

THE WORLD BANK
ASIA ALTERNATIVE ENERGY PROGRAM
(ASTAE)

STATUS REPORT #8
FY00



December 2000
Washington, D.C.

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Introduction

Purpose of Report

1. This report documents the performance of the Asia Alternative Energy Program (ASTAE) for the World Bank's fiscal year 2000 (FY00), the eighth fiscal year of ASTAE's operation. The Report focuses on ASTAE's activities and work program, staffing status and resource mobilization and utilization for the 12-month period July 1, 1999 through June 30, 2000. It also summarizes the Ninth Annual ASTAE Donors' Meeting, held in April 2000, and ASTAE's current strategy and future work program.

Background

2. In 1992, the World Bank (WB) created the Asia Alternative Energy Program (ASTAE)¹ to mainstream renewable energy and energy efficiency investments into the Bank's lending program in the East Asia and Pacific (EAP) and South Asia (SAR) Regions. Since that time, ASTAE has been supported by the Netherlands Directorate General for International Cooperation (DGIS), the US Department of Energy (USDOE), the US Agency for International Development (USAID), the United Nations Development Program (UNDP), the Swiss Confederation, the Government of Finland, and other donors.

3. The Asia Alternative Energy Program has been an highly effective, collaborative effort by the Bank and several donors to integrate clean, sustainable, renewable energy and energy efficiency technologies into the Bank's lending operations. Originally launched as a three-year pilot effort, the Bank and donors agreed that this should become a full-scale program with continued support by both groups.²

4. Since its inception, ASTAE has supported alternative energy activities in Bangladesh, Cambodia, China, India, Indonesia, Lao PDR, Nepal, Sri Lanka, the Philippines, Thailand, and Vietnam.

Activities

5. In its support to client countries and Bank staff, ASTAE seeks to:
- promote viable alternative energy options at all levels of decision-making;
 - strengthen institutional capacities to identify, assess and implement proven, cost-effective alternative energy options; and
 - foster public-private sector partnerships in the development of environmentally sustainable energy projects.

¹ Formerly known as the Asia Alternative Energy Unit.

² The Asia Alternative Energy Program is a direct product of the Financing Energy Services for Small-Scale Energy Users (FINESSE) project, which the World Bank and bilateral donors embarked on in August 1989. FINESSE focused on identifying possibilities for multilateral development bank financial assistance to providers of small-scale energy services who lacked access to credit through conventional means. The FINESSE project identified substantial scope for meeting the large unmet demand for energy services throughout the Asia region through renewable energy and energy efficiency technologies and concluded that World Bank regional operations should give special attention to this potential. Following a joint request from Asian borrowers and donor partners, the Bank's EAP and SAR Regions acted to implement the FINESSE recommendations by creating the Asia Alternative Energy Program (ASTAE) in January 1992.

6. Specific activities undertaken by ASTAE include:

- identification, preparation, appraisal and supervision of renewable energy and energy efficiency investments, supported by the WB and by the Global Environment Facility (GEF);
- analytic and advisory activities (AAA), including:
 - * economic and sector work (ESW), including formulation of policies to promote environmentally sustainable renewable energy and energy efficiency options;
 - * technical assistance and training;
 - * capacity building; and
 - * technology assessments and feasibility studies.
- knowledge management; and
- coordination with donor agencies and resource mobilization for alternative energy development.

FY00 ASTAE Summary

7. **ASTAE: A Model of Success.** ASTAE provides a useful model of a Bank/donor partnership to integrate alternative energy options into energy delivery services. In FY00, the energy policies and environmental action plans of Asian client countries and the Bank Country Directors demonstrated increased commitment to developing alternative energy resources.

8. **Lending Activities.** In 1992, the Bank and ASTAE donors agreed, as an initial indicator of program effectiveness, that 10 percent of Bank financial assistance to the power sector in Asia would be allocated to alternative energy. This target has been reached and surpassed with alternative energy accounting for a new high of 47.3 percent of total power sector lending in FY00, marking the second consecutive year alternative energy has exceeded 45% of the Bank power sector lending in the South and East Asia regions.³ The ASTAE-supported portfolio of alternative energy projects for FY93-FY03 has grown to 37 renewable energy and energy efficiency projects in 11 borrowing countries in Asia, with a total alternative energy cost of \$3.8 billion and total Bank/GEF commitments of \$1.1 to \$1.5 billion.

9. **Nonlending Services.** In FY00, ASTAE engaged in significant AAA work (analytical and advisory activities) to advance alternative energy programs in client countries, including policy and regulatory support, education and outreach, local capacity building and technical assistance and training. Lending, though vital, is not sufficient to mainstream alternative energy options because alternative energy projects typically involve new policy, financing and delivery models. It has become clear that sustainable alternative energy development requires enhanced institutional capacity in both the Bank and in client countries. ASTAE's AAA work has provided significant support in this area.

³ While the overall Bank power sector lending program has significantly declined during the last two years, the 10 percent goal would have been achieved if lending commitments had remained constant.

Work Program

Lending Operations

10. To date, ASTAE's primary method of mainstreaming alternative energy has been through the initiation of lending operations, i.e., developing projects or project components for WB/GEF financing. In FY92, the WB had approved only one loan in the Asia Regions with an alternative energy component of \$2.0 million.⁴ Since that time, ASTAE has supported the development of 18 projects (14 of which are currently under implementation, the remaining four have closed), totaling over US\$680 million in Bank/GEF support for alternative energy in Asia. These projects represent over \$1.8 billion in alternative energy investments by the private sector, commercial banks, local governments, and bilateral and multilateral institutions (see Figure 1 and Attachment 1 for details of the ASTAE-supported project portfolio).⁵ The projects currently under implementation are expected to displace almost 1.5 gigawatts (GW) of fossil fuel-fired generation capacity and will provide electricity to an estimated 530,000 to 630,000 rural households in remote areas that would otherwise lack access to modern energy services (see Attachment 2).

11. ASTAE continues to be one of the champions of alternative energy within and outside the Bank. It is supporting project preparation work for an additional 19 projects, with an estimated total alternative energy cost of over \$2 billion and WB/GEF support of at least \$500-900 million. A summary of the ASTAE-supported alternative energy portfolio is presented in Box 1.

Box 1: Summary of ASTAE Operations in Asia

ASTAE-supported WB/GEF Investment Projects (FY93-03)

- 37 Projects
 - ◊ 4 Projects have closed
 - ◊ 14 Projects under implementation
 - ◊ 19 Projects under preparation
- Total alternative energy project/project component costs of ~\$3.8 billion;
- Bank/GEF assistance for alternative energy of ~\$1.1-1.5 billion;
- Avoided Capacity of ~1.5 GW for completed projects and projects under implementation.

ASTAE Budget Expenditures (FY92-00) = \$ 22.4 million, of which

- World Bank = \$9.00 million (40%)
- Donor funding plus in-kind support = \$13.45 million (60%)

⁴ The solar component included in the Nepal Telecommunications V Project was subsequently canceled.

⁵ The portfolio of ASTAE-supported projects does not include projects that have been canceled or dropped. The Asia financial crisis had a severe impact on lending operations in Indonesia, forcing the cancellation of two projects under implementation (the Sumatra and Kalimantan Power and the Renewable Energy for Small Power Projects) and three projects under preparation (Eastern Indonesia Renewable Energy Development Project, Eastern Islands Power Sector Development Project, and the Sumatera, Kalimantan Sulawesi Rural Electrification Project). The Henan (Qinbei) Thermal Power Project in China, which included an energy efficiency component, was canceled shortly after loan approval and is not included in the portfolio. The Philippines Renewable Energy Isolated Grids AIJ project is no longer being implemented by the Bank.

Box 2: DSM in Thailand: An ASTAE Evaluation

ASTAE commissioned a review of the recently completed Thailand Promotion of Electrical Energy Efficiency Project (Loan 3598-TH, GEF Grants 28637 & 21221-TH) to evaluate the effectiveness of the project and to disseminate lessons learned from implementation. This ASTAE-supported project provided resources for the Electricity Generating Authority of Thailand's (EGAT's) implementation of a five-year DSM demonstration program. The project was approved on April 27, 1993 and closed on June 30, 2000.

In 1993, Thailand initiated a \$189 million demand-side management (DSM) program to help curb electricity demand growth and promote more energy-efficiency equipment and cost-effective energy services within the country with primary support from an automatic tariff mechanism for DSM and other services (F₁). In addition, the Program received a \$9.5 million grant from the Global Environment Facility (GEF), \$6.0 million grant from the Government of Australia, and a \$25 million concessional loan from the Overseas Economic Cooperation Fund of Japan (OECF).

During the project lifetime, EGAT's DSM Office has developed a strong portfolio of DSM measures, including some 19 DSM programs targeting a wide range of sub-sectors and end-uses, and substantially surpassed its original peak reduction and energy conservation targets. EGAT has also created substantial public awareness of energy conservation and actively promoted private sector participation in providing such services. EGAT's DSM Office has been recognized internationally for its success in designing DSM programs that fit within an Asian context as well as its innovation and partnerships with other agencies.

EGAT's DSM programs have resulted in an aggregate peak load reduction of 558 MW, or 4 percent of the 1999 peak load, and cumulative annual energy savings of 3,099 GWh, representing more than double the original energy savings Program targets. The Program has also provided significant environmental benefits, reducing CO₂ emissions by 2.29 million tons per year.

Thailand's DSM program experience offers considerable insights into the major issues associated with implementing DSM programs, and of the potential benefits that can accrue. At the time EGAT began its DSM Program, it was unable to keep up with growth in energy demand. While several of EGAT's DSM programs did not achieve their intended impacts, EGAT achieved its overall peak and energy reduction goals at costs well below the cost of additional generation capacity. While every country's and utility's context is unique, EGAT's experience offers a number of useful lessons that cut across geographical boundaries. And, whether or not Thailand decides to sustain its DSM activities in the face of electric utility industry restructuring, the market transformation effects and persistence of energy savings will continue to produce real economic and environmental benefits for Thailand.

12. ASTAE-supported WB/GEF investment projects include a wide range of alternative energy technologies. Renewable energy investments include solar photovoltaic (PV), small and mini-hydro, wind power, biomass cogeneration, small geothermal and solar thermal electric projects or project components. Demand-side management (DSM) projects or project components fund investments in efficient lighting, appliances, motors, agricultural pumpsets, and HVAC technologies, load management and load research, industrial cogeneration and energy management services. ASTAE's efforts have aided in making energy efficiency a key component of the Bank's power sector reform strategy in India.

Solar Array in India



Photograph Courtesy of ASTAE

**Figure 1: ASTAE-Supported World Bank/GEF Alternative Energy Investment
Projects, FY92-03**

13. As Figures 2 and 3 demonstrate, ASTAE project support has utilized technical assistance to build local capacity, strengthen institutions, and address policy, regulatory and other barriers to alternative energy investments while supporting development of a wide range of technologies.

**Figure 2: Renewable Energy -
 ASTAE-Supported Projects by Technology and Policy Measure**

Country	Project	Technical Assistance and Policies				Technologies				
		Training & Capacity Building/ <u>a</u>	Renewable Energy Master Plan	Small Power Purchase Agreement	Tariff & Duty Adjustment	Photo-voltaic	Hydro/ <u>b</u>	Wind Power	Biomass Power	Geo-thermal <u>c</u>
China	Renewable Energy Resources	•	•		•	•		•		
Indonesia	Second Rural Electrification	•	•	•	•		•			•
	Solar Home Systems	•				•				
Lao PDR	Southern Provinces Rural Elect.	•	•			•	•			
Vietnam	Power Development	•	•							
Vietnam	Rural Energy I	•	•	•	•		•			
India	Renewable Resources Development	•				•	•	•		
India	Renewable Energy II/Energy Efficiency	•		•	•		•			
Sri Lanka	Energy Services Del.	•		•	•	•	•	•		

Includes:

a institutional strengthening activities; b small-, mini-, and micro-hydro; and c small-, mini-, and micro-geothermal.

**Figure 3: Energy Efficiency -
 ASTAE-Supported Projects by Technology and Policy Measure**

Country	Project	Technical Assistance and Policies					Technologies					
		Training & Capacity Building	DSM Plans <u>a</u>	Load Research <u>b</u>	Codes & Standards <u>c</u>	ESCO Dev.	Load Mgmt.	Motors	Lighting	Appliances	HVAC <u>d</u>	Cogen. <u>e</u>
China	Energy Conservation	•				•		•	•			•
Lao PDR	Provincial Grid Integration	•										
India	Orissa Power Sector	•	•	•			•	•			•	
	Haryana Power APL ^f	•	•	•		•	•	•		•	•	
	Andhra Pradesh Ag. AIJ	•		•			•	•				
	Andhra Pradesh Power APL ^f	•	•	•		•	•	•	•		•	
	Renewable Energy II/Energy Efficiency	•				•	•	•	•		•	•
Sri Lanka	Energy Services Del.	•	•	•	•				•	•	•	
Thailand	Distrib. Sys. & E.E.	•	•	•	•		•	•	•	•	•	
	Metropolitan Distribution	•		•		•				•		
Vietnam	Transmission & Distribution	•	•	•			•	•	•			

Includes:

a monitoring and evaluation activities; b institutional strengthening activities; c energy efficiency building codes and equipment standards; d vapor absorption technology; e industrial and biomass cogeneration; and f TA and technologies for the entire APL program.

Cross Sector Applications

14. ASTAE has also engaged in strategic development of alternative energy investments for cross-sector applications. Alternative energy technologies are ideally suited to supplying energy needs in a broad range of end-use applications (water pumping, refrigeration, lighting, communications, etc.). These applications span a number of sectors in Bank operations, including agriculture, health and population, rural development, urban, and water. ASTAE is currently supporting several pilot projects promoting the use of alternative energy in cross-sector applications in China and will continue to support activities that incorporate alternative energy solutions in rural development and social sector projects in the EAP and SAR Regions.

In FY00, ASTAE completed the RENEWABLE AND EFFICIENCY APPLICATION PROJECT (funded by the Government of the Netherlands). The project financed the following eight sub-tasks:

1. Canal-Based Small Hydro in Uttar Pradesh, India, 2. Renewable Energy for Rural Health Clinics in China, 3. PV for Education Project in China, 4. Energy Efficient Housing in China, 5. Energy Efficiency Procurement in the Education Sector in Thailand, 6. Renewable Energy for Rural Infrastructure Development in Vietnam, 7. Demand Side Management for Municipal/Water Sector in India, and 8. Promotion of Alternative Energy for Cross Sector Applications/ASTAE Program Support.

This project successfully increased Bank awareness of the potential for alternative energy projects or project components in non-power sector projects, and financed identification/appraisal work which may be incorporated into future projects and project components.

Box 3: REAP Sub-Task Report: Canal-Based Small Hydro in Uttar Pradesh, India

The Uttar Pradesh (UP) irrigation sector is currently experiencing financial difficulties, and performs below its potential. This is of concern where major proportions of the population live in rural areas and depend on agriculture for their livelihoods. In a state that receives the bulk of its rainfall in just a four-month period, reliable supplies of water for irrigation are a necessity. Recognizing the need to overcome these challenges, the Uttar Pradesh Irrigation Department has sought assistance from the World Bank to address key sector issues and to establish a sector restructuring, investment and technical assistance program.

The REAP TF provided assistance to identify prospective canal-based small hydro systems within UP, and to investigate five selected schemes at the pre-feasibility level within the framework of broader support to the UP water sector.

Nine potentially viable canal-based small hydro sites were identified, and five schemes were selected and studied at the pre-feasibility level. The proposed total installed capacity of the five schemes is 11.45 MW, with an annual energy generation of 78.9 GWh. Pre-feasibility designs using a number of innovative approaches were developed for each of the five schemes. Four of the schemes showed attractive financial internal rates of return, and are considered economically viable.

The REAP funds also supported a workshop held in Bahraich, Uttar Pradesh to discuss and review the pre-feasibility study report on May 25, 2000. The workshop was attended by local dignitaries, representatives of the local community, UP Irrigation Department, World Bank and the consultants. A comprehensive presentation of the results of the pre-feasibility studies was made during the workshop. In addition to technical aspects, various arrangements of implementing the project were discussed, including community-based, participatory approaches.

The pre-feasibility studies and final report from this REAP subtask will be further developed in conjunction with the proposed UP Water Sector Restructuring Project (FY02). One of the identified projects (Imamganj Canal) will be implemented in the first phase of the UP Water Sector investment program to meet the power requirements for lift irrigation and to meet village electricity needs in the vicinity of the canal drop.

Nan He Township Hospital in Gansu Province:
Utilization of Passive Solar Design Techniques in ASTAE-Supported Pilot Project



Photograph Courtesy of J. Spears

Alternative Energy, Poverty, and Gender Initiative (ENPOGEN)

15. This initiative, funded by the Government of the Netherlands, is investigating the linkages between alternative energy, poverty alleviation, and gender equity. The initial studies will be based upon fieldwork in China, India, Sri Lanka and Indonesia. Follow-up work of the ENPOGEN project will develop and test improved project preparation methods for increasing impact of alternative energy on poverty alleviation, and will promote incorporation of alternative energy into rural infrastructure/poverty projects. The results of this initiative will increase the impact of ASTAE-supported energy sector projects and the program's ability to work in other sectors, such as health, education, and rural development.

Analytic and Advisory Activities

16. ASTAE's client-centered approach is tailored to help countries remove regulatory, technical, financial and institutional barriers to alternative energy and to ensure appropriate policy environments. ASTAE has engaged in significant non-lending activities such as major economic and sector work (ESW), technical assistance, training, and knowledge management.

Economic and Sector Work

17. Bank **economic and sector work** provides the analytical framework for integrating alternative energy options into Country Assistance Strategies (CASs). ASTAE has helped provide an analytical framework for evaluating development strategies and donor activities related to alternative energy development. For example, ASTAE's significant ESW and AAA work with the Government of China (GOC) directly supported the development of the \$135 million WB/GEF China Renewable Energy Development Project. Box 4 presents the initial outputs from ASTAE support in promoting renewable energy development in Vietnam.

Box 4: Vietnam Renewable Energy Action Plan

At the request of Electricity of Vietnam (EVN), ASTAE assisted in preparing a strategy for international assistance for the development of renewable electricity in Vietnam: the Renewable Energy Action Plan (REAP). The REAP lays out a ten year program to accelerate large scale development of renewable energy for rural electrification and grid supply in Vietnam, in two phases: a five year pilot phase and a five year implementation phase. The REAP details the activities, technical assistance, and institutional and financial requirements for the pilot phase of the program, and provides a broad outline for the scope of the implementation phase.

The 10-Year-REAP-Program will focus on five main components of intervention:

- (i) Policy Development and Capacity Building for Renewable Electricity (technical assistance);
- (ii) Pico-hydro & PV Household/Institutional Systems (technical assistance and investment);
- (iii) Community Isolated Grids Based on Hydro (technical assistance and investment);
- (iv) EVN and Private Sector Renewable Electricity for the Grid (technical assistance and investment);
- (v) Renewable Resource and Technology Assessment/Demonstration (technical assistance)

The time schedule has been designed in such a way that the recommendations of the Renewable Energy Action Plan can flow into one (or more) of the WB Vietnam energy projects currently in the pipeline:

- Vietnam: System Efficiency Improvement Project (FY02)
- Vietnam: Rural Energy II Project (FY03)

Technical Assistance and Training

18. **Technical assistance** supported by ASTAE has included: pre-feasibility studies; performance testing; help in drafting standard power purchase agreements and tariffs for small power producers; developing analytic tools for evaluating least-cost energy alternatives; help in developing business plans; and other activities to develop institutional capacity. Wherever possible, the program uses local expertise to enhance in-country capacity for sustainable alternative energy development. In FY00, ASTAE contracted with experts, firms, agencies and NGOs in Cambodia, China, India, Philippines, Sri Lanka, and Vietnam. (See Attachment 3 presenting ASTAE's use of local consultants in FY00.)

19. **Training activities** in FY00 focused on such areas as technical, economic and environmental aspects of alternative energy technologies; institutional requirements and regulatory frameworks; mechanisms for marketing alternative energy investments; and facilitation of public-private partnerships for private-sector delivery of energy services. The success of these partnerships was due to careful matching of partners, appropriate attention to selection of participants, monitoring of impacts, rapid intervention for issue resolution and most importantly country "ownership" of the programs.

20. In FY00, ASTAE continued its utilization of the stakeholder consultation process as a key element of its Project work. ASTAE will continue this process, which aids in the identification of win-win situations to improve project quality and stakeholder acceptance, thus increasing sustainability of alternative energy programs.

21. Many Asian countries seek appropriate **technical standards support** for alternative energy products. Standards for product design, installation and maintenance help promote and sustain market penetration by reducing the consumer risks regarding the technical performance of alternative energy products. ASTAE's technical assistance and training to build capacity in alternative energy development relies on local consultants, stakeholder workshops and targeted support and training for

public and private sector participants. In FY00, ASTAE continued its work with the Photovoltaic Global Approval Program (PV GAP) in an effort to establish globally accepted standards, testing laboratories, reference manuals, approval/certification programs, and a PV Quality Seal in ASTAE-assisted countries (Box 5).

Box 5: Photovoltaic Global Approval Program (PV GAP)

ASTAE, in collaboration with the Global Approval Program for Photovoltaics (PV-GAP) and the Institute for Sustainable Power (ISP), is implementing the project “Mitigating Global Climate Change Through the Development of a Quality Process Infrastructure for Renewable Energy” (QuaP-PV). This project was funded by the WB/Netherlands Partnership Program for the Environment.

The objective of this project is to contribute to increased consumer satisfaction with PV systems in developing countries by effecting quality improvements in all links of the PV market infrastructure, including; design, manufacturing, testing, installation and maintenance of PV systems.

The main products of the QuaP-PV project are the following four “quality” training manuals:

1. Design and Design Modifications of Electronic BOS Components for SHS.
2. Manufacturers Quality Control.
3. Quality Improvement of PV Testing Laboratories.
4. Implementing Qualified Certification Programs for PV Installation and Maintenance Practitioners.

The manuals and corresponding pilot training course was presented in Jaipur India in collaboration with the Indian Ministry of Nonconventional Resources in October 1999. Additional training courses were conducted in China, the Philippines, South Africa, and in Sri Lanka.

Technology Assessment and Feasibility Studies

22. ASTAE has also supported alternative energy technology assessment and feasibility studies. This work is a necessary precondition for project and program formulation. Boxes 6 & 7 present information on two such activities undertaken by ASTAE in FY00.

Box 6: Philippines AIJ Project: Renewable Energy Applications on Island Grids

ASTAE oversaw implementation of the first phase of this project, funded by the Government of Switzerland. The first phase of this project, an Activities Implemented Jointly (AIJ) mechanism of the United Nations Framework Convention on Climate Change (UNFCCC), focused on project identification of potential sites which would be subsequently developed for incorporation of renewable energy into existing island grids in the Philippines.

The first phase of this project identified 12 possible renewable energy projects (including small and mini hydro, biomass, geothermal, and wind powered resources), and developed a selection criteria and screening methodology to determine a short list of projects for follow-up support through the AIJ mechanism.

The project also identified several institutional, policy, regulatory, and procedural barriers that have limited opportunities for investment in renewable energy projects in the Philippines. The Phase 1 report noted that in order to make the AIJ mechanism sustainable for projects in the Philippines, policy modifications and revised institutional arrangements are required.

The Schedule for follow-up action as defined per Phase 2 of the project is currently being evaluated by the Governments of Switzerland and the Philippines.

Box 7: Indochina Wind Mapping Study

In FY00, ASTAE continued its efforts to develop a regional wind atlas as a first step towards investigating the potential for grid-connected and off-grid wind energy applications in Indochina (Vietnam, Cambodia, Laos, and Thailand). Once completed, the atlas will contain a discussion and supporting documentation, maps, charts, and tables which describe the wind resource (including frequency, distributions, and monthly and inter-annual variability of the wind resource) for the Indochina region as a whole, as well as for specific areas showing favorable wind resources. The resulting maps and atlas will be made available on CD-ROM and in hard copy format. The final report summarizing results will be ready by Jan 2001. The assessments will aid in the development of alternative energy components for the following ASTAE-supported projects (currently under preparation):

- Cambodia: Rural Electrification and Transmission Project (FY01)
- Lao PDR: Rural Electrification Project (FY01)
- Vietnam: System Efficiency Improvement Project (FY02)
- Vietnam: Rural Energy II Project (FY03)

Wind Resource Map of Southeast Asia



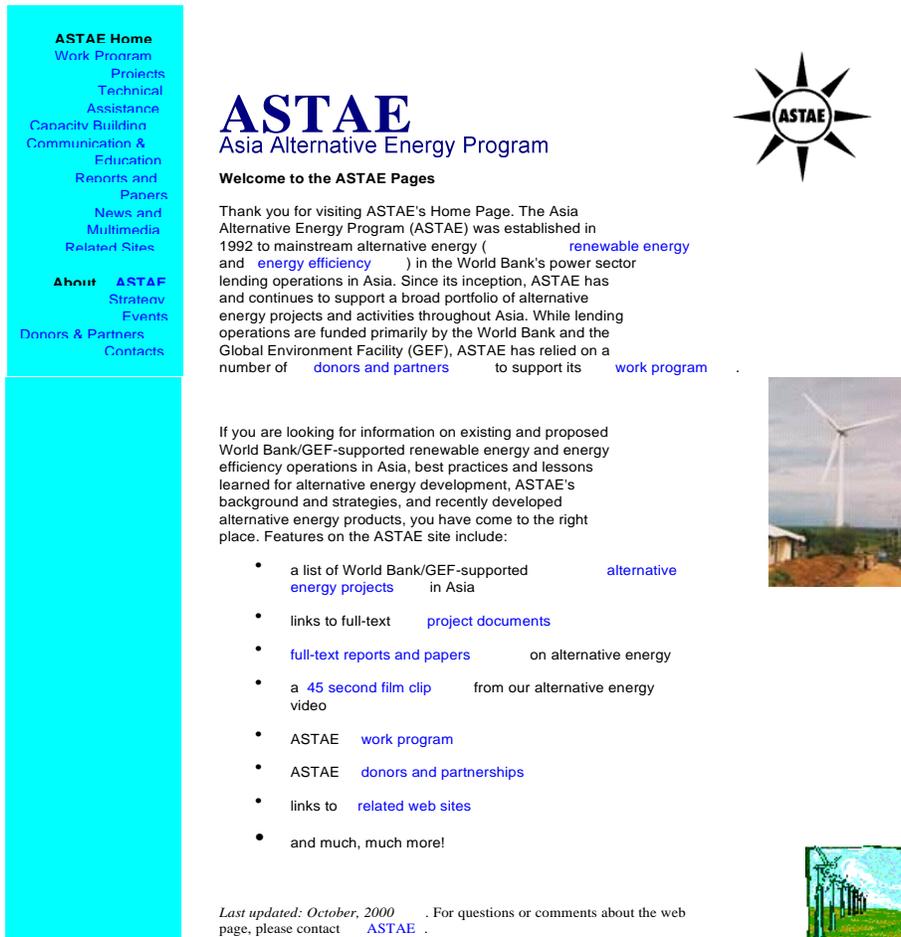
Prepared: Universal Transverse Mercator (Zone 48)

This wind resource map of Southeast Asia was created for the World Bank using MetMap, a dynamical atmospheric simulation model, and historical weather data.

ASTAE Knowledge Management

23. ASTAE has continued to disseminate knowledge gained from its experiences in alternative energy through publication of best practices materials, presentations at conferences and training seminars, and maintenance of the ASTAE web site. Details on ASTAE conference and seminar participation are presented in Attachment 4.

24. **Web Site.** ASTAE maintains a web site that includes comprehensive information on ASTAE's work program, project information, alternative energy publications, multimedia products, and donor information within the World Bank's Web Page. This low-cost tool has already been visited by alternative energy professionals worldwide and has received very positive responses. ASTAE periodically updates this site to incorporate new features to better disseminate alternative energy best practices, project information, technical information and improved feedback options. This site can be found at www.worldbank.org/astae/.



ASTAE Home
Work Program
Projects
Technical Assistance
Capacity Building
Communication & Education
Reports and Papers
News and Multimedia
Related Sites

About ASTAE
Strategy
Events
Donors & Partners
Contacts

ASTAE

Asia Alternative Energy Program

Welcome to the ASTAE Pages

Thank you for visiting ASTAE's Home Page. The Asia Alternative Energy Program (ASTAE) was established in 1992 to mainstream alternative energy (renewable energy and energy efficiency) in the World Bank's power sector lending operations in Asia. Since its inception, ASTAE has and continues to support a broad portfolio of alternative energy projects and activities throughout Asia. While lending operations are funded primarily by the World Bank and the Global Environment Facility (GEF), ASTAE has relied on a number of donors and partners to support its work program.

If you are looking for information on existing and proposed World Bank/GEF-supported renewable energy and energy efficiency operations in Asia, best practices and lessons learned for alternative energy development, ASTAE's background and strategies, and recently developed alternative energy products, you have come to the right place. Features on the ASTAE site include:

- a list of World Bank/GEF-supported alternative energy projects in Asia
- links to full-text project documents
- full-text reports and papers on alternative energy
- a 45 second film clip from our alternative energy video
- ASTAE work program
- ASTAE donors and partnerships
- links to related web sites
- and much, much more!

Last updated: October, 2000. For questions or comments about the web page, please contact ASTAE.



ASTAE: Building Partnerships

ASTAE Client Partnerships

25. Since its inception, ASTAE has been successful in building strong client partnerships with a number of organizations throughout the Asia region. ASTAE's utilization of the participatory approach has significantly aided in forging ties with new partners, broadening the base of ASTAE support. Partnerships have been strengthened with traditional clients such as national government agencies and power utilities, as well as a variety of new clients including provincial and local governments/ utilities, NGOs, village cooperatives and the private sector.

ASTAE Donor Partnerships

26. In its operational and non-lending activities, ASTAE has collaborated with a number of donors whose resources have been critical to ensuring a comprehensive, quality work program. Donors have included the Netherlands (Directorate General International Cooperation, DGIS, and NOVEM), the Asian Development Bank (ADB), Australia (AusAID), Canada (CIDA), Denmark (DANIDA), the European Community, France (EdF), Finland, Germany (GTZ, KfW), the Global Environment Facility (GEF), New Zealand, Norway, Sweden (Swedish International Development Agency, Sida), Switzerland (SDC), United Nations Development Program (UNDP), the United Kingdom (Department of International Development, DFID), the United States (USAID, USDOE), and the US Export Council for Renewable Energy (US/ECRE).

Ninth Annual Donors' Meeting

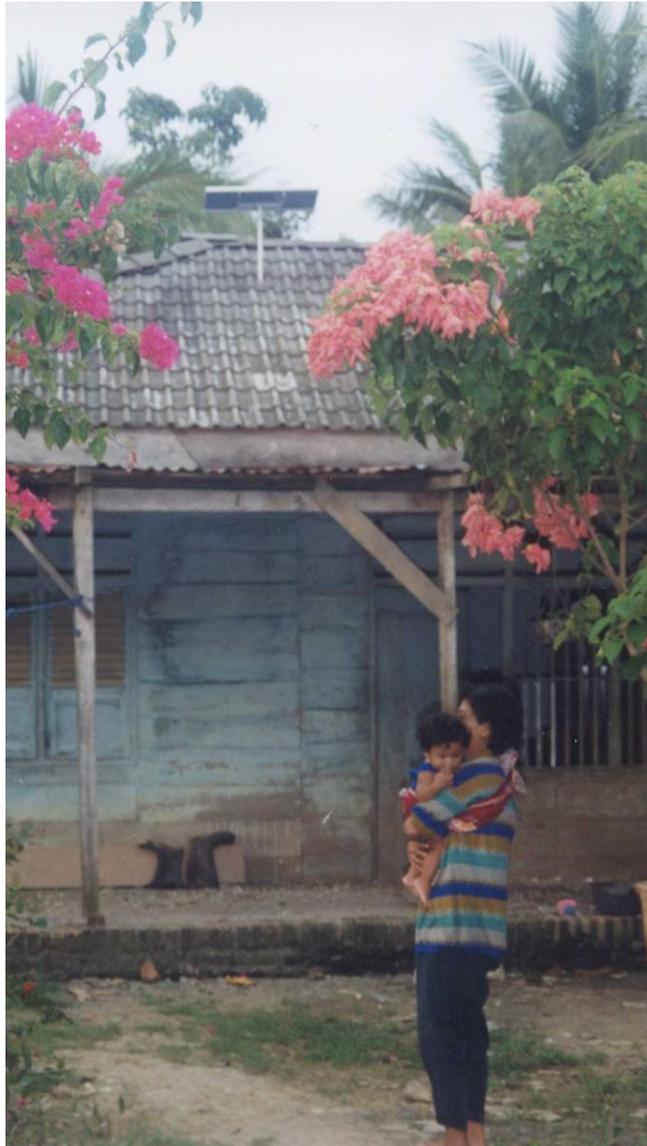
27. The Ninth Annual ASTAE Donors' Meeting, held in Washington in April 2000, was well attended by ASTAE's multilateral and bilateral partners/agencies, other strategic partners, and World Bank staff. The donors were briefed on the challenges that ASTAE is facing in several areas, including/ensuring the successful implementation of approved alternative energy projects and in scaling up the impact of alternative energy on environmental protection and poverty alleviation. The donors were briefed on the Bank's energy agenda for South and East Asia regions, the status of the ASTAE-supported alternative energy portfolio, the growing interest in client countries for alternative energy, and ASTAE's new strategy to scale up the impact of alternative energy by adopting a programmatic approach.

28. Donors expressed their strong satisfaction with ASTAE's performance and clear willingness to support this program in FY00 and beyond. Several donors mentioned that they would like to see the ASTAE program receive increased financial support from the Bank, as it is not expected that donors would continue their Program support indefinitely. ASTAE staff noted that the new energy strategy at the Bank increasingly favors alternative energy, and that this would lead to an increased level of Bank support for the ASTAE program. However, ASTAE stressed that there remains a need for donor assistance in project preparation work for alternative energy projects and for additional effort in strengthening the enabling environments in client countries to improve sustainability of alternative energy impacts. It was noted by the donors that ASTAE is starting to look more like a development institution than a purely financial institution.

29. Participants at the Ninth Annual ASTAE Donors' Meeting included representatives from ASTAE's key donors—the Netherlands NEDA, UNDP, and USAID. Other attendees included

representatives from the Japanese New Energy Development Organization (NEDO), the Japan Bank for International Cooperation, Swiss SECO, the United Kingdom DFID, Canadian CIDA, Asian Development Bank (ADB), and representatives from the Embassies of Britain and New Zealand. Among the observers were representatives from Winrock International, Alternative Energy Development, and Sussex Research Associates.

Solar Home In Indonesia



Photograph Courtesy of A. Cabraal (ASTAE)

ASTAE Resources

Resource Mobilization

30. Since FY92, ASTAE has mobilized \$14.8 million from external sources and \$9.0 million in WB/GEF support, for a total of \$23.8 million. Annual WB support to ASTAE has grown from \$226,400 in FY92 to \$1.26 million in FY00, with donor funds increasing from \$108,000 in FY92 to \$1.66 million in FY00. Total funding flows to ASTAE in FY00 were \$2.92 million.

31. Figure 4 provides data on resource mobilization, including donor and WB funding flows to ASTAE, FY92-99. Figure 5 disaggregates total donor contribution by key ASTAE donors.

Figure 4: Resource Mobilization, World Bank and Donors, FY1992-2000

	Donors /b		World Bank /c		Total	
	US\$	%	US\$	%	US\$	%
FY92/a	108,000	32	226,400	68	334,400	100
FY93	1,847,859	82	419,100	18	2,266,959	100
FY94	1,325,190	66	688,100	34	2,013,290	100
FY95	2,348,137	69	1,046,000	31	3,394,137	100
FY96	1,096,562	40	1,618,924	60	2,715,486	100
FY97	1,605,859	57	1,197,128	43	2,802,987	100
FY98	1,207,856	52	1,126,683	48	2,334,539	100
FY99	3,609,670	72	1,424,788	28	5,034,458	100
FY00	1,660,349	57	1,261,815	43	2,922,164	100
Total	14,809,482	62	9,008,938	38	23,818,420	100

/a Based on actual expenses for the six month period January 1 through June 30, 1992.

/b Includes the Netherlands, US agencies, New Zealand Ministry of Foreign Trade, German BMZ/GTZ, European Community, IEA, DANIDA, Sida, Government of the Swiss Confederation, Government of Sweden, Government of Finland, and in-kind contributions.

/c Includes WB/GEF Annual Discretionary Budget, Office Occupancy, Consultant Trust Funds, Japan PHRD, IDF, and PDF Grants.

Figure 5: Resource Mobilization by Donor Funding Source, FY1992-2000

	Netherlands		US/b		UNDP		Dutch Partnership		Swiss		Finland		Others/c		Total Donors	
	US\$	%	US\$	%	US\$	%	US\$	%	US\$	%	US\$	%	US\$	%	US\$	%
FY92/a	-	-	108,000	100	-	-	-	-	-	-	-	-	-	-	108,000	100
FY93	1,558,288	84	289,571	16	-	-	-	-	-	-	-	-	-	-	1,847,859	100
FY94	821,140	62	345,300	26	98,750	7	-	-	-	-	-	-	60,000	4	1,325,190	100
FY95	1,497,237	64	756,400	32	35,000	1	-	-	-	-	-	-	59,500	2	2,348,137	100
FY96	-	-	509,462	46	377,100	34	-	-	-	-	-	-	210,000	20	1,096,562	100
FY97	537,522	33	720,574	45	347,763	22	-	-	-	-	-	-	-	-	1,605,859	100
FY98	226,256	19	294,537	24	287,728	24	-	-	306,791	25	-	-	92,544	8	1,207,856	100
FY99	-	-	474,688	13	11,853	1	2,913,667	81	157,379	4	-	-	52,083	1	3,609,670	100
FY00	-	-	42,147	3	23,854	2	1,420,777	86	-	-	173,570	10	-	-	1,660,349	100
Total	4,640,442	31	3,540,679	24	1,182,048	8	4,334,444	29	464,170	3	173,570	1	474,127	3	14,809,482	100

/a Actual expenses for the six-month period January 1 through June 30, 1992.

/b Includes USDOE, USTDA, USAID, US/ECRE, US/NREL, Sandia National Laboratory, US/NRECA, US/IFREE, and AWEA.

/c Includes New Zealand Ministry of Foreign Trade, German BMZ/GTZ, European Community, IEA, DANIDA, Sida, NOVEM, Government of Sweden and in-kind contributions.

Resource Utilization

32. Total ASTAE expenditures in FY00 were \$4.1 million. WB financial support of ASTAE accounted for 37 percent of FY00 total expenditures (\$1.5 million), with donor support accounting for 63 percent (\$2.6 million). WB support for ASTAE reflects the increased demand from WB Country Departments for ASTAE staff support and ASTAE's mobilization and utilization of WB trust funds and other grant sources. Figure 6 identifies ASTAE expenditures by the two key funding sources—World Bank and Donors. Figure 7 provides a breakdown of ASTAE resource utilization by donor source.

Figure 6: ASTAE Resource Utilization, World Bank and Donors, FY1992-2000

	Donors/c		World Bank/b		Total	
	US\$	%	US\$	%	US\$	%
FY92/a	108,000	32	226,400	68	334,400	100
FY93	827,087	66	419,100	34	1,246,187	100
FY94	1,399,635	67	688,100	33	2,087,735	100
FY95	1,309,063	56	1,046,000	44	2,355,063	100
FY96	2,057,058	56	1,618,924	44	3,675,982	100
FY97	1,705,817	59	1,197,128	41	2,902,945	100
FY98	1,617,777	59	1,126,683	41	2,744,460	100
FY99	1,787,393	61	1,156,346	39	2,943,740	100
FY00	2,642,245	63	1,523,150	37	4,165,396	100
Total /d	13,454,076	60	9,001,831	40	22,455,908	100

/a Actual expenses for the six-month period January 1 through June 30, 1992.

/b Includes WB/GEF Annual Discretionary Budget, Office Occupancy, Consultant Trust Funds, Japan PHRD, IDF, and PDF Grants.

/c Includes the Netherlands, US agencies, New Zealand Ministry of Foreign Trade, German BMZ/GTZ, European Community, IEA, DANIDA, Sida, Government of the Swiss Confederation, and Government of Finland.

/d Previous ASTAE Status reports included non-invoiced commitments in utilization tables for FYs 93-97. These figures have been revised to reflect actual utilization amounts.

Figure 7: ASTAE Resource Utilization, by Donor Funding Source, FY1992-2000

	Netherlands		US /b		UNDP		Dutch Partnership		Swiss		Finland		Others /c		Total Donors	
	US\$	%	US\$	%	US\$	%	US\$	%	US\$	%	US\$	%	US\$	%	US\$	%
FY92/a	-	-	108,000	100	-	-	-	-	-	-	-	-	-	-	108,000	100
FY93	436,487	53	390,600	47	-	-	-	-	-	-	-	-	-	-	827,087	100
FY94	855,535	61	433,200	31	50,900	4	-	-	-	-	-	-	60,000	4	1,399,635	100
FY95	570,563	44	606,500	46	72,500	6	-	-	-	-	-	-	59,500	5	1,309,063	100
FY96	978,496	48	521,562	25	347,000	17	-	-	-	-	-	-	210,000	10	2,057,058	100
FY97	877,032	51	612,500	36	216,285	13	-	-	-	-	-	-	-	-	1,705,817	100
FY98	669,086	41	334,576	21	459,656	30	-	-	61,915	4	-	-	92,544	6	1,617,777	100
FY99	283,455	16	491,594	28	11,853	1	602,634	34	345,775	19	-	-	52,936	3	1,787,393	100
FY00	-	-	42147	2	23,854	1	2,536,299	96	39,945	2	-	-	-	-	2,642,245	100
Total	4,670,654/d	35	3,540,679	26	1,255,825	9	3,138,933	23	447,635	3	-	-	474,127	4	13,454,076	100

/a Actual expenses for the six-month period January 1 through June 30, 1992.

/b Includes USDOE, USTDA, USAID, US/ECRE, US/NREL, Sandia National Laboratory, US/NRECA, US/IFREE, and AWEA.

/c Includes New Zealand Ministry of Foreign Trade, German BMZ/GTZ, EC, IEA, DANIDA, Sida, NOVEM, Government of Sweden, and in-kind contributions.

/d Includes utilization of \$30,212 mobilized from currency fluctuations and accrued interest.

Staffing

33. In FY00, ASTAE had 15 staff members at its peak. Mr. Yoshihiko Sumi, Sector Director, Energy and Mining Development Sector Unit, East Asia and Pacific Region, is the ASTAE Program Manager. Mr. Nouredine Berrah serves as ASTAE's Deputy Program Manager. In FY00, Mr. Anil Cabraal was the Renewable Energy Team Leader and Mr. Michael Willingham was the Energy Efficiency Team Leader. Supporting these individuals is a highly skilled team of alternative energy specialists, engineers, economists, and administrative staff (see Attachment 6).

Windfarm in China



Photograph Courtesy of S. Piscitello

ASTAE in FY01 and Beyond

Overview

34. ASTAE's new strategy was presented at the 9th Annual Meeting for donor feedback. The main theme of ASTAE's new vision is that mainstreaming of alternative energy has been achieved, in that renewable and energy efficiency technologies are now viewed as accepted possible project components within Bank loans. ASTAE's new strategy is to scale up Alternative Energy development, which can create a direct and immediate link to the Bank's overall mission of poverty alleviation and growing emphasis on environmental protection, emphasized in all Country Assistance Strategies in the two regions covered by ASTAE and by other parts of the Bank.

35. This new strategic vision will guide the formulation of ASTAE's three-year business plans, and will have a major impact on ASTAE's future activities.

36. ASTAE's future work plan will focus on the following key components:

- Successful Implementation
- Scale Up Impact of Alternative Energy through Programmatic Approach
- Strengthen Enabling Environment in ASTAE Client Countries
- Develop Project Pipeline

Continued donor support is paramount in developing and implementing this agenda.

Successful Implementation

37. ASTAE will continue to provide support for the 14 projects currently under implementation and will provide additional assistance as needed to aid in their successful completion. The following three project loans will reach completion by the end of FY01: India Renewable Resources Development; India Haryana Power Sector Restructuring Project APL I; and the India Andhra Pradesh Integrated Agricultural AIJ Project.

38. The Bank has limited experience in implementing alternative energy projects, thus increasing the importance of continued ASTAE assistance. Additionally, there are large potential benefits from knowledge dissemination based on our experiences in implementing these projects, both within the Asia region and throughout the Bank.

Programmatic Approach

39. When ASTAE began its work in 1992, alternative energy was rather new in the World Bank and new for many client countries. Developing a small alternative energy lending operation was a significant achievement. Capacity building was very important but was mainly project based. Because projects were relatively small, they were not able to leverage policy reforms that could benefit all alternative energy projects.

40. The capacity building done in our client countries is only a fraction of what is required to achieve a measurable and lasting impact on increasing both rural access to energy and environmental protection.

41. To make a measurable impact in reducing greenhouse gas emissions and providing remote rural access to modern energy, more and larger alternative energy projects are required. More meaning not only more projects supported by the World Bank and other bilateral and multilateral agencies, but more broadly, more projects that involve the public and private sector domestic investors as well as NGOs and INGOs. This will require the development of broad-based local capacity to develop and implement alternative energy projects.

42. ASTAE is well placed to assist in developing this capacity, but this will require a paradigm shift from working on stand-alone projects to working strategically on a multiproject program basis. The projects will not be ends in themselves, as in the past, but will be seen as vehicles to build capacity and provide the momentum for policy and institutional change and the creation of an enabling environment to sustain the development of alternative energy. A longer-term and more programmatic approach will be adopted by ASTAE, focusing more on broad-based capacity building and creation of an enabling environment, including proper policy and incentive mechanisms.

43. This approach will require ASTAE to focus on selected countries that have significant potential, rather than following up on all project opportunities as was done in the past. This programmatic approach has both the longer time horizon and the flexibility needed to respond to specific market conditions as the alternative energy project infrastructure develops in client countries. A logical consequence of the programmatic approach is that the funding requirement will be larger, which will also provide increased incentives for client countries to adopt appropriate policy and incentive mechanisms to promote alternative energy.

Strengthen Enabling Environment in ASTAE Client Countries

44. Large-scale alternative energy development requires that countries establish an institutional, policy, financial and regulatory framework that helps attract capital from international financial institutions, export credit agencies and, most importantly, the domestic and international private sector. This framework or enabling environment would require measures to:

- Stimulate the market for electricity or energy savings from alternative energy by:
- providing adequate incentives to mobilize investment by public/private entities in alternative energy facilities;
- facilitating alternative energy project development, including clear and transparent rules, procedures and approval processes; and
- encouraging the development of mature, internationally competitive local manufacturing industries for alternative energy equipment.

45. ASTAE and the WB are well placed to assist client countries to learn from the approaches that have been used in different countries to create an enabling environment for alternative energy, and to adapt existing mechanisms or develop new mechanisms that are suitable to the circumstances of each country.

Develop Project Pipeline under Programmatic Approach

46. ASTAE will continue its support in the development of new projects in the energy sector, but will now pursue a programmatic approach when allocating ASTAE resources. The new projects will include both grid-connected and off-grid renewable energy applications, as well as market-based energy efficiency projects. ASTAE will continue its work in promoting alternative energy in non-energy sector applications, including agriculture, health, rural, urban, and water.

47. A new initiative by the WB/GEF, the *Strategic Partnership for Renewable Energy Development* (see Box 8), will greatly facilitate work on a programmatic basis in this area. This initiative, approved by the GEF Council and the Bank Board in early 1999, seeks to shift efforts from an individual project approach to long-term programmatic pathways, providing developing countries the time and resources required to develop renewable energy markets and technologies in a sustainable way. The Partnership will support eight- to ten-year country programs, and will make available a larger amount of GEF resources, targeting them to building effective bridges to private-sector market development and financing. There will be a one-time GEF program approval, coupled with delegated project approval authority and ex-post reviews, to facilitate processing. ASTAE is supporting the Bank's preparation of a pilot Partnership in China under the Strategic Partnership. ASTAE is also developing proposals for a similar program approach for energy efficiency.

Box 8: China: World Bank/GEF Renewable Energy Scale-Up Program

This project aims to support the GOC Renewable Energy Program to be presented in the 10th and 11th Five-Year Plans. The objective would be to reduce environmental emissions from coal-fired power generation by developing sustainable commercial markets for electricity from renewable energy. This would be done by creating a mandated large-scale market and reducing costs for mature technologies such as windfarms, small hydroelectricity and biomass.

Preliminary discussions indicate that the Partnership would assist the GOC Program in four main ways, by supporting:

- implementation of a strategic framework for renewable energy development including policies, laws and regulations needed for the mandatory share/RPS as well as measures needed to make the market work;
- actions to reduce the cost of renewable energy and make it competitive, including technology improvement to assist local manufacture of good-quality equipment to reduce cost;
- building local capacity for project development and financing as well as efficient operation and maintenance of facilities; and
- if necessary, selected demonstration and investment projects that have strategic importance.

Conclusions

48. **Alternative Energy in the Bank.** In the recent past the World Bank and ASTAE, in particular, have begun to achieve positive results in alternative energy project development and implementation. It is clear that alternative energy will continue to grow and gain importance.

49. Alternative energy is an area where WB involvement makes a difference and one in which ASTAE's added value is high. Without the creation of a strategic framework of policies and incentives and without capacity building on a large scale, it is difficult for the private sector to carry out alternative energy investments in the Bank's client countries. ASTAE's continued involvement can make a real difference by contributing to the formation of a solid sustainable base of local capacity for alternative energy development and by creating an enabling environment.

50. Donor assistance has been essential in helping ASTAE achieve its results to date. The partnership model has proven to be extremely effective in promoting alternative energy within the Bank. Continued donor support is needed to ensure that the gains already achieved are maintained, and that ASTAE can continue its efforts to scale up the impact of alternative energy on poverty alleviation and increased environmental protection.

51. ASTAE remains committed to supporting the development of alternative energy in the Asia region, building on past experience and using new tools available such as the WB/GEF Strategic Partnership Program to scale up the impact of alternative energy on poverty alleviation and environmental protection, in FY01 and beyond.

Attachment 1: Status of ASTAE-Supported World Bank/GEF Loans, Credits and Grants For Alternative Energy In Asia

A. Closed Loans, Credits and Grants

1) Lao PDR Provincial Grid Integration (PGI), Credit 2425-LA

This project included components for demand-side management (DSM) and institutional building. ASTAE has coordinated a South-South twinning arrangement between *Électricité du Laos (EdL)* and *Tenaga Nasional Berhad* (the Malaysian electric utility) to provide comprehensive training in utility operations to EdL. ASTAE also helped twin EdL with Tunisia's *Agence pour la Matrise de L'Energie* for training in commercial sector energy audits. Total World Bank support for the DSM component was **\$1.5 million**. Board approval date: October 6, 1992; Closing date: June 30, 1999.

2) Thailand Promotion of Electrical Energy Efficiency, Loan 3598-TH, GEF Grants 28637 & 21221-TH

This project provided support for the Electricity Generating Authority of Thailand's (EGAT's) implementation of a five-year DSM demonstration program. The project created considerable momentum in promoting efficient electricity consumption through utility-sponsored DSM programs and public education. EGAT's Demand-Side Management Office (DSMO) launched over 17 efficiency programs in areas such as lighting, appliances, industrial/commercial buildings and load management. ASTAE's initial evaluation of the program revealed that the DSMO exceeded its savings target of 238 MW in load reduction by 234%, and achieved 558 MW in avoided capacity through improved efficiency gains. The energy savings from this program avoided an estimated 2.3 million tons of CO₂ emissions. Total WB/GEF support for the DSM component was **\$9.5 million, although \$1.5 million of this was later allocated to the Thailand Metropolitan Distribution Reinforcement Project**. Board approval date: April 27, 1993; Closing date extended to June 30, 2000.

3) Indonesia Second Rural Electrification (REII), Loan 3845-IND

This project provided support for PLN's least-cost rural electrification program, which included renewable energy generation components. Among the objectives of the project was the establishment of incentives for private sector and local cooperatives to take an increasingly larger share of RE distribution and renewable energy development within the framework of a least cost RE Master Plan. ASTAE supervised the preparation, appraisal, and supervision of the small geothermal and grid-connected mini-hydro components. Private participation in small power generation was supported by the issuance of regulations and letters of awards, announcement of purchase tariffs, but the financial crisis in 1997 prevented further progress. The mini-hydro projects (7.8 MW) were commissioned at about 14 percent below estimated cost. PLN prepared additional mini-hydro and mini-geothermal projects with an aggregate capacity of about 30 MW for future assistance, but no follow-up investment was made on account of the negative impact of the financial crisis. Total WB lending for the renewable energy components of this project was **\$20.5 million**. Board approval date: February 28, 1995; Closing date extended to March 31, 2000.

4) Vietnam Power Development, Credit 2820-VN

This project supported the development of new gas-fired generator at Phu My and augmentation of transforming capacity to meet the electricity needs of Vietnam. ASTAE assisted in the preparation of Terms of Reference for a Rural Electrification Master Plan that included renewable energy technologies and assisted in the supervision of the Master Plan's preparation. Total World Bank support for the alternative energy component was **\$0.5 million**. Board approval date: February 20, 1996; Closing date: December 31, 1999.

B. Loans, Credits and Grants Under Implementation

5) India Renewable Resources Development, Loan 3544-IN, Credit 2449-IN, GEF Grant 28633-IN

ASTAE assisted in the overall design, appraisal and supervision of this project, which has solar photovoltaic (PV), wind and mini-hydro components. A \$26.0 million Global Environment Facility (GEF) grant supports both the wind farm and solar PV market development components. The solar PV component (\$55.0 million) is expected to address the financing, delivery and installation of up to 3 MW of equipment for lighting, water pumping and other applications. IREDA has sanctioned solar PV projects with a combined capacity of 4.2 MW_p. Of this, nearly 1 MW_p has been installed through some 40,000 systems. Fourteen wind power projects were financed through this project, with a total capacity of 49.9 MW. The project also directly financed 19 small hydro projects with a total capacity of 43.5 MW. Total World Bank/GEF support for the renewable energy components is **\$141.0 million**. Board approval date: December 17, 1992; Closing date extended to December 31, 2001.

6) India Orissa State Power Sector Restructuring, Loan 4014-IN

ASTAE assisted in the preparation of a DSM component in the state's power sector reform program and is now supervising implementation of this component. A DSM cell has been set up within the Grid Corporation of Orissa (GRIDCO) to facilitate load research and DSM program development. DSM investments include municipal water pumping and storage systems, motor rewinding and motor efficiency programs, load research linked to a proposed metering program and various DSM opportunities in the industrial, residential, commercial and agricultural sectors. The total Bank support for the DSM component is **\$80 million**. Board approval date: May 14, 1996; Closing date: December 31, 2002.

7) Indonesia Solar Home Systems (SHS), Loan 35544-IND, GEF Grant 3700-IND

ASTAE has assisted in the design of this project, which supports solar home system investments funded and/or implemented by the private sector, NGOs and cooperatives. Within the framework of a least-cost rural electrification strategy, the project supports investments in approximately 200,000 solar home systems to areas not expected to receive grid-connected electrical services for at least three years. This project includes technical assistance for developing energy strategies and strengthening institutional capacities. Total World Bank/GEF support for this stand-alone solar PV project is **\$44.3 million**, of which \$20 million is WB loan and \$24.3 million is GEF Grant. Board approval date: January 28, 1997; Closing date: April 30, 2002.

8) Sri Lanka Energy Services Delivery (ESD), Credit 2938-LK, GEF Grant 39965-LK

This project encourages the provision of grid and off-grid energy services using renewable energy and DSM investments. The project includes an ESD Credit Program Component to help finance investments by the private sector, NGOs and cooperatives in off-grid solar PV and village hydro schemes, of grid-connected mini-hydro sites and other renewable energy applications. The other components are: (a) CEB-executed grid-connected Pilot Wind Farm; and (b) technical assistance to the CEB to strengthen its capacity to (i) help ESD Credit Program subproject developers and (ii) to undertake DSM activities, including DSM program design and implementation, load research and implementation of an energy-efficient building code. Total WB/GEF support for this stand-alone alternative energy project is **\$30.1 million**, of which \$24.2 million is WB credit and \$5.9 million is a GEF Grant. Board approval date: March 18, 1997; Closing date: December 31, 2002.

9) Thailand Metropolitan Distribution Reinforcement, Loan 4199-TH

This Bank-assisted project seeks to meet the anticipated growth in demand over 1997-2001 by improving system reliability and restructuring the Metropolitan Electricity Authority (MEA) in preparation for its commercialization and corporatization. ASTAE assisted in the preparation and is supervising the DSM component, which includes the creation of an appliance testing laboratory, load research, load control and energy service company (ESCO) development. A **\$1.5 million** grant from the Thailand Promotion of Electrical Energy Efficiency Project was allocated to MEA to support this program. Board approval date: June 24, 1997; Closing date: October 31, 2002.

10) India Haryana Power Sector Reform APL, Loan 4271-IN

This ASTAE-assisted project is the first phase of a five-phase APL approach, and will support major restructuring and policy reforms in the Haryana power sector. Particular focus is expected to be on cogeneration investments and private sector delivery of energy efficiency services. Efficiency improvements on the demand side, including metering systems and DSM programs, will also be included in the investment component. The total proposed spending on energy efficiency in the five phases of the APL is **\$70 million**, although the share of Bank financing supporting DSM in each phase has yet to be determined. Board approval date: January 1998; Closing date: December 31, 2000.

11) Vietnam Transmission, Distribution and Disaster Reconstruction, Credit 3034-VN

The project will finance expansion of transmission systems in south and central Vietnam, and rural electrification in selected areas. The Swedish Sida-supported DSM component consists of technical assistance to prepare a DSM policy and regulatory framework, load management program, municipal street lighting program and energy efficiency standards and codes. The Sida commitment supporting alternative energy is **\$3.6 million**. Board approval date: January 20, 1998; Closing date: June 30, 2002.

12) Lao PDR Southern Provinces Rural Electrification, Credit 3047-LA

The project focuses on increasing the level of rural electrification in southern and central Laos. ASTAE is assisting in the design and supervision of a renewable energy component, which includes investments for off-grid electrification in solar PV and micro-hydro. Bank/GEF support for this project is \$35.4 million, with an off-grid electrification component of **\$1.7million** consisting of a \$1

million WB loan and a \$.7 million GEF grant. Board approval date: March 17, 1998; Closing date: June 30, 2004.

13) China Energy Conservation, Loan 4304-CN, GEF Grant 28323-CN

This project is designed to introduce, demonstrate and disseminate new project financing concepts and market-oriented institutions to promote and implement energy efficient measures in China. ASTAE is assisting in the supervision of this project, which has established through demonstration Energy Management Companies (EMC), to implement largely industrial efficiency projects through performance contracts. The project will also support a more efficient national energy conservation dissemination center. Funding for this project stands at **\$85 million**. Board approval date: March 26, 1998; Closing date: June 30, 2004.

14) India Andhra Pradesh Power APL I, Loan 4441-IN

This project supports the major restructuring and policy reforms in the Andhra Pradesh power sector. ASTAE is assisting in the design of the DSM component comprising technical assistance for DSM and load research. Specific focus will be on improvements in efficiency in the agricultural sector through innovative energy efficiency procurement mechanisms. The total proposed spending on energy efficiency in the five phases of the APL is **\$50 million**, although the share of Bank financing for DSM in each phase has yet to be determined. Board approval date: February 1999; Closing date: August 31, 2003.

15) India Andhra Pradesh Integrated Agricultural DSM

This project seeks to improve power sector efficiency in Andhra Pradesh through the implementation of an integrated agricultural DSM project. The project includes improvements in distribution system efficiency, metering, and end-use efficiency improvements in irrigation systems. Total grant by the Activities Implemented Jointly (AIJ) program, which is being implemented by the Bank with funding from the Government of Norway is estimated at **\$4.6 million**. Approval date: June 1999; Closing date: December 31, 2000.

16) China Renewable Energy Development, Loan 4488-CN

This stand-alone renewable energy project will support the accelerated development of renewable resources of energy. The project includes 190 MW of wind farms, ~10 MW of solar home systems plus a technology development component. Total WB/GEF support for this project is **\$135.0 million**, consisting of a WB loan of \$100 million and a GEF grant of \$35 million. Board approval date: May 25, 1999; Closing date: June 30, 2006.

17) Vietnam Rural Energy, Credit 33580-VN

This project will provide energy to about 450,000 households in 32 provinces in rural Vietnam. The Project includes technical assistance components to develop institutional capacity and policy frameworks to encourage the use of renewable energy to supplement grid supply or serve isolated communities where renewables are the least cost option. Total support for alternative energy is **\$2.5 million**. The World Bank Group is financing \$2.2 million through ASTAE, the IFC, PHRD, ESMAP, and the Swiss consultant trust fund. New Zealand is co-financing \$0.3 million in

alternative energy costs. Board Approval Date: May 30, 2000. Expected closing date: June 30, 2004.

18) India Renewable Energy II/Energy Efficiency LN 4571-IN, CR 33960-IN, GEF

This project is a follow-up to the first Renewable Resources Development Project and expands support for the small hydro program beyond the southern region to include other states in India. The project also provides support for IREDA to promote and finance energy efficiency, demand side management investments and foster the development and operation of energy service companies. The total **\$135 million** in World Bank support for this project consists of a US\$80 million IBRD Loan, US\$50 million in IDA assistance, and a US\$5 million GEF grant. Board Approval Date: June 28, 2000. Closing Date: March 31, 2006.

C. Loans, Credits and Grants in the Pipeline

19) India Haryana Power APL II

This ASTAE-assisted project will support the second phase of the major restructuring and policy reforms in the Haryana power sector. Particular focus is expected to be on cogeneration investments and private sector delivery of energy efficiency services. Efficiency improvements on the demand side, including metering systems and DSM programs, will also be included in the investment component. The total proposed spending for energy efficiency in the five phases of the APL is **\$70 million**, although the share of Bank financing for alternative energy in each phase has yet to be determined. Estimated Board Date: FY01.

20) India Rajasthan Power Sector Restructuring Project

This project will directly support the implementation of the power sector reform program in the state of Rajasthan in order to improve the efficiency of electricity service and enable the sector to gain access to capital markets and commercial financing. ASTAE is assisting in the design of the DSM component comprising technical assistance for DSM and load research. The estimated level of WB support for this project is \$180.0 million, with a DSM TA component estimated at **\$2 million**. Estimated Board Date: FY01.

21) Nepal Power Development

This project will support the development of the power sector in Nepal, including the development of mini- and small hydro resources. Additional information on this project is not yet available. Estimated Board Date: FY01.

22) India Uttar Pradesh Power Sector Restructuring Project APLII

This second phase of the power sector restructuring project may include DSM and energy efficiency components. Additional information on this phase of the APL project is not yet available. Estimated Board Date: FY01.

23) China Passive Solar Heating for Rural Health Clinics

This cross-sector project will promote improved building energy efficiency in the health sector in China. Potential GEF support is estimated to be **\$0.75 million**. Estimated Board Date: FY01.

24) India Solar Thermal Power

This project is designed to promote solar thermal power in India. It will finance an integrated solar combined cycle facility, incorporating a parabolic trough solar thermal field of 35-40 MW. ASTAE has provided assistance in the project's design, and will offer continued support in the appraisal and implementation of the project. The proposed GEF support for this stand-alone alternative energy project is estimated at **\$49.0 million**. Estimated Board Date: FY01.

25) Bangladesh Power Development APL I

This APL project aims to unbundle the power distribution sector and rationalize supply areas. The project would help integrate parastatal supply pockets to existing rural electricity cooperatives, establish new companies for distribution in large cities, strengthen performance of rural electrification board, operating cooperatives and new distribution companies, rehabilitate and provide required physical improvement. An ASTAE-assisted renewable energy component, which may include technical assistance and PV electrification, is estimated at about **\$17.0 million**. Estimated Board Date: FY01.

26) Cambodia Rural Electrification and Transmission

This project will contain renewable energy components for rural applications. Additional information on this project is not yet available. Estimated Board Date: FY01.

27) China Energy Conservation II

This project will serve as a follow up to China Energy Conservation I Project, Loan 4304-CN. The first phase project efforts have been successful so far in introducing and adapting energy performance contracting to Chinese conditions, developing a viable business model in the three EMCs (ESCO's), and developing an initial market among client enterprises. The objective of the proposed Phase II project is to achieve exceptionally cost-effective improvements in energy efficiency and associated reductions in the growth of carbon dioxide emissions through the aggressive development of the EMC (ESCO) industry in China. Estimated GEF support for this project will be **\$25 million**. Estimated Board Date: FY01.

28) Thailand ESCO Development

This project will seek to overcome barriers to expanded commercial financing of energy efficiency projects. Estimated WB/GEF support for this project will be **~\$10-20 million**. Additional information on this project is not yet available. Estimated Board Date: FY01.

29) India Uttar Pradesh Water Sector Program APL

This APL project will include canal-based hydro components. Additional information on this project is not yet available. Estimated Board Date: FY01.

30) India Andhra Pradesh Power APL II

This project will support the second phase of the restructuring and policy reforms in the Andhra Pradesh power sector. The total proposed spending for energy efficiency in the five phases of the APL is **\$50 million**, although the share of Bank financing for alternative energy in each phase has yet to be determined. Additional information on this project is not yet available. Estimated Board Date: FY01.

31) Vietnam System Efficiency Improvement

This project will include renewable energy components and may include DSM components. Additional information on this project is not yet available. Estimated Board Date: FY01.

32) Lao Rural Electrification

This project will contain renewable energy components for rural applications. Additional information on this project is not yet available. Current macroeconomic crisis may force cancellation/postponement of this project.

33) Philippines Rural Electrification

This project will contain renewable energy components for rural applications. Additional information on this project is not yet available. Estimated Board Date: FY01.

34) WB/GEF Renewable Energy Scale-Up Program

The Partnership aims to support the GOC Renewable Energy Program to be presented in the 10th and 11th Five-Year Plans. The objective would be to reduce environmental emissions from coal-fired power generation by developing sustainable commercial markets for electricity from renewable energy. This would be done by creating a mandated large-scale market and reducing costs for mature technologies such as windfarms, small hydroelectricity and biomass. Estimated WB/GEF support for this project will be **\$100-400 million**. Estimated Board Date: FY02.

35) India Calcutta Municipal Water Supply and Drainage

This project will seek to improve energy efficiency in municipal sector pumping applications. Additional information on this project is not yet available. Estimated Board Date: FY02.

36) Vietnam Rural Energy II

Information on this project is not yet available. Estimated Board Date: FY03.

37) India Renewable Energy III

This project will serve as a follow-up to the India Renewable Energy II/Energy Efficiency project. Additional information on this project is not yet available. Estimated WB/GEF support for this project is **\$150 million**. Estimated Board Date: FY03.

**Attachment 2: Estimated Total Renewable Power Capacity Installed
and Avoided in WB/GEF-Assisted Alternative Energy Projects/Project Components
in Asia (FY1993-00)**

Renewable Energy Projects:		Renewable Energy Installed (MW)	Number Off-Grid Households Provided Access ('000s)
China	Renewable Energy Development	200*	300-400*
Indonesia	Second Rural Electrification	7.8	
	Solar Home Systems	10*	200*
India	Renewable Resources Development	188	
	Renewable Resources II/Energy Efficiency	200*	
Lao PDR	Southern Provinces Rural Electrification	0.3*	4.6
Sri Lanka	Energy Services Delivery	26*	32*
Vietnam	Power Development	T.A	
	Rural Energy	T.A	
Totals:		632.1	536.6-636.6
Energy Efficiency Projects:		Capacity Avoided (MW)	
China	Energy Conservation / <u>a</u>		n/a
India	Orissa Power Sector Restructuring		234*
	Haryana Power APL / <u>b</u>		40*
	Andhra Pradesh Integrated Agricultural DSM		8*
	Andhra Pradesh Power APL		n/a
	Renewable Energy II/Energy Efficiency		n/a
Lao PDR	Provincial Grid Integration		T.A
Sri Lanka	Energy Services Delivery		18*
Thailand	Promotion of Electrical Energy Efficiency		558
	Metropolitan Distribution (MEA)		T.A
Vietnam	Transmission, Distribution and Disaster Reconstruction		T.A
Total Capacity Avoided:			858

* Projected figures

na – not yet available

T.A – Technical Assistance only

/a MW savings not available; project will save 13 million tce (tons of coal equivalent) over seven years.

/b Estimated savings from the entire APL program.

Attachment 3: ASTAE Use of Local Consultants in FY00

Name of Consultants	Nationality	Project/Activity	Dates	Amount (US\$)	Funding Source
KCEC	Cambodia	Rural Electrification & Transmission Project	May 00 - present	35,000	ASTAE/ PHRD
Beijing Jike New Energy Technology Development Company	Chinese	Passive Solar Heating for Rural Health Clinics	Apr 99 – Dec 99	3,300	BNPP
National Health Economics Research Institute	Chinese	Passive Solar Heating for Rural Health Clinics	Apr 99 – Dec 99	30,000	BNPP
Hefei University of Technology	Chinese	China Renewable Energy Development Project	Mar 99– Aug 99	30,000	GEF
Product Testing/CRED	Chinese	China Renewable Energy Development Project	May 99– Dec 99	95,000	GEF
China Feed Industry Assoc. Information Center	Chinese	China Renewable Energy Development Project	Jul 99 – Dec 99	30,000	GEF
Song Yanquin	Chinese	China Renewable Energy Development Project	Aug 99– Sep 99	5,000	GEF
Center for Renewable Energy Development (CRED)	Chinese	China Renewable Energy Development Project		8,000	PHRD
Miao Hong	Chinese	China Renewable Energy Development Project		12,500	GEF
Orientation Workshop for Stakeholders	Chinese	China Renewable Energy Development Project		7,000	GEF
Electric Power Research Institute/CREDD	Chinese	China Renewable Energy Scale Up Program		30,000	GEF
Electric Power Research Institute	Chinese	China Renewable Energy Scale Up Program		40,000	Spanish Trust Funds
Feng Liu	Chinese	Energy Efficient Housing in China	Nov 99- Mar 00	23,000	REAP TF
Tsinghua University	Chinese	Energy Efficient Housing in China		7,300	REAP TF
Haiyan Qiang	Chinese	PV for Education	June 99- Oct 99	2,300	REAP TF
Winrock International India Ltd.	Indian	Identification of Renewable Energy Opportunities in Cambodia	July 00- Sept 00	17,500	GEF
Winrock International India Ltd.	Indian	Lessons Learned: India Renewable Resources Project	Dec 99	45,000	ESTA-Dutch
Consulting Engineering Services (Pvt) Ltd. India	Indian	Canal-based Small Hydro Pre-Feasibility Study in Uttar Pradesh	Dec 99- Apr 00	90,500	REAP TF (Netherlands)
Rajasthan Electronics & Inst., LTD.	Indian	QuaP-PV Project	Oct 99- Nov99	35,000	BNPP Funds
Rekha Dayal	Indian	ENPOGEN	Nov 99- Feb 00	7,500	Netherlands
PC-SPUG	Filipino	AJ Philippines	Aug. 99- Feb. 00	38,088	Swiss CTF
Lalith Fernando	Sri Lankan	Renewable Energy for Rural Infrastructure	Jan 00 – Mar 00	5,000*	ASTAE-REAP
Renewable Energy Research Center; Institute of Energy	Vietnamese	Renewable Energy Action Plan	Jun 99 – Aug 00	520,000	ASTAE/ESMAP, PHRD, BB
Institute of Energy	Vietnamese	Renewable Energy Action Plan	Nov 99 – present	10,000	ASTAE/ ESMAP/ PHRD
Hydro Power Center	Vietnamese	Renewable Energy Action Plan	Nov 99 – Nov 00	19,200	ASTAE/ ESMAP/ PHRD
Prof. Loc	Vietnamese	Renewable Energy Action Plan	Nov 99 – Oct 00	5,000*	ASTAE/ESMAP/ PHRD
Mr. Nguyen	Vietnamese	Renewable Energy Action Plan	Nov 99 – Oct 00	5,000*	ASTAE/ ESMAP/ PHRD
PECC1	Vietnamese	Renewable Energy Action Plan	Nov 99 – Oct 00	5,000*	ASTAE/ ESMAP/ PHRD
Mrs. Nguyet Anh	Vietnamese	Renewable Energy Action Plan	Nov 99 – May 00	10,000	ASTAE/ ESMAP/ PHRD
Viet Phong	Vietnamese	Renewable Energy for Rural Infrastructure	Dec 99 – Apr 00	5,000*	ASTAE-REAP
Renewable Energy Research Center	Vietnamese	Business Plan Pico Hydro Systems	Jan 00 – present	5,000*	Swiss Consultant Trust Funds

* Estimated amounts, local consultants were hired through sub-contracts with a minimum amount indicated in the Request For Proposals

Attachment 4: Conferences/Workshops/Seminars in FY00

Location	Title of Conference/ Workshop/Seminar	Date	Sponsor	ASTAE Speaker/ Representative	Audience
Washington DC, USA	Energy Access for Rural Development	9/13/99- 9/14/99	ASTAE, IIE Energy Group, Winrock Int.	M. Cosgrove- Davies, S. Piscitello	World Bank Staff in non-energy sectors, USAID, NGO
Jaipur, India	QuaP-PV Pilot Training Workshop for Implementing an Accreditation and Certification Framework	10/11/99- 10/15/99	PV GAP	E. Heijndermans	Representatives from government, industry, education sectors from India, China, & Sri Lanka.
Germany	Gelsenkirchen International Renewable Energy Conference	5/18/00		Berrah	
Bahraich, UP, India	Canal-based small hydro schemes in Uttar Pradesh	5/25/00	ASTAE	Cabraal	Local dignitaries, community representatives UP Irrigation Department, World Bank
Washington DC	International Conference on Accelerating Grid-based Renewable Energy Power Generation for a Clean Environment	3/00	WBG, ESMAP, WEC, SIDA, USAID, Winrock, Int.	Cabraal	Wide range of representatives from private, public, government, multilateral, and international NGO sectors.
Tysons Corner, VA	Energy Week: Energy & the Poor, What's the Recipe?	4/00	World Bank	A. Cabraal, N. Berrah	Wide range of representatives from private, public, government, multilateral and international NGO sectors concerned with energy and the poor.
Washington DC	DSM/EE Opportunities in India's Municipal Water Sector	3/00	ASTAE	C. Govindarajalu	World Bank energy and water sector Staff, private sector
Bangkok, Thailand	Energy Efficiency in Public Buildings		ASTAE /EGAT		University and government officials
Washington DC	Energy Efficiency in Public Buildings	5/4/00	ASTAE	J. Singh	Project managers and energy efficiency/education staff
Guilin, China	International Symposium on Renewable Energy Development,	5/22-5/25 2000	WEC/IEA	S. Bogach	
Glasgow, Scotland	Photovoltaics in Developing Countries	5/00	World Bank- European Commission	A. Cabraal	

Attachment 5: Key ASTAE Funding Events

Year	Month	Agency	Event	Amount (US\$)	Source
1992	Jan	WB	Creates ASTAE with 2 WB staff and 1 seconded USDOE consultant	\$327,000/a	WB/USDOE
	Mar		<i>ASTAE Donors Meeting #1</i> (WB/ASTAE funding proposal to donors)		
	May	ASTAE	Revised funding proposal submitted to Netherlands DGIS (\$4,798,500)		
	Jul	USAID	Approves ASTAE funding through USAID/WB Trust Fund	\$200,000	USAID
	Sep	USDOE	Funds to USTDA Trust Fund for ASTAE support	\$200,000	USDOE/USTDA
	Nov	WB	Creates Interim Fund for ASTAE while awaiting donor funding	\$500,000/b	WB
1993	May		<i>ASTAE Donors Meeting #2</i>		
	May	Neth. DGIS	Netherlands Trust Fund Arrangement signed	(\$4,401,180/c)	Neth. DGIS
	Jun	Neth. DGIS	Netherlands Trust Fund Tranche #1	\$1,558,290	Neth. DGIS
	Sep	UNDP	Netherlands DGIS/UNDP Funding Agreement signed	(\$479,520/d)	Neth./UNDP
	Oct	USDOE	Funds to USTDA Trust Fund for ASTAE support	\$250,000	USDOE/USTDA
	Nov	UNDP	UNDP Trust Fund Tranche #1	\$29,250	Neth./UNDP
	Dec	Neth. DGIS	Netherlands Trust Fund Tranche #2	\$821,140	Neth. DGIS
1994	Apr		<i>ASTAE Donors Meeting #3</i>		
	May	UNDP	UNDP Trust Fund Tranche #2	\$69,500	Neth./UNDP
	Sep	Neth. DGIS	Netherlands Trust Fund Tranche #3	\$914,020	Neth. DGIS
	Sep	USDOE	USDOE Funding Agreement signed	(\$3,000,000/e)	USDOE
	Oct	USDOE	USDOE Trust Fund Tranche #1 (for ASTAE)	\$685,000	USDOE
	Oct	WB	Japan PHRD Grant approved for India DSM work.	\$700,000	WB/Japan PHRD
	Nov	Neth. DGIS	Netherlands Trust Fund Tranche #4	\$583,220	Neth. DGIS
	Dec	UNDP	UNDP Trust Fund Tranche #2	\$190,880	Neth./UNDP
1995	Apr	WB	Approval IDF Grant for Philippines DSM capacity building	\$245,000	WB/IDF
	May		<i>ASTAE Donors Meeting #4</i>		
	May	UNDP	UNDP Trust Fund Tranche #3	\$35,000	Neth./UNDP
	Sep	WB	Approval Project Preparation Facility (PPF) Advance for Sri Lanka Energy Services Delivery	\$340,000	WB/GEF
	Sep	UNDP	UNDP Trust Fund Tranche #4	\$347,000	Neth./UNDP
	Oct	WB	Approval GEF-Project Development Facility (PDF) Grant for Sri Lanka Energy Services Delivery	\$200,000	WB/GEF
	Oct	WB	Approval GEF-Project Development Facility (PDF) Grant for China Renewable Energy	\$140,000	WB/GEF
	Oct	USDOE	USDOE Trust Fund Tranche #2 (for ASTAE)	\$339,000	USDOE
1996	May		<i>ASTAE Donors Meeting #5</i>		
	Aug	WB	Japan PHRD Grant approved for use for India DSM	\$800,000	WB/Japan/ PHRD
	Oct	USDOE	USDOE Trust Fund Tranche #3 (for ASTAE)	\$180,000	USDOE
1997	Jan	UNDP	UNDP Trust Fund Tranche #5	\$347,763	Neth./UNDP
	Apr		<i>ASTAE Donors Meeting #6</i>		
	Apr	Neth. DGIS	Netherlands Trust Fund Tranche #5	\$530,525	Neth. DGIS
	Oct	Neth. DGIS	Netherlands Trust Fund Tranche #6a	\$215,000	Neth./UNDP
	Oct	UNDP	UNDP Trust Fund Tranche #5b	\$287,728	Neth. DGIS
	Dec	Gov. Swiss	Swiss Trust Fund Agreement Signed	(\$470,000)	Gov. Swiss
	Dec	Gov. Swiss	Swiss Trust Fund Tranche #1	\$307,000	Gov. Swiss
1998	Apr		<i>ASTAE Donors Meeting #7</i>		
	Jun	Netherlands	B/NPP Agreements Signed	(\$3,250,000)	B/NPP
	Aug	Netherlands	Dutch Partnership Trust Fund	(\$2,230,000)	Neth. MOFA
	Aug	Netherlands	Dutch Partnership Trust Fund	\$750,000	Neth./UNDP
1999	Jan	Gov. Swiss	Swiss Tranche #2	\$154,723	Gov. Swiss
	Mar	Netherlands	B/NPP Tranche #1	\$2,250,000	B/NPP
	Mar	ESMAP	ESMAP Agreement Signed	(\$223,000)	ESMAP
	Apr	ESMAP	ESMAP Transfer	\$223,000	ESMAP
	Apr		<i>ASTAE Donors Meeting #8</i>		
	May	Netherlands	Dutch Partnership Trust Fund	\$970,000	Neth. Partnership
	Jul	WB	Japan PHRD Grant approved for use for Vietnam REAP	\$100,000	WB/Japan PHRD
	Aug	Gov. Finland	Finnish Trust Fund Agreement Signed	(\$569,000)f	Gov Finland
	Oct	Gov. Finland	Finnish Trust Fund Tranche #1	\$173,570	Gov Finland
2000	Jan	Netherlands	Dutch Partnership Trust Fund	\$530,000	Neth. Partnership

Year	Month	Agency	Event	Amount (US\$)	Source
	Apr		ASTAE Donors Meeting #9		
	May	Netherlands	B/NPP Tranche #2	\$1,000,000	B/NPP
	July	Gov. Finland	Finnish Trust Fund Tranche #2	\$173,570	Gov Finland
	Oct	UNDP	UNDP Trust Fund Tranche #6	\$950,000	Neth./UNDP
	Nov	Gov. Finland	Finnish Trust Fund Tranche #3	\$173,570	Gov Finland
<i>Projected</i>					
2001	Apr		ASTAE Donors Meeting #10		

Note: Table does not include annual World Bank support.

- /a Includes \$227,000 committed by WB plus secondment by USDOE of Anil Cabraal and other consultants to ASTAE during FY92 (January-June 1992).
- /b Reimbursed to WB in June 1993, following receipt of Netherlands funding.
- /c To be disbursed in five tranches over three-year period. Retroactive to July 1992.
- /d To be disbursed in tranches over three-year period.
- /e To be disbursed in tranches of \$1,000,000 per year over three-year period, of which ASTAE receives \$700,000 per year. Retroactive to July 1994.
- /f To be disbursed in equal tranches over three-year period.

B/NPP: Bank/Netherlands Partnership Program
 ESMAP: Energy Sector Management Assistance Program
 GEF: Global Environmental Facility Grant
 Gov. Swiss: Government of the Swiss Confederacy
 Gov. Finland: Ministry of Foreign Affairs,
 Government of Finland
 IDF: World Bank Institutional Development Fund Grant
 Neth. DGIS: Netherlands Directorate General for
 International Development

PPF: Project Preparation Facility
 PDF: Project Development Facility – GEF
 UNDP: United Nations Development Program
 USAID: United States Agency for International Development
 USDOE: United States Department of Energy
 USTDA: United States Trade and Development Agency
 WB: World Bank

Attachment 6: ASTAE Staff

(July 1999 - June 2000)

Yoshihiko Sumi	Program Manager, ASTAE Sector Director, East Asia Energy & Mining Development Sector Unit
Noureddine Berrah	Deputy Program Manager
Anil Cabraal	Senior Renewable Energy Specialist/Renewable Team Leader
Michael Willingham	Energy Efficiency Team Leader*
Susan Bogach	Energy Economist
Mac Cosgrove-Davies	Solar Thermal, PV Engineer**
Scott Piscitello	Renewable Energy Engineer***
Enno Heijndermans	Alternative Energy Specialist
Jas Singh	Energy Efficiency Specialist
Chandrasekar Govindarajalu	Energy Specialist
Johannes Exel	Alternative Energy Engineer
Jeremy Levin	Alternative Energy Specialist
Shelly Thorpe	Budget/Program Assistant
Teresita G. Velilla	Program Assistant
Christina Hernandez	Team Assistant
Parin Saxena	Program Assistant****

* Left ASTAE 5/00.

** Left ASTAE 12/99.

*** Left ASTAE 5/00.

**** Retired ASTAE 6/00.