

Annual Report

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**ESMAP**

Energy Sector Management Assistance Programme



# **ESMAP Annual Report 1997**

**Joint UNDP/World Bank Energy Sector Management Assistance Programme**

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**ENERGY, MINING AND TELECOMMUNICATIONS, THE WORLD BANK**



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# Abbreviations, Acronyms, and Definitions

<b>\$</b>	U.S. dollars
<b>ADB</b>	Asian Development Bank
<b>BCF</b>	Billion cubic feet
<b>BERI</b>	Beijing Economic Research Institute
<b>BIG-CC</b>	Biomass integrated gasification combined-cycle
<b>Billion</b>	1,000,000,000
<b>BOT</b>	Build-operate-transfer
<b>CIS</b>	Commonwealth of Independent States
<b>CNG</b>	Compressed natural gas
<b>DfID</b>	Department for International Development (United Kingdom)
<b>EBRD</b>	European Bank for Reconstruction and Development
<b>EESC</b>	Energy and Environment Steering Committee
<b>ENERCON</b>	National Energy Conservation Center (Pakistan)
<b>ESCO</b>	Energy service company
<b>ESMAP</b>	Energy Sector Management Assistance Programme
<b>FI</b>	Financial intermediary
<b>FIAS</b>	Foreign Investment Advisory Service
<b>FSU</b>	Former Soviet Union
<b>GEF</b>	Global Environment Facility
<b>GTZ</b>	<i>Gesellschaft für Technische Zusammenarbeit</i> Corporation for Technical Cooperation (Germany)
<b>IDA</b>	International Development Association (World Bank Group)
<b>IDB</b>	Inter-American Development Bank
<b>IFC</b>	International Finance Corporation (World Bank Group)
<b>LNG</b>	Liquefied natural gas
<b>LPG</b>	Liquefied petroleum gas
<b>M&amp;T</b>	Monitoring and targeting
<b>MW</b>	Megawatt
<b>NGO</b>	Nongovernmental organization
<b>ODA</b>	Overseas Development Administration, now DfID (United Kingdom)
<b>OECD</b>	Organisation for Economic Co-operation and Development
<b>OED</b>	Operations Evaluation Department (of the World Bank)
<b>PV</b>	Photovoltaic
<b>PVGC</b>	PetroVietnam Gas Company
<b>RE</b>	Rural electrification
<b>SADC</b>	Southern African Development Community
<b>SAPP</b>	Southern Africa Power Pool
<b>TAG</b>	Technical Advisory Group (of ESMAP)
<b>UNDP</b>	United Nations Development Programme
<b>YFPB</b>	<i>Yacimientos Petrolíferos Fiscales Bolivianos</i> Bolivian National Oil Fields



# 1

## Introduction

This annual report covers the calendar 1997 activities of the Energy Sector Management Assistance Programme (ESMAP), jointly sponsored by the United Nations Development Programme (UNDP) and the World Bank. The present chapter provides an introduction to ESMAP activities. Chapter 2 discusses ESMAP's operations in detail, and chapter 3 reviews ESMAP's management structure and financial position.

As is customary, this report also contains several annexes providing detailed data and documentary material. Annex 1 reproduces the ESMAP Consultative Group's 1997 *communiqué*. Annex 2 provides data on ESMAP activities (completed, ongoing, and newly launched) during calendar 1997. Annex 3 is a comprehensive regional listing of ESMAP's reports on completed activities.

### ESMAP's Priorities

The Energy Sector Management Assistance Programme (ESMAP) is a global technical assistance program that helps build consensus and provides policy advice on sustainable energy development to the governments of developing countries and transition economies. Recognizing the central role of energy to the development process, ESMAP provides technical assistance that is intended to help countries introduce and develop appropriate policies for the

production and use of energy for sustainable economic growth. ESMAP relies on grants from its donors and in turn provides free services to its recipients.

In recent years, ESMAP has focused primarily on six energy "thematic areas," or issues, which are related to three core "quality of life" principles supported by the world community and the World Bank. These principles are expected to be the pillars of ESMAP work in the coming years:

- Improving the local, regional, and global environment.
- Providing increased access to energy, particularly by the poor in developing countries.
- Restructuring inefficient energy sectors in developing countries and transition economies.

ESMAP's six energy thematic areas are summarized below (they are described in detail in chapter 2). In 1997, ESMAP consolidated its work on these issues and extended efforts to countries where it had not been active.

### *Energy and the Environment*

People all over the world are increasingly concerned about local and global environmental issues, and they understand that production and consumption of energy can have a large—and potentially damaging—impact on the environment. One of ESMAP's chief

roles is to help developing countries address the problem of the historic link between economic growth and increased use of energy, on the one hand, and between energy use and environmental damage, on the other.

In 1997, ESMAP's major work in the energy and environment area included support for the World Bank's Clean Coal Initiative, including monitoring of the costs and performance of various clean coal technologies. The Programme also continued managing the implementation phases and related dissemination and training activities under the *Environmental Manual for Power Development* and its associated computer model; engaging in work to improve fuel quality through phasing out lead as an additive to gasoline and removing sulfur from diesel fuel; and continuing studies related to reducing natural gas flaring and venting, oil and gas pipeline leaks, and oil spills.

### ***Rural and Household Energy***

ESMAP's strategy is to develop new insights and to identify new approaches and methodologies for the household and rural energy sector in developing countries, in conjunction with the objectives of reducing poverty and improving the environment. Recommended policies and programs must be consistent with a country's economic situation and based on available energy resources. Current ESMAP activities are focused principally on developing least-cost rural electrification, promoting the supply and use of modern biofuels, and enlarging the role of cost-effective, small-scale renewable energy sources.

In 1997, ESMAP held the highly successful Rural Energy Roundtable, April 16–18, which brought together 26 speakers and more than 200 participants. In country activities, rural electrification studies in Cameroon, Laos, and Guinea were completed and will lead to investments. Policy review studies were completed in Swaziland and Malawi. In India, the urban household energy project was completed, and ESMAP's dialogue with the World Bank and the Indian government on the study's conclusions and recommendations was initiated.

### ***Renewable Energy***

ESMAP seeks to enlarge the economic role for renewable energy in the World Bank's operations in its client countries. The projects supported by ESMAP dem-

onstrate continuous innovation. They are broadening access to modern energy services by fostering new products, such as miniature 20 amp-hour batteries in Africa, and introducing new institutional models, such as solar electrification concessions, to make energy more affordable for the poor. ESMAP is also working to overcome barriers to implementation of renewable energy. For example, subsidies have been a basic reality of rural electrification. Now, however, new mechanisms are evolving out of ESMAP operations that target, minimize, and phase out subsidies while safeguarding economic and financial sustainability.

In 1997, new and larger renewable energy projects catalyzed by ESMAP assumed increasing prominence in World Bank energy lending. In Argentina, a stand-alone, first-of-a-kind, rural electrification concession project advanced to the appraisal stage. A second project in Brazil has already begun to build on the insights of the Argentine concession. The Egypt solar thermal power project, in the midst of preparation, is expected to be funded by the private sector, an unprecedented development in solar thermal.

In other areas of the globe, ESMAP continues to respond to small-country needs. In Cape Verde, a recent preinvestment study identified a market of approximately 12,000 households for decentralized solar power. In Niger and Kenya, ESMAP conducted marketing tests for solar lamps for the poorer end of the market, with encouraging results.

### ***Energy Sector Reform***

The governments of many developing countries and transition economies continue to seek to improve the efficiency of their energy sectors by increasing the role of private sector capital and management. ESMAP seeks to facilitate these restructuring and reform efforts through studies, consultations, and training programs. The Programme also helps governments to elaborate and establish the new legal and regulatory frameworks they need to support energy sector reform. The value of such assistance was highlighted by a recent internal study by the World Bank's Operations Evaluation Department (OED) that identified ESMAP-sponsored seminars with ministers and high-level government officials as often pivotal in persuading governments to commit themselves to reform and restructuring.

In 1997 in the electric power sector, ESMAP completed a five-year project in Poland that led to the enactment of a new energy law and the establishment of a new regulatory authority. In Vietnam, a draft electricity law was completed and is expected to be promulgated in 1998. In Cambodia, although ESMAP's sector reform work was curtailed by political unrest, it is expected to resume in 1998. In Africa, ESMAP is providing ongoing support to the development of the Southern Africa Power Pool.

In the hydrocarbon sector, ESMAP's 1997 activities included a study on the restructuring of the PetroVietnam Gas Company in preparation for the development of new gas resources and gas markets in Vietnam. In Bolivia, ESMAP assisted the government and regulatory agencies in the implementation of a new reform program following the capitalization of the state hydrocarbons company, *Yacimientos Petroliferos Fiscales Bolivianos* (YPFB).

### *Energy Efficiency*

Achieving efficiency improvements in both the production and the consumption of energy in developing and transition countries is a key component of ESMAP's effort to improve the environment. The Programme's primary strategy in this area is to complement governments' "top-down" reform and restructuring efforts with "bottom-up" grassroots projects designed to remove or reduce obstacles to the introduction of energy-efficient practices, equipment, and technology at the local level.

The commercialization of public enterprises resulting from recent reforms has redefined the government's role in the power sector in many countries—from central energy planner to market facilitator. In tandem, ESMAP's energy reform and efficiency programs have been increasingly focused on assisting governments in playing the role of facilitator and supporter of private sector initiatives. This reform process has not proceeded as quickly in the oil and gas sectors as it has in the power sector. Therefore, ESMAP's activities in the oil and gas sector continue to emphasize the importance of restructuring, price reform, and reduction of cross-subsidies that encourage inefficient energy use.

One of the major ESMAP activities of 1997 was the preparation of a second Energy Efficiency

Roundtable in Washington, D.C., on April 24–25. This Roundtable highlighted institutional and financial efficiency measures and a broad range of consumer-oriented demand-side efficiency options. Also in 1997, the Programme continued its energy service and management projects incorporating monitoring and targeting (M&T). A management technique for controlling energy costs, M&T focuses on the industrial and commercial sector at the firm level, using computerized tools to establish benchmarks for energy use and targets for energy efficiency based on industry best practices and the particular circumstances. ESMAP has also been moving beyond M&T services to possible large-scale institutional financing of M&T-identified efficiency improvements. District heating efficiency improvement remains ESMAP's prime activity in Eastern Europe. In the oil and gas sector, the focus with respect to efficiency is on reduction of gas venting and flaring and on reform of oil product pricing.

### *Energy Trade*

International energy trade, particularly of clean fuels such as electricity and natural gas, contributes to the more efficient development and use of energy.

The international interconnection of electric power networks provides many benefits, including increased reliability, reduced reserve capacity requirements, reduced investment and operating costs, more diversified and secure energy sources, and an improved environment, especially where hydropower is an option. ESMAP's role in this area is to study the prerequisites and constraints related to regional power markets and pooling arrangements and to disseminate the accumulated knowledge and experience through workshops and technical assistance. During 1997, ESMAP provided support to the development of regional power markets in southern and central Africa, Central America, and the Mekong region of Southeast Asia.

International gas trade is capital intensive, subject to long payback periods, and often challenging because the projects may cross the borders of countries that are politically or economically volatile. This concentration of risks has meant that bankable international projects wholly within developing regions have been rare, and ongoing projects involving developing countries typically have large,

stable industrial countries as the importers. ESMAP's role in promoting international gas trade has been to identify situations in developing areas where both suppliers and buyers can benefit substantially and to provide assistance to developing-country governments on the financing and contractual frameworks for effective trade arrangements. In 1997 ESMAP work in this area included continuation of the Africa Gas Initiative for five West African countries and continued restructuring of the Bolivian hydrocarbon sector that led to the signing of a Bolivia-Brazil gas pipeline agreement.

### **Governance, Management, and Finances**

The 1997 Annual Meeting of the ESMAP Consultative Group was held on April 23 in Washington, D.C. A Donors' Roundtable on Energy Efficiency and the Environment was also held in conjunction with the Consultative Group Meeting. ESMAP's Technical Advisory Group (TAG) met twice in 1997, first in April immediately before the Consultative Group meeting, and then again in October. At the October meeting, two new TAG members were introduced to the Programme, succeeding two members whose terms had concluded in the course of 1997. The TAG submitted three reports to the Consultative Group in 1997—a general reflection on ESMAP by one of the outgoing TAG members; a review of an ESMAP intervention in Chad; and a general assessment of ESMAP's priorities and prospects. Program management of ESMAP also experienced change in 1997,

when the then program manager was tapped by the Bank to lead its Human Resource Reform Agenda, and ESMAP's deputy program manager was appointed program manager.

Overall donor support to ESMAP changed only slightly in 1997. Contributions totaled \$8.4 million, virtually the same level as in 1996. The Bank's contribution to the Programme represented approximately 19 percent of total receipts, up slightly from the 1996 share of 18 percent. Core receipts weakened in 1997, down to approximately \$1.7 million (excluding the Bank's contribution amount, which is considered fully core), from \$2.7 million in 1996. Programme expenditures for 1997 exceeded total contributions received in the year by approximately \$100,000, but were down approximately \$300,000 from the level projected in the 1996 ESMAP Annual Report. Lower expenditures stemmed largely from the slower-than-expected take-up of ESMAP activities by Bank units outside the Energy, Mining and Telecommunications Department (the successor department to the Industry and Energy Department as of July 1, 1997). This was due at least in part to the Bank's internal reorganization and management changes, which were initiated in mid-1997. By end-1997 the most significant internal changes had been implemented, and ESMAP activity had already begun to accelerate. Also affecting ESMAP finances was the strength of the U.S. dollar (the currency in which most expense transactions are carried out) against most other major currencies, including the contribution currencies of a number of the donors.

# 2

## ESMAP Operations

ESMAP's activities and projects during 1997 are discussed in this chapter under the following thematic areas:

- Energy and the environment.
- Rural and household energy.
- Renewable energy.
- Energy sector reform.
- Energy efficiency.
- Energy trade.

Annex 2 contains data on projects completed, launched, and ongoing in 1997.

### **Energy and the Environment**

#### *Issues and Strategy*

Although developing countries need increased energy services to support economic development and to improve the quality of life of their populace, they also face the challenge that increased use of energy can have detrimental environmental impacts. ESMAP aims to take a leading role in helping developing countries to solve this problem and to break the historic links between economic growth and increased use of energy, on the one hand, and between energy use and environmental damage, on the other.

A recent internal study by the World Bank's Operations Evaluation Department (OED) indicated that

market-based restructuring of the energy sector is already reaping financial and environmental rewards in some developing countries. In particular, the OED identified ESMAP-sponsored seminars with ministers and high-level government officials as frequently pivotal in persuading governments to commit to reform and restructuring. But the OED study also concluded that much more time than is typically estimated may be needed for countries to implement the necessary reforms and for the reforms to have tangible effects in improving environmental conditions. Moreover, progress in energy efficiency—either on the supply or demand side—is still weak.

The lessons of the OED review, combined with the continuing challenges of a rapidly evolving energy market and increasing concerns about the environment, have led the World Bank Group to formulate a new environmental strategy for the energy sector. Initial strategy discussions, which have included ESMAP, have identified several priorities for action:

- Focusing on upstream work to guide lending for projects and to set priorities for action across the whole energy chain—for example, by helping governments define national air pollution standards.
- Bringing environmentally friendly technologies and practices into the mainstream of

operations, with a special focus on renewable energy in rural areas.

- Helping to improve standards of analysis for environmental problems and to improve monitoring of projects aimed at solving them—for example, by accurately estimating the costs of different types of pollution.
- Moving to the forefront of worldwide efforts to avert the threat of climate change and encouraging the use of new technologies to reduce greenhouse gas emissions.
- Developing new public and private partnerships and providing new resources of its own to boost investment in large-scale renewable energy and energy efficiency projects.
- Improving and bolstering specialist staff, particularly in renewable energy, energy efficiency, and energy sector reform.

Because ESMAP has been a major factor in the development of the Bank Group's sustainable energy efforts, the Programme's continued support will be critical to broad implementation of the new energy-environment strategy. Essential ESMAP contributions to mitigating the environmental impacts of energy include continued strong support for energy sector reform and restructuring and a stepped-up program for energy efficiency. In particular, ESMAP's Energy and Environment thematic area is responding to the energy-environment initiatives in the following ways:

- Conducting energy-environment sector assessments.
- Accelerating activities under the Clean Coal Initiative.
- Developing better tools and methodologies to estimate and internalize the costs of environmental externalities.
- Continuing with evaluations of new technologies that can reduce the cost of pollution abatement.
- Providing training and technical assistance to clients through extensions of knowledge management systems, such as the *Environmental Manual for Power Development*.

### *Highlights of Ongoing Activities*

Ongoing ESMAP activities in the energy and environment theme are highlighted below.

### *Environmental Issues in India's Power Sector*

The study, *Environmental Issues in the Power Sector*, is examining the main environmental impacts of the expansion of coal-based electricity generation, including environmental externalities and the costs of the associated expansion of coal production. Studies have been completed in the states of Andhra Pradesh and Bihar, and a national synthesis is under way. Several workshops have been held in the course of the studies, including consultations with NGOs, a national technical workshop, and a state-level decisionmakers' workshop.

### *Clean Coal Initiative*

The use of coal will continue to grow where it is abundantly available as an indigenous fuel and where secure economic alternatives have yet to emerge—notably in Eastern Europe and Asia. Although improvements in energy efficiency and accelerated transitions to nonfossil fuels are crucial goals for these areas, the need remains in the near term to keep the mining and use of coal within acceptable environmental and social impact standards. The Clean Coal Initiative seeks to encourage clean coal production and use and made a significant step in that direction when participants at the Clean Coal Roundtable, held in Washington in June 1996, adopted its principles. The World Bank and ESMAP have investigated, in cooperation with the European Union and the French government, mechanisms for funding the Clean Coal Initiative and opportunities for pilot projects and activities to undertake jointly with client countries. ESMAP staff continue to monitor the cost and performance experience of various clean coal technologies, such as fluidized-bed, coal gasification, and desulfurization equipment, in order to make this information available to client countries through the *Environmental Manual for Power Development*.

### *Environmental Management*

Managed by ESMAP, the Environmental Management for Power Development program is a collaborative effort involving the World Bank, Germany, the Netherlands, Switzerland, and the United Kingdom that focuses on the development of energy-environment assessment tools and their application in carrying out sectoral assessments. In particular,

ESMAP, in collaboration with the *Gesellschaft für Technische Zusammenarbeit* (GTZ, Germany's Corporation for Technical Cooperation), has been instrumental in the following:

- Developing and applying the environmental management model.
- Developing EMPower Info, a knowledge-base system in the World Bank's external Web site that provides guidance on how to carry out environmental assessments.
- Organizing information on the energy-environment assessment computer software, in cooperation with the International Atomic Energy Agency.

Application of these tools continues to grow, building on early studies in countries such as China, the Kyrgyz Republic, Morocco, the Philippines, and Poland. For example, the environmental management model was used to assess the cost-effectiveness of environmental control options in Shanghai (the results were presented in the World Bank's 1997 publication, *China in the 21st Century: Clear Water, Blue Skies*). The methodology developed under this study addresses China's immediate needs to develop least-cost environmental compliance strategies. At present, ESMAP is cooperating with the Beijing Economic Research Institute (BERI) in carrying out a similar study in China's Henan Province. Several other provinces want to initiate similar studies, and BERI, which has done the bulk of the analytical work, has sought to bolster the capacity of local organizations to carry out such assessments.

Another energy-environment study has been initiated recently in India to assess the cost-effectiveness of greenhouse gas reduction options. The study uses the environmental management model and integrates methodologies developed by ESMAP and the Global Overlays project of the World Bank's Climate Change Unit. Funding for the environmental management program will be fully committed by the end of March 1998, but the *Environmental Manual for Power Development* will continue to be used in energy-environment sector assessments, for which additional funding is being sought.

#### *Energy, Transport, and the Environment*

Preliminary conclusions of the study, Energy, Transport, and the Environment, were reported at the 1997 En-

ergy Donors' Roundtable on April 22. The final report confirmed that the energy sector will always be in a supporting role in efforts to reduce emissions from transport. In this area, ESMAP is working to improve fuel quality by phasing out lead as an additive to gasoline and removing sulfur from diesel fuel.

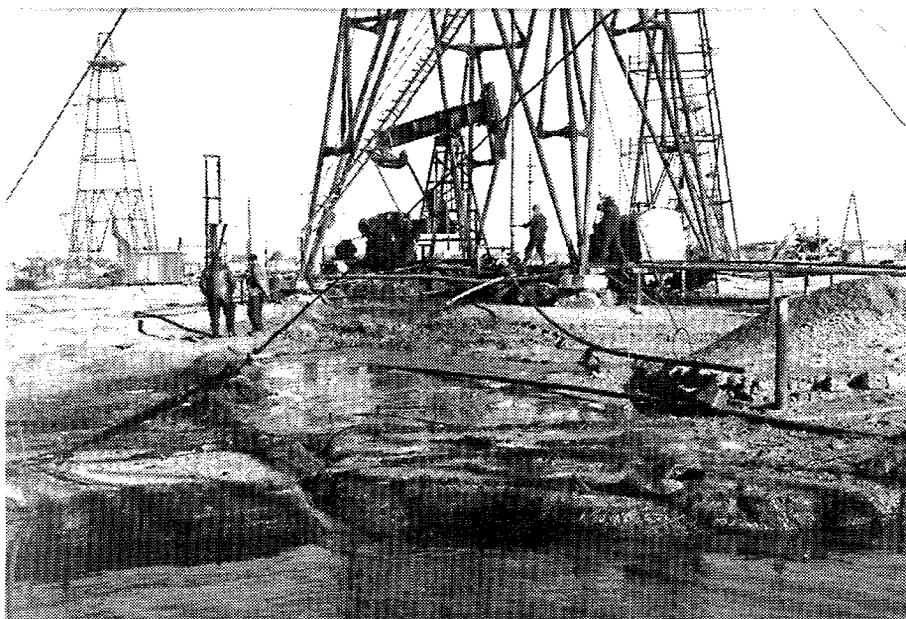
Although economic fuel pricing and taxation are essential instruments for encouraging the rational use of energy, they will not be sufficient in light of the high and relatively inflexible demand for the mobility that motor vehicles provide. Options to reduce the environmental impact of motor vehicles include fuel reformulation, effective enforcement of vehicle emission standards, vehicle maintenance, traffic management, expanded use of mass transit, improvements in road conditions and layout, and urban planning.

ESMAP has focused its efforts on energy and transport aspects of air quality management that can be addressed directly through the energy sector—phaseout of lead from gasoline; reformulation of fuels; and the use of alternative fuels, such as compressed natural gas (CNG) or liquefied petroleum gas (LNG), where economic. With respect to the phasing out of lead from gasoline in Latin America and the Caribbean, several countries—including the Dominican Republic, Haiti, Paraguay, Peru, and Trinidad and Tobago—have decided to eliminate leaded gasoline earlier than they had originally planned.

One of the principal benefits for air quality management of eliminating lead is that it enables the use of catalytic converters, by far the most effective means of reducing exhaust emissions from gasoline engines. Because eliminating lead reduces octane ratings, the process cannot be separated from that of reformulating gasoline, and other fuels in general, to restore their functionality in the most environmentally benign manner possible. ESMAP has therefore funded a program to propose the harmonization of fuel specifications throughout Latin America and the Caribbean. This would not only ensure promulgation and implementation of baseline environmental standards but would also facilitate intraregional trade in petroleum products, which could promote a highly desirable rationalization of the refining industry in the region.

#### *Oil and Gas*

In the oil and gas area, ESMAP continues to focus on studies related to reducing natural gas venting and



Oil/water separation at the wellhead, near Baku, Azerbaijan. ESMAP technical assistance is intended to help governments in the Caspian Sea region develop more environmentally sound procedures for oil production and pipeline transport. To date, ESMAP oil spills monitoring, remediation, and prevention analyses have focused primarily on oil and product trunklines and gathering flow lines at the oil fields.

*Photo courtesy of Jacqueline Michel.*

flaring, oil and gas pipeline leaks, and damage to the environment from operation of wells and refineries. ESMAP will continue to advance projects such as the African Gas Initiative, which seeks to increase the local utilization of previously flared associated gas for power generation and production of related LPG for domestic consumption in Sub-Saharan Africa.

The search for oil and gas in remote areas inevitably has a major socioeconomic and cultural impact on indigenous people. ESMAP has recently begun a new activity in Peru to assess these issues in the Camisea region and to help the government review the legal, regulatory, and contractual framework for harmonizing petroleum exploration and production with protection of the environment.

Another activity just getting under way in the oil and gas sector is ESMAP's Oil Spills Project. This effort will help governments in the Caspian Sea region build up their capacity to address the environmental,

health, and safety aspects of oil production and transportation. The poor state of many of the region's oil fields constitutes not only a health and environmental hazard but a deterrent to foreign investment.

#### *Future Activities*

In addition to continuing with its ongoing work, ESMAP proposes to undertake energy-environment sector assessments that will cover the whole energy chain and the whole range of its environmental impacts. These assessments will help the World Bank Group and others map out what it will do in the sector regarding energy supply and demand, as well as pollution avoidance and control in areas such as efficiency, conservation, rehabilitation, and decommissioning. Of equal importance, the assessment activities will highlight possible institutional and financing mechanisms.<sup>1</sup> The goal is to carry out a program

1. World Bank Operations Evaluations Department, "Effectiveness of Environmental Assessments and National Environmental Action Plans: A Process Study," World Bank; June 28, 1996; and "The Impact of Environmental Assessments: A Review of World Bank Experience," World Bank, 1997.

of up to seven assessment tasks by July 1999 and an increasing number each year thereafter.

The Energy and Environment Steering Committee (EESC), supported by ESMAP, has been set up within the World Bank to advise and assist the Bank in identifying the appropriate means of speeding up the dissemination of environmentally benign technologies in developing countries. The EESC comprises experts from ESMAP donor and developing countries. At its meeting in early 1997, the Committee recommended that the evaluation of biomass power generation should be undertaken, as it appears to have the potential for providing electricity in a carbon-neutral and cost-effective manner. Because of the growing use of coal, the Committee identified assessments of clean thermal power options and renewable energies as priorities in its work program.

With respect to options for clean thermal power, ESMAP can make a valuable contribution by providing clients with information concerning costs and reliability of new technologies in order to reduce the per-

ceived cost and performance risks when clients are comparing alternatives or evaluating bids from developers of independent power production ventures. One of these new options is the biomass integrated gasification combined-cycle (BIG-CC) technology that is proposed in Brazil for a 30 MW wood-burning pilot project to be financed with support from the Global Environment Facility (GEF). Because the technology is in the early stage of development, the capital cost is considerably higher than that of conventional technologies, but once the initial learning curve is passed, with the building of several successive plants, the costs are expected to become competitive. Other new clean technologies, particularly those that burn coal, are at or nearing full commercialization. Because these technologies have limited track records to date, power utilities perceive them as of higher risk and are often reluctant to use them. By disseminating knowledge of costs and reliability from diverse clean energy installations around the world, ESMAP can help put these new options in the proper technological and economic perspective.



Cooking stove in a household near Hyderabad, Andhra Pradesh, India. This stove is unusual among traditional Indian woodstoves in that it is placed beneath a chimney. Most such stoves simply allow smoke to fill an unventilated room, posing severe health threats to the occupants most exposed—mainly women and children.

*Photo courtesy of Douglas Barnes.*



Vehicle unloading at a fuelwood depot in Hyderabad city. This is an increasingly rare sight in the city center, as government policies have increased access to LPG across the income continuum, liberalized urban fuel markets, and made it easier for poorer city dwellers to afford modern-fuel appliances. Use of fuelwood continues on a small commercial and household scale, mainly for cooking at traditional wedding banquets and other ceremonial occasions.

*Photo courtesy of Douglas Barnes.*



Woman in Hyderabad cooking with LPG. As a result of policy reforms typical of those recommended by ESMAP, families in the lower income brackets are now likely to be cooking with kerosene (cooking efficiency 25% to 35%) or LPG (cooking efficiency 60%) rather than wood (cooking efficiency 15%).

*Photo courtesy of Douglas Barnes.*

## Rural and Household Energy

### *Issues and Strategy*

Developing countries are facing two crucial and related problems in the energy sector. The first is the widespread inefficient production and use of traditional energy sources, such as fuelwood and agricultural residues, which pose economic, environmental, and health threats. The second is the highly uneven distribution and use of modern energy sources, such as electricity, petroleum, LPG, and natural gas, which raise important issues of economics, equity, and quality of life. Ultimately most people in the developing world can be expected to make the “energy transition” to cleaner and more efficient modern fuels, but competing demands for scarce economic resources, ready supplies of inexpensive biomass fuels in some areas, and a host of social and cultural factors mean that simply expanding supplies of modern energy will not accomplish a rapid energy transition. Rather, both urban and rural populations in developing countries are likely to remain heavily reliant on traditional fuels for the next 30 years.

ESMAP’s household and rural energy strategy is intended to keep the complex energy scenario of

the developing world in a realistic perspective. The Programme aims at identifying more economic and more environmentally benign approaches for producing and using traditional renewable fuels. At the same time, ESMAP will continue helping countries to expand their use of modern fuels in an environmentally appropriate way. As a whole, ESMAP’s strategy seeks to promote policies and programs that emphasize clean and renewable energy, fit a country’s macroeconomic and budgetary situation, utilize available energy resources, apply demand management, exploit opportunities for interfuel substitution, and implement sound fuel pricing.

In practice, ESMAP activities within the rural and household energy theme fall into three broad categories:

- Extending access to electricity services in rural and periurban areas in a least-cost, phased, and financially sustainable manner.
- Promoting sustainable supply and use of modern biofuels.
- Enlarging the role of renewables, where that strategy is cost-effective or potentially cost-effective and supported by external grants.



Truck unloading at a fuelwood market near Niamey, Niger. Local village management and replenishment of wood resources, combined with effective taxation and regulation of uncontrolled wood mining, have helped to make woodfuel use sustainable even in Sahelian areas where it has appeared scarce.

*Photo courtesy of Willem Floor.*

### Activities in 1997

The highlight of 1997 was the Rural Energy Roundtable, held April 16–18. More than 200 participants heard some 26 speakers during the two-and-a-half days of the meeting. Of the speakers, 4 were from the World Bank, 8 were from Organisation for Economic Co-operation and Development (OECD) countries, and 14 were from developing countries. The meeting was structured into five sessions that covered several emerging areas of interest in the rural energy agenda:

- Rural energy policy and institutional development.
- Joint forest management.
- Rural electrification: extending the grid.
- Rural electrification: nongrid options.
- Postreform issues in the power sector and rural households.

Each session began with a short overview of the main issues. These were followed by a handful of brief presentations by invited speakers that expanded on the key issues with lessons of practice gained from programs or projects, mostly in developing countries. As expected, given the diverse experience of the

speakers and participants, several points of interest and controversy developed during the meeting, leading to productive discussions (Box 2.1).

Other activities mostly addressed rural problems, with an emphasis on developing new approaches and methodologies to expand access to modern energy services in rural areas. Work focused heavily on mechanisms for decentralized rural electrification (RE) or rural lighting for dispersed rural populations, particularly on analyzing factors that determine sustained, cost-effective delivery. The investigations looked not only at the financing mechanisms (such as in Kenya for solar energy systems), but also at RE policies; implementation infrastructures (e.g., technicians who can sell, build, and operate systems, or private investors looking to sell modern energy services to rural populations); and means of assisting community decisionmaking. Finally, an area of emphasis was on methodology—how to justify RE investments more effectively by calculating the benefits more accurately and how to make RE more affordable by developing criteria for selecting technically sound low-cost distribution systems.

Some of the foregoing projects are multiyear activities because they require extensive preparation,



Improved charcoal kilns in Madagascar are enabling commercial charcoal briquette makers to use less wood in manufacture, thus helping to slow the rapid pace of land erosion and river siltation from overharvesting of biomass resources.

*Photo courtesy of Robert van der Plas.*

**Box 2.1. The Way Ahead**

Conclusions of the Rural Energy Roundtable, April 16–18, 1997

Perhaps the clearest message to come from the meeting is that rural energy—particularly its renewable energy and electrification components—is rapidly developing new paradigms and practices that are taking developing countries beyond centrally managed and subsidized energy projects, blanket subsidies, detailed government planning, and restrictive regulation. The new model emphasizes local management and control of woodfuel resources, market-driven provision of an appropriate mix of energy sources and appliances, and an increased emphasis on environmentally sound use of biomass and modern fuels.

Participants noted, however, that the new model of rural energy should still include the governmental or centralized components. In particular, planning and the public sector should be steered toward nurturing and supporting private sector initiatives and consumer participation and choice. These can include support for R&D and “commercialization” (or nurturing) of clean and efficient new technologies in the marketplace. It may also involve information, training, and broader capacity building; consumer protection through regulation of the private sector; and continued attention to mandates for rural development and alleviation of poverty. Well-meaning, top-down projects may appear attractive, but they ultimately may undermine the sustainability of local business initiatives. The public sector can do much to support sustainable energy development, at minimal cost, by focusing on policy change, deregulation, information, and capacity building that will help the private sector deliver on a wider range of energy services.

In this context, the issue of subsidies provoked an informative discussion during the meeting. As it has in the past, ESMAP held that selective subsidies on capital (or “first”) costs of energy-efficient equipment may be effective; similarly, the subsidies incorporated in Global Environment Facility (GEF) activities are appropriate to developmental and environmental goals. On the other hand, subsidizing energy operating costs engenders dependency and distorts competition. The key question, thus, is how subsidies can be focused appropriately and phased out of existence when they are no longer needed.

surveys, and final analysis. This is the case with the benefits assessment for RE (to be completed in 1999), the benchmarking for low-cost distribution systems (just started, but to be ready in 1999), and the study of RE success factors (to be ready mid-1999). Some specific RE studies have already been completed and will lead to investments (Cameroon, Lao PDR, and Guinea). Others are being completed (Peru, Uganda) before follow-up activities are designed, and one has just started (Zimbabwe). Two policy review studies have been completed (in Swaziland, the study led to agreement with the government on adoption of policy adjustments; in Malawi, the dialogue with the government will start in 1999).

Although biomass projects had a relatively lower profile in 1997 than previously, these activities will soon regain prominence in ESMAP’s work program. In Bolivia, within the context of the ongoing rural energy program, ESMAP helped to formulate a biomass project. To be inaugurated in January 1998, this project aims to reduce environmental damage resulting from nonsustainable practices of biomass consumption and to improve the quality of life of the rural population. In Nicaragua, another biomass project has begun, with the objective of developing an integrated program for modernizing production and consumption of woodfuels in the Managua area and its supply centers.

ESMAP undertook only one purely urban household energy activity in 1997: the India Urban Energy

Study. The project joined the capabilities of ESMAP and the government of India in the field to assess urban energy problems and needs. The project evaluated appropriate energy policies and potential investments for India’s rapidly growing urban population by addressing the following issues:

- The problems and prospects of the continued use of traditional fuels in urban areas, especially their environmental impact.
- The potential for energy conservation to reduce problems associated with the rapidly growing demand for electricity and other forms of energy.
- The impact of energy policies on the urban poor, including the impact on their quality of life.

ESMAP has begun a dialogue with the World Bank and India on the study’s conclusions and recommendations.

## Renewable Energy

### Strategy

ESMAP’s principal objective is to contribute to the international efforts to provide clean energy use by the mainstreaming of solar, wind, and small hydro-power technologies into the programs of local governments, the private sector, and development institutions such as the World Bank.

ESMAP is continually expanding the range of bankable renewable energy investment operations entering the project pipeline. The Programme is introducing innovations in renewable energy lending, such as the solar photovoltaic (PV) concession systems for Argentina and Brazil and the joint public-private concession in Cape Verde. Renewable energy interventions are reaching upstream, as power sector reform and private sector participation are beginning to provide explicitly for renewable energy development. Investments are growing both in small-scale and large-scale renewable projects. At the small-scale end of the spectrum, ESMAP has financed micro-PV lantern demonstration projects that are successfully leading the private sector toward serving the very poorest energy consumers. At the opposite end of the spectrum, a comparatively modest outlay of ESMAP re-

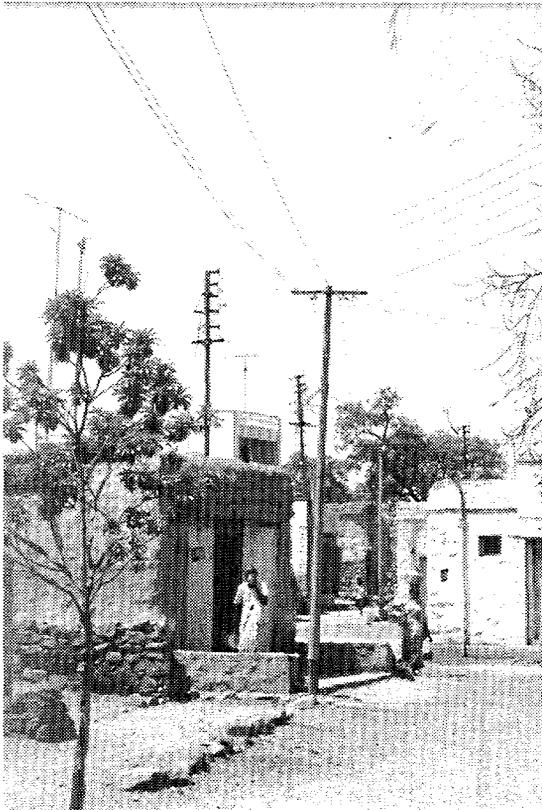
sources has leveraged an unprecedented \$225 million for a decentralized renewable electrification project that is now under preparation in Argentina.

#### *Activities in 1997*

New and larger renewable energy projects catalyzed by ESMAP are assuming increasing prominence in World Bank energy lending. In Argentina, a stand-alone, first-of-a-kind rural electrification concession has advanced to the appraisal stage. This solar and small-hydro electrification project is a significant departure from its predecessors, which were based on retailer financing and energy service company (ESCO) models. The project has also produced some significant conceptual advances, notably in defining and providing for the proper role and rationale for short-term capital subsidies. A second project in Brazil has already begun to build on the insights of the Argentine concession, and the market potential is substantial.

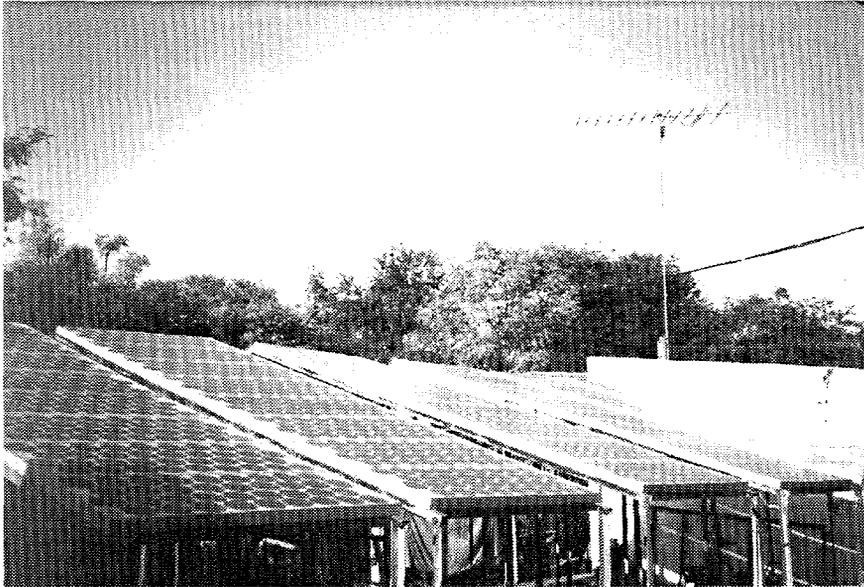
ESMAP continuously innovates. For example, the Egypt solar thermal power project, in preparation, is breaking new ground in that its funding is expected to come from the private sector, an unprecedented development for this type of energy project. This development would lead privatization and reform in the Egyptian power sector. In addition, the project presents a rare new case in which the World Bank serves as implementing agency for a GEF project under Operational Policy 7, which boosts new and emerging energy technologies. Finally, the World Bank may provide a first-ever investment guarantee for solar thermal to help distribute and mitigate investment risks. ESMAP is playing a leading role in these developments as well.

ESMAP continues to respond to small-country needs. A preinvestment study for Cape Verde recently identified approximately 12,000 households that need and are willing to pay for decentralized solar power. The PV project that developed goes beyond electrification and establishes renewable energy provisions as an integral part of the reform process. Further creativity was required to solve the challenges of the small size of the market and the absence of an existing infrastructure for delivery of electric service. The project responded with a framework for coupling public and private infrastructure. Public sector, community solar installations were first provided through the concessionaire to help



Rural electrification lines in a village in Maharashtra, India, about 150 kilometers north of Pune. The rural electrification program has brought electricity to about 65 percent of rural households in the region.

*Photo courtesy of Douglas Barnes.*



Photovoltaic panels (top) and instrument array for battery charging (bottom) at the Urjagram village program in Gujarat, India. The project provides solar electricity to the village. Although the government spent a considerable amount of money to establish this pilot project, the concept has not yet spread because it is not market driven. ESMAP is promoting commercialization and community control of alternative energy infrastructures to ensure more effective dissemination.

*Photos courtesy of Douglas Barnes.*



enlarge the concessionaire's business and establish the market infrastructure. To become truly profitable, however, the concessionaire must then provide solar systems to meet commercial demand. Thus, the first-cost grant necessary to launch the project will be rapidly phased out, and the system will become self-sustaining. Perhaps the most remarkable feature of the project is its swiftness of delivery. In a single year, the project is expected to advance from concept to Board approval.

Finally, the poorest people were served through tests of solar lamps for the lower end of the market in Kenya and Niger. The results were similar in the two countries and encouraging in both cases. Even though consumers realized that the lamps were not perfect, they judged them acceptable (see Box 2.2). Currently a test is under way to see whether ESMAP can interest the private sector in both countries to start and continue importing and selling these lamps without the Programme's assistance.

### Energy Sector Reform

Governments of developing countries and transition economies continue to seek to increase the efficiency of their energy sectors by fostering the introduction of private capital and private sector management. However, progress in some regions and countries has been slow.

### Power Sector Reform

#### Strategy

The objectives of ESMAP's power sector reform activities are as follows:

- To increase efficiency and create more competition in the power sector through unbundling integrated companies and expanding the role of the private sector in various segments of the market.
- To encourage governments to establish new legal frameworks and separate and transparent regulatory mechanisms for the pricing of power, selection of projects, and operation of more competitive power markets.
- To address poverty, especially in rural areas, by creating new legal frameworks to encourage private capital to install facilities that can provide adequate returns to investors and reduce the burden of governments in meeting the needs of the poor.

#### Issues

Reform of the power sector has begun in many countries, but progress generally has been slow. Latin America has seen the greatest progress, particularly in unbundling of the sector, but much remains to be done, especially in Central America. In Asia, the financial crisis has forced some of the severely affected countries to put unbundling and privatization plans on hold; the region still can benefit, however, from a variety of adaptations to current conditions (see Box 2.3). In Eastern Europe and Central Asia, reforms are emerging—notably in Russia, in some Commonwealth of Independent States (CIS) countries, and in Poland—but much remains to be done before efficient competitive power markets can be established. The Republic of Slovenia is taking another step in this di-

#### Box 2.2. Lighting Services for the Rural Poor

Solar lanterns are presumed to be too small and unprofitable for solar companies to sell. Thus, they are usually found in very limited quantities, if at all, in only a few stores in African capital cities. In addition, the lanterns that are available are generally ones designed for the weekend market in industrial countries rather than for everyday use in developing countries.

As a way of learning more about the lighting needs of rural households and of obtaining feedback from end-users on the suitability and affordability of such equipment, ESMAP placed some 500 lanterns of different makes and models in rural stores in Kenya and Niger. Subsequent surveys demonstrated that current solar lantern models—even though not specifically designed for daily use in Africa—are seen to enhance living standards substantially, with a relatively short payback time. End-users have specific preferences for certain types of solar lanterns, and some 60 percent of the preferred types were still functioning after 1.5 to 2 years of use, at which point they had saved the end-user enough money from kerosene, candles, and dry-cell batteries to pay back the lantern's investment costs. The solar equipment market in Africa is likely by far to be the largest for this type of equipment.

End-users who had been using a candle or small kerosene wick lantern before they purchased their solar lantern quickly adopted the solar model as their new norm. Although they were satisfied with the performance, they also wanted more benefits than a single solar lantern could provide. It therefore makes sense to promote different solar lantern systems that can be expanded in power capacity over time (for example, to allow plugging in a radio and a second solar module), as well as small but technically sound solar home systems that can be built up modularly.

### Box 2.3. Responding to the Financial Crisis in Asia

The ongoing financial crisis in Asia is a reminder to ESMAP of the Programme's origins as a response to the energy crisis of the 1970s. In the 1990s, the problem is not security of supply, as it was in earlier times, but unbalanced supply and the postponement of many independent power projects that were leading the way toward sector reform. ESMAP has the potential to respond creatively and flexibly to conditions of crisis and has been emphasizing several strategies to ensure that the energy sectors of Asia remain a positive force in the development process:

- Establishment of more transparent market rules, separate regulation, and legal parameters of more competitive markets to pave the way for reform.
- Careful scrutiny of the need for energy investments in current market conditions.
- Exploration of regional power pooling and interconnections to relieve existing local overcapacity and to defer investments in energy-poor regions.
- Accelerated exploitation of domestic and renewable energy resources to conserve scarce foreign exchange while preserving the local and global environment.

rection as well. In cooperation with the Foreign Investment Advisory Service (a joint activity of the World Bank and the International Finance Corporation), ESMAP has been providing technical assistance to the Republic in establishing the institutional frameworks for power and other infrastructure investments (see Box 2.4). In Africa, however, energy sector reforms have been more sporadic, and most countries continue to suffer from inefficiencies and a poor climate for power investment. The absence of strong donor support for power reform is an impediment to accelerating the Bank's policies on rural electrification, renewable energy, poverty, and the environment.

#### *Activities in 1997*

ESMAP provided support for the elaboration of laws aimed at encouraging development of regulatory

frameworks that would promote private investment and sector reform in three countries:

- In Cambodia, political instability has curtailed work in support of reform of the power sector. However, this work should resume early in 1998 and will consist of preparation of a new energy strategy and efforts to accelerate passage of the draft electricity law. The energy strategy is intended for consideration by the new government that is expected to be elected in mid-1998.
- In Poland, ESMAP completed a five-year program that led to enactment of a new Energy Law in July and the establishment of an Energy Regulatory Authority in December 1997. The Energy Regulatory Authority is preparing licenses for all electricity, heat, and gas enterprises and within two years will take full responsibility

### Box 2.4. Slovenia: Support for Project Financing

The government of the Republic of Slovenia requested assistance from ESMAP and the Foreign Investment Advisory Service (FIAS), a joint facility of the International Finance Corporation and the World Bank, to examine the legal and institutional framework for foreign direct investment in the country's infrastructure. Based on the government's intention to attract private investment into the electricity, telecommunications, transportation, and water supply sectors, ESMAP and FIAS were asked to analyze the environment in these areas for build-operate-transfer (BOT) type investments. The two groups were also invited to offer recommendations on how to improve the implementation process of such projects.

With support from the World Bank's Private Sector Development Department and ESMAP, a Bank team conducted a field mission during June 1997. At the beginning of this visit, the team held a half-day workshop for senior government officials on international experiences in project finance transactions and the supporting roles required from governments. The team also met with many key government representatives, including senior executives of the major infrastructure parastatals, as well as with private investors interested in infrastructure projects. At the end of September, FIAS also organized an investor roundtable attended by 14 senior executives from the private sector, 8 specialists from multilaterals and foreign governments, and 29 government officials. At the two-day roundtable, private sector and government representatives exchanged ideas on impediments to a stronger involvement by the private sector in Slovenia's infrastructure and on means of facilitating private participation.

In support of this work, Slovenia's Ministry of Finance asked Dr. Mojmir Mrak, associate professor at the University of Ljubljana, to conduct an analysis of the future financial needs for infrastructure investments. The resulting study, "Infrastructure Investment in Slovenia" (September 1997), was distributed to the government officials participating at the investor roundtable.

### Box 2.5. Vietnam: Developing the Legal and Regulatory Foundations for Reform

Legal and regulatory reform are key elements of the transition from an integrated publicly owned and managed power sector to one that is functionally divided into a larger number of operating entities with increasing private ownership. ESMAP has provided support to governments to prepare draft electricity legislation and supporting regulations as part of the reform process. In Vietnam, ESMAP is advising the government on the scope and substance of an electricity law and its supporting regulations. The counterpart group in the government is headed by the minister of industry. The proposed law will pave the way for a distinct regulatory body and for licensing of individual sector operations by *function* (that is, generation, transmission, bulk supply, distribution, and retail supply). This will facilitate the planned separation of transmission as a profit center and will allow for private entry into distribution franchise operations. One of the key functions of the regulatory body will be to set electricity tariffs to allow for adequate financial recovery and ability to finance future investments. The electricity law will likely be promulgated in 1998. Follow-up support for establishing a regulatory body and training its staff is being provided by a World Bank grant and by funding from the Asian Development Bank (ADB).

for regulation of retail pricing. Privatization of many facilities is now expected to accelerate.

- In Vietnam, ESMAP and Vietnamese counterparts have drafted an electricity law that is expected to go to a plenary session of the National Assembly in March 1998. This will be a considerable achievement and may lead to greater separation of the regulatory and productive functions currently exercised by government ministries (see Box 2.5).

Understanding of regulation and reform in Eastern Europe has been enhanced by an ESMAP study of power regulation and restructuring in Poland, Hungary, and Ukraine. This study is becoming a key reference source for governments in the region that have been increasing their efforts in 1997 toward reform of their power sectors.

In Southern Africa, ESMAP is providing ongoing support to the development of a Southern Africa Power Pool (SAPP). In 1997, ESMAP held a workshop on project finance. Further work will focus on issues related to regulation, governance, and review of the SAPP agreements.

#### **Reform in the Hydrocarbon Sector**

##### *Strategy*

ESMAP's primary strategy in the hydrocarbon sector is to improve the efficiency of operations in developing countries and create a favorable business environment through energy development policy, pricing policy, and restructuring of the oil and gas sectors. This work includes preparation for increased private sector involvement, introduction of or improvements in the legal and regulatory framework,

and assistance in the implementation and evaluation of privatization programs.

Many client countries accept the need to restructure their oil and gas sectors in order to attract the investments and management skills they need to develop domestic hydrocarbon reserves and to introduce efficiencies in the downstream segment of the sector. ESMAP's strategy for reform in the oil and gas sector usually includes the following recommendations:

- *Upstream:* An open and competitive hydrocarbon sector should be developed, based on exploration and production carried out by private companies.
- *Downstream:* Refineries and oil product distribution should be open to competition wherever possible. In the gas sector, although transmission and distribution are monopolies that should be regulated, various other points in the gas chain are amenable to competition through separation of production, transmission, and distribution services (unbundling). Further competition can be introduced by providing for open access to pipelines and open bidding for the construction of transmission and distribution networks.

##### *Activities in 1997*

In Vietnam, ESMAP is conducting a study on the reform and restructuring of the PetroVietnam Gas Company (PVGC), which has been assigned the role of gas trader by the government in anticipation of future associated and nonassociated gas production and sales. The objective of the project is to prepare the PVGC for the evolution of a gas industry under different phases of gas development. The project

focuses on scenarios for the growth of the gas production sector and the development of gas markets. It includes a detailed assessment of the present organizational structure of the company and analyzes options for organizing and commercializing the core business together with the necessary institutional, legal, and contractual framework. ESMAP staff presented a training program on these issues for government officials.

With ESMAP assistance, Bolivia completed a series of comprehensive and complementary policy initiatives aimed at deregulating and restructuring the hydrocarbon sector and making it attractive to potential investors. These initiatives included a new hydrocarbon law and implementing regulations, a national regulatory law, and a capitalization program for the state oil company, YPF.

ESMAP also provided assistance to Bolivian regulatory agencies in various areas related to the implementation of this reform program, including safety and technical regulations, economic regulations relating to gas transmission and distribution, and tax collection in the hydrocarbon sector.

### *Energy Efficiency*

A key focus of the ESMAP program continues to be the improvement of efficiency in the production, transmission, distribution, and consumption of energy.

### *Issues and Strategy*

Developing and transitional countries have the potential to make a significant impact on improving the competitiveness of their economies and their local environmental conditions and on decreasing the potential for global warming by improving efficiency in all segments of the energy chain, from the production to the consumption of energy. Most energy-efficiency gains in the recent past have come from top-down reform and restructuring at the sector level. ESMAP's strategy is to expand and complement these macro initiatives with local grassroots (bottom-up) projects, most of which are designed to remove or reduce obstacles to the introduction of market-driven and more energy-efficient practices, equipment, and technology.

ESMAP projects seek to increase access to efficiency gains, available alternatives, and best practices in energy management. As a result of reforms in the power sector, the role of government in many countries has changed from central energy planner to market facilitator, and ESMAP's energy reform and efficiency programs are consequently focusing on helping governments perform the role of directly supporting private sector initiatives. In the oil and gas sectors, many reform issues remain to be tackled. Therefore, ESMAP continues to emphasize restructuring, price reform, and reduction of cross-subsidies that encourage inefficient energy use. The Programme seeks to reinforce these efforts by providing upstream assistance and facilitating the emergence of local energy entrepreneurs.

In a market-driven environment, greater emphasis is placed on empowering energy consumers to deal with a competitive supply of energy, a wide variety of energy tariffs and energy supply choices, a more competitive economy, and a knowledge-based society, while promoting economic growth in an environmentally sound framework. In this context, ESMAP will continue to develop pilot operations improving energy efficiency in nonenergy operations. Substantial gains in energy efficiency are possible in water supply, sanitation, housing projects, and so on.

Based on a review by ESMAP of the critical success factors for energy efficiency programs,<sup>2</sup> on the results of a review of the energy service industry,<sup>3</sup> and on country experience in the design and implementation of efficiency projects at the World Bank, ESMAP developed an approach for its efficiency work involving four elements as part of a Country Assistance Strategy:

- Establishing country teams and training team members to form a nucleus of expertise and an interface in a region to sustain technology transfer. In some cases, the local teams would be backed up by an international team of consultants or experts from regional or centralized groups of the Bank.
- Developing a portfolio of pilot demonstration schemes at industrial and commercial establishments in a manner that would generate local "best practice" case studies for dissemination.

2. "Report to the ODA and the World Bank: Critical Success Factors for Energy Efficiency: Programmes and Agencies," May 1994.

3. "A Review of the Energy Service Company (ESCO) Industry in the USA," March 1996; "The Canadian Energy Performance Contracting Industry," Draft, January 1997.

- Conducting strategic reviews of prospective medium- and long-term niche markets for energy services.
- Formulating a medium-term plan of action to transfer energy efficiency delivery mechanisms to the country or region, including the packaging of projects for financing by the private sector, multilateral development banks, and donors.

Three factors are fundamental in applying the above elements:

- The assistance must be tailored to the country's position regarding economic reform, the degree of participation—or lack of it—from the private sector, and the World Bank's policy dialogue over the energy sector.
- ESMAP will need to increase its role linking and disseminating knowledge to help structure pilot projects, disseminating results to the donor-investor community, and scaling such projects up to bankable size. This in turn requires a more agile structure to design, deliver, and monitor projects.
- Further development will be needed with respect to regional and interagency partnerships to leverage resources, share practical knowledge, and mobilize funds for implementation.

Investments in energy efficiency throughout the energy chain are recognized as among the best options for reducing greenhouse gases and increasing the competitiveness of industrial consumers, as they represent investments with life-cycle benefits from energy savings that more than offset investment and other costs. However, numerous barriers still stand in the way of the implementation of financially sound energy efficiency projects (see Box 2.6).

#### *Activities in 1997*

A major ESMAP activity during 1997 was the preparation of the second Energy Efficiency Roundtable, held in Washington, D.C., on April 24–25, 1997. The roundtable, organized by the World Bank's energy efficiency network, was attended by task managers from multilateral development banks (the World Bank, Inter-American Development Bank (IDB), ADB, and the European Bank for Reconstruction and Development (EBRD)); public and private energy-efficiency service providers; financial service providers for energy projects; public and private institutions with experience or interest in the development of the energy efficiency market; and practitioners in the field of energy efficiency services in developing and industrialized countries (see Box 2.7).

In Latin America, ESMAP's energy efficiency activity has continued with emphasis on progressing from the M&T stage to the development of an energy service industry that would focus on industrial consumers. As a follow-up to the activity in Peru, it has been proposed to develop an International Finance Corporation (IFC) operation that would support the development of a local ESCO.

ESMAP work in Bahia, Brazil, which began with M&T and energy management service activities, is being extended in the preparation of a \$300 million energy efficiency project that will be cofinanced by the World Bank, among other financial institutions. This project, scheduled for appraisal in 1998, will include the following components:

- A pipeline of pilot demonstration efficiency projects is envisioned both on the supply and demand sides. These projects will be implemented by distribution utilities, ESCOs, and energy contractors.

#### **Box 2.6. Gaps to Bridge**

Barriers that impede the implementation of energy efficiency projects include the following:

- Inadequate information among enterprises and financial institutions.
- Limited technology transfer.
- Project, market, and implementation risk for enterprises.
- "Insignificance" to the enterprise of many high-return energy efficiency projects.
- High transaction costs for designing, packaging, and implementing projects.
- Difficulties in arranging financing.
- Institutional constraints.

**Box 2.7. The Second Energy Efficiency Roundtable, April 24–25, 1997**

Reflecting the pace of reforms in the energy sectors around the world, the various speakers at the roundtable highlighted best practices on institutional and financial delivery mechanisms to design and implement energy efficiency projects, rather than just technology applications. A recurrent topic throughout the discussions was the fact that energy efficiency has emerged not only as the right thing to do in the context of environmental concerns, but as a growing market with good opportunities for business, quoted as a \$8 to \$20 billion market in non-OECD countries. This is particularly relevant as the competition in the power and gas sectors to capture and retain customers is intensifying.

A second message was that although supply-oriented reforms in the energy sector are becoming a mainstream product with common structures, energy demand oriented programs and projects—under the efficiency umbrella—are being designed and implemented under a broad spectrum of structures, hence the lack of unique solutions. However, they all converge in one aspect: a consumer-focused orientation, thus broadening the range and quality of options to consumers.

Third, regarding the role of utility-based demand-side management and availability of financing, the discussions concluded that (a) in the current competitive environment, utilities are competing for customers using different market driven tools, including distributed generation, ESCO subsidiaries, and pricing instruments; and (b) lack of financing resources should no longer be considered a major barrier. Instead, current barriers are the lack of credible sponsors, and project and investment expertise to present bankable projects. This is an area where the multilateral development and commercial banks have a role to play in providing the basic infrastructure to demonstrate, disseminate, scale-up, and package projects.

- A financing and institutional mechanism will be developed to replicate successful pilot projects in other states in Brazil.
- An information component is planned to disseminate best practices.

In Africa, previous efficiency projects succeeded in creating awareness and disseminating technical skills in the workplace. However, the projects generally fell short of generating sustainable and highly professional businesses either in the public or the private sector. This may have been a reason why donors have not been very keen on supporting other efficiency project proposals in this region. However, ESMAP has begun a project in Tunisia that will evaluate energy savings achieved, highlight the potential for additional savings, and define priority actions to realize those savings.

In the oil and gas sector, several projects are under way and proposed. A primary goal is to assist African countries in establishing appropriate policy and fiscal changes to encourage the most efficient use of oil and gas products, to develop markets for previously flared gas, and to use available but presently unmarketable gas to displace less efficient or more polluting fuels. In addition, ESMAP is seeking to increase the efficiency of production, refining, transportation, and distribution of petroleum and gas products.

In Asia, the political upheavals in Pakistan have unfortunately contributed to the inability of the government to come to closure on the fundamental reforms needed and agreed upon to enable the National Energy Conservation Center (ENERCON) to carry

out its work as the lead agency for energy efficiency work in Pakistan. In 1997 it was decided to close the ESMAP activity.

In Mongolia, field work has been completed to prepare an energy efficiency strategy and action plan for implementation in the district heating and power sectors. A World Bank lending operation (\$35 million) is being prepared on the basis of the ESMAP study.

District heating continues to be a focus of ESMAP activities in Central and Eastern Europe. These projects have led to increased participation of ESMAP staff in preparing and appraising district heating projects financed by the World Bank and others. The regional ESMAP study, *Increasing the Efficiency of Heating in Central and Eastern Europe*, for which a draft final report has been prepared, highlighted the need to investigate the local conditions that determine whether district heating or more decentralized heating options are the most cost-effective solutions. In several of the cities for which case studies were prepared, follow-up projects are under consideration.

ESMAP has provided technical assistance in the Slovak Republic to demonstrate the application of monitoring and targeting (M&T) techniques in the industrial sector to stimulate the development of energy management systems. This activity was extended in 1996 to assess the feasibility of third-party financing to promote the use of M&T in Slovakia. The project was completed in 1997 with the dissemination of the results in a workshop in Slovakia and two training modules on M&T. The companies involved in the M&T may be able to get funding for their energy-saving projects from a new revolving fund

for environmental projects that will be set up in 1998, possibly with World Bank participation.

In the hydrocarbon sector, the continuation of reform and reduction of gas venting and flaring are other ESMAP activities in former Soviet Union (FSU) countries that will ultimately lead to better conservation measures and more efficient use of energy resources.

## Energy Trade

### *Electricity Trade*

#### *Issues and Strategy*

International trade in electricity is increasing within industrial regions, such as in the Nordic countries, within continental Europe, and within North America. The benefits of regional power trading include cheaper sources of electricity, postponement or cancellation of expensive investments, mitigation of pollution, and broadened public access to electricity. Many developing countries are discovering these benefits, and regional electricity markets are under development or consideration in several areas of the world, especially in Southern Africa, in Central and South America, and in the Mekong area in Asia.

Transport of electricity over long distances has become increasingly feasible from a technical viewpoint and increasingly attractive from an economic perspective. Nonetheless, growth in international electricity trade, especially development of regional power markets, will require overcoming significant economic and political obstacles, and it will call for increased cooperation between potential trading partners. Sophisticated organizational structures ("pools") need to be put in place to ensure the effectiveness of technical, economic, and financial cooperation, as well as the resolution of conflicts that may arise between the partners. Another obstacle has been the relatively slow progress of power sector reform in various prospective countries, where unbundling of the production, transmission, and distribution functions would facilitate flexibility in developing electricity trade.

ESMAP's strategy in this energy trade is to investigate the prerequisites and constraints related to regional pooling arrangements, to raise awareness and promote the concepts of interconnection, and to transfer techniques and information through workshops and focused technical assistance to policymakers.

#### *Activities in 1997*

Two years ago, ESMAP started to investigate regional power markets and undertook a review of the organizational and economic issues in international electricity trade for different regions of the world. During 1997, ESMAP, in collaboration with the operations divisions of the World Bank, provided support to the development of several regional power markets:

- The Southern Africa Power Pool (SAPP).
- The 12 countries of the Southern African Development Community (SADC) area—especially Botswana, the Congo Democratic Republic, Mozambique, South Africa, Zambia, and Zimbabwe.
- All the Central American countries, from Guatemala to Panama.
- The Greater Mekong Region (Cambodia, Laos, Thailand, Vietnam, and Yunnan Province of China).

Several additional potential regional markets are in the pipeline for future support:

- The Western African region encompassing Benin, Côte d'Ivoire, Ghana, Nigeria, and Togo.
- The Maghreb and the Machrek areas in North Africa.
- The Mercosur area in South America (Argentina, Brazil, Paraguay, and Uruguay).

It is recognized that the development of power trade in a region is a long-term process. Consensus building is a key element for success in developing and implementing a regional power market. Therefore, ESMAP is embarking on a series of workshops and follow-up technical assistance programs to support these regional efforts.

#### *International Gas Trade*

In 1997 ESMAP was not involved directly in international gas trade projects, but several ESMAP activities are focusing on market studies and on the institutional and regulatory frameworks that are necessary to allow international gas trade projects to proceed. Programme activities incorporating this focus include the following:

- *The Africa Gas Initiative.* This effort evaluates gas reserves, identifies market potential, and reviews the required institutional and regulatory framework in several African countries, including Angola, Cameroon, Congo, Côte d'Ivoire, and Gabon. The ultimate objective is to attract private sector investments for the development and implementation of these projects to enable domestic utilization and international gas trade.
- *Deregulation and restructuring of the hydrocarbon sector in Bolivia.* ESMAP has provided assistance to a comprehensive policy initiative aiming at deregulating and restructuring Bolivia's hydrocarbon sector and making it attractive to potential investors. The initiatives included a new hydrocarbon law and implementing regulations, a national regulatory law, and a capitalization program for the state oil company, YPFB. These activities provided the basis for private investments in the upstream sector and the signing of a Bolivia-Brazil gas pipeline agreement comprising a 3,150 kilometer pipeline from Bolivia to São Paulo and Porto Alegre in Brazil.



# 3

## ESMAP Management and Finances

Despite a general decrease in development assistance worldwide, ESMAP donors' financial commitment to the Programme remained stable in 1997. Contributions received during 1997 totaled \$8.4 million, virtually the same as the 1996 level (after adjusting for a 1996 contribution recording error), and expenses, or disbursements against funds received, totaled \$8.6 million compared with \$8.5 million in 1996. Non-World Bank donor contributions totaled \$6.9 million in 1997 compared with \$7.0 million received in 1996. Contributions to core (net of the World Bank's contribution of \$1.6 million, which is also considered core) dropped from \$1.7 million from \$2.7 million in 1996. This brought the share of core from 38 percent of total non-World Bank donor contributions in 1996 to 24 percent in 1997. Two new funding agreements were put in place in 1997 to receive core contributions from Denmark and from Germany through trust fund arrangements, thereby simplifying reporting requirements. Work on new agreements with Finland, Norway, and Switzerland was initiated in 1997, and contributions are expected under these agreements in 1998.

In the course of 1997, ESMAP management undertook to review the overall strategy of the Programme in order to confirm its continued relevance and to provide a framework for its strategic direction in the medium term. The results of the review were summarized in an ESMAP Strategy Pa-

per, which was made available to the TAG in early 1998, and are expected to be discussed at the Consultative Group Meeting in April 1998.

### **Consultative Group Membership and Management Change**

Following a proposal of the chairman of the Consultative Group, and after consultation with the incumbent members, the Consultative Group was strengthened by the appointment of an additional "at-large" member, Mr. Rufino Bomasang of the Philippines. Mr. Bomasang is president and chief executive officer of the Philippine National Oil Company-Exploration Corporation. A mining engineer and geologist by training, Mr. Bomasang has more than 20 years of experience at top management and policy formulation levels in the energy sector. Before assuming his present position, Mr. Bomasang served with distinction as undersecretary in the Department of Energy of the Philippines and acting director in the Office of Energy Affairs, in the Office of the President, with primary responsibilities for energy policy and the overall monitoring and coordination of energy activities in the country.

In July 1997, Mr. Richard Stern, who had served as ESMAP's program manager since December 1991 and, simultaneously, as director of the Industry and Energy Department since 1993, took on new senior

management responsibilities with the World Bank. Subsequently, the chairman of the Consultative Group, Mr. Jean-François Rischard, proposed to Consultative Group members that Mr. Stern continue to contribute to the Programme by becoming the new chairman of the Consultative Group. In tandem with this change, Mr. William Porter, who had been deputy manager of ESMAP since early 1996, took over as manager of ESMAP.

### Technical Advisory Group Membership Changes and Activities

The terms of two members of the Technical Advisory Group (TAG), Mr. Eugene Godley and Dr. Bruno Philippi, ended in 1997. Both had served on the TAG since its establishment in 1991 and had been reappointed twice, in 1993, when the TAG was reorganized and its membership reduced from six to four members, and for a last mandate of two years in 1995. Mr. Godley had also served as the moderator of the TAG since 1993. In accordance with the new Terms of Reference of the TAG, both Dr. Philippi and Mr. Godley had served for a maximum of two consecutive two-year terms. During their tenure they brought to ESMAP exceptional knowledge of the oil and gas and power sectors and invaluable experience as policymakers in the energy sector. The guidance they provided to ESMAP management and to the Consultative Group during the past six years was instrumental in helping to steer the Programme toward its present priorities.

In October 1997, two new members were appointed to the TAG: Ing. Herbert Müller Costas and Mr. Jan Moen. They join Dr. Youba Sokona and Mr. Andrew Barnett, whose terms began in late 1996. The new members bring impressive credentials to the group:

- *Ing. Herbert Müller Costas*, an economist and industrial engineer from Bolivia, had been minister of state in charge of energy and hydrocarbons in Bolivia; president of the Central Bank of Bolivia; and undersecretary for monetary policy, banking, and credit. During his tenure as minister of energy, he signed a key contract for trade of natural gas between Bolivia and Brazil, which launched a process of energy integration in Latin America's Southern Cone, and he initiated, with ESMAP's support, important restructuring in the electric power and

hydrocarbons sectors in Bolivia that have paved the way for the privatization of public energy enterprises. Ing. Müller has agreed to serve as the new moderator of the TAG.

- *Mr. Jan Moen*, from Norway, is the director of the Demand-Side Management and Market Division of the Norwegian Energy and Water Administration and is the regulator for electric power in Norway. Mr. Moen has lectured, written abundantly, and provided consultancy services around the world on energy issues. He brings to ESMAP more than 18 years of high-level professional experience in the fields of tariffs and load studies, development of new tariffs, energy planning and forecasting, development and evaluation of large-scale energy conservation programs, and development of power market trading relations and development of rate-of-return and performance-based regulation routines of distribution utilities.

The TAG met on two occasions in 1997, first in April (immediately before the Consultative Group meeting) and in October. The second meeting, in which Mr. Godley also participated, served as a transitional gathering, facilitating the introduction of the new members to ESMAP themes and priorities. During the year, the TAG submitted three reports to the Consultative Group: a general reflection on ESMAP by Dr. Bruno Philippi; a review by Dr. Youba Sokona of an ESMAP urban household energy project in Chad; and a general assessment of ESMAP's situation, orientations, and prospects. In addition, the members of the TAG maintained frequent contacts with the ESMAP management team and task managers, providing informal advice and guidance.

### Staffing

The ESMAP work program comprised some 82 active projects in 1997. The program was carried out by 40 energy sector specialists with expertise in the areas of efficiency, environment, rural and household energy, renewables, restructuring and reform, and oil and gas. In addition to their work on ESMAP products, these specialists are shared with, and contribute substantively to, the delivery of the World Bank's energy program. Among those experts are individuals made available to ESMAP and to the World Bank through secondment and special-assignment ar-

rangements with partner organizations in the private sector and in donor countries, including government agencies and nongovernmental organizations (NGOs). These arrangements allow ESMAP and the World Bank to draw from a broader range of experience and expertise, as they facilitate the transfer of first-hand knowledge of ESMAP and World Bank programs to organizations that share development objectives in the energy sector.

With the regrouping of the World Bank sector specialists across the organization into professional networks, communication of ESMAP priorities and objectives to the Bank staff at large has been enhanced, and the flow of information in both directions on good practice and lessons learned has been facilitated. Supporting the information exchange is the Bank's Energy Sector Knowledge Management Group, which was launched in 1997, expanding the services of the former practice management team. The Knowledge Management Group is responsible for the development of relevant energy sector knowledge products and the dissemination of global and country-specific information on high-priority energy sector topics. As a part of this effort, a redesign of ESMAP's Web site was planned for 1997. This work has been delayed and is expected to be implemented in the course of 1998.

### Program Evaluation and Administration

In July 1997, the United Kingdom's Department for International Development (DfID) sponsored a workshop in Washington at which ESMAP staff were introduced to the Logical Framework (LogFrame) methodology for project design and monitoring. As a result of that workshop, ESMAP management decided to adopt LogFrame in all new activities. It is expected that the use of the LogFrame will facilitate evaluation efforts at the project level, thematic level, and at the overall program level. More substantive evaluation at all these levels is expected to contribute to better integration of lessons learned into new

activities, leading to better project design, and ultimately to better projects. Supporting the LogFrame initiative are efforts to reformulate *ESMAP Operational Guidelines* and *ESMAP Guidelines for Submission of Proposals*.

ESMAP funding was applied to activities identified as priorities in previous communiqués of the Consultative Group, ESMAP annual report, and other communications from ESMAP management to the donors.

ESMAP relies principally on the World Bank's accounting system but maintains an additional information system for detailed budget monitoring and donor reporting. In 1997 the work of integrating and coordinating ESMAP's administrative procedures and practices with the World Bank's procedures was advanced, although not fully implemented, as the Bank is preparing for a complete renewal of its systems structure. Renewal efforts are to be launched in early 1998, with an expected completion date of end-1999. ESMAP program management will keep abreast of the progress of systems renewal and will ensure that the requirements specific to the Programme will be met in the new systems structure. In the meantime, ESMAP will continue to maintain a separate accounting system to ensure that funds are accounted for accurately and applied straightforwardly and transparently.

### Funding

In broad terms, ESMAP's funding can be categorized into four types, differentiated by the restrictions that donors impose on the use of the funds. These are unrestricted, "core" funding; "thematic" funding; "country program" funding; and "project-specific" funding, as elucidated in Box 3.1.

The flexibility offered by core funding, and to a lesser degree by thematic funding, allows ESMAP to use its resources more efficiently. Sufficient core funding ensures that ESMAP can respond in a just-in-time

#### Box 3.1. Funding Types

- "Core" funding. These funds are unrestricted and may be used for any project or activity of the Programme.
- "Thematic" funding. These funds are restricted in that they are approved only for activities that have a common theme—such as household, rural energy, and renewables—but are less restrictive than project-specific funding (see below).
- "Country Program" funding. Use of these funds is restricted to providing technical assistance to a specific country.
- "Project-specific" funding. These funds may be used only for projects or activities for which specific approval has been obtained from the donors, prior to the commencement of work.

manner to opportunities as they arise, and can maintain access to appropriate expert skills. In addition, because the application of core and thematic funds to specific projects does not require the execution of individual agreements, it reduces the administrative burden associated with monitoring and reporting on separate agreements for both ESMAP and the donor.

### Contributions Received

ESMAP receipts totaled \$8.4 million in 1997, virtually the same level as in 1996. A total of eight donors, including the World Bank, contributed to the Programme in 1997. The World Bank's contribution of \$1.6 million (up from \$1.5 million in 1996) represented 19 percent of total receipts. Table 3.1 shows actual ESMAP receipts by donor for 1994–97.

To allow for a modest program expansion, ESMAP management would need to pursue more vigorously other potential donors outside of the official development assistance group. In the past, roadblocks (in the form of World Bank legal limitations) have prevented the Programme from accepting contributions from the private sector if those funds are earmarked for specific projects or themes. These issues are now being addressed within an overall cofinancing context. Prospects for arrangements with

private sector donors are expected to improve, and if they do, ESMAP management will initiate a program of fundraising with interested parties.

### Core and Thematic Funding

In 1997, core contributions to ESMAP from donors other than the World Bank totaled \$1.7 million, down from \$2.7 million in 1996. In addition, the World Bank contribution of \$1.6 million in 1997 is considered core. Among the donors, those who made contributions to core included Denmark, Germany, Sweden, and the United Kingdom. Work on new agreements for core contributions was initiated in 1997 with Finland, Norway, and Switzerland, and deposits associated with these agreements are expected in 1998. Thematic funding increased in 1997 to \$700,000 from \$200,000 in 1996 as payments against existing Netherlands umbrella funds were received. No new thematic funding arrangements were finalized in 1997. Core and thematic contributions—excluding the World Bank's contributions—for 1994–97 are shown in Table 3.2.

### Country Program Funding

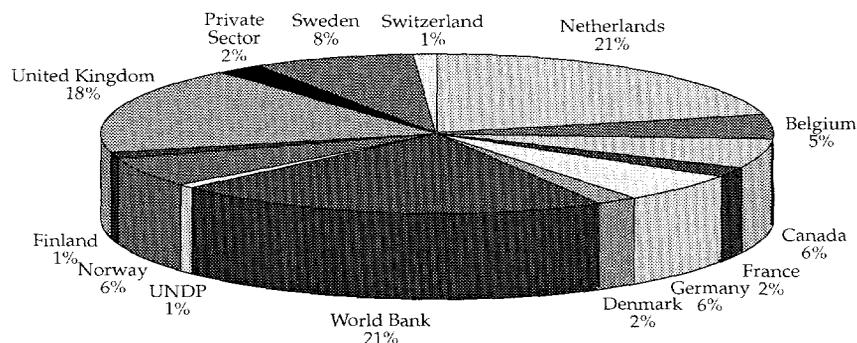
Country program funding totaled \$1.2 million, representing the first tranches of the \$1.7 million Bolivia

**Table 3.1. ESMAP Receipts, 1994–97**  
(US\$'000)

Donor	Year				Total	Percent of total receipts	Percent of which, core <sup>a</sup>	Percent of total core <sup>a</sup>
	1994	1995	1996	1997				
UNDP	100.0	82.0	0.0	0.0	182.0	0.5	0.0	0
World Bank	2,182.4	1,862.3	1,496.0	1,600.0	7,140.7	21.3	0.0	0
Belgium	700.4	398.7	646.9	0.0	1,746.0	5.2	496.4	6
Canada	0.0	355.6	809.3	732.4	1,897.3	5.7	0.0	0
Denmark	104.7	141.5	0.0	392.8	639.0	1.9	392.0	5
Finland	0.0	221.4	0.0	0.0	221.4	0.7	221.4	3
France	0.0	0.0	0.0	518.6	518.6	1.5	0.0	0
Germany	995.7	334.6	258.1 <sup>b</sup>	566.4	2,154.8	6.4	1,514.1	18
Netherlands	1,994.8	1,863.8	1,045.0	2,284.0	7,187.6	21.4	0.0	0
Norway	1,034.3	0.0	1,087.7	0.0	2,122.0	6.3	2,122.0	25
Sweden	876.2	716.3	371.1	633.6	2,597.2	7.7	788.8	9
Switzerland	301.7	0.0	0.0	0.0	301.7	0.9	0.0	0
United Kingdom	891.5	1,231.4	2,382.3	1,623.2	6,128.4	18.3	2,376.4	28
Private Sector	0.0	430.0	300.0	0.0	730.0	2.2	730.0	8
TOTAL	9,181.7	7,637.6	8,396.4	8,351.0	33,566.7	100.0	8,641.1	100

a. Excludes the World Bank's contribution, which is considered core.

b. In 1996, \$350,000 was erroneously reported; \$258,065 was the correct contribution.

**Figure 3.1. ESMAP Receipts, 1994–97**

Country Programme Phase II, and the \$2.6 million Bolivia National Biomass Programme—both funded by the Netherlands. Arrangements for these programs, follow-ups of the Netherlands-funded Bolivia Country Program Phase I, were completed in late 1997, and work is expected to begin in early 1998.

#### *Project-Specific Funding*

Project specific funding totaled \$3.1 million, or 37 percent of total funds received in 1997. Of that, approximately \$400,000 is not yet allocated to specific projects.

#### *Expenditures*

Expenditures in 1997 totaled \$8.4 million, down approximately \$100,000 from 1996, and down \$400,000 from the level projected at the beginning of the year. Included in the total is \$1.6 million in

contributions from the Bank for management, overhead, and operational expenses, down from \$1.8 million projected.

Lower-than-expected expenditures were the result of a slower-than-hoped start-up of the expansion of ESMAP program delivery by World Bank staff outside of the Energy Mining and Telecommunications Department. This was due in part to the World Bank's internal reorganization and management changes, which were initiated in mid-1997. Participation in and task management of ESMAP products by staff in the Regional vice presidencies of the World Bank had already begun to accelerate at the end of 1997. Overall Programme expenditures are expected to reach \$10 million in 1998, with the introduction of the new energy-environment assessment product line.

Table 3.3 summarizes ESMAP's actual operational and overhead expenses for 1994–97. Table

**Table 3.2. Core and Thematic ESMAP Donor Contributions, 1994–1997**

Year	Donor contributions (\$ million)			Core as % of total donor contributions	Core + thematic as % of total donor contributions
	Total	Core	Core + thematic		
1994	7.00	2.45	3.45	35	49
1995	5.78	1.97	2.97	34	51
1996	6.99	2.66	3.39	38	49
1997	6.80	1.65	2.35	24	35
Total	26.6	8.7	12.2	33	46

Note: Does not include the World Bank's contribution.

3.4 shows Consultative Group and TAG actual expenses for the same period. Consultative Group expenses were down from \$42,000 in 1996 to \$12,000 in 1997, primarily because the speakers at the associated donor roundtables in 1997 were able to fund their own travel and subsistence expenses. TAG expenses were lower than projected because a number of evaluations expected to be carried out during the year were not. The TAG is formulating its 1998 work program, which is expected to include some evaluations. The 1998 ESMAP Annual Meeting will be hosted by the United Nations Development Programme

(UNDP) and will be held in New York City. UNDP will also fund the expenses of the TAG in 1998.

#### *Cash Position*

At December 31, 1997, cash balances in ESMAP trust fund accounts totaled \$10.8 million, down from \$12.1 million in 1996. Of the total, approximately \$2.0 million was received in December. As is ESMAP practice, approximately \$2.0 million of the cash on hand at the end of 1997 represented core funding held in reserve. The balance of the funds on hand has been or will have been allocated to projects within the first half of 1998.

**Table 3.3. ESMAP Operational and Overhead Expenses, 1994-97**  
(US\$'000)

<i>Expense item</i>	<i>1994</i>	<i>1995</i>	<i>1996</i>	<i>1997</i>
<b>Staff costs</b>				
Donor funded	2,484	2,230	2,120	1,122
World Bank funded	1,075	1,060	885	1,005
Subtotal	3,559	3,290	3,005	2,127
<b>Consultant fees and contractual services</b>				
Donor funded	3,192	2,965	3,489	4,104
World Bank funded	167	41	30	75
Subtotal	3,359	3,007	3,519	4,179
<b>Travel</b>				
Donor funded	706	620	977	1,316
World Bank funded	202	70	79	100
Subtotal	907	690	1,056	1,416
<b>Other expenses</b>				
Donor funded	467	359	341	340
World Bank funded	709	642	436	408
Subtotal	1,176	1,001	777	760
<b>TOTAL operational and overhead</b>	<b>9,001</b>	<b>7,988</b>	<b>8,357</b>	<b>8,470</b>
<b>CG and TAG expenses</b>	<b>80</b>	<b>59</b>	<b>116</b>	<b>73</b>
<b>TOTAL ESMAP EXPENSES</b>	<b>9,080</b>	<b>8,019</b>	<b>8,473</b>	<b>8,543</b>
<i>of which: contribution from World Bank</i>	<i>2,183</i>	<i>1,862</i>	<i>1,496</i>	<i>1,600</i>

**Table 3.4. ESMAP Consultative Group and Technical Advisory Group Expenses, 1994–97**  
(US\$'000)

<i>Expense item</i>	<i>1994</i>	<i>1995</i>	<i>1996</i>	<i>1997</i>
<b>CG meeting (Bank-funded)</b>	30	40	42	12
<b>Technical Advisory Group (TAG) meetings</b>				
Honoraria	19	10	13	15
Travel	31	8	21	24
Miscellaneous	0	0	1	3
Subtotal TAG meetings	50	18	35	42
of which: Donor-funded	0	10	32	42
Bank-funded	0	8	3	0
<b>Technical Advisory Group (TAG) Evaluations</b>				
Honoraria	0	0	11	4
Fees	0	0	16	5
Travel	0	0	13	10
Miscellaneous	0	0	0	0
Subtotal TAG Evaluations	0	0	40	19
of which: Donor-funded	0	0	18	19
Bank-funded	0	0	22	0
<b>TOTAL CG AND TAG EXPENSES</b>	80	59	116	73
of which: Donor-funded	0	10	50	61
Bank-funded	30	48	66	12



# Annex 1: Meeting of the Consultative Group of ESMAP, Final Communiqué

Washington, D.C., April 23, 1997—The Sixth Meeting of the Consultative Group of the Joint UNDP/World Bank Energy Sector Management Assistance Programme (ESMAP) was held at the World Bank's headquarters in Washington, D.C., on April 22 and 23, 1997, under the chairmanship of Mr. Jean-François Rischard, the World Bank's vice president for Finance and Private Sector Development.

The meeting included a roundtable on energy and development attended by representatives from the donors and by energy experts from both industrial and emerging economies. The roundtable included three sessions, respectively on energy and the environment, energy and transport, and energy efficiency. The energy and environment session focused particularly on global environmental issues and reviewed the current initiatives with respect to the operationalization of the climate change convention. The transport and environment session discussed possible policy options to mitigate environmental degradation due to energy use in transport, including reducing lead and sulfur in refined petroleum products. The energy efficiency session reviewed several recent energy efficiency programs in donor countries and recipient countries. From the discussions at the roundtable, it appeared that market forces, released by sector reform, can go a long way toward achieving energy efficiency—notably on the supply side—and toward mitigating the adverse environmental impacts of energy production and use. However, the existence of externalities argue in favor of a continued role for government in extending energy-efficiency programs, particularly on the demand side (for example, in designing and enforcing building codes, appliance standards, and other regulatory measures).

During the meeting of the Consultative Group, ESMAP donors discussed the Programme's achievements in 1996 and the current year's orientation. The Consultative Group heard a report by the Technical Advisory Group (TAG) in which the TAG indicated that the present size of the Programme prevents ESMAP from being "all things to all people" and that

if it is to respond most effectively to competing interests from donors, ESMAP should either be larger or more narrowly focused on a smaller number of specific issues. The TAG also encouraged ESMAP to conduct a retrospective study on energy sector reform to draw lessons and identify possible weaknesses in past programs, notably with respect to the effect of sector reform on poverty alleviation, private resource mobilization, and regulatory systems. The TAG also recommended that a self-evaluation feature be more systematically integrated into ESMAP activities. The CG expressed its appreciation to Mr. Gene Godley and Dr. Bruno Philippi for their dedication and guidance during their six-year tenure with the TAG.

The Consultative Group also received two additional reports from the TAG: a general reflection on ESMAP, and an evaluation of an ESMAP project in Chad. The general reflection on ESMAP, by TAG member Bruno Philippi, recommended that ESMAP become more of a facilitator guiding a country down the road of proven, successful solutions. The third report by the TAG, conducted by TAG member Dr. Youba Sokona, gave a retrospective evaluation of an urban household energy project in Chad, which the TAG estimated as having been useful to the recipient country. The TAG review of the Chad project recommended, however, that more importance be given to local capacity building in similar projects.

The Consultative Group thanked the management and staff of ESMAP for the work accomplished in 1996, as reported in the 1996 ESMAP Annual Report. Donors confirmed their support for the Programme as a useful forum and technical assistance vehicle. The Consultative Group endorsed the TAG's recommendations for ESMAP to focus on its comparative advantage. Several donors emphasized that this lies chiefly in the provision of technical cooperation for conceptual development in the energy sector. They confirmed that ESMAP should continue to focus on a set of six principal issues:

1. Energy sector reform and regulation.
2. Environmental aspects of energy supply and consumption.
3. Rural and household energy.
4. Renewable energy.
5. Energy efficiency.
6. Energy trade.

The Consultative Group reviewed the implication for ESMAP of the establishment of professional networks in the World Bank and of ESMAP's interaction with such networks, including the possibility of executing ESMAP tasks in collaborative ventures with energy and environment units throughout the World Bank.

Funding from ESMAP donors reached \$8.5 million in 1996, compared with \$7.6 million in 1995.

Indications from donors during the meeting were that funding should stay at a similar level in 1997. Donors welcomed the UNDP's decision to resume its financial support to ESMAP and encouraged ESMAP management to continue its efforts to mobilize funding from additional public and private donors.

In addition to the cosponsors of the Programme—the UNDP and the World Bank—the following donors were represented at the Consultative Group meeting: Denmark, Finland, France, Germany, the Netherlands, Norway, Sweden, Switzerland, the United Kingdom, and the Marubeni Corporation of Japan.

The Consultative Group decided to reconvene in about a year.

## Annex 2: Activities Completed, Launched, and Ongoing During Calendar 1997

Table A2.1. Activities Completed During Calendar 1997

<i>Region/country</i>	<i>Description</i>	<i>Date completed</i>	<i>Total cost (US\$)</i>	<i>Of which ESMAP (US\$)</i>
<i>Africa</i>	<i>Review of Efficiency of Petroleum Pricing</i>	<i>July 97</i>	<i>50,000</i>	<i>50,000</i>
<i>Bolivia</i>	<i>Development of Regulation for the Hydrocarbon Sector</i>	<i>October 97</i>	<i>414,500</i>	<i>369,500</i>
<i>Brazil<sup>a</sup></i>	<i>Hydro and Thermal Power Sector Study</i>	<i>September 97</i>	<i>149,800</i>	<i>149,800</i>
<i>Central and Eastern Europe</i>	<i>Power Sector Reform</i>	<i>July 97</i>	<i>34,976</i>	<i>34,976</i>
<i>Central Asia Republics</i>	<i>Renewable Strategy Study</i>	<i>December 95</i>	<i>143,200</i>	<i>143,200</i>
<i>Global</i>	<i>Clean Coal Initiative Roundtable</i>	<i>December 95</i>	<i>74,000</i>	<i>74,000</i>
<i>Latin America</i>	<i>Energy Management Services</i>	<i>June 95</i>	<i>89,800</i>	<i>89,800</i>
<i>Latin America and the Caribbean</i>	<i>Lead Elimination in the Americas (Phase I)</i>	<i>February 96</i>	<i>411,300</i>	<i>396,400</i>
<i>Mozambique<sup>b</sup></i>	<i>Energy Pricing and Household Energy</i>	<i>December 93</i>	<i>142,000</i>	<i>142,000</i>
<i>Vietnam</i>	<i>Domestic Fuels Efficiency TA</i>	<i>September 97</i>	<i>245,700</i>	<i>206,000</i>

a. *The project was formerly called Gas to Power.*

b. *Two separate reports were issued: "Electricity Tariffs Study" and "Sample Survey of Low Voltage Electricity Customers."*

Table A2.2. Activities Launched During Calendar 1997

Region/country	Description	Date launched	Funds received (US\$)	Of which ESMAP (US\$)
Africa	Commercialization of Marginal Gas Fields	February 97	110,000	42,000
Africa	Forum on Downstream Petroleum	February 97	50,900	50,900
Africa	Gas Training	February 97	293,000	43,000
Africa	Petroleum Transportation Corridors	March 97	150,000	150,000
Bolivia	Assisting Regulatory Agencies Following the Capitalization of the National Oil Company	January 97	365,100	365,100
Bolivia	Country Programme Phase II	December 97	494,475	494,475
Bolivia	National Biomass Programme	December 97	742,946	742,946
Brazil	Special Initiative on Energy Efficiency	February 97	210,000	120,000
Central America & Panama	Rural Electrification and Power Reform	October 97	306,000	306,000
Central & Eastern Europe	Ukraine Integrated Heat Demonstration	January 97	220,000	220,000
Egypt	Solar Thermal Power Options	March 97	50,000	50,000
Ghana	Corporatization of Distribution Concessions through Capitalization	April 97	70,000	70,000
Global	Argentina and the Netherlands: CNG – LPG Experience	July 97	30,000	30,000
Global	Carbon Backcasting Study	November 96	100,000	100,000
Global	Costs of Grid Extension for Rural Electrification	June 97	85,000	85,000
Global	1997 Energy Efficiency Roundtable	February 97	80,800	80,800
Global	Gas Leakage from Natural Gas Operations in Developing Countries	November 97	30,000	30,000
Global	Oil Spills Occurrence Database, Modeling, Remediation and Prevention	November 97	446,300	75,000
Global	1997 Rural Energy Roundtable	March 97	60,000	60,000
Latin America and the Caribbean	Improving Fuel Quality in Latin America (Lead Elimination Phase II)	January 97	292,100	292,100
Middle East and North Africa	Lead Elimination	February 97	50,000	50,000
Nicaragua	Modernization of Fuelwood Sector	August 97	150,000	150,000
Philippines	Options for Privatization of Electricity Supply for Small Islands	August 97	150,000	150,000

(continues on next page)

(Table A2.2 continued)

<i>Region/country</i>	<i>Description</i>	<i>Date launched</i>	<i>Funds received (US\$)</i>	<i>Of which ESMAP (US\$)</i>
<i>Poland</i>	<i>Natural Gas Upstream Pricing</i>	<i>January 97</i>	<i>134,000</i>	<i>102,000</i>
<i>Slovenia</i>	<i>Workshop on Private Participation</i>	<i>May 97</i>	<i>54,000</i>	<i>54,000</i>
<i>South Africa <sup>a</sup></i>	<i>Gas Regulation Study</i>	<i>September 97</i>	<i>919</i>	<i>919</i>
<i>Uganda</i>	<i>Power Restructuring Implementation Study</i>	<i>January 97</i>	<i>100,000</i>	<i>100,000</i>
<i>Vietnam</i>	<i>Environmental and Safety Aspects of the Downstream Gas Industry</i>	<i>June 97</i>	<i>454,000</i>	<i>77,000</i>
<i>Vietnam</i>	<i>Institutional Reform and Restructuring of Petrovietnam Gas Company</i>	<i>January 97</i>	<i>165,300</i>	<i>66,000</i>
<i>Vietnam</i>	<i>Reservoir Management Workshop and Upstream Fiscal Systems</i>	<i>April 97</i>	<i>106,000</i>	<i>66,000</i>
<i>Zimbabwe</i>	<i>Decentralized Rural Electrification</i>	<i>September 97</i>	<i>154,900</i>	<i>154,900</i>

a. *Suspended pending approval of the government.*

Table A2.3. Activities Ongoing in Calendar 1997

Region/country	Description	Initiation	Funds received (US\$)	Of which ESMAP (US\$)
Africa	Africa Gas Initiative Phase I	March 94	771,600	604,500
Africa	Improving Efficiency of Petroleum Procurement	March 94	148,000	100,000
Africa	LPG Options	October 96	117,000	100,000
Africa	Product Specifications Standardization	July 96	227,500	80,000
Africa	Regional Electricity DSM TA Phase II	January 96	100,000	100,000
Africa	West Africa Solar Project	April 95	360,000	360,000
Bolivia	Energy Efficiency and Environment	March 94	381,100	381,100
Bolivia	Energy Strategy for Rural Sector	September 94	330,000	330,000
Bolivia	Renewables for Rural Electrification	April 96	110,300	85,000
Brazil	Bahia End-use Energy and Effluent Management Strategy TA	March 96	64,400	64,400
Brazil	Electricity Energy Efficiency Phase II FINEP	January 96	90,000	90,000
Brazil	Northeast Renewable Energy Ident.	March 96	96,500	96,500
Cambodia	Commercialization of a Power Company	December 95	362,400	362,400
Cameroon	Decentralized Rural Electrification	May 96	250,000	250,000
Cameroon <sup>a</sup>	Energy Strategy	December 96	426,500	426,500
Central and Eastern Europe <sup>b</sup>	District Heating I	March 95	674,100	601,600
Central Asia <sup>c</sup>	Gas Trade	November 95	1,467,100	400,000
China	Institutional Strengthening and TA in Rural Power Sector	March 92	324,100	324,100
China <sup>d</sup>	Natural Gas Development Strategy	February 95	84,400	84,400
Comoros	Solar Market Development	August 95	150,000	150,000

(continues on next page)

Note: Does not include the projects listed in Table A2.1, "Activities Completed During Calendar 1997," or Table A2.2, "Activities Launched During Calendar 1997."

- a. Cameroon Energy Strategy Study was reported completed during calendar 1996 by mistake.
- b. District Heating II, listed separately in 1996 Annual Report, ultimately was combined with District Heating I.
- c. This project was formerly called Natural Gas Investment Strategy.
- d. China Natural Gas Development Strategy has been dropped from the work program.

(Table A2.3 continued)

Region/country	Description	Initiation	Funds received (US\$)	Of which ESMAP (US\$)
Egypt	Renewable Energy Strategy and Institutional Strengthening Study	December 95	113,000	75,000
Global	Electricity Benefits Assessment	April 96	237,000	237,000
Global	Energy & Environment Steering Comm.	April 96	138,000	138,000
Global	Energy, Transport, Environment Study	February 96	28,000	28,000
Global	Environment Manual for Power Dev.	June 95	505,700	505,700
Global	Gas Flaring Reduction	October 96	75,000	75,000
Global	Increasing Efficiency of Gas Distribution Networks	December 95	150,300	120,000
Global	Lighting Services for the Rural Poor	February 96	101,100	101,100
Global	Regional Project Identification Strategy II	February 96	111,700	111,700
Global	Rural Electrification Success Factors	June 96	50,000	50,000
Global	Solar Initiative Regional Strategy	March 95	171,300	85,000
Global <sup>e</sup>	Techniques for Financing Photovoltaics	August 96	30,000	30,000
Guinea	Decentralized Rural Electrification	December 95	250,000	250,000
India	Environmental Issues in the Power Sector	March 95	2,058,500	2,058,500
India	Rural Energy Study	July 89	375,700	375,700
India	Urban Energy Study	March 93	202,800	202,800
Kenya	Photovoltaics-Financing Mechanisms for Solar Electric Equipment	September 95	255,000	255,000
Lao PDR	Decentralized Rural Electrification	April 96	198,000	198,000
Malawi	Rural Energy Development	February 96	250,000	250,000
Mongolia	Energy Efficiency Program	January 96	590,200	50,000
Morocco	Gas Development Plan, Phase 2	March 93	525,400	525,400
Morocco	Gas Pricing Study	March 93	200,000	200,000
Pakistan	Energy Efficiency TA to ENERCON	March 95	290,100	290,100
Peru	Environmental Impact of Hydrocarbons Production	September 95	115,000	115,000
Peru	Rural Energy Electrification	September 95	176,700	176,700

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Note: Does not include the projects listed in Table A2.1, "Activities Completed During Calendar 1997," or Table A2.2, "Activities Launched During Calendar 1997."

e. Formerly called Mc Solar Techniques for Financing Photovoltaics.

(Table A2.3 continued)

<i>Region/country</i>	<i>Description</i>	<i>Initiation</i>	<i>Funds received (US\$)</i>	<i>Of which ESMAP (US\$)</i>
<i>Peru</i>	<i>Training: Energy Management Services</i>	<i>October 95</i>	<i>215,000</i>	<i>215,000</i>
<i>Peru/Colombia</i>	<i>End-Use Energy and Effluent Mgmt. Strat.</i>	<i>May 96</i>	<i>50,000</i>	<i>50,000</i>
<i>Poland</i>	<i>Energy Sector Restructuring Program</i>	<i>February 93</i>	<i>1,049,200</i>	<i>959,000</i>
<i>Slovak Republic</i>	<i>Energy Efficiency Technical Assistance</i>	<i>August 94</i>	<i>301,700</i>	<i>301,700</i>
<i>Southern Africa</i>	<i>Development of an Electricity Market</i>	<i>May 96</i>	<i>130,000</i>	<i>130,000</i>
<i>Southern Africa</i>	<i>Renewable Energy for Rural Elec.</i>	<i>December 95</i>	<i>135,200</i>	<i>135,200</i>
<i>Swaziland</i>	<i>Household Energy Strategy Study</i>	<i>January 96</i>	<i>75,000</i>	<i>75,000</i>
<i>Tanzania</i>	<i>Power Loss Reduction and Distribution Expansion</i>	<i>August 89</i>	<i>765,300</i>	<i>765,300</i>
<i>Tanzania</i>	<i>TA to DOE and TANESCO</i>	<i>January 93</i>	<i>757,300</i>	<i>757,300</i>
<i>Tunisia<sup>f</sup></i>	<i>Renewable Energy (RE) Strategy Study</i>	<i>May 95</i>	<i>33,100</i>	<i>33,100</i>
<i>Uganda</i>	<i>Rural Electrification Study</i>	<i>May 96</i>	<i>170,000</i>	<i>170,000</i>
<i>Vietnam</i>	<i>Power Sector Regulation and Electricity Law</i>	<i>May 96</i>	<i>329,700</i>	<i>329,700</i>
<i>Zambia</i>	<i>Energy Sector Restructuring</i>	<i>June 93</i>	<i>583,100</i>	<i>583,100</i>

Note: Does not include the projects listed in Table A2.1, "Activities Completed During Calendar 1997," or Table A2.2, "Activities Launched During Calendar 1997."

f. French version of the report has been issued.

## Annex 3: List of Reports on Completed Activities

<i>Region/Country</i>	<i>Activity/Report Title</i>	<i>Date</i>	<i>Number</i>
<b>SUB-SAHARAN AFRICA (AFR)</b>			
<i>Africa Regional</i>	<i>Anglophone Africa Household Energy Workshop (English)</i>	<i>07/88</i>	<i>085/88</i>
	<i>Regional Power Seminar on Reducing Electric Power System Losses in Africa (English)</i>	<i>08/88</i>	<i>087/88</i>
	<i>Institutional Evaluation of EGL (English)</i>	<i>02/89</i>	<i>098/89</i>
	<i>Biomass Mapping Regional Workshops (English)</i>	<i>05/89</i>	—
	<i>Francophone Household Energy Workshop (French)</i>	<i>08/89</i>	—
	<i>Inter-African Electrical Engineering College: Proposals for Short- and Long-Term Development (English)</i>	<i>03/90</i>	<i>112/90</i>
	<i>Biomass Assessment and Mapping (English)</i>	<i>03/90</i>	—
	<i>Symposium on Power Sector Reform and Efficiency Improvement in Sub-Saharan Africa (English)</i>	<i>06/96</i>	<i>182/96</i>
<i>Angola</i>	<i>Energy Assessment (English and Portuguese)</i>	<i>05/89</i>	<i>4708-ANG</i>
	<i>Power Rehabilitation and Technical Assistance (English)</i>	<i>10/91</i>	<i>142/91</i>
<i>Benin</i>	<i>Energy Assessment (English and French)</i>	<i>06/85</i>	<i>5222-BEN</i>
<i>Botswana</i>	<i>Energy Assessment (English)</i>	<i>09/84</i>	<i>4998-BT</i>
	<i>Pump Electrification Prefeasibility Study (English)</i>	<i>01/86</i>	<i>047/86</i>
	<i>Review of Electricity Service Connection Policy (English)</i>	<i>07/87</i>	<i>071/87</i>
	<i>Tuli Block Farms Electrification Study (English)</i>	<i>07/87</i>	<i>072/87</i>
	<i>Household Energy Issues Study (English)</i>	<i>02/88</i>	—
	<i>Urban Household Energy Strategy Study (English)</i>	<i>05/91</i>	<i>132/91</i>
<i>Burkina Faso</i>	<i>Energy Assessment (English and French)</i>	<i>01/86</i>	<i>5730-BUR</i>
	<i>Technical Assistance Program (English)</i>	<i>03/86</i>	<i>052/86</i>
	<i>Urban Household Energy Strategy Study (English and French)</i>	<i>06/91</i>	<i>134/91</i>
<i>Burundi</i>	<i>Energy Assessment (English)</i>	<i>06/82</i>	<i>3778-BU</i>
	<i>Petroleum Supply Management (English)</i>	<i>01/84</i>	<i>012/84</i>
	<i>Status Report (English and French)</i>	<i>02/84</i>	<i>011/84</i>
	<i>Presentation of Energy Projects for the Fourth Five-Year Plan (1983-1987) (English and French)</i>	<i>05/85</i>	<i>036/85</i>
	<i>Improved Charcoal Cookstove Strategy (English and French)</i>	<i>09/85</i>	<i>042/85</i>

<i>Region/Country</i>	<i>Activity/Report Title</i>	<i>Date</i>	<i>Number</i>
	<i>Peat Utilization Project (English)</i>	<i>11/85</i>	<i>046/85</i>
	<i>Energy Assessment (English and French)</i>	<i>01/92</i>	<i>9215-BU</i>
<i>Cape Verde</i>	<i>Energy Assessment (English and Portuguese)</i>	<i>08/84</i>	<i>5073-CV</i>
	<i>Household Energy Strategy Study (English)</i>	<i>02/90</i>	<i>110/90</i>
<i>Central African Republic</i>	<i>Energy Assessment (French)</i>	<i>08/92</i>	<i>9898-CAR</i>
<i>Chad</i>	<i>Elements of Strategy for Urban Household Energy: The Case of N'djamena (French)</i>	<i>12/93</i>	<i>160/94</i>
<i>Comoros</i>	<i>Energy Assessment (English and French)</i>	<i>01/88</i>	<i>7104-COM</i>
<i>Congo</i>	<i>Energy Assessment (English)</i>	<i>01/88</i>	<i>6420-COB</i>
	<i>Power Development Plan (English and French)</i>	<i>03/90</i>	<i>106/90</i>
<i>Côte d'Ivoire</i>	<i>Energy Assessment (English and French)</i>	<i>04/85</i>	<i>5250-IVC</i>
	<i>Improved Biomass Utilization (English and French)</i>	<i>04/87</i>	<i>069/87</i>
	<i>Power System Efficiency Study (English)</i>	<i>12/87</i>	<i>—</i>
	<i>Power Sector Efficiency Study (French)</i>	<i>02/92</i>	<i>140/91</i>
	<i>Project of Energy Efficiency in Buildings (English)</i>	<i>09/95</i>	<i>175/95</i>
<i>Ethiopia</i>	<i>Energy Assessment (English)</i>	<i>07/84</i>	<i>4741-ET</i>
	<i>Power System Efficiency Study (English)</i>	<i>10/85</i>	<i>045/85</i>
	<i>Agricultural Residue Briquetting Pilot Project (English)</i>	<i>12/86</i>	<i>062/86</i>
	<i>Bagasse Study (English)</i>	<i>12/86</i>	<i>063/86</i>
	<i>Cooking Efficiency Project (English)</i>	<i>12/87</i>	<i>—</i>
	<i>Energy Assessment (English)</i>	<i>02/96</i>	<i>179/96</i>
<i>Gabon</i>	<i>Energy Assessment (English)</i>	<i>07/88</i>	<i>6915-GA</i>
<i>The Gambia</i>	<i>Energy Assessment (English)</i>	<i>11/83</i>	<i>4743-GM</i>
	<i>Solar Water Heating Retrofit Project (English)</i>	<i>02/85</i>	<i>030/85</i>
	<i>Solar Photovoltaic Applications (English)</i>	<i>03/85</i>	<i>032/85</i>
	<i>Petroleum Supply Management Assistance (English)</i>	<i>04/85</i>	<i>035/85</i>
<i>Ghana</i>	<i>Energy Assessment (English)</i>	<i>11/86</i>	<i>6234-GH</i>
	<i>Energy Rationalization in the Industrial Sector (English)</i>	<i>06/88</i>	<i>084/88</i>
	<i>Sawmill Residues Utilization Study (English)</i>	<i>11/88</i>	<i>074/87</i>
	<i>Industrial Energy Efficiency (English)</i>	<i>11/92</i>	<i>148/92</i>
<i>Guinea</i>	<i>Energy Assessment (English)</i>	<i>11/86</i>	<i>6137-GUI</i>

<i>Region/Country</i>	<i>Activity/Report Title</i>	<i>Date</i>	<i>Number</i>
	<i>Household Energy Strategy (English and French)</i>	<i>01/94</i>	<i>163/94</i>
<i>Guinea-Bissau</i>	<i>Energy Assessment (English and Portuguese)</i>	<i>08/84</i>	<i>5083-GUB</i>
	<i>Recommended Technical Assistance Projects (English and Portuguese)</i>	<i>04/85</i>	<i>033/85</i>
	<i>Management Options for the Electric Power and Water Supply Subsectors (English)</i>	<i>02/90</i>	<i>100/90</i>
	<i>Power and Water Institutional Restructuring (French)</i>	<i>04/91</i>	<i>118/91</i>
<i>Kenya</i>	<i>Energy Assessment (English)</i>	<i>05/82</i>	<i>3800-KE</i>
	<i>Power System Efficiency Study (English)</i>	<i>03/84</i>	<i>014/84</i>
	<i>Status Report (English)</i>	<i>05/84</i>	<i>016/84</i>
	<i>Coal Conversion Action Plan (English)</i>	<i>02/87</i>	<i>—</i>
	<i>Solar Water Heating Study (English)</i>	<i>02/87</i>	<i>066/87</i>
	<i>Peri-Urban Woodfuel Development (English)</i>	<i>10/87</i>	<i>076/87</i>
	<i>Power Master Plan (English)</i>	<i>11/87</i>	<i>—</i>
	<i>Power Loss Reduction Study (English)</i>	<i>09/96</i>	<i>186/96</i>
<i>Lesotho</i>	<i>Energy Assessment (English)</i>	<i>01/84</i>	<i>4676-LSO</i>
<i>Liberia</i>	<i>Energy Assessment (English)</i>	<i>12/84</i>	<i>5279-LBR</i>
	<i>Recommended Technical Assistance Projects (English)</i>	<i>06/85</i>	<i>038/85</i>
	<i>Power System Efficiency Study (English)</i>	<i>12/87</i>	<i>081/87</i>
<i>Madagascar</i>	<i>Energy Assessment (English)</i>	<i>01/87</i>	<i>5700-MAG</i>
	<i>Power System Efficiency Study (English and French)</i>	<i>12/87</i>	<i>075/87</i>
	<i>Environmental Impact of Woodfuels (French)</i>	<i>10/95</i>	<i>176/95</i>
<i>Malawi</i>	<i>Energy Assessment (English)</i>	<i>08/82</i>	<i>3903-MAL</i>
	<i>Technical Assistance to Improve the Efficiency of Fuelwood Use in the Tobacco Industry (English)</i>	<i>11/83</i>	<i>009/83</i>
	<i>Status Report (English)</i>	<i>01/84</i>	<i>013/84</i>
<i>Mali</i>	<i>Energy Assessment (English and French)</i>	<i>11/91</i>	<i>8423-MLI</i>
	<i>Household Energy Strategy (English and French)</i>	<i>03/92</i>	<i>147/92</i>
<i>Mauritania, Islamic Republic of</i>	<i>Energy Assessment (English and French)</i>	<i>04/85</i>	<i>5224-MAU</i>
	<i>Household Energy Strategy Study (English and French)</i>	<i>07/90</i>	<i>123/90</i>
<i>Mauritius</i>	<i>Energy Assessment (English)</i>	<i>12/81</i>	<i>3510-MAS</i>
	<i>Status Report (English)</i>	<i>10/83</i>	<i>008/83</i>

<i>Region/Country</i>	<i>Activity/Report Title</i>	<i>Date</i>	<i>Number</i>
	<i>Power System Efficiency Audit (English)</i>	<i>05/87</i>	<i>070/87</i>
	<i>Bagasse Power Potential (English)</i>	<i>10/87</i>	<i>077/87</i>
	<i>Energy Sector Review (English)</i>	<i>12/94</i>	<i>3643-MAS</i>
<i>Mozambique</i>	<i>Energy Assessment (English)</i>	<i>01/87</i>	<i>6128-MOZ</i>
	<i>Household Electricity Utilization Study (English)</i>	<i>03/90</i>	<i>113/90</i>
	<i>Electricity Tariffs Study (English)</i>	<i>06/96</i>	<i>181/96</i>
	<i>Sample Survey of Low Voltage Electricity Customers</i>	<i>06/97</i>	<i>195/97</i>
<i>Namibia</i>	<i>Energy Assessment (English)</i>	<i>03/93</i>	<i>11320-NAM</i>
<i>Niger</i>	<i>Energy Assessment (French)</i>	<i>05/84</i>	<i>4642-NIR</i>
	<i>Status Report (English and French)</i>	<i>02/86</i>	<i>051/86</i>
	<i>Improved Stoves Project (English and French)</i>	<i>12/87</i>	<i>080/87</i>
	<i>Household Energy Conservation and Substitution (English and French)</i>	<i>01/88</i>	<i>082/88</i>
<i>Nigeria</i>	<i>Energy Assessment (English)</i>	<i>08/83</i>	<i>4440-UNI</i>
	<i>Energy Assessment (English)</i>	<i>07/93</i>	<i>11672-UNI</i>
<i>Rwanda</i>	<i>Energy Assessment (English)</i>	<i>06/82</i>	<i>3779-RW</i>
	<i>Energy Assessment (English and French)</i>	<i>07/91</i>	<i>8017-RW</i>
	<i>Status Report (English and French)</i>	<i>05/84</i>	<i>017/84</i>
	<i>Improved Charcoal Cookstove Strategy (English and French)</i>	<i>08/86</i>	<i>059/86</i>
	<i>Improved Charcoal Production Techniques (English and French)</i>	<i>02/87</i>	<i>065/87</i>
	<i>Commercialization of Improved Charcoal Stoves and Carbonization Techniques Mid-Term Progress Report (English and French)</i>	<i>12/91</i>	<i>141/91</i>
<i>SADC</i>	<i>SADC Regional Power Interconnection Study, Volumes I-IV (English)</i>	<i>12/93</i>	<i>—</i>
<i>SADCC</i>	<i>SADCC Regional Sector: Regional Capacity-Building Program for Energy Surveys and Policy Analysis (English)</i>	<i>11/91</i>	<i>—</i>
<i>São Tome and Príncipe</i>	<i>Energy Assessment (English)</i>	<i>10/85</i>	<i>5803-STP</i>
<i>Senegal</i>	<i>Energy Assessment (English)</i>	<i>07/83</i>	<i>4182-SE</i>
	<i>Status Report (English and French)</i>	<i>10/84</i>	<i>025/84</i>
	<i>Industrial Energy Conservation Study (English)</i>	<i>05/85</i>	<i>037/85</i>
	<i>Preparatory Assistance for Donor Meeting (English and French)</i>	<i>04/86</i>	<i>056/86</i>
	<i>Urban Household Energy Strategy (English)</i>	<i>02/89</i>	<i>096/89</i>

<i>Region/Country</i>	<i>Activity/Report Title</i>	<i>Date</i>	<i>Number</i>
	<i>Industrial Energy Conservation Program (English)</i>	<i>05/94</i>	<i>165/94</i>
<i>Seychelles</i>	<i>Energy Assessment (English)</i>	<i>01/84</i>	<i>4693-SEY</i>
	<i>Electric Power System Efficiency Study (English)</i>	<i>08/84</i>	<i>021/84</i>
<i>Sierra Leone</i>	<i>Energy Assessment (English)</i>	<i>10/87</i>	<i>6597-SL</i>
<i>Somalia</i>	<i>Energy Assessment (English)</i>	<i>12/85</i>	<i>5796-SO</i>
<i>South Africa, Republic of</i>	<i>Options for the Structure and Regulation of Natural Gas Industry (English)</i>	<i>05/95</i>	<i>172/95</i>
<i>Sudan</i>	<i>Management Assistance to the Ministry of Energy and Mining (English)</i>	<i>05/83</i>	<i>003/83</i>
	<i>Energy Assessment (English)</i>	<i>07/83</i>	<i>4511-SU</i>
	<i>Power System Efficiency Study (English)</i>	<i>06/84</i>	<i>018/84</i>
	<i>Status Report (English)</i>	<i>11/84</i>	<i>026/84</i>
	<i>Wood Energy/Forestry Feasibility (English)</i>	<i>07/87</i>	<i>073/87</i>
<i>Swaziland</i>	<i>Energy Assessment (English)</i>	<i>02/87</i>	<i>6262-SW</i>
	<i>Household Energy Strategy Study</i>	<i>10/97</i>	<i>198/97</i>
<i>Tanzania</i>	<i>Energy Assessment (English)</i>	<i>11/84</i>	<i>4969-TA</i>
	<i>Peri-Urban Woodfuels Feasibility Study (English)</i>	<i>08/88</i>	<i>086/88</i>
	<i>Tobacco Curing Efficiency Study (English)</i>	<i>05/89</i>	<i>102/89</i>
	<i>Remote Sensing and Mapping of Woodlands (English)</i>	<i>06/90</i>	<i>—</i>
	<i>Industrial Energy Efficiency Technical Assistance (English)</i>	<i>08/90</i>	<i>122/90</i>
<i>Togo</i>	<i>Energy Assessment (English)</i>	<i>06/85</i>	<i>5221-TO</i>
	<i>Wood Recovery in the Nangbeto Lake (English and French)</i>	<i>04/86</i>	<i>055/86</i>
	<i>Power Efficiency Improvement (English and French)</i>	<i>12/87</i>	<i>078/87</i>
<i>Uganda</i>	<i>Energy Assessment (English)</i>	<i>07/83</i>	<i>4453-UG</i>
	<i>Status Report (English)</i>	<i>08/84</i>	<i>020/84</i>
	<i>Institutional Review of the Energy Sector (English)</i>	<i>01/85</i>	<i>029/85</i>
	<i>Energy Efficiency in Tobacco Curing Industry (English)</i>	<i>02/86</i>	<i>049/86</i>
	<i>Fuelwood/Forestry Feasibility Study (English)</i>	<i>03/86</i>	<i>053/86</i>
	<i>Power System Efficiency Study (English)</i>	<i>12/88</i>	<i>092/88</i>
	<i>Energy Efficiency Improvement in the Brick and Tile Industry (English)</i>	<i>02/89</i>	<i>097/89</i>
	<i>Tobacco Curing Pilot Project (English)</i>	<i>03/89</i>	<i>UNDP Terminal Report</i>

<i>Region/Country</i>	<i>Activity/Report Title</i>	<i>Date</i>	<i>Number</i>
	<i>Energy Assessment (English)</i>	<i>12/96</i>	<i>193/96</i>
<i>Zaire</i>	<i>Energy Assessment (English)</i>	<i>05/86</i>	<i>5837-ZR</i>
<i>Zambia</i>	<i>Energy Assessment (English)</i>	<i>01/83</i>	<i>4110-ZA</i>
	<i>Status Report (English)</i>	<i>08/85</i>	<i>039/85</i>
	<i>Energy Sector Institutional Review (English)</i>	<i>11/86</i>	<i>060/86</i>
	<i>Power Subsector Efficiency Study (English)</i>	<i>02/89</i>	<i>093/88</i>
	<i>Energy Strategy Study (English)</i>	<i>02/89</i>	<i>094/88</i>
	<i>Urban Household Energy Strategy Study (English)</i>	<i>08/90</i>	<i>121/90</i>
<i>Zimbabwe</i>	<i>Energy Assessment (English)</i>	<i>06/82</i>	<i>3765-ZIM</i>
	<i>Power System Efficiency Study (English)</i>	<i>06/83</i>	<i>005/83</i>
	<i>Status Report (English)</i>	<i>08/84</i>	<i>019/84</i>
	<i>Power Sector Management Assistance Project (English)</i>	<i>04/85</i>	<i>034/85</i>
	<i>Petroleum Management Assistance (English)</i>	<i>12/89</i>	<i>109/89</i>
	<i>Power Sector Management Institution Building (English)</i>	<i>09/89</i>	<i>—</i>
	<i>Charcoal Utilization Prefeasibility Study (English)</i>	<i>06/90</i>	<i>119/90</i>
	<i>Integrated Energy Strategy Evaluation (English)</i>	<i>01/92</i>	<i>8768-ZIM</i>
	<i>Energy Efficiency Technical Assistance Project: Strategic Framework for a National Energy Efficiency Improvement Program (English)</i>	<i>04/94</i>	<i>—</i>
	<i>Capacity Building for the National Energy Efficiency Improvement Programme (NEEIP) (English)</i>	<i>12/94</i>	<i>—</i>
<b>EAST ASIA AND PACIFIC (EAP)</b>			
<i>Asia Regional</i>	<i>Pacific Household and Rural Energy Seminar (English)</i>	<i>11/90</i>	<i>—</i>
<i>China</i>	<i>County-Level Rural Energy Assessments (English)</i>	<i>05/89</i>	<i>101/89</i>
	<i>Fuelwood Forestry Preinvestment Study (English)</i>	<i>12/89</i>	<i>105/89</i>
	<i>Strategic Options for Power Sector Reform in China (English)</i>	<i>07/93</i>	<i>156/93</i>
	<i>Energy Efficiency and Pollution Control in Township and Village Enterprises (TVE) Industry (English)</i>	<i>11/94</i>	<i>168/94</i>
	<i>Energy for Rural Development in China: An Assessment Based on a Joint Chinese/ESMAP Study in Six Counties (English)</i>	<i>06/96</i>	<i>183/96</i>
<i>Fiji</i>	<i>Energy Assessment (English)</i>	<i>06/83</i>	<i>4462-FIJ</i>
<i>Indonesia</i>	<i>Energy Assessment (English)</i>	<i>11/81</i>	<i>3543-IND</i>
	<i>Status Report (English)</i>	<i>09/84</i>	<i>022/84</i>
	<i>Power Generation Efficiency Study (English)</i>	<i>02/86</i>	<i>050/86</i>

<i>Region/Country</i>	<i>Activity/Report Title</i>	<i>Date</i>	<i>Number</i>
	<i>Energy Efficiency in the Brick, Tile and Lime Industries (English)</i>	<i>04/87</i>	<i>067/87</i>
	<i>Diesel Generating Plant Efficiency Study (English)</i>	<i>12/88</i>	<i>095/88</i>
	<i>Urban Household Energy Strategy Study (English)</i>	<i>02/90</i>	<i>107/90</i>
	<i>Biomass Gasifier Preinvestment Study, Volumes I and II (English)</i>	<i>12/90</i>	<i>124/90</i>
	<i>Prospects for Biomass Power Generation with Emphasis on Palm Oil, Sugar, Rubberwood and Plywood Residues (English)</i>	<i>11/94</i>	<i>167/94</i>
<i>Lao PDR</i>	<i>Urban Electricity Demand Assessment Study (English)</i>	<i>03/93</i>	<i>154/93</i>
<i>Malaysia</i>	<i>Sabah Power System Efficiency Study (English)</i>	<i>03/87</i>	<i>068/87</i>
	<i>Gas Utilization Study (English)</i>	<i>09/91</i>	<i>9645-MA</i>
<i>Myanmar</i>	<i>Energy Assessment (English)</i>	<i>06/85</i>	<i>5416-BA</i>
<i>Papua New Guinea</i>	<i>Energy Assessment (English)</i>	<i>06/82</i>	<i>3882-PNG</i>
	<i>Status Report (English)</i>	<i>07/83</i>	<i>006/83</i>
	<i>Energy Strategy Paper (English)</i>	—	—
	<i>Institutional Review in the Energy Sector (English)</i>	<i>10/84</i>	<i>023/84</i>
	<i>Power Tariff Study (English)</i>	<i>10/84</i>	<i>024/84</i>
<i>Philippines</i>	<i>Commercial Potential for Power Production from Agricultural Residues (English)</i>	<i>12/93</i>	<i>157/93</i>
	<i>Energy Conservation Study (English)</i>	<i>08/94</i>	—
<i>Solomon Islands</i>	<i>Energy Assessment (English)</i>	<i>06/83</i>	<i>4404-SOL</i>
	<i>Energy Assessment (English)</i>	<i>01/92</i>	<i>979-SOL</i>
<i>South Pacific</i>	<i>Petroleum Transport in the South Pacific (English)</i>	<i>05/86</i>	—
<i>Thailand</i>	<i>Energy Assessment (English)</i>	<i>09/85</i>	<i>5793-TH</i>
	<i>Rural Energy Issues and Options (English)</i>	<i>09/85</i>	<i>044/85</i>
	<i>Accelerated Dissemination of Improved Stoves and Charcoal Kilns (English)</i>	<i>09/87</i>	<i>079/87</i>
	<i>Northeast Region Village Forestry and Woodfuels Preinvestment Study (English)</i>	<i>02/88</i>	<i>083/88</i>
	<i>Impact of Lower Oil Prices (English)</i>	<i>08/88</i>	—
	<i>Coal Development and Utilization Study (English)</i>	<i>10/89</i>	—
<i>Tonga</i>	<i>Energy Assessment (English)</i>	<i>06/85</i>	<i>5498-TON</i>
<i>Vanuatu</i>	<i>Energy Assessment (English)</i>	<i>06/85</i>	<i>5577-VA</i>

Region/Country	Activity/Report Title	Date	Number
Vietnam	<i>Rural and Household Energy: Issues and Options (English)</i>	01/94	161/94
	<i>Power Sector Reform and Restructuring in Vietnam: Final Report to the Steering Committee (English and Vietnamese)</i>	09/95	174/95
	<i>Household Energy Technical Assistance: Improved Coal Briquetting and Commercialized Dissemination of Higher Efficiency Biomass and Coal Stoves (English)</i>	01/96	178/96
Western Samoa	<i>Energy Assessment (English)</i>	06/85	5497-WSO
<b>SOUTH ASIA (SAS)</b>			
Bangladesh	<i>Energy Assessment (English)</i>	10/82	3873-BD
	<i>Priority Investment Program (English)</i>	05/83	002/83
	<i>Status Report (English)</i>	04/84	015/84
	<i>Power System Efficiency Study (English)</i>	02/85	031/85
	<i>Small Scale Uses of Gas Prefeasibility Study (English)</i>	12/88	—
India	<i>Opportunities for Commercialization of Nonconventional Energy Systems (English)</i>	11/88	091/88
	<i>Maharashtra Bagasse Energy Efficiency Project (English)</i>	07/90	120/90
	<i>Mini-Hydro Development on Irrigation Dams and Canal Drops, Volumes I, II, and III (English)</i>	07/91	139/91
	<i>Wind Farm Pre-Investment Study (English)</i>	12/92	150/92
	<i>Power Sector Reform Seminar (English)</i>	04/94	166/94
Nepal	<i>Energy Assessment (English)</i>	08/83	4474-NEP
	<i>Status Report (English)</i>	01/85	028/84
	<i>Energy Efficiency and Fuel Substitution in Industries (English)</i>	06/93	158/93
Pakistan	<i>Household Energy Assessment (English)</i>	05/88	—
	<i>Assessment of Photovoltaic Programs, Applications, and Markets (English)</i>	10/89	103/89
	<i>National Household Energy Survey and Strategy Formulation Study: Project Terminal Report (English)</i>	03/94	—
	<i>Managing the Energy Transition (English)</i>	10/94	—
	<i>Lighting Efficiency Improvement Program Phase 1: Commercial Buildings Five Year Plan (English)</i>	10/94	—
Sri Lanka	<i>Energy Assessment (English)</i>	05/82	3792-CE
	<i>Power System Loss Reduction Study (English)</i>	07/83	007/83
	<i>Status Report (English)</i>	01/84	010/84
	<i>Industrial Energy Conservation Study (English)</i>	03/86	054/86

<i>Region/Country</i>	<i>Activity/Report Title</i>	<i>Date</i>	<i>Number</i>
<b>EUROPE AND CENTRAL ASIA (ECA)</b>			
<i>Bulgaria</i>	<i>Natural Gas Policies and Issues (English)</i>	<i>10/96</i>	<i>188/96</i>
<i>Central and Eastern Europe</i>	<i>Power Sector Reform in Selected Countries</i>	<i>07/97</i>	<i>196/97</i>
<i>Eastern Europe</i>	<i>The Future of Natural Gas in Eastern Europe (English)</i>	<i>08/92</i>	<i>149/92</i>
<i>Kazakhstan</i>	<i>Natural Gas Investment Strategy Study, Volumes 1, 2, and 3</i>	<i>12/97</i>	<i>199/97</i>
<i>Kazakhstan and Kyrgyzstan</i>	<i>Opportunities for Renewable Energy Development</i>	<i>11/97</i>	<i>16855-KAZ</i>
<i>Poland</i>	<i>Energy Sector Restructuring Program, Volumes I-V (English)</i>	<i>01/93</i>	<i>153/93</i>
<i>Portugal</i>	<i>Energy Assessment (English)</i>	<i>04/84</i>	<i>4824-PO</i>
<i>Romania</i>	<i>Natural Gas Development Strategy (English)</i>	<i>12/96</i>	<i>192/96</i>
<i>Turkey</i>	<i>Energy Assessment (English)</i>	<i>03/83</i>	<i>3877-TU</i>
<b>MIDDLE EAST AND NORTH AFRICA (MNA)</b>			
<i>Egypt, Arab Republic of</i>	<i>Energy Assessment (English)</i>	<i>10/96</i>	<i>189/96</i>
<i>Morocco</i>	<i>Energy Assessment (English and French)</i>	<i>03/84</i>	<i>4157-MOR</i>
	<i>Status Report (English and French)</i>	<i>01/86</i>	<i>048/86</i>
	<i>Energy Sector Institutional Development Study (English and French)</i>	<i>07/95</i>	<i>173/95</i>
<i>Syria</i>	<i>Energy Assessment (English)</i>	<i>05/86</i>	<i>5822-SYR</i>
	<i>Electric Power Efficiency Study (English)</i>	<i>09/88</i>	<i>089/88</i>
	<i>Energy Efficiency Improvement in the Cement Sector (English)</i>	<i>04/89</i>	<i>099/89</i>
	<i>Energy Efficiency Improvement in the Fertilizer Sector(English)</i>	<i>06/90</i>	<i>115/90</i>
<i>Tunisia</i>	<i>Fuel Substitution (English and French)</i>	<i>03/90</i>	<i>—</i>
	<i>Power Efficiency Study (English and French)</i>	<i>02/92</i>	<i>136/91</i>
	<i>Energy Management Strategy in the Residential and Tertiary Sectors (English)</i>	<i>04/92</i>	<i>146/92</i>

<i>Region/Country</i>	<i>Activity/Report Title</i>	<i>Date</i>	<i>Number</i>
	<i>Renewable Energy Strategy Study, Volume I (French)</i>	11/96	190A/96
	<i>Renewable Energy Strategy Study, Volume II (French)</i>	11/96	190B/96
Yemen	<i>Energy Assessment (English)</i>	12/84	4892-YAR
	<i>Energy Investment Priorities (English)</i>	02/87	6376-YAR
	<i>Household Energy Strategy Study Phase I (English)</i>	03/91	126/91
<b>LATIN AMERICA AND THE CARIBBEAN (LAC)</b>			
LAC Regional	<i>Regional Seminar on Electric Power System Loss Reduction in the Caribbean (English)</i>	07/89	—
	<i>Elimination of Lead in Gasoline in Latin America and the Caribbean (English and Spanish)</i>	04/97	194/97
Bolivia	<i>Energy Assessment (English)</i>	04/83	4213-BO
	<i>National Energy Plan (English)</i>	12/87	—
	<i>National Energy Plan (Spanish)</i>	08/91	131/91
	<i>La Paz Private Power Technical Assistance (English)</i>	11/90	111/90
	<i>Natural Gas Distribution: Economics and Regulation (English)</i>	03/92	125/92
	<i>Prefeasibility Evaluation Rural Electrification and Demand Assessment (English and Spanish)</i>	04/91	129/91
	<i>Private Power Generation and Transmission (English)</i>	01/92	137/91
	<i>Household Rural Energy Strategy (English and Spanish)</i>	01/94	162/94
	<i>Natural Gas Sector Policies and Issues (English and Spanish)</i>	12/93	164/93
	<i>Preparation of Capitalization of the Hydrocarbon Sector (English)</i>	12/96	191/96
Brazil	<i>Energy Efficiency and Conservation: Strategic Partnership for Energy Efficiency in Brazil (English)</i>	01/95	170/95
	<i>Hydro and Thermal Power Sector Study</i>	09/97	197/97
Chile	<i>Energy Sector Review (English)</i>	08/88	7129-CH
Colombia	<i>Energy Strategy Paper (English)</i>	12/86	—
	<i>Power Sector Restructuring (English)</i>	11/94	169/94
	<i>Energy Efficiency Report for the Commercial and Public Sector (English)</i>	06/96	184/96
Costa Rica	<i>Energy Assessment (English and Spanish)</i>	01/84	4655-CR
	<i>Recommended Technical Assistance Projects (English)</i>	11/84	027/84
	<i>Forest Residues Utilization Study (English and Spanish)</i>	02/90	108/90

<i>Region/Country</i>	<i>Activity/Report Title</i>	<i>Date</i>	<i>Number</i>
<i>Dominican Republic</i>	<i>Energy Assessment (English)</i>	<i>05/91</i>	<i>8234-DO</i>
<i>Ecuador</i>	<i>Energy Assessment (Spanish)</i>	<i>12/85</i>	<i>5865-EC</i>
	<i>Energy Strategy Phase I (Spanish)</i>	<i>07/88</i>	<i>—</i>
	<i>Energy Strategy (English)</i>	<i>04/91</i>	<i>—</i>
	<i>Private Mini-Hydropower Development Study (English)</i>	<i>11/92</i>	<i>—</i>
	<i>Energy Pricing Subsidies and Interfuel Substitution (English)</i>	<i>08/94</i>	<i>11798-EC</i>
	<i>Energy Pricing, Poverty and Social Mitigation (English)</i>	<i>08/94</i>	<i>12831-EC</i>
<i>Guatemala</i>	<i>Issues and Options in the Energy Sector (English)</i>	<i>09/93</i>	<i>12160-GU</i>
<i>Haiti</i>	<i>Energy Assessment (English and French)</i>	<i>06/82</i>	<i>3672-HA</i>
	<i>Status Report (English and French)</i>	<i>08/85</i>	<i>041/85</i>
	<i>Household Energy Strategy (English and French)</i>	<i>12/91</i>	<i>143/91</i>
<i>Honduras</i>	<i>Energy Assessment (English)</i>	<i>08/87</i>	<i>6476-HO</i>
	<i>Petroleum Supply Management (English)</i>	<i>03/91</i>	<i>128/91</i>
<i>Jamaica</i>	<i>Energy Assessment (English)</i>	<i>04/85</i>	<i>5466-JM</i>
	<i>Petroleum Procurement, Refining, and Distribution Study (English)</i>	<i>11/86</i>	<i>061/86</i>
	<i>Energy Efficiency Building Code Phase I (English)</i>	<i>03/88</i>	<i>—</i>
	<i>Energy Efficiency Standards and Labels Phase I (English )</i>	<i>03/88</i>	<i>—</i>
	<i>Management Information System Phase I (English)</i>	<i>03/88</i>	<i>—</i>
	<i>Charcoal Production Project (English)</i>	<i>09/88</i>	<i>090/88</i>
	<i>FIDCO Sawmill Residues Utilization Study (English)</i>	<i>09/88</i>	<i>088/88</i>
	<i>Energy Sector Strategy and Investment Planning Study (English)</i>	<i>07/92</i>	<i>135/92</i>
<i>Mexico</i>	<i>Improved Charcoal Production Within Forest Management for the State of Veracruz (English and Spanish)</i>	<i>08/91</i>	<i>138/91</i>
	<i>Energy Efficiency Management Technical Assistance to the Comision Nacional para el Ahorro de Energia (CONAE) (English)</i>	<i>04/96</i>	<i>180/96</i>
<i>Panama</i>	<i>Power System Efficiency Study (English)</i>	<i>06/83</i>	<i>004/83</i>
<i>Paraguay</i>	<i>Energy Assessment (English)</i>	<i>10/84</i>	<i>5145-PA</i>
	<i>Recommended Technical Assistance Projects (English)</i>	<i>09/85</i>	<i>—</i>
	<i>Status Report (English and Spanish)</i>	<i>09/85</i>	<i>043/85</i>
<i>Peru</i>	<i>Energy Assessment (English)</i>	<i>01/84</i>	<i>4677-PE</i>
	<i>Status Report (English)</i>	<i>08/85</i>	<i>040/85</i>

<i>Region/Country</i>	<i>Activity/Report Title</i>	<i>Date</i>	<i>Number</i>
	<i>Proposal for a Stove Dissemination Program in the Sierra (English and Spanish)</i>	<i>02/87</i>	<i>064/87</i>
	<i>Energy Strategy (English and Spanish)</i>	<i>12/90</i>	<i>—</i>
	<i>Study of Energy Taxation and Liberalization of the Hydrocarbons Sector (English and Spanish)</i>	<i>120/93</i>	<i>159/93</i>
<i>Saint Lucia</i>	<i>Energy Assessment (English)</i>	<i>09/84</i>	<i>5111-SLU</i>
<i>St. Vincent and the Grenadines</i>	<i>Energy Assessment (English)</i>	<i>09/84</i>	<i>5103-STV</i>
<i>Trinidad and Tobago</i>	<i>Energy Assessment (English)</i>	<i>12/85</i>	<i>5930-TR</i>
<b>GLOBAL</b>			
	<i>Energy End Use Efficiency: Research and Strategy (English)</i>	<i>11/89</i>	<i>—</i>
	<i>Guidelines for Utility Customer Management and Metering (English and Spanish)</i>	<i>07/91</i>	<i>—</i>
	<i>Women and Energy—A Resource Guide: The International Network—Policies and Experience (English)</i>	<i>04/90</i>	<i>—</i>
	<i>Assessment of Personal Computer Models for Energy Planning in Developing Countries (English)</i>	<i>10/91</i>	<i>—</i>
	<i>Long-Term Gas Contracts Principles and Applications (English)</i>	<i>02/93</i>	<i>152/93</i>
	<i>Comparative Behavior of Firms Under Public and Private Ownership (English)</i>	<i>05/93</i>	<i>155/93</i>
	<i>Development of Regional Electric Power Networks (English)</i>	<i>10/94</i>	<i>—</i>
	<i>Roundtable on Energy Efficiency (English)</i>	<i>02/95</i>	<i>171/95</i>
	<i>Assessing Pollution Abatement Policies with a Case Study of Ankara (English)</i>	<i>11/95</i>	<i>177/95</i>
	<i>A Synopsis of the Third Annual Roundtable on Independent Power Projects: Rhetoric and Reality (English)</i>	<i>08/96</i>	<i>187/96</i>

Joint UNDP/World Bank

Energy Sector Management Assistance Programme (ESMAP)

ENERGY, MINING AND TELECOMMUNICATIONS DEPARTMENT

THE WORLD BANK

1818 H STREET, NW

WASHINGTON, DC 20433 USA

**Joint United Nations Development Programme / World Bank**



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