Gary Goldstein, IRG International, [GGoldstein@irgltd.com]; MARKAL-ANSWER*

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The objective of the ETSAP Newsletter is to keep ETSAP participants and the wider energy planning and modelling community informed of advancements in the methodology and tools, as well as the status of significant projects completed, underway, or in the planning stage employing the ETSAP Tools.

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Acknowledgments

The ETSAP partnership and the extended network of ETSAP tool users celebrated its 30th anniversary in 2008. The success of this nearly unique collaboration community can be attributed to the contributions of the 17 Contracting Parties, the dedication of the experts involved in ETSAP, and the efforts of the modelling community experts.

The final report of Annex X "Global Energy Systems and Common Analyses" summarizes the advancements, applications, and accomplishments within the community in the most recent years (2005-2008) and thereby demonstrates why ETSAP has sustained now for three decades. It provides many examples of policy relevant application of the MARKAL/TIMES modelling platform and its continued spread to new users through capacity building projects, as well as the ongoing advancement of the methodology to meet the requirements for integrated energy planning in these challenging times. With the knowledge and skills needed to effectively use the methodology now widespread around the world, the framework is positioned to make further important contributions towards identifying policies and pathways that will lead to the low-carbon future essential for sustainable development on our planet.