

Proposed IEA response to the Gleneagles Plan of Action

ETSAP answers to the questions of Neil Hirst /Graham Campbell
(Letter dated 7 November 2005)

Executive Summary

ETSAP's suggestions with respect to each of the five areas of inquiry regarding the IEA-G8 Plan of Work (POW) are highlighted here and briefly elaborated in the accompany material.

- 1) ETSAP suggests improving the IEA-G8 POW by:
 - A1 – establishing a closer collaboration with the Secretariat and contributing more directly to the development of the ETP model and scenarios;
 - A2 – comparing different energy technologies and policy options on a level playing field;
 - B – expanding the IEA National Energy Balance (NEB) towards a new methodology that includes the end uses, integrates energy flows with the actual current stock of energy supply and demand technologies (technology database), with prices and emissions; and
 - D – contributing to the identification of the sectors where a new large-scale cooperative international energy RD&D effort could be most beneficial.

- 2) Since 1976 the core business of ETSAP has been “to assist decision-makers in the assessment of new energy technologies and policies in meeting the challenges of energy needs, environmental concerns, and economic 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 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 other energy and environment related policy issues”. Thus ETSAP is ideally suited to cooperate with the Secretariat and to contribute to the implementation of the IEA-G8 POW by fully exploiting the existing network of skilled national experts familiar with the central issues and goals of the POW.

- 3) ETSAP holds semi-annual workshops; the next one will be held in Cape Town (South Africa) at the end of June 2006. The workshops could be expanded to include special sessions related to the implementation of the IEA-G8 POW.

- 4) Most experts and users of the ETSAP methodology (over 140 institutions in over 60 countries) are ready to contribute to the IEA-G8 POW with specialised consultancy.

- 5) ETSAP recommends a multi-stage approach for engaging of the Plus-Five, and beyond, by:
 - a. inviting, encouraging and supporting the Plus-Five to participation in ETSAP;
 - b. beginning an undertaking to dramatically expand the national planning capability in the Plus-Five by assisting the national teams with regionalizing their existing country models, and
 - c. initiating a major new Annex involving any country with or interested in the ETSAP Tools to foster the wide-spread use of a proven common framework.

ETSAP believes that the time may be ripe for a major capability building initiative, sponsored by the IEA, to be undertaken under the auspices of the World Bank.

- 1) *We welcome your constructive comments to refine and improve the overall IEA G8 Plan of Work (POW). The POW is attached to this message as document (IEA/SLT/CERT (2005)16). What are your brief recommendations to improve the POW, does your Working Party, Group or IA have information on hand now, and is there related work in progress?*

The G8 Gleneagles Plan of Action states that only global action has chances of success in tackling climate change, promoting clean energy and achieving sustainable development. The multilateral international Plan of Work proposed by the IEA in response the G8 Gleneagles communiqué (IEA-G8 POW) aims at transforming global objectives into globally concerted multi-regional actions. The following comments to the IEA-G8 POW by task and sub-task are intended:

- to support actions indicated in the draft text of October 2005;
- to add supplementary actions in the same line; and
- to provide ideas and new lines of action with the same objectives.

Task A. World Alternative Policy Scenario and Technology Scenario Analysis

It is suggested that the IEA establishes a closer collaboration with ETSAP and engages in joint projects, similarly to what already exists in the renewable sector (see G8 POW, task C ‘Powering a Clean Energy Future’, no. 3 ‘Renewable Energy’). The focal point for this collaboration would be to contribute to continued evolution and improvement of the IEA Energy Technology Perspective (ETP) MARKAL global, multi-regional, technology rich model. The nature of ETSAP’s contribution would be to compliment and add value to the IEA’s ETP efforts. Said framework can be employed to examine the most important elements resulting of the IEA-G8 POW and to explore alternative development and policy scenarios. Particular areas where ETSAP could contribute to compliment the ETP activities at the IEA can be developed in concert with the IEA ETP team.

It is suggested to add to Task A

Sub-task 2) Benefits of implementing the G8-POW

This subtask would take advantage of technical-economic systems modelling developed by ETSAP and used for ETP in analysing and comparing different energy technologies and policy options on a level playing field¹. In particular it would highlight the economic advantage for each public and private operator in implementing the decisions suggested by the IEA-G8 POW². This Sub-task would evaluate the contributions to energy security, economic development, environmental protection and climate change mitigation of policies affecting different sectors in comparable and consistent ways. This would take into account the competition among different measures and avoid double counting of effects or the over-optimism of proponents of a single technology or policy. This would be done by the ETSAP partners currently participating in the Implementing Agreement conducting common assessments using their national models. These detailed experts and models currently contribute directly to decision-making at the highest levels for their governments, and would serve as a powerful resource for evaluating the cost and benefits of the IEA-G8 POW. This would also serve to facilitate buy-in by said countries in the IEA-G8 POW.

¹ ETSAP has been stewarding the ongoing development and use of a series of energy system planning models (the MARKAL/TIMES family of models), and their associated data handling and analyst support systems, referred to here as ETSAP Tools.

² In the case of a specific policy, ETSAP Tools have been already used by an international organization (OECD, Environment Directorate for the evaluation of the economic – environment benefits of removing energy subsidies [MICHAELIS, L. et al., "Reforming Energy and Transport Subsidies: Environmental and Economic Subsidies", OECD 1997, Paris, ISBN 92-64-15681-X.]

Task B. Transforming the Way we Use Energy

The idea of emphasising the energy efficiency gains and emission reductions possible by actions in the end use and energy service sector is welcome. Although more difficult to implement, actions in the end-use sectors have a much higher benefit / cost ratio than in the primary supply sectors. As just noted in proposed Task 1.A, the same experts and framework is ideally suited for expounding the many virtues that will arise from transforming the way we use energy.

Sub-task 1) Cross-cutting Task: Energy data and indicators for buildings, industry, and transport

Further to the IEA indicator database, it is suggested to develop a more integrated and wider set of quantitative energy information. The package would include an expanded method of compiling the National Energy Balances (NEB), an energy technology database with energy, environment economic and technical information integrated to the NEB, and the economic / environment versions of the NEB³.

The methodology would develop the NEB through the following main steps⁴:

- Adding to the detailed NEB, which now include three sections (primary energy supply, transformations, final energy consumption), two additional sections on transformation to energy services and energy services provided, with the same lines of the section on final energy (the columns remain the same);
- Compile the version of the NEB that used the substitution principle, to be used for providing the primary energy equivalent to any final energy consumption and energy service demand;
- Open the technological dimension in the NEB, by integrating to the transformation sections the information on the existing stock of energy technologies split by large categories (for example the cell giving the amount of natural gas used in producing electricity would be split by type of power plant, and energy technology characterization data would be used); if this dimension is ordered by production cost, supply curves are obtained⁵;
- Quantify the economic value of the energy system with the same disaggregation of the NEB, and
- Extended to encompass the most important emissions⁶.

Most steps can be developed separately. Details can be provided.

The results of this subtask would be directly beneficial to modellers and energy analysts in general and could enhance the robustness of policy evaluation. The development and use of this new methodology would extend the IEA leadership in NEBs.

The ETSAP network and tools (perhaps expanded to include IIASA and Tellus Institutions methodologies as built upon the same core data needs and analytic philosophy) can serve as an organizing framework for the collection, dissemination and better use of such information by various energy systems modellers around the world, both within IEA countries and among the Plus-Five and other non-OECD countries (see 5).

³ ETSAP has a long experience in this regard. ETSAP analysts' livelihoods depend upon the collecting of quality energy system related data and its proper use. The essential starting point for any energy system development model is the collect quantitative information on present energy system, and to careful calibration of this system to ensure consistency and provide that solid starting point needed to establish the point of departure for examining the evolution of energy systems under changing futures. In the past ETSAP has published several energy technology data handbooks (1981, 1983), and it may be worthwhile to revisit that resource by compiling a current "technology repository" for various regions of the world.

⁴ The methodology of NEB had been developed more than fifty years ago and has not change much since. The new methodology would be aimed at integrating the concept of NEB with the concept of energy technology databases and expanding the framework for quantitative data on transformation technologies, end use devices, energy services, economic and environment. This task would extend the work pioneered by Lee Schipper and used by in the IEA indicator database, with the advantage of making the absolute values consistent with the NEB.

⁵ See for instance the data included in 'Projected costs of generating electricity', Nuclear Energy Agency, Update 2005.

⁶ Similarly to what is already included in the IEA statistics on CO2 emissions from energy use.

Task C. Powering a Clean Energy Future

It is suggested to discuss with OECD/NEA and to add a sub-task on the possible advancement and potential role of nuclear energy technologies in the context of sustainable development. As noted in earlier tasks, the ETSAP experts and framework is ideally suited for collaborative examination of the potential merits arising from deployment of advanced nuclear technologies.

Task D. Promoting Networks for Research and Development

Apparently none of the energy technology existing today or under development by energy R&D is capable of ensuring long term sustainability. It seems extremely necessary to promote something more ambitious than Networks for Research and Development, such as a large new multi-lateral international Energy R&D effort, more adequately funded than in the past twenty years (see figure 1)⁷. Maybe researchers and experts working in different scientific fields will be able to identify the ‘silver bullet’ towards energy security, economic development, environment protection and climate change mitigation, which has not yet been identified by the groups and organisations traditionally active in the field of energy research and technologies⁸.

ETSAP can contribute to the identification of the energy markets and technology type where new RD&D are most beneficial towards sustainability by collectively examining the benefits of coordinated R&D.

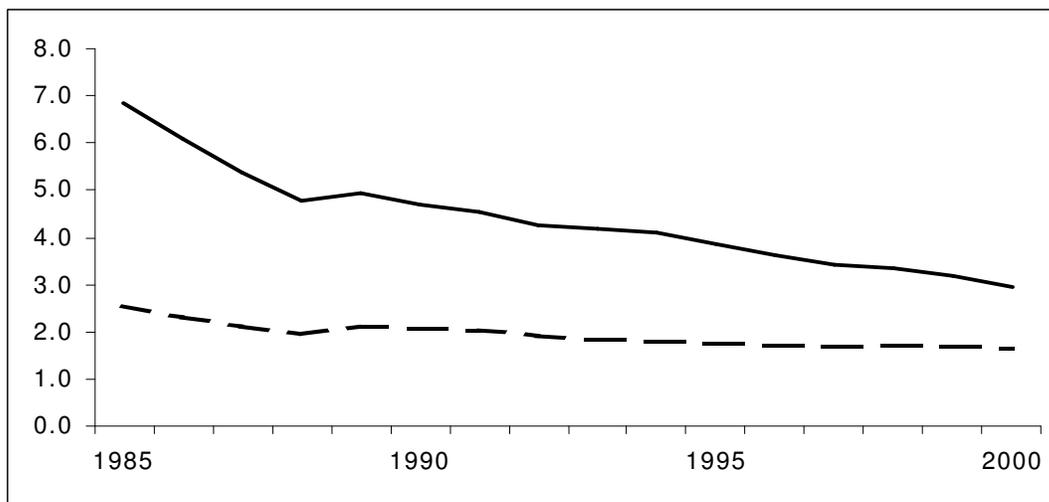


Figure 1: Energy R&D investment of USA, Japan, EU15 (adapted from www.izt.de/eurendel/) [absolute values in ‘0000 Million \$US2002 (dashed curve) and percentage of the whole scientific R&D (continuous curve)]

⁷ In the 15 years period between 1985 and 2000, global energy R&D investments have decreased by a factor of 1.54 to about 16.5 BUS\$2002, while the whole scientific R&D investments have increased by the exactly same factor to about 550 BUS\$2002, in line with the economic growth of more developed countries. While in 1985, energy R&D accounted for about 7% of the whole scientific R&D investments, in the year 2000 its weight was less than halved, about 3%. While 2.5% of the global Gross Domestic Product is invested in scientific R&D, energy R&D funds are about 1% of the gross value of the Total Primary Energy Supply (which is about 2 TUS\$ in 2005), about 0.45% of the value of the Total Final Energy Consumption (which is about 4.5 TUS\$ in 2005), and about 0.15% of the value of the energy systems including the end-use devices.

⁸ More can be found in the presentations given by GC Tosato on ‘Market of new energy technologies and R&D of long-term innovative concepts’ at the 28th Annual IAEE International Conference held in Taipei, 3-6.06.05, and to the workshops organized by the IEA Ad Hoc Group on Science and Energy Technologies in Berlin (on ‘New Links between Basic Research and Applied Energy R&D’, Nov. 8-9, 2004) and in Paris (on “Tools and methodologies for the evaluation of energy chains and for technology perspective”, 3-4 March 2005).

- 2) *In one page or less please describe what specific role your Working Party, Group or IA desires to play to implement the G8 Plan of Work? What are the most relevant activities and studies under your responsibility that contribute to the proposed IEA G8 Plan of Work? We do not seek an exhaustive list; rather please identify the top 2-3 most relevant items.*

“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, environmental concerns, and economic 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 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 other energy and environment related policy issues”⁹. ETSAP tools and partners play a key role in the following global projects¹⁰:

- IEA/ETO’s Energy Technology Perspective (ETP) examines the role of advanced technologies in meeting multi-lateral energy, environmental and security goals;
- U.S. Energy Information Administration’s System for the Analysis of Global Energy markets (SAGE) analyses the energy security implications of current trends and prepares its annual International Energy Outlook;
- ETSAP TIMES Integrated Assessment Model (TIAM) analyses climate change mitigation policies under uncertainty in the framework of EMF-22;
- Paul Scherrer Institute’s Global Multi-Regional MARKAL-MACRO-Trade Model (GMM) evaluates the economic advantages of endogenous and induced learning via public and private RD&D spending in support of carbon-free generation technology; and
- the European Fusion Development Agreement (EFDA) consortium examines the long-term global potential and benefits of nuclear fusion.

Several major multi-country/state undertakings employing the ETSAP tools were begun, including:

- Australia’s Agency for International Development sponsored Energy Planning and Systems Analysis Project (EPSAP) involving 8-ASEAN countries and the Asian Center for Energy (ACE) in a coordinated capability building and planning undertaking;
- EU NEEDS (New Energy Externalities Development for Sustainability) project developing a 25-member states pan-European TIMES model, which merges energy modelling with externalities and life cycle assessment techniques and evaluates the effects of internalising energy externalities;
- The Northeast States for Coordinated Air Use Management (NESCAUM) is building a 6-state New England-MARKAL model to assess Clean Air Act goals and to support the New England Governors/Eastern Canadian Premiers climate change commitment, and
- US Agency for International Development is sponsoring an 8-country Southeast Europe Regional Energy Demand Planning initiative to provide a consistent framework for energy planning.

The MARKAL/TIMES community has grown to over 60 countries with some 140 governments, research and university institutions actively employing the methodology to evaluate national and local policies for energy, pollution control and emissions trading. Making use of its methodologies and tools, ETSAP and its experts are prepared to cooperate with the IEA in

- putting together the information gathered by task B (subtasks 2-5), task C and other energy supply and demand sectors in a consistent system (task B, subtask 1);
- evaluating on a common level playing field the sectoral proposals in alternative development plans (scenarios, tasks A, C, D), where the main goals of energy security, economic development, environment protection and climate change mitigation are quantified and balanced; and
- preparing a new energy RD&D strategy, as it has already done in 1980 with the ‘IEA Energy RD&D group strategy’.

Possible contributions to the IEA-G8 POW more specific to the Gleneagles ‘Plus-Five’ are detailed below (response no. 5).

⁹ Quoted from the End of Term Report (1999-2004) discussed by the IEA/CERT at its 38th meeting (Paris, June 9-10, 2004). The CERT approved a five-year extension of the ETSAP IA to June 2009.

¹⁰ The following bullets are quoted from the ETSAP Annex VIII/IX final report (2002-5), where details are described (213 pages). Both documents and the proceedings of ETSAP semi-annual workshops are posted at www.etsap.org.

- 3) *Looking at your 2006-2008 calendars what future workshops, conferences, events and meetings might be oriented to contribute to the IEA-G8 Plan of Work? We do not seek a full review of your working calendar; rather please identify the top 3-5 items that are most applicable. Please provide a short description of the calendar item (title of event, date, place, overall goal of event).*

ETSAP organizes every year two workshops on data, tools, models and scenarios for analyses and decision making support in the field of energy, economy, environment and engineering (the proceedings of the most recent workshops are posted at www.etsap.org). All the workshops are organised jointly with international and national organizations. Some of them are held in non-OECD countries. These meetings could serve as regular forums for addressing specific IEA-G8 POW topics/issues. In general ETSAP offers its forum to the IEA. Meetings typically run 3-days, and could “piggy-back” with 2-day IEA-G8 topic/issues twice a year. Such an approach would provide an organizing framework and continuity to ensure that the IEA-G8 message, priorities and needs find their way into the research and policy communities of the member, Plus-Five and other countries.

The next ETSAP workshop, June 2006, is particularly relevant to the IEA-G8 POW. It will coincide with the annual International Energy Workshop (IEW) organised jointly with Stanford/EMF, IIASA, IEA/LTO and ERC in Cape Town (South Africa). It could be easily merged with the deliverable No. 3 (Workshop on energy technology modelling and data with focus on the “Plus-Five” countries) of Task A (World Alternative Policy Scenario and Technology Scenario Analysis) mentioned in the IEA-G8 POW. Owing to the Workshop being held in South Africa the program happens to line up quite well with the IEA-G8 POW (see the IEW announcement, Appendix I). Move over, recognizing the potential that such a gathering offers, the United Nations Development Programme will be providing direct funding to support participation by leading African energy planners and experts. An excellent way to jump-start the IEA-G8 POW with respect to the Plus-Five could be for the World Bank to provide funding for participation by key Plus-5 institutions in both the IEW and in a 3-day mini-workshop that would “brainstorm,” set priorities, and establish goals for a new ETSAP Annex with the Plus-Five proposed in Section 5.

The second semi-annual ETSAP workshop, to be held in November probably in Germany, could be merged with one of the workshops on missing data, proposed in the IEA-G8 POW (Task B: ‘Transforming the Way We Use Energy’, sub-task ‘Industry’). ETSAP is confronted continuously with the problem of modelling elements of the energy systems, which are not reported by energy statistics and are difficult to quantify. This workshop could be extended to missing data in other end use sectors. It could be included in the larger framework of developing a new methodology of integrated energy statistics, where National Energy Balances are expanded to the supply of energy services, to technologies which transform energy commodities, to economic and environmental aspects, as discussed under Task 1.B.

The first 2007 semi-annual ETSAP workshop could be held in Paris and devoted to the development of the ETP global model to include the findings of most IEA-G8 POW tasks. It would look to familiarize various Working Parties, Ad Hoc Groups, and Implementing Agreements with the nature of the ETSAP Tools with particular emphasis on how their activities can contribute to the quality of data and how the ETSAP Tools, both ETP and the network of national models, can be used to examine issues and policies related to their particular area of expertise and interest. Initiating such bi-directional IEA in-networking would have huge potential to leverage the strengths of the individual expert groups.

The second 2007 semi-annual ETSAP workshop(s) could be held in another ‘Plus-Five’ country (ETSAP has been to China and will be in South Africa in June 2006, so targeted would be one of the remaining three) and devoted to improve the regional specification of models, scenarios and policy evaluations. [See 5 below.]

ETSAP is ready and has the network and experience to organise additional events, workshops and training sessions in countries where ETSAP tools are used¹¹. They could serve the purpose of making local teams aware of the IEA-G8 POW and ready to contribute with local expertise to the energy systems analysis that is required.

- 4) *Please help us identify top talent to implement the IEA G8 POW. If you have suggestions regarding candidates for IEA Secretariat project staff or consultants please share them with us.*

The following experts have a long experience in energy technology systems analysis and modelling with ETSAP tools, in sectors and aspects assigned to the IEA-G8 POW:

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Erik O. Ahlgren” <ahleri@entek.chalmers.se>;

¹¹ ETSAP meetings have been held in dozens of OECD countries. Among non-OECD countries, ETSAP has organized workshops in Beijing a Joint China – IEA seminar on "Energy Modelling and Statistics" supported by the IEA secretariat (2003), and in Taipei a technical conference on “Global, Regional, National and Local Energy Modeling” sponsored by the Taiwanese Energy Protection Administration (2005).

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Peter Taylor <peter.g.taylor@aeat.co.uk>;

Phillip Tseng <Phillip.Tseng@EIA.DOE.GOV>;

Gary Goldstein <ggoldstein@irgltd.com>;

John C. Lee <jcl@bnl.gov>;

Mark Howells <markh@eng.uct.ac.za>;

The name and address of many more experts is listed in different pages at www.etsap.org; all of them are ready to contribute to the IEA-G8 POW with specialised consultancy.

- 5) *We will be engaging with major energy consuming developing countries, including the Gleneagles Plus Five (Brazil, China, India, Mexico, South Africa), in order to strengthen their links with the IEA. Please let us know whether you believe that offering specific developing countries observer status in your Working Party, Group or IA would be beneficial. We would also be grateful if Chairs of Implementing Agreements could let us know whether they believe that their IA would benefit from the participation of specific developing countries and of any contacts that may already have been made with these countries.*

The ETSAP network of experts and the widespread use of its Tools (over 140 institutions in over 60 countries) provide an as of yet serious under tapped resource for the IEA. This is particularly true in the Plus Five countries where the leading analytical institutions in these countries have been working with the ETSAP Tools to study the major energy issues in their countries.

ETSAP strongly believes that offering the Plus-Five countries observer status, and therefore obtaining their regular participation in our workshops and meetings, will greatly enhance their ability to perform studies in energy systems analyses, and enable both parties to profit from the exchange of information and perspective. Most importantly, specific workshops and case studies could be organized where ETSAP modelers and the country experts meet, present and discuss their analyses for improving both the individual county models and the representation of their country models in the multi-regional global models employing the ETSAP Tools (i.e., the IEA-ETP and EIA-SAGE¹² models). Furthermore, the experts of Plus-Five countries will have a forum to present their own analyses in support of their own interest, objectives and viewpoints, helping others to get a better understanding of their problems and to facilitate defining common goals.

Moreover, key, well established and respected institutions in all of the Plus-Five countries are already familiar with the ETSAP Tools, with most actively contributing to the nation dialog on energy systems planning (see Table 5.1). In addition, recent requests from many government, research and planning institutions in each of the Plus-Five make it clear that such collaboration is highly sought and would be warmly embraced and appreciated.

Plus-Five participation in ETSAP clearly offers immediate benefits both to ETSAP (and thereby the IEA) and the Plus-Five countries. But a wider vision of IEA/ETSAP engagement with the Plus-Five beyond just participation in ETSAP should also be considered. Once engaged it is suggested that a more ambitious initiative be undertaken with the participating Plus-Five institutions to foster the regionalization of their national models (or in the case of South Africa inclusion of the Southern African Development Community countries). These are large, complex energy systems, which need to be represented at the necessary (multi-

¹² The System for the Analysis of Global Energy (SAGE) is a global MARKAL model (run time-stepped) developed by the US Department of Energy's Energy Information Administration that is used for the annually for the production of the *International Energy Outlook*.

Table 5.1 - Institutions in the Plus-Five Countries Familiar with the ETSAP Tools

Country	Institutions	Comment
Brazil	Universidade Federal do Rio de Janeiro (Not in active use, but expertise/interest there)	Recent request for assistance with MARKAL from the Ministry of Mines and Energy.
China	China Energy Research Institute Environmental Protection Department, Hong Kong GRIEP, Guangzhang Guangdong Energy Economic Research Centre Shanghai Academy of Environmental Sciences Tsinghua University	Recent requests for assistance from Tsinghua and Shanghai.
India	Indian Institute of Management, Ahmedabad Reliance Industries Ltd. The Energy Research Institute	Recent request for assistance with MARKAL-MACRO.
Mexico	Instituto Mexicano del Petróleo National University of Mexico	Recent request for access to and training for SAGE.
South Africa	Department of Minerals and Energy Energy Research Centre, University of Cape Town	Existing, ongoing active collaborations with ERC.

region) level of detail to enable both provincial planning within a national context¹³ as well as proper assessment of Clean Development Mechanism (CDM). At the same time putting in place such an analytic framework would provide Plus-Five decision-makers with the kind of capabilities need to assess the implication of post-Kyoto proposals and thereby become more fully engaged in these deliberations¹⁴.

While the Plus-Five are key and the focus on the immediate IEA-G8 thinking, we'd like to encourage a grander vision deserving consideration if the developing world is to become fully engaged in responsible energy system planning and consensus building with respect to Climate Change deliberations. ETSAP believes that the time may be ripe for a major capability building initiative to be undertaken under the auspices of the World Bank, guided by ETSAP. What is envisioned is a new ETSAP Annex for Outreach. The focus would be in-country capability building within a region context. While CDM offers a start, the biggest potential for long-term economic development and GHG mitigation is regional cooperation / trade.

Why, and why now? Various independent capability building initiatives have been undertaken since the early 1990's (e.g., US Country Studies, ADB Asian Least-cost Greenhouse Gas Initiative) made some inroads, but for the most part were not sustainable. But over the past decade both the ETSAP Tools and our ability to successfully transfer them to non-OCED countries have substantially evolved. The Tools are ideally suited for examining the major issues of the IEA-G8 POW with respect to assessing and promoting clean and renewable energy and energy efficiency for promoting economic growth while considering climate change and local air (health) implication. And with Post-Kyoto deliberations now poised to begin it is essential that within the next four years the appropriate tools, the data they need, and the in-country expertise to apply them be established. While this might seem a pipe-dream two major regional cooperation initiatives (the AusAID EPSAP and USAID SEE-REDP, see Tables 5.2 and 5.3) are demonstrating that indeed achieving such success is not beyond the reach of those with commitment and vision, and support.

¹³ Multi-region modeling initiatives making use of the ETSAP Tools are an increasing trend in the OECD, such as the EC funded NEEDS project (where a 25+ member state EU model including externalities), the New England initiative (6 US states, expanding now to 12), and others listed in response to question #2.

¹⁴ For instance it would be beneficial to develop the multi-province China model, as recently discussed with the China Energy Research Institute and proposed by ETSAP to the Asian Development Bank.

Table 5.2: Australia’s Agency for International Development sponsored Energy Planning and Systems Analysis Project (EPSAP)

“Country”	Participating Institution	Study Description/Status
ASEAN	ASEAN Centre for Energy	<ul style="list-style-type: none"> • The Trans-ASEAN Energy Network - Analysis of gas pipelines and electricity interconnections • ASEAN Energy Market Integration
Cambodia	Ministry of Industry, Mines and Energy	<ul style="list-style-type: none"> • National Energy Policy - Analysis of Options
Indonesia	Badan Pengkajian Dan Penerapan Teknoioigi	<ul style="list-style-type: none"> • Gas Utilization: National Gas Pipelines, Alternative Fuel Mix for Power Plant and Demand Sectors • The Future Demand for Natural Gas in Indonesian Regions with Particular Reference to the Use of CNG in Transport • Future Technologies for Power Plants in Indonesian Regions with Particular Reference to the Use of Renewable Energy and Small Scale Coal Steam Plant
Laos	Ministry of Industry and Handicrafts, Electricity	<ul style="list-style-type: none"> • Energy Security and Diversity.
Myanmar	Ministry of Energy	<ul style="list-style-type: none"> • Energy Self-Sufficiency - Options and Strategies
Malaysia	PTM Malaysia Energy Centre	<ul style="list-style-type: none"> • Fuel Diversification - Economic and Environmental Impact of Alternative Fuel Mix • Cost and Environmental Impact of Renewable Energy Technologies • GHG Mitigation Options with Emphasis on Energy Efficiency and Renewable Energy Strategies
Philippines	Department of Energy	<ul style="list-style-type: none"> • Impact of Natural Gas Expansion • Promoting Renewable Energy in a Restructured Electricity Market • Increasing Renewable Energy Utilization by Full Cost Accounting of Electricity Supply
Thailand	National Energy Policy Office	<ul style="list-style-type: none"> • Removing the Subsidy on LPG and Implementing a Policy to Increase the Use of CNG in Transport • Fuel Options for Power Generation • Renewable Energy
Vietnam	Ministry of Industry	<ul style="list-style-type: none"> • The Strategy Orientation for Electricity Supply • Analysis of Power Development Strategies in Compliance with Environmental and Energy Security Issues • Energy Pricing and its Implication for Energy Efficiency and Environment

Thus it is proposed that consideration be given to starting a separate Annex in conjunction with the World Bank for those non-OECD countries that already employ the ETSAP tools, and bring other interested countries along, to review and improve the quality of their models and data, (ensuring that said data finds its way into the IEA system, particularly the NEB discussed in 1.b), vetting said models, and strengthening the domestic use of the capability. This would be done with an eye towards realizing what is necessary to establish credible/certifiable models that can be used for CDM baseline emission projections and project evaluation, and strong analytic framework to support policy-makers engaged in national planning and post-Kyoto deliberations in these countries. This will become increasingly important as we move from the smaller “low hanging fruit” to the serious size projects that are going to be necessary to truly impact Climate Change. Given ETSAP Tools’ open architecture, transparent data, and well-understood least-cost paradigm such a framework could serve as a verifiable approach to ongoing assessment of CDM opportunities and their impact on the baseline. And as CDM gears up for real such an organizing framework will be essential for every host country, and invaluable to those looking to negotiate carbon credits¹⁵.

¹⁵ For instance the MARKAL-Kazakhstan model is being developed in order to support the governmental decision on the full participation to the Kyoto Protocol and the Joint Implementation.

Table 5.3: US Agency for International Development sponsored Southeast Europe Regional Energy Demand Planning (SEE-REDP)

Participants	Steering Committee	Technical Working Group
Albania	National Energy Agency	National Energy Agency
Bosnia	Ministry of Foreign Trade and Economic Relations	Ministry of Foreign Trade and Economic Relations Federal Ministry of Energy, Mining and Industry Energy Ministry of Republika Srpska
Bulgaria	Ministry of Economy and Energy	Ministry of Economy and Energy
Croatia	Ministry of Economy, Labour and Entrepreneurship,	Ministry of Economy, Labour and Entrepreneurship, Energy Institute Hrvoje Pozar Croatian Electric Power Utility
UNMIK	Ministry of Energy and Mining	Ministry of Energy and Mining Energy Regulatory Office
Macedonia	Electric Power Company of Macedonia	Electric Power Company of Macedonia
Montenegro	Ministry of Economy	Ministry of Economy Electric Power Company
Romania	National Power Grid Company - Transelectrica	National Power Grid Company - Transelectrica
Serbia	Ministry of Energy and Mining	Electric Power Industry of Serbia

Summarizing, the multi-stage recommendation for ETSAP engaging of the Plus-Five and beyond are:

- a. invite, encourage and support the Plus-Five to participation in ETSAP;
- b. begin an undertaking to dramatically expand the national planning capability in the Plus-Five by assisting the national teams with regionalizing their existing country models, and
- c. initiate a major new Annex involving any country with or interested in the ETSAP Tools to foster the wide-spread use of a proven common framework.

All three tasks, but especially 2 and 3, would also look to ensure the flow of data and knowledge from the non-OECD countries to the IEA, in particular if the expanded NEB approach is undertaken.