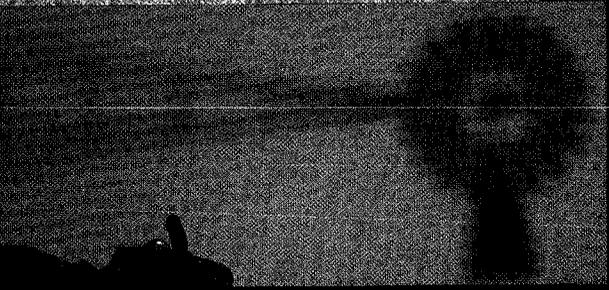
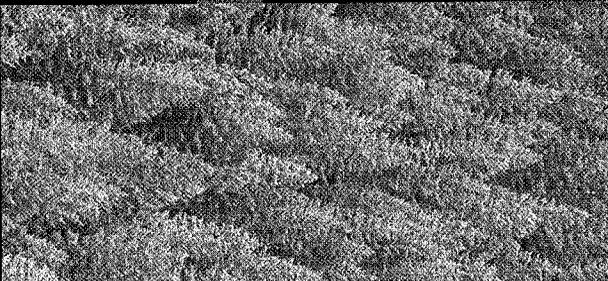
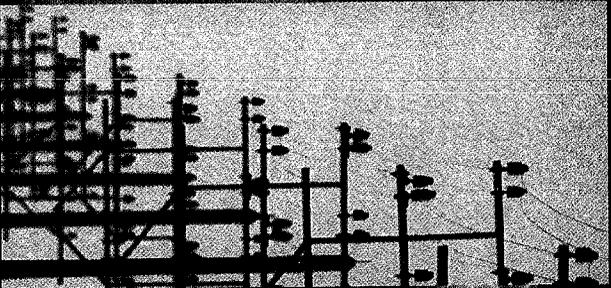


Annual Report 1998

19667



Energy

Sector

Management

Assistance

Programme

 ESMAP

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INNOVATION



KNOWLEDGE

ESMAP 1998 HIGHLIGHTS

- 89 ongoing projects in 37 countries
- Cumulative value of ESMAP ongoing projects: \$21.7 million
- 12 projects completed, 17 projects launched
- 9 donors contributed \$8.2 million to the program
- Introduction of a new project evaluation approach
- Launching of country Energy Environment Reviews
- A new publication: The Energy and Development Report



CAPACITY BUILDING

The Energy Sector Management Assistance Programme (ESMAP) is a global technical assistance program sponsored by the World Bank and the United Nations Development Programme (UNDP) with financial participation from public and private donors. ESMAP focuses on the role of energy in economic development with the objective of contributing to poverty alleviation and economic progress, improving living conditions, and preserving the environment in developing and transition economies.

ESMAP provides policy advice and other technical assistance to help governments, public institutions and private businesses. It focuses on three priority areas; the development of energy markets, the promotion of environmentally sustainable energy production and uses, and the increased access to reliable, efficient and affordable energy services by un-served or under-served populations with a focus on the poorest.

Since it was established in 1983, ESMAP has supported more than 450 projects, in more than 100 countries. ESMAP concentrates on issues not yet mainstreamed in the operations of bilateral or multilateral development institutions. It aims at designing innovative approaches to address energy issues. ESMAP is a participatory and partnership program which involves local and international institutions and businesses in project formulation and implementation. ESMAP's results—through studies, pilot projects and training—enrich the world's knowledge base for addressing energy issues to the benefit of development and transition economies.

ESMAP in 1998

ESMAP Donors Members of the Consultative Group

Belgium

General Administration for Development
Cooperation

Canada

Canadian International Development Agency

Denmark

Ministry of Foreign Affairs

EnergieNed, The Netherlands

Finland

Ministry of Foreign Affairs

France

Ministry of Foreign Affairs

Germany

Bundesministerium für Wirtschaftliche
Zusammenarbeit und Entwicklung

Italy

Ministry of Foreign Affairs

At Large Members of the Consultative Group

Edward D. Ayensu

Rufino Boomasang

José Goldemberg

Chairman of the Consultative Group

Richard D. Stern

Technical Advisory Group

Andrew Barnett

Jan Moen

Herbert Muller*

Youba Sokona

Marubeni Corporation, Japan

Norway

Royal Ministry of Foreign Affairs

Sweden

Swedish International Development Cooperation
Agency

Switzerland

Department for International Economic Cooperation

The Netherlands

Ministry of Economic Affairs

Ministry of Foreign Affairs

United Kingdom

Department for International Development

The World Bank (co-sponsor)

United Nations Development Programme
(co-sponsor)

ESMAP Administrative Team

Dominique Lallement, ESMAP Manager**

William Porter, ESMAP Manager**

Henri Bretaudeau

Maureen Cuffley

Nyra Guice

Joanne Fleming

Brenda Manuel

Kristin McGrath

Nancy Pinto

Kyung Hee Plusquellec

Josephina Regino-Suarez

Representatives from Sponsoring Organizations

Thomas Johansson (UNDP)

Suresh Hurry (UNDP)

James Bond (The World Bank)

*Resigned in August 1998 after being appointed Minister of Finance of Bolivia.

**Dominique Lallement succeeded William Porter as ESMAP Manager on April 15, 1998.

Meeting the Energy Needs of the Poorest: Taking Stock and the Road Ahead for ESMAP

The year 1998 saw major upheavals in the energy sector globally, but even more so in developing and transition economies. While the demand for energy has continued to increase, if only to keep up with population and economic growth, the financial resources to meet those needs have become scarcer. In this already bleak context, the situation of the poorest countries and population segments has become bleaker. As a result of financial crises in Asia, Latin America, and many countries of Eastern Europe, Central Asia, and Africa, households' disposable incomes, fiscal resources and private capital have declined rapidly. This has further delayed the opportunities for poorly served populations and economies to access reliable, efficient, and environmentally sustainable energy services.

The year 1998 underlined the fact that the challenge ahead remains very complex. A broad consensus exists between all partners in energy development that energy services are indispensable for increasing productivity and economic growth, for meeting basic needs in households, and for social services in education, health, or the supply of clean water. A consensus has also largely been reached that functioning markets, economic growth, environmental and financial viability are prerequisites to meeting the energy needs of the poor. However, implementing the tenets of the consensus is difficult.

Against this background, the relevance of the ESMAP program has been reconfirmed. In particular, the demand continues for technical assistance to help move forward with market reforms, and to test new institutional, financial and technical approaches for the delivery of energy services to the poor.

This annual report covers calendar year 1998 ESMAP activities. The present chapter provides a status report on the implementation of the ESMAP strategy. The following chapters discuss ESMAP operations, the program's governance and management, and the financial results.

This report also contains the customary annexes with ESMAP data and documentary material. Annex 1 reproduces the ESMAP Consultative Group's 1998 Communiqué. Annex 2 provides data on ESMAP activities (completed, newly launched, and on-going) during calendar year 1998. Annex 3 provides a comprehensive listing of ESMAP's reports on completed activities.

Taking Stock

In a document entitled *ESMAP: Purpose and Approach*, ESMAP's management proposed that the Programme focuses on finding solutions for the delivery of energy services for the unserved or underserved populations, in particular the poorest. This strategy paper was issued in July 1998, after receiving the overall endorsement of the donors at their April 1998 meeting, and following further discussion with the Technical Advisory Group (TAG) and UNDP in June 1998. Three strategic directions were outlined for the Programme:

- Increasing access to energy services.
- Providing efficient energy services through the development of energy markets.
- Ensuring environmentally sustainable energy services.

Increasing Access to Energy Services

It is estimated that more than 2.0 billion people in the world still do not have access to modern and efficient energy services. They rely largely on traditional bio-mass resources, and spend 10% to 12% of their disposable income to purchase additional fuels and batteries. These people have little chance to improve their productivity and generate enough income to access more productive and sustainable energy services. Among them, women are particularly vulnerable as they spend a substantial share of their time procuring and using bio-mass, with deleterious impacts on their productivity, health, and life expectancy. Improving access to energy services needs to combine improvements in markets for fuels and energy

sources, in particular renewables, and testing new institutional and financing mechanisms in which energy users and suppliers become true partners.

The 1998 work-program of ESMAP reflects the continued commitment of the Programme to search for solutions and improve access to energy services by the poorest. Some of the activities seek global solutions, such as the project *Techniques for Financing Photovoltaics*, which proposed ways for expanding the commercial sales of photovoltaics for household and commercial use in rural areas of developing countries. This will be complemented by an on-going study which aims to compare the experience in six to eight countries in *Financing Decentralized Rural Electrification*. Other activities, such as the Uganda or Zimbabwe Rural Electrification Strategies, are focussed on specific countries but the results have potential for much broader application.

The Development of Energy Markets

The East Asia crisis underlined once again the fragility of energy markets where commercially oriented reforms have not yet taken place. According to a recently completed ESMAP study called *Review of Status of Energy Sector Reform*, only a handful of countries, 20 at most, have made strong headway in implementing market reforms. As a result, for example, only 10 countries have mobilized the bulk of all private sector investments in power development; in most countries the government has been unable to meet the need to improve the supply of energy to all of its people. In 1998, a number of

countries continued to embark on reforms, made remarkable progress in defining the appropriate regulatory and legal frameworks, or privatized their industries (Bolivia, Brazil, Peru, Kazakhstan, Ivory Coast). For others, the work is just beginning (Vietnam, Madagascar, Zimbabwe). For example, the public sector still represents 90% of power sector investments in developing countries. It must also be recognized that implementation of such reforms is politically complex (Russia, Ukraine), requires sustained commitment (Argentina, Chile, Poland, Hungary), and substantial resources, in particular technical assistance and financial support.

As in previous years, facilitation of core sector reforms has continued to be a fundamental ESMAP priority. Through a review of experience with reforms, organization of workshops (Slovenia, South Africa) and seminars for clients, and specific country technical assistance efforts (Bolivia, Vietnam), ESMAP has continued to generate new knowledge on the status of reforms and concretely assist with implementation. These experiences are then shared throughout the world.

Environmentally Sustainable Energy Services

The energy sector is the single largest source of pollution: 80% of carbon emissions from human activity come from energy, whether from power generation or uses, from industry, or from urban transport fuels. Destruction of bio-mass, pollution of land or water resources from over-use or spills further increases the environmental liability caused



Bolivia - Construction of a gas pipeline terminal near Santa Cruz.

by the energy sector. Millions of human lives are yearly affected or lost from lack of proper environmental management: premature deaths, bronchial or pulmonary infections from air pollution, debilitating diseases from lead ingested by malnourished people.

Environmental mismanagement also represents foregone income and GDP growth. For example, health costs of particulates in the air in China have been estimated at 5% of GDP; the gas flared in Africa, represents 140% of electricity yearly generated in Africa and 7.9% of the continent's GDP. Any foregone GDP growth is also a foregone opportunity to invest in poverty alleviation.

The interface between energy and environmental issues — local, regional or global — was ESMAP's increasing concern in 1998. While work on gas flaring and lead elimination has continued, the latter expanding from Latin America to South Asia and to the Middle East, *Energy and Environment Reviews* have been launched as a new ESMAP 'product' to assist countries in developing environmentally sustainable energy policies. This has been addressed in the context of the discussion paper *Fuel for Thought: a New Environmental Strategy for the Energy Sector* which proposes a energy-environment policy for the world Bank Group. Other activities, focussed on energy efficiency or bio-

mass resource management (Bolivia). They are generating new models for associating non governmental organizations NGOs, the private sector and other local partners in the proper environmental management of energy. Finally, ESMAP is providing unique leadership in new areas such as the impact of energy resource development on indigenous populations.

Looking Ahead

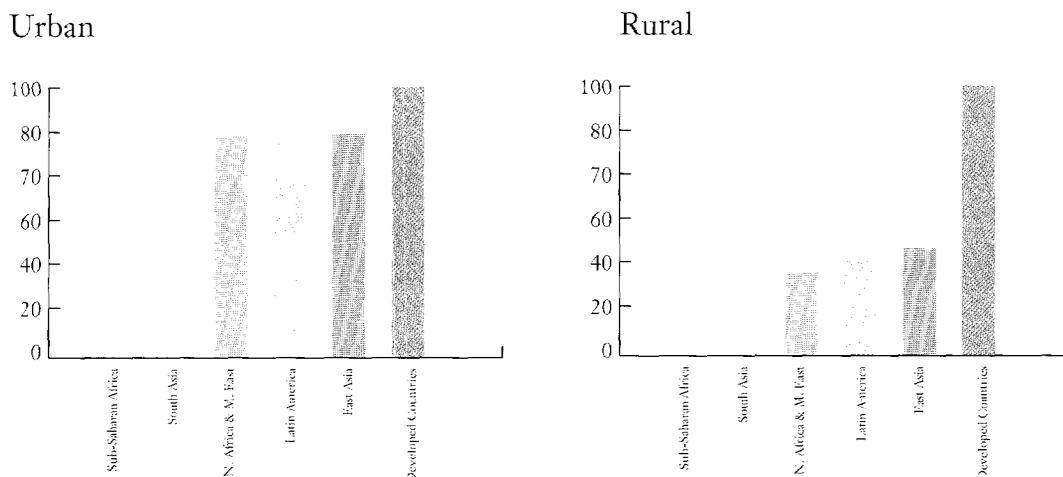
The relevance of the ESMAP strategy is likely to remain strong in the short and medium term. But, like all strategies, it should keep evolving as new issues emerge and new experience is gained.

Access to energy services for poverty alleviation will continue to represent a major challenge. Electricity availability today is still limited to a small share of the world's population (Box 1.1). Demand for energy in developing and transition economies is expected to increase to amounts which might be twice the consumption of OECD countries in 20 years, even in an energy efficient scenario (Box 1.2). In addition, it is estimated that by year 2020, 70% of the world population will be living in urban environments, and 60% of those will be poor.

Many questions remain, therefore, for ESMAP to help address: How will the energy needs of the poor, increasingly displaced from the rural to the

Figure 1 Energy Access for the Poor: Our Clients Have a Long Way to Go

Percentages of populations served by electricity



Source: K. Jechoutek, *Empowering the Poor: Sustainable Energy for the Poor*

urban areas, be met? What possibilities do we have to increase the availability of energy services to enhance the productivity of the poor? What are the financing and institutional resources needed to maintain the existing supply? How can the specific needs of women be addressed effectively?

Market Development. There is no walking away from the current trend to reform energy markets. The unfinished agenda is such, on all continents, that the demand for continuing current work — for sharing experiences available (West Africa) and for providing technical assistance for implementation (India, Poland, Mexico)— is unlikely to subside. Furthermore, new themes need further analysis, in particular regarding the impact of reforms on the poor and how to mitigate efficiently the social costs of market transformations.

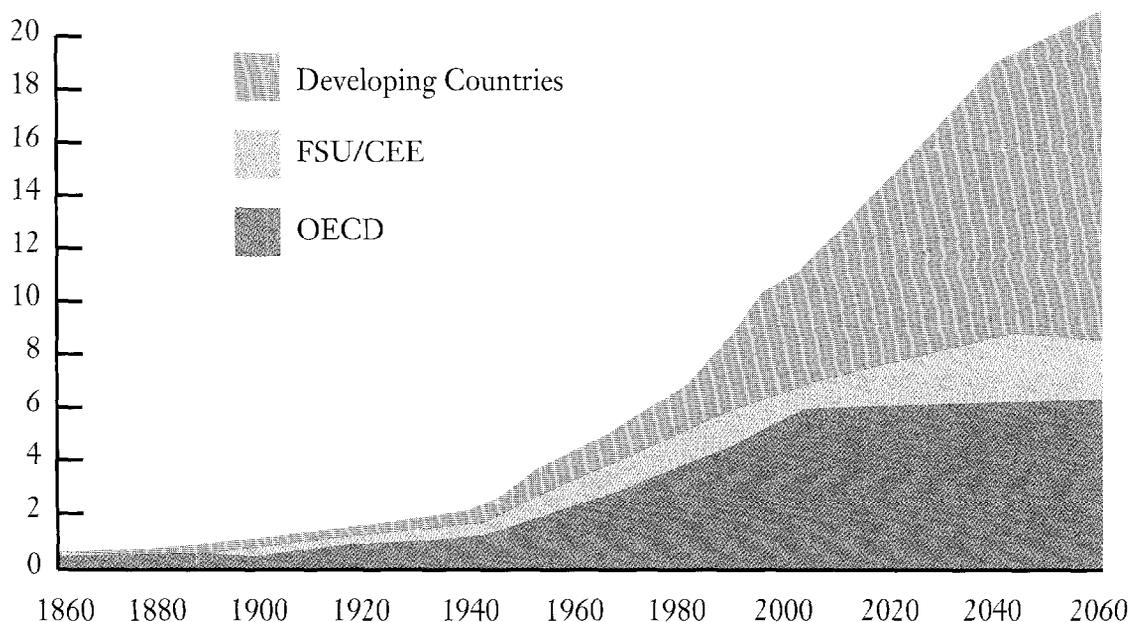
Environmentally sustainable energy services are a collective responsibility which will require imaginative solutions and sustained commitment. Again, ESMAP has a fundamental role to play.

Finally, given the fairly limited size of the Programme, its efficiency and success will continue to depend on the five main criteria agreed by ESMAP's management and donors:

- *Partnerships* between the World Bank Group and the UNDP, public and private donors, client countries governments, institutions and businesses, and world energy partners.
- *Intellectual leadership* both by targeting program assistance on thematic areas in which limited knowledge and experience is readily available, and by drawing on experiences of a world-wide pool of 'energy for development' experts.
- *Innovation* through a systematic attempt to search for and test new solutions adapted to the needs of a particular client.
- *Capacity building* through an effort to associate partner governments and institutions in the design and implementation of program activities.
- *Knowledge generation and dissemination* through a rigorous selection of only those activities which generate new knowledge, and the dissemination of that knowledge to all partners.

ESMAP already has a strong record in applying all these criteria. The challenge ahead is to continue the quest for excellence, to capitalize on past knowledge and experience; and to keep strengthening its financial and intellectual partnerships, and its capacity building efforts.

Figure 2 Actual and Projected Energy Demands: Our Clients Are Front-Runners



Products and Services

ESMAP concentrates on issues not yet mainstreamed in the operations of bilateral or multilateral development institutions, or of the private sector. It aims at designing innovative approaches to address energy issues.

ESMAP provides technical assistance which helps build consensus and provides policy advice on sustainable energy development to governments of developing countries and economies in transition.

ESMAP contributes to the transfer of technology and knowledge in energy sector management.

ESMAP's mandate has evolved over time to meet the changing needs of its clients. ESMAP suggests innovative and strategic "cutting edge" solutions to governments, in the areas of both traditional and non-traditional energy use, complementing and facilitating the work of other development institutions and the private sector. ESMAP is focused on upstream, that is pre-investment, issues that have clear potential for key policy formulation and energy investment.

ESMAP has operated in over 100 countries through approximately 450 activities covering a broad range of energy issues. Early on, these activities were almost exclusively Country Energy Assessments

ESMAP Instruments

Knowledge Generation and Dissemination

- Conferences, roundtables
- Publications
- Training, workshops and seminars

Technical Assistance

- Specific studies
- Advisory services
- Pilot projects

which served to fill the knowledge gap on the energy situation in a specific country, and provide options to address priority energy issues in an environment of rapidly rising energy prices.

ESMAP's product line has been expanded to include targeted technical studies, strategic advice, best practice dissemination, and pre-investment work. The work program in 1998 included over 90 projects grouped under six principal themes:

- energy sector policy and restructuring,
- linkages between energy use and the environment,
- promotion of access to energy in rural areas and under-served households,
- mainstreaming renewable energy technologies,
- encouraging more energy efficient practices, and
- facilitating international energy trade.

Box 1 Vietnam: Technical Assistance for Natural Gas Development

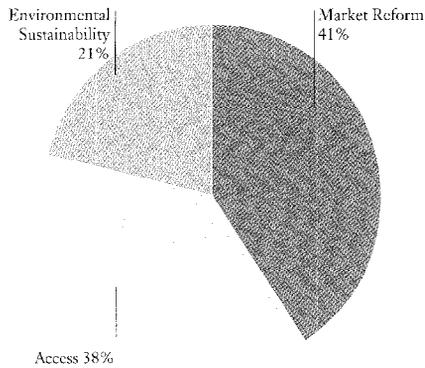
ESMAP provides technical assistance to Vietnam in the oil and gas sector to support the development of indigenous gas resources and to build up a modern gas industry. The main use of natural gas is in the power sector, where the World Bank has financed several projects, for power generation. ESMAP assistance includes several elements, from the wellhead to the burner tip, essential for the introduction of a modern natural gas industry such as advice on the design of fiscal terms for oil and gas exploration and development by private companies, methods for enhanced reservoir management, production and use of gas in a safe and environmentally friendly way, gas purchase contracts and gas sales contracts in accordance with best international practice, gas distribution and metering, and institutional aspects of gas sector development, in particular the corporatization of the Petrovietnam gas company.

ESMAP technical assistance to Vietnam includes studies, advice, workshops and training of Petrovietnam managers and experts. The capacity building and advice to the Government and Petrovietnam has already greatly improved the familiarity of Vietnamese decision makers with best international practices in all phases of gas development. It also helped develop a more level playing field for negotiations of gas supply contracts and fiscal terms with foreign investors.

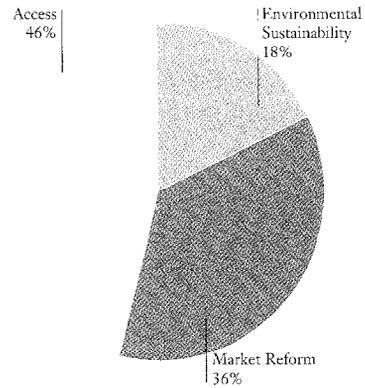
Bent R. Svensson

1998 Portfolio at a Glance

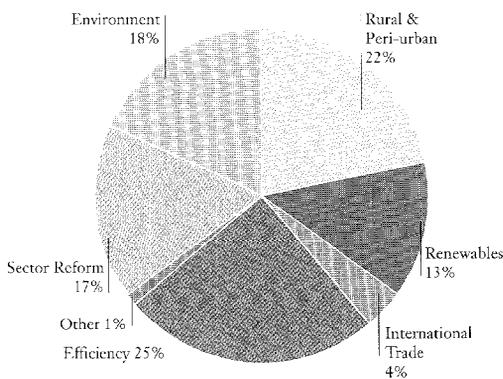
Number of Project by Strategic Area



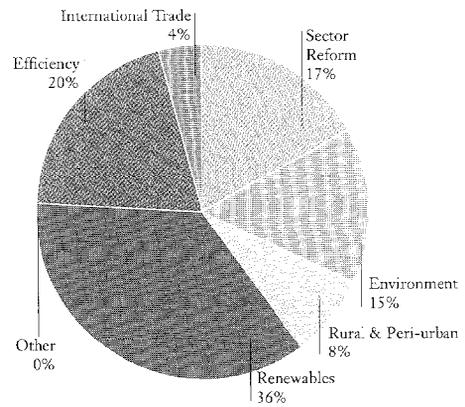
1998 Portfolio Profile (as a % US\$ Value)



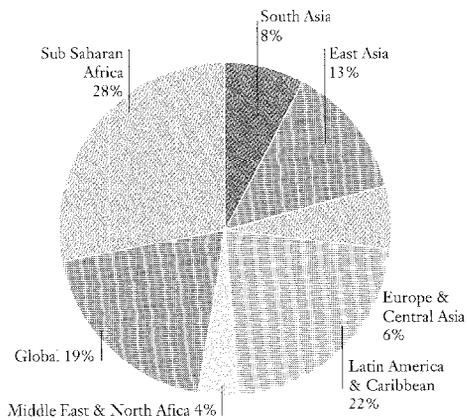
Number of Project by Thematic Area



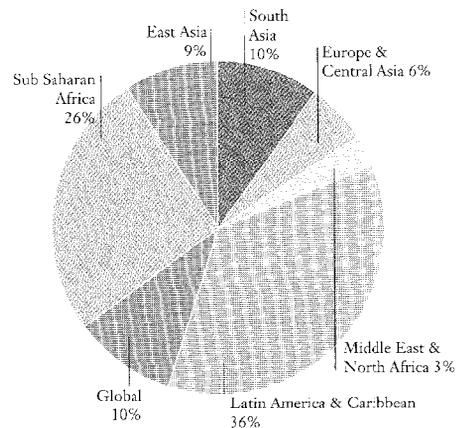
Thematic Breakdown (as a % US\$ Value)



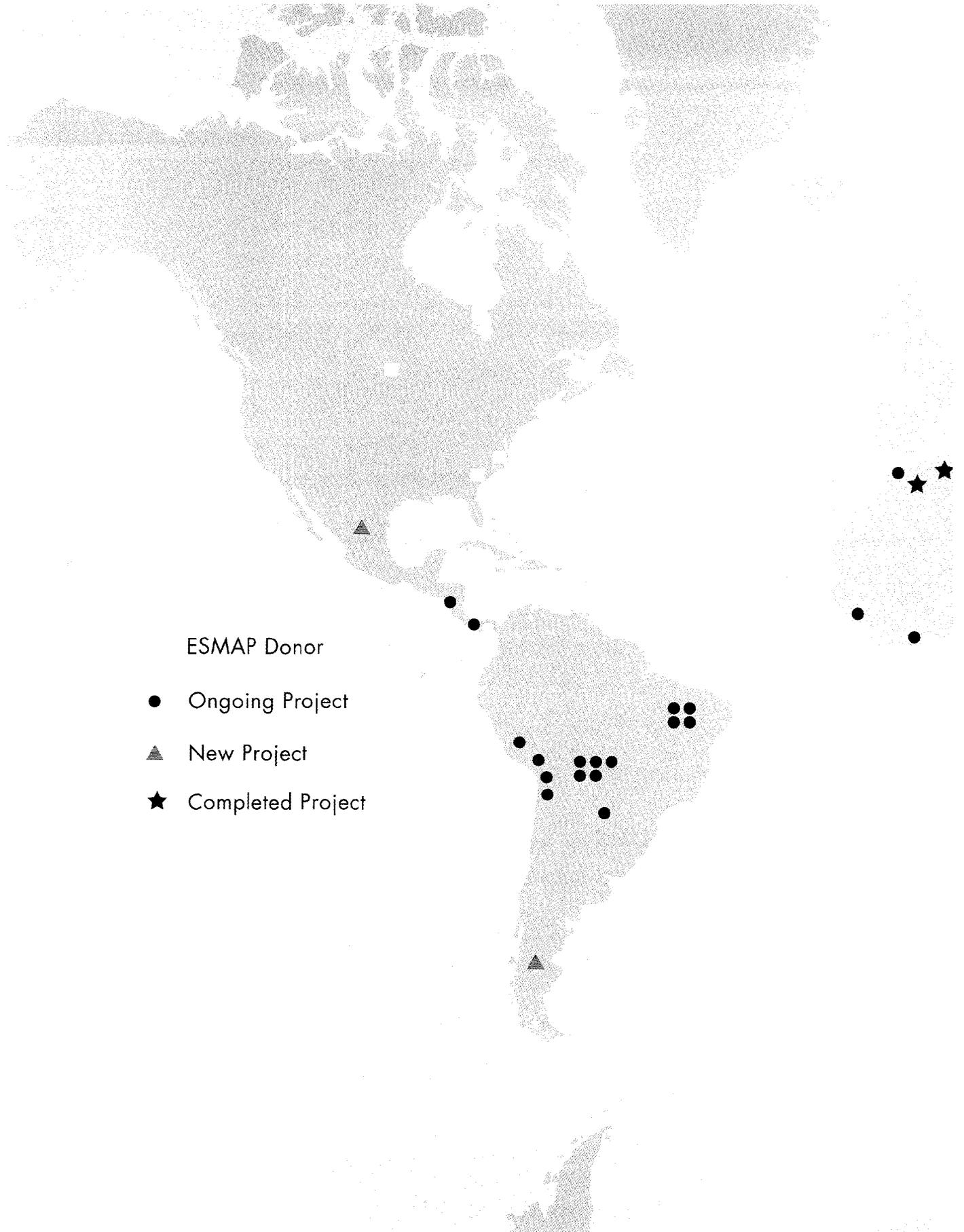
Number of Project by Geographical Area

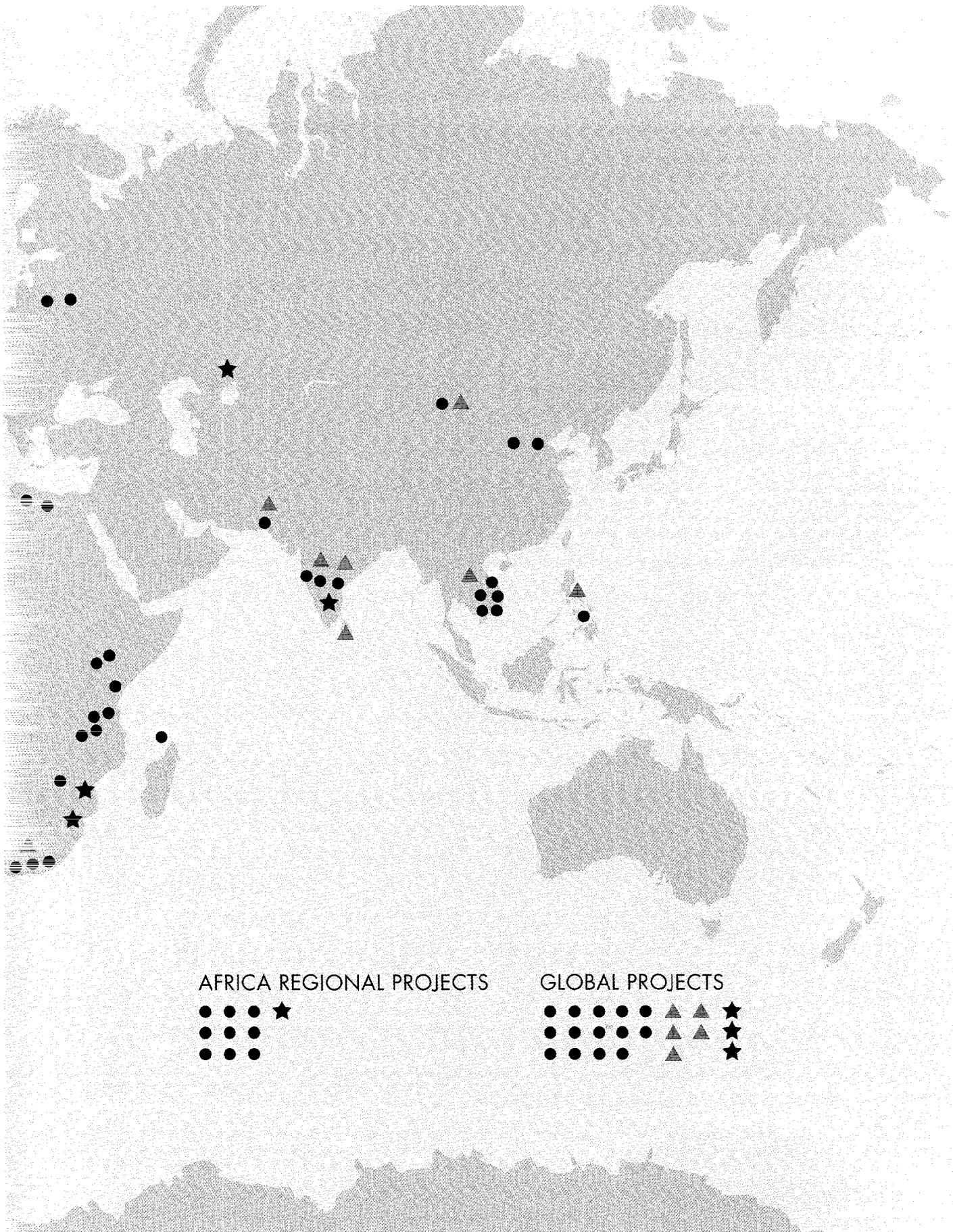


Regional Breakdown (as a % US\$ Value)

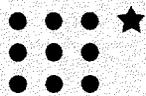


ESMAP in the World in 1998

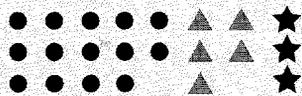




AFRICA REGIONAL PROJECTS



GLOBAL PROJECTS



ESMAP Operations

This chapter provides an overview of the 1998 portfolio of trends as compared to the 1997 portfolio, and discusses the likely impact of new portfolio management tools recently introduced.

Portfolio Overview

Portfolio Profile

As of December 31, 1998, ESMAP's portfolio comprised 89 projects, totaling funding for US\$21.6 million, implemented in about 37 countries. These projects were grouped under six main themes:

- Sector Reform: assisting with energy sector policy and restructuring;
- Trade: facilitating international and domestic energy trade.
- Renewable Energy: mainstreaming renewable energy technologies;
- Environment: analyzing local, regional and glo-

bal energy-environment linkages;

- Energy Efficiency: encouraging more efficient energy practices; and
- Rural and Peri-urban Access: promoting energy access in rural and peri-urban areas, and to under served households and businesses;

The *ESMAP Project Development Facility* (category "other" of Table 1) was officially established in 1998 to provide seed money to finance the preparation of potential ESMAP projects. Annex 2 presents a list of projects completed, launched and ongoing in 1998.

Table 1 presents the breakdown of the 1998 portfolio by thematic and geographic area. Table 2 presents a view of the portfolio by geographic area cross-referenced by theme. The evolution of the portfolio during 1998 is presented in Table 3. Three projects were dropped from the portfolio, namely: (a) Gas Leakage; (b) Argentina and Netherlands CNG/LPG Experience; and (c) China Natural Gas Development

Table 1 Profile of 1998 Portfolio as of December 31, 1998

	Number of Projects	Percentage	Amount of ESMAP Financing (thousands US\$)	Percentage
By Theme				
Sector Reform	15	17%	3,678	17%
Trade	4	4%	950	4%
Renewable	12	13%	7,743	36%
Environment	16	18%	3,289	15%
Efficiency	21	25%	4,279	20%
Rural & Periurban	20	22%	1,638	8%
Other	1	1%	65	0%
Total	89	-	21,643*	-
By Region				
Global	17	19%	2,133	10%
Sub Saharan Africa	25	28%	5,637	26%
East Asia	12	13%	1,927	9%
Europe & Central Asia	5	6%	1,286	6%
Latin America & Caribbean	20	22%	7,794	36%
Middle East & North Africa	3	3%	695	3%
South Asia	7	8%	2,217	10%
Total	89	-	21,643*	-

*Total may not add up because of rounding

Strategy. There is a potential for some of these projects to be included in the future after some modifications in the projects' designs.

Portfolio Trends and Management

Over the past two years, ESMAP has experienced a slight decrease in its portfolio size (Figures 3 and 4) and in US dollar terms, the average size of an ESMAP project has also decreased (Figure 5) from about \$280,000 to \$240,000. This decrease is explained by the completion of two relatively large projects: (a) India-Environmental Issues in the Power Sector, and (b) Poland-Sector Restructuring, which received ESMAP financing in the amount of approximately \$2.0 and \$1.0 million, respectively.

ESMAP's portfolio of projects at the end of calendar year (CY) 98 decreased from 90 projects, in CY 97 to 89 projects in CY 98 (Table 4). In US

dollar terms, the value of the portfolio also decreased from \$25.4 million in CY97 to \$21.6 million in CY98.

In general, the portfolio's profile for 1998 was similar to that of 1997. Recognizing the limitations of any portfolio classifications, the largest share of the portfolio in terms of the thematic areas continues to be in efficiency projects, and in regional terms, it continues to be in Africa.

The increase of environmental projects in the portfolio reflects ESMAP's commitment to additional efforts in the field of energy and the environment.

In 1998, ESMAP also increased the number of projects in Latin America, and East Asia and South Asia, reflecting the demand for continued assistance for policy reform and privatization efforts within these regions. Although the share of projects in Africa has decreased from 31 to 28 percent, a solid

Table 2 Profile of 1998 Portfolio by Region and Theme

	Policy & Restructuring	Environment	Rural & Periurban	Renewables	Efficiency	Trade	Other	Total
Global	2	7	4	2	1	0	1	17
Africa	5	0	6	4	7	3	0	25
East Asia	4	2	2	1	2	1	0	12
Europe & Central Asia	1	0	0	0	4	0	0	5
Latin America	1	4	6	3	6	0	0	20
Middle East & North America	1	0	0	2	0	0	0	3
South Asia	1	3	2	0	1	0	0	7
TOTAL	15	16	20	12	21	4	1	89

Table 3 Evolution of the Portfolio (Number of Projects)

	Number of Projects
As of December 31, 1997	90
Approved and operational, during calendar year 1998	17
Completed	12
Cancelled	6
New sub-total as of December 31, 1998	89
Approved, not yet operational	10
Expected closings as of June 30, 1999	35
Expected new projects as of June 30, 1999	14
Total size of portfolio expected as of July 1, 1999	78

Figure 3 ESMAP Financing 1997/1998

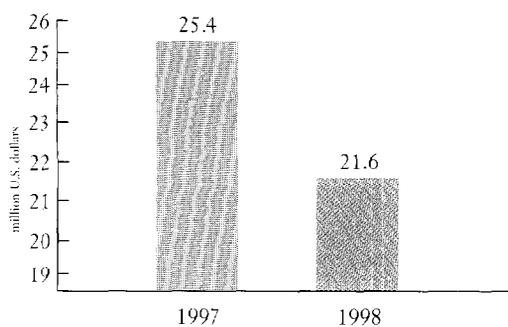


Figure 4 Number of Projects 1997/1998

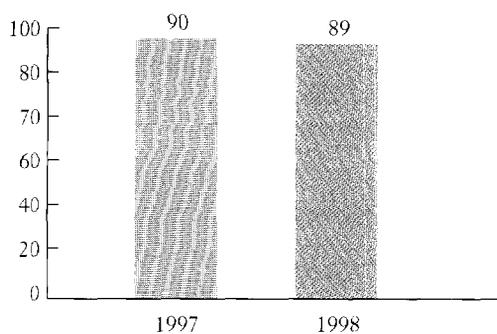


Figure 5 Average Project Size 1997/1998

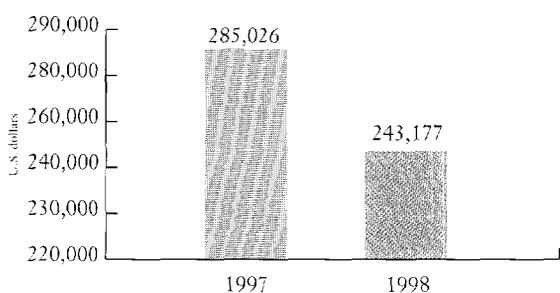
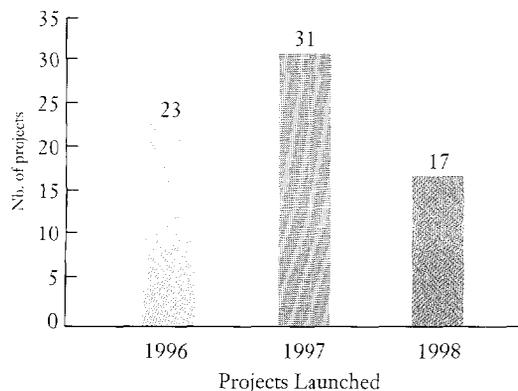


Figure 6 Changes in Project Portfolio, 1996/1998



work program for Africa was being developed by the end of 1998 and should start being implemented in 1999.

In 1998, a major portfolio review was carried out to review all on-going projects. The ESMAP Program Manager met with each project managers to discuss the implementation of on-going projects, and agree on a schedule for closing completed and dormant operations. The full results of the review will be reflected in the 1999 portfolio.

The systematic introduction of the Logframe approach (see chapter on governance and management) as a key management tool for the ESMAP program will now provide:

- An environment for quality and consistency in project design and implementation monitoring;
- A mechanism for project redesign when implementation circumstances change;
- A process to look at issues on a thematic basis and within the framework of the regional or country strategy for the energy sector;
- The means to pay special attention to intersectoral issues, such as defining more clearly the linkages between energy production, transportation and use, and the impact of these activities on the environment, and assessing the results of energy sector reform; and
- A clearer distribution of responsibilities between the World Bank staff and the counterpart agencies in recipient countries.

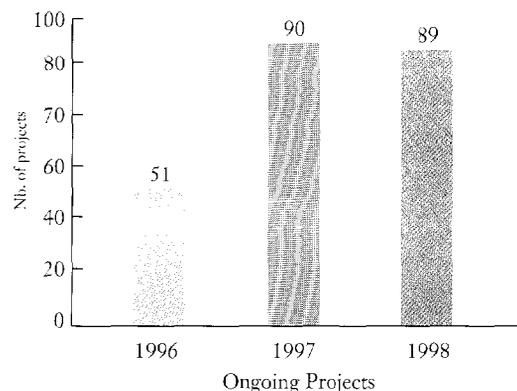


Table 4 Thematic and Geographic Coverage of ESMAP Projects in 1997 and 1998

	1997		1998	
	Nb.	%	Nb.	%
By Theme				
Sector Reform	14	16%	15	17%
Trade	3	3%	4	4%
Renewable	14	16%	12	13%
Environment	12	13%	16	18%
Efficiency	27	30%	21	25%
Rural & Periurban	19	21%	20	22%
Other	0	0%	1	1%
Total	89	-	89	-
By Region				
Global	18	20%	17	19%
Africa	28	31%	25	28%
East Asia	10	11%	12	13%
Europe & Central Asia	7	8%	5	6%
Latin America	17	19%	20	22%
Middle East & North Africa	5	6%	3	4%
South Asia	4	4%	7	8%
Total	89	-	89	-

Disbursements

Some \$13 million had been disbursed at the end of 1998 against projects in ESMAP portfolio, which represented 60% of the total funding for these projects. Because of foreign exchange fluctuations and a redefinition of base costs for Bank staff salaries, some of the allocated amounts were adjusted from figures, published earlier, and ESMAP-financed allocations were reduced or increased accordingly from the originally agreed-upon amounts.

The distribution of disbursements by thematic area and region is given in Table 5.

**Table 5
Disbursements through December 31, 1998**

	(thousands US\$)	%
By Theme:		
Sector Reform	2,664	21%
Trade	783	6%
Renewable	1,301	10%
Environment	1,485	11%
Efficiency	3,597	28%
Rural & Periurban	3,138	24%
Total	12,969	
By Region:		
Global	1,460	11%
Africa	4,564	35%
East Asia	1,413	11%
Europe & Central Asia	1,033	8%
Latin America	3,014	23%
Middle East & North Africa	630	5%
South Asia	855	7%
Total	12,969	

Thematic Overview

In the following section, activities are discussed by thematic areas.

Energy Sector Reforms

The year 1998 continued to see a strong call for better functioning energy markets, both in developing and transition economies. Lessons were learned from countries affected by the financial crises which have set the tone for on-going and future work, in particular the need for continued reforms to ensure:

- more clarity in the distribution of roles between the government and energy enterprises, and continued divestiture of publicly owned energy assets
- more transparency in such market transactions as with independent power producers (IPP) and privatisations
- greater financial solvency of supply markets in order to attract private investors
- greater supply and end-use efficiency, in order to reduce the cost end users.

Furthering the development of competitive energy markets remains a priority, in order to make markets accessible to new entrants, and benefit from increased trade in energy products and services. The core of the current reform agenda is therefore likely to continue in all sectors — power, oil and gas, or heat with the need for:

- Commercializing companies' activities and enhancing cost recovery to improve the financial viability of the sector;
- Passing legislation to enable restructuring, privatization, and energy trade;
- Establishing independent regulation of the sector to ensure that the benefits of competition are reaped, and that the concerns of the vulnerable groups of consumers are taken into consideration;
- Unbundling production, transport, and retail supply;
- Introducing private ownership into the sector through new projects;
- Privatizing existing publicly-owned enterprises.

Much reform work has been undertaken over the past ten years on all continents, yet few countries have fully implemented the reforms as is summarized in Box 2. Implementation of reforms also varies depending on the sectors. Accross all sectors, however, fewer than half of all developing countries have allowed private sector involvement in new investments, and only a quarter have even begun to privatize existing assets.

It is in **Latin America** that reforms are the most advanced. The privatization of power distribution companies reached unprecedented levels in Brazil, during the year, and new models of concessions to bring power supply to unserved rural areas are being tested in Argentina. Privatization in Colombia helped boost cost recovery and competition. Contrary to the signals provided by the strong interest of the private sector to invest in **East Asia**, countries like Thailand which have actually made much progress with reforms remain few. The Philippines, for example, is struggling with a bankrupt electricity public company, unfinished IPPs, and a rate of rural electrification of only 60%. The successful development of the Malampaya project—one of the largest in East Asia—is, by contrast, the direct result of the successful implementation of the new Hydrocarbon law of the Philippines. Sector reforms have continued to progress in **Eastern and Central Europe**, and in **Central Asia**. For several countries, the perspective of joining the European Union is providing a new impetus for reform as they will have to comply with the new EU regulation. Major efforts have been initiated in Russia, Ukraine, and other countries of Eastern and Central Europe and of Central Asia, in particular in the oil and power sectors. Heat production and distribution utilities have become less dependent on municipalities and a few have been privatized. However, barter payment for energy is still widespread and hampers progress. Very few countries have achieved significant reforms in the **Middle East** and in **Africa** where political instability in many countries continues to be a serious impediment to initiating and sustaining reforms. Three main lessons could be learned from the study conducted by ESMAP on energy sector reform:

Box 2 Towards Market Reforms in Non-OECD Countries: A Scoresheet

ESMAP surveyed 115 countries to assess the state of market reforms. Six questions were asked about each of the power, upstream oil and gas, downstream gas and downstream oil sub-sectors. The six questions asked simply whether or not certain steps, crucial for obtaining the maximum benefits for energy sector reform, had been taken at mid 1998. The questions were:

- 1) Has the utility been commercialized and corporatized?
- 2) Has an 'Energy Law' been completely passed by Parliament (a law which would permit the creation of a sector that could be unbundled and/or privatized in part or in whole?)
- 3) Has a regulatory body started work (a body that is separate from the utility and from the Ministry)?
- 4) Is there any private sector investment on greenfield sites in operation, or under construction?
- 5) Has the core state owned utility been restructured/separated?
- 6) Has any of the existing state owned enterprise been privatized (including outright sale, voucher privatization of joint ventures)?

Each question was answered by a 'yes' or 'no', so that countries could score for each subsector between zero and six. The questions focused on a thoroughgoing reform which involved a number of steps, but for which the final aim was to introduce private sector ownership and investment where possible, and to induce competition in those parts of the energy industries which are not natural monopolies. The aim was to utilize the profit motive in order to remove cost inefficiencies, to pass some of the benefits to consumers, in terms of lower prices and better quality of service, and to reduce the drain on the government budget, which in turn gives it the ability to spend more on those items which the private sector is unwilling to take.

The Results. The aggregate reform indicator showed that globally only 39% of the steps identified as necessary for a fully effective reform have been taken in the energy sector as a whole, with the following regional and subsector distribution.

Overall Reform Indicators for Regions and Globally

	Power	Upstream Oil/Gas	Downstream Oil Wholesale	Overall Wholesale	Overall reform	Percentage of maximum	
Global	2.06	2.94	2.29	1.05	0.96	9.30	39%
Africa	.88	3.55	1.83	0.73	0.59	7.58	32%
East Asia	2.44	2.80	2.25	1.75	.63	9.87	41%
Europe & Central Asia	2.70	2.65	2.19	1.36	1.35	10.25	43%
Latin America	4.28	3.00	3.78	0.73	1.00	12.79	53%
Middle East and North Africa	1.00	2.60	0.67	0.50	0.80	5.57	23%
South Asia	3.00	3.00	3.00	1.33	0.80	11.13	46%

These figures presented above understate what actually remains to be done to achieve extensive private sector operation of the sector, because even a smallest sale of assets of an existing state owned company is counted as a 'success' for the purposes of the survey. In fact, to privatize all the sub-sector, or the non-monopolistic parts of it will often take much more time, even though it will eventually bring substantially larger benefits.

Source: Robert Bacon, ESMAP, 1999 (forthcoming)

- The upstream oil and gas sectors are generally more advanced than the power and downstream sectors.
- Independent Power Projects (IPPs) have become widely accepted as a means to attract new entrants and private sector financing, mostly in East and South Asia, but also in Latin America and even in Africa, where a few projects have come to closure (Ivory Coast, Kenya) or are under discussion (Uganda, Zimbabwe). This opening to IPPs has encouraged some institutional reforms, including the end of state-owned monopolies, the modernization of financing instruments and the reduction of subsidies.
- Many countries have introduced legislation which provide for an independent sector regulator, but few regulators are able to exercise their independence. Responding to political opposition, Government interference with the introduction of cost-effective pricing, in particular in the retail supply of energy services (electricity, heat, gas, gasoline), continues to lessen the effectiveness of regulators. Where corruption is common and judicial governance dysfunctional, alternatives to independent regulation have proved an effective first step, such as precise rate-setting rules in concession contracts.



Bolivia - Compressors at a gas pipeline terminal. Energy sector reform in Bolivia, supported by ESMAP, has helped attract foreign capital to finance a major gas pipeline to Brasil.

At the end of 1998, some 15 ESMAP operations continued to support the process of reforms. The on-going activities centered on assisting with the preparation of Laws and Regulations in the power sector, for example in Bolivia, Cambodia, Poland, and Vietnam, and with the development of oil and gas markets, in particular in Africa.

In Poland, ESMAP has provided assistance to the new regulator in establishing and organizing the Energy Regulatory Authority (URE). Both the Ministry of Economy and the president of URE have requested further Bank/ESMAP assistance after the URE was established. At the end of 1998, a new ESMAP project was being developed to assist the URE in implementing energy pricing and tariff regulations, and to assist the Ministry of Economy in finalizing secondary legislation needed to implement new regulatory framework consistent with the Energy Law and the European Union (EU) principles. In Slovenia, ESMAP conducted a “hands-on” training workshop which focused on the contractual and financing aspects of BOT (build-operate-transfer) projects in the power sector, as well as the legal and regulatory frameworks that need to be in place for Slovenia’s accession to the European Union.

In Africa, ESMAP also supported a conference in Southern Africa which was successful in reaching the participants’ understanding of the necessity to identify the sector restructuring required in the individual countries to promote efficient electricity markets for regional economic growth and to prepare projects to initiate sector restructuring. The conference participants’ also agreed that there was a need for regional regulatory cooperation.

In another effort, ESMAP is assisting the government of Ghana to look at: (a) the potential for using employee share ownership plans (ESOPs) in the privatization of electricity distribution concessions; and (b) the relevant international experience with ESOPs. One of the results of the activity will be to provide guidelines for introducing appropriate legal reforms that could facilitate the implementation of employee ownership as a key element of the Government’s privatization strategy.

ESMAP has been active in providing assistance to regulatory agencies in Bolivia following the capi-

talization of the national oil company in such areas as: (a) environmental and social regulations of petroleum operations, in particular, their effect on the indigenous population; (b) safety and technical regulations of gas transmission and distribution; (c) coordination of tax collection; and (d) audit of petroleum firms; and (e) management of petroleum data storage and retrieval center. A related project in the Sub Andean region was approved in 1998 and will focus on the Governments' framework for dealing with environmental issues, including the socio-economic and cultural impact of petroleum operations on the indigenous population, as well as the Government's capacity to enforce related regulations.

ESMAP also provided assistance to Kazakhstan in developing a strategy for natural gas investment, use and trade. A study was completed in 1998 to clarify existing issues and provide recommendations to the Government with regard to developing its gas sector and ensuring that its gas resources deliver the maximum potential benefit to Kazakhstan's economy.

In Morocco, ESMAP is updating the Gas Development Plan developed in 1991. The current study is designed to evaluate gas demand for power generation, for new projects and the conversion of existing facilities, and gas demand for potential industrial markets. ESMAP has also reviewed the recently updated version of the Power Development Plan prepared by the power utility, ONE. This new version takes into account major additions to the power generation and transmission system, in particular, the coal-based power plants at Jorf-Lasfa, a large hydro plant at Matmata and the interconnection line with Spain.

Amongst the activities launched in 1998, the *Review of the Status of Energy Sector Reform*, enabled ESMAP to take stock of energy sector reforms introduced in developing and transition economies (see Box 2). The preliminary assessment carried out as the Phase I of the project provides the financial community with a snapshot of the current situation, and illustrates starkly the scope of the work yet to be done, which deserves assistance from ESMAP and others. A phase II is to be carried out in 1999 and will provide a more in-depth assessment through various case studies.

Other follow-up projects on market development which were prepared for ESMAP financing in 1998 and will be implemented in 1999 include technical assistance to Mexico to assist with reforms in the energy sector, studies for the development of the Nile Basin in order to facilitate the rational utilization of energy resources and the promotion of energy trade amongst riparian countries, and assistance to four countries of West Africa — Benin, Ivory Coast, Ghana, and Togo — to start the process for the development of an electricity pool.

Energy Trade

One of the great benefits from the development of energy markets, from increased efficiency gains through competition amongst a greater number of market players, will be the development of energy trade, in terms of both products and services.

During 1998, ESMAP has continued to support a wide-range of activities in this area which were focussed on the following main themes:

- Regional electricity trade.
- Marketing of primary energy and energy products.
- Removing trade barriers for biomass and renewables.

Electricity Trade

The example of North America and Western Europe in electricity trade has continued to inspire other parts of the world. As electricity trade is increasingly becoming akin to commodity trade, the benefits from power trade are also better understood: more rational use of natural resources from one region, more efficient use of transmission networks, rationalization of investments, and potential for foreign exchange earnings. Implementation of regional electricity trade is nonetheless quite difficult. It requires creating new institutions, adapting local regulations and policies to regional objectives, and, more importantly building political trust amongst countries. Consequently, electricity trade also has the potential to be a key contributor to regional economic development and peace in troubled areas such as the Caucasus.

Besides actively supporting the development of the South Africa Power Pool, ESMAP is now in the lead to assist the member countries of the Mekong Basin.

In 1998, a *Conference on Regional Energy Regulation Cooperation* financed by ESMAP was held in South Africa. It provided the countries' decision makers the opportunity to share their views on sector restructuring in their respective countries, including the needed support on the regulatory side. It was also an opportunity to transfer knowledge about similar work done by other countries, as well as to explain the regulatory systems adopted by such countries, and the implementation issues and solutions. Speakers came from Europe, the US, and Argentina in addition to African Participants. This Conference complemented the work done by ESMAP previously with the *Development of the South Africa Power Pool* (see Box 3) which had highlighted the need to harmonize the national regulatory systems and address such institutional issues as the governance and legal status of the regional coordination center of the pool. Resolving such institutional issues takes time and must be addressed up-front in the process of establishing regional electricity trade arrangements.

The experience with the *Development of the South Africa Power Pool* was transferred to the *Development of a Regional Electricity Market in the Greater Mekong Sub-Region*. The objective of this project is to establish a consensus amongst the five countries of the Mekong basin (Cambodia, Laos, Thailand, Vietnam, and China-Yunnan Province) on a development strategy for the promotion and expansion of power trade in the region in order to optimize the use of the abundant hydropower resources. An initial workshop took place in June 1998 which led to establish a Working Group with representatives from all member countries. They are now developing an Action Plan, which will include, in particular, the institutional steps needed towards the establishment of a regional power pool.

Other projects which were developed in 1998 and which will be implemented in 1999 include the *Development of Electricity Trade in Latin America*, under the aegis of the CIER —the association of

electricity utilities, and the *Development of the West Africa Power Pool* between Benin, Ghana, Ivory Coast, and Togo.

Primary Energy and Products Trade

In 1998, ESMAP's support to international *gas trade* was limited to two activities. First, the completion of the *Central Asia Gas Trade Study*. The initial objectives were to assist the Governments of gas producers in Central Asia in developing a sound strategy for natural gas investment, use, and trade, and to set up a working committee of Central Asian and major consumer countries and international oil and gas companies to coordinate the activities. Only the first phase of the project — dealing with Kazakstan — was completed. The final report has been available since December 1997. Second, the continuation of the *Assistance to the Regulatory Agencies following the Capitalization of the National Hydrocarbon Company of Bolivia*. Technical assistance has been provided to the regulatory agency for hydrocarbons in two key areas: to set up appropriate mechanisms to enforce the safety and technical regulations of the Bolivia/Brazil pipeline; and to carry out a study on pipeline transit fees.

Improving the *trade of petroleum products* has continued to be the focus of the ESMAP-supported work in this area. In Africa. A *Forum on Downstream Petroleum* was held in May 1998. Participants from about 20 countries representing energy ministries and national oil companies shared experience with participants from international oil companies. The country representatives committed to work towards establishing more efficient petroleum policies, while international companies agreed to take the lead on safety issues. This forum built up on other ESMAP supported activities, on product procurement and standardization of specifications for gasoline, diesel fuel oil, and LPG. It also reported on a review of options for the production, transport, storage, bottling and marketing of LPG in West Africa, as the annual growth of LPG at 15% has outpaced historical trends in the whole region and even world averages. LPG is now produced in large volumes in the region, from new oil and gas fields coming on stream. The review looked at Abidjan as a potential hub of petroleum trade, mostly for LPG. Other work underway includes

Box 3 Southern Africa Power Pool

Most countries in Southern Africa suffer from a lack of electricity or unreliable power. There are regional strengths, however, that can be taken advantage of. For example, coal is cheap and largely available in the southern part of the region, and cheap hydropower is available in the north. Power could be traded to improve the situation of the whole region. Cooperation of the national utilities within a coordinated pool structure could benefit all parties.

A traditional power pool brings together utilities to make better use of available resources and improve the reliability of their service. These utilities need to harmonize their practices to be able to trade electricity among them in a pool, and for the pool market mechanisms to encourage competition between electricity producers. Many pools operate within national boundaries, with international contracts to cover trade beyond the pool. Some power pools, however, operate across borders, with constant trading between eligible buyers and suppliers of electricity from neighboring countries.

A Southern Africa Power Pool (SAPP) was established in December 1995, with membership limited to national power utilities. The new pool agreement covers 12 countries, 9 million square kilometers, and 200 million people. SAPP is the first international pool to operate in the developing world. In the short term, SAPP is foreseen as a cooperative, loose pool, but it may become a more competitive market-based pool at a later stage after the partners have acquired some experience and become more comfortable in working together.

ESMAP supported the national partners during the development of a consensus that allowed the creation of the SAPP. Furthermore, ESMAP, in cooperation with energy staff from the World Bank's Africa Region, prepared a detailed report on the key issues to be addressed to fully operationalize SAPP.

Establishing a regional pool requires a strong political willingness and trust between partner utilities and governments. Because of weaknesses on this front, SAPP has experienced delays, for example, in deciding the location of its central coordinating office and in selecting its general manager.

The cooperation between utilities, however, has already brought concrete results as new electric lines are being installed and old ones reinforced. This, in turn, has made more obvious the need for harmonization and coordination in transmission systems standards in the different countries.

As the SAPP started its operations, several of its participating countries were launching power sector reforms to encourage and competition and reduce costs and prices. The separation, or "unbundling," of national generation, transmission, and distribution activities is generally one of the first steps of power sector reform. This "unbundling" usually facilitates private investment and the participation of independent power producers (IPPs) and independent transmission projects (ITPs). These reforms should ease the power pool's operations and support its goals.

By September 1998, SAPP members had agreed on the location of their operations center (Harare, Zimbabwe) and with assistance from the U.S. Agency for International Development, were developing software for planning studies. In May 1997, ESMAP supported a SAPP workshop on Project Finance to share information and views with private investors and development agencies.

Important governance and legal issues remain to be addressed. The pool arrangements still have to strike a balance to meet the needs of all members, large and small, and ensure that they will all share in the decisions and the benefits of the pool. Mechanisms for swift and effective processes for conflict resolution, and the legal status of the coordinating center still have to be agreed on. To a certain extent, SAPP has moved more slowly and cautiously than expected from the planning to operational stage, but its progress has been sustained and kept broadly in line with the original goals.

Although a traditional pool can operate where regulatory regimes differ, questions of unfair advantages created by differences in regulatory systems can slow members' willingness to participate. Thus, in the near future, the compatibility of national regulatory regimes is likely to become a major issue for the SAPP. For example, the need for a consistent approach to transmission access is becoming apparent as more IPPs and ITPs express interest in investing in the region.

For some SAPP members there is still ambiguity between their participation in an international pool and their aspirations of self-sufficiency and autonomy. This is likely to continue for some time, and the pool agreements may have to acknowledge these concerns, along with provisions for greater integration. However, on the positive side, several countries participating in the SAP have opted to increase their imports of electricity rather than building additional domestic generating capacity.

ESMAP continues to help the SAPP and its executive committee set up its coordinating center, harmonize and optimize its investments, and review environmental issues.

Jean-Pierre Charpentier

a review of *Petroleum Transport Corridors*, starting with the southern countries of Sub-Saharan Africa, in order to identify the lowest cost modes of transport. The benefits of trade liberalization on fuel switching and enhanced access to energy services by the poor, has also been well documented in the *India-Urban Energy Study* (see section on rural and peri-urban household energy).

Biomass and Renewables Trade

Improving the trade of biomass energy sources and removing trade barriers to renewable energy products has been another component of the ESMAP work program on energy trade. This work is particularly key to improving access to energy services by the poor, both in the rural and peri-urban areas



Traditional brick manufacturing in Boliva - ESMAP program in Bolivia is helping poor brick makers increase the efficiency of their use of traditional fuels.

where modern forms of energy are limited. Seminal work on the marketing of fuelwood for Managua, Nicaragua, has been carried out under the ESMAP-supported project *Modernization of the Fuelwood Sector* (see Box 4). The review concluded that fuelwood trade could become more efficient if the sector benefited from more transparent, predictable and stable policies, including a better defined and more equitable tax regime, and if adequate services were provided to fuelwood producers and merchants. The conclusion of this work can have a wide application to other countries of Central and South America and Africa where fuelwood is still a major source of energy for household needs of major urban centers.

Testing financing and market delivery mechanisms for small-scale solar energy has been the focus of several projects, in particular in Africa. In Kenya, for example, under a project to test *Financing Mechanisms for Solar Electric Equipment*, the staff from a rural bank and from Cooperatives were trained to identify clients, set-up the financing arrangements, procure, install, and provide after-sale service for solar equipment. After a long preparation period of two and a half years to install 15 systems, it was estimated that it would take about 6 months to get the next 75-100 systems financed and installed, and three additional months for the next 500 systems. The project will provide solar electricity to about 150 households, and can be easily replicated to other regions and countries. It is also providing the implementation capacity for the IFC/GEF Photovoltaic Market Transformation Initiative (PVMTI).

Removing trade barriers, promoting trade liberalization for all energy products and services will remain a key area of work in the ESMAP workprogram as a means to improve market efficiency and increase access to energy services by the poorest.

Energy and the Environment

It is now well documented that the poorest segments of the population suffer the most from environmental degradation, regardless of the type of degradation. For example, the loss of biomass leading to desertification, forces the affected populations to

Box 4 Nicaragua: Modernization of the Fuelwood Sector

In Nicaragua most people use fuelwood for cooking. This seems to be the case for virtually all families in rural areas and at least half of them in the denser urban areas. However, until a few months ago there was no recent data on fuelwood use patterns. The government was concerned with the high economic costs of supplying fuelwoods and the environmental damage to natural forests.

In August 1997, in response to the government concern, ESMAP set out to help assess the situation. It proposed to conduct a survey on fuelwood and to collect data, notably with respect to the environmental impact of wood consumption by urban households. At the same time, ESMAP proposed to use the survey to develop a strategy to supply fuelwood to Managua, the capital city. In addition to funding and supervising the work of local consultants collecting data and designing strategic options, ESMAP experts participated directly in the delivery of technical assistance, notably through a series of field visits.

The ESMAP fuelwood survey had five main components:

- A review of the regulatory and fiscal situation for fuelwood activities to clarify and improve the legal and regulatory framework;
- An analysis of household energy consumption patterns through sample surveys in two major cities, Leon and Managua which established that wood was still used for cooking by 53% of households in Managua and 75% in Leon;
- An assessment of the environmental situation in wood production areas, which shown that fuelwood collection was not the main reason for deforestation around the two cities, and that reducing fuelwood use may not result in sizeable environmental improvements;
- An evaluation of fuelwood traffic on the main entrances to Leon and Managua, collecting data such as wood species, means of transportation, distance from the collection areas, whether the wood comes from natural forest or plantations, etc...;
- An evaluation of the liquefied gas and kerosene household supply and consumption to be conducted by the end of 1998.

In October 1997, an ESMAP team visited Nicaragua to review the overall fuelwood activities in the country, discuss the possible scope of ESMAP's work with officials from the government, and identify possible local consultants. A second visit, in February 1998, decided on the methodology to be used and on detailed activities to be carried out. A local consultant—PROLEÑA, a non-governmental organization—was associated with the work, and before the activity was officially launched, all interested stakeholders were consulted in a meeting of the Interministerial Dendroenergy Committee established to discuss the ESMAP activity.

A follow-up ESMAP visit took place in June 1998, after the end of the surveys. In September 1998, a fourth ESMAP visit of ESMAP experts was organized. By then, data from the survey were ready to be analyzed and discussed in a Wood Energy Forum. This was expected to lead, before the end of 1998, to the definition of an investment and technical assistance program for the woodfuel sector. By early September 1998, the data collection surveys had actually been carried out by PROLEÑA, and their results were available in Spanish.

As this ESMAP activities continues, the data collected by ESMAP so far shows that, unexpectedly, there is not a very clear relationship between deforestation and the harvesting of firewood. Many other activities may account for deforestation, including forest burning for hunting purposes. The intensive discussions held with wood producers, regulators and government officials, notably through a series of workshops in preparation for a Wood Energy Forum, demonstrated that the sector would benefit from more transparent, predictable and stable policies, including a tax regime better defined and more equitable, and the provision of adequate services to fuel-wood producers and merchants. It also appeared that the potential for reforestation involving fuelwood producers was left unrealized because of lack of policy continuity on the part of local and central governments.

ESMAP's challenge remains to help forge a strong consensus among fuelwood producers and users, and the government on the new set of policies emerging from the conclusions and recommendations of the surveys, as well as from discussions with stakeholders. Eventually, this may lead to the preparation of a project which would demonstrate the feasibility to ensure a sustainable and affordable supply of fuelwood for cooking to households in Managua and Leon, while, simultaneously, preserving the environment.

René Massé

reduced living standards or to migration. Air pollution in urban settings affects most the weak and malnourished; and hampers brain development in children, stunting their intellectual potential. As more than half of air pollution and a substantial share of biomass degradation is directly linked to the energy sector, efforts to mitigate environmental degradation are part of ESMAP's strategic agenda. As a result, the ESMAP workprogram in energy and the environment has continued to expand in 1998, and is now focussed on the following main themes:

- *Clean Air Initiatives*
- *The Environmental and Social Impact of Hydrocarbon Production:*
- *Energy and Environment Policies*

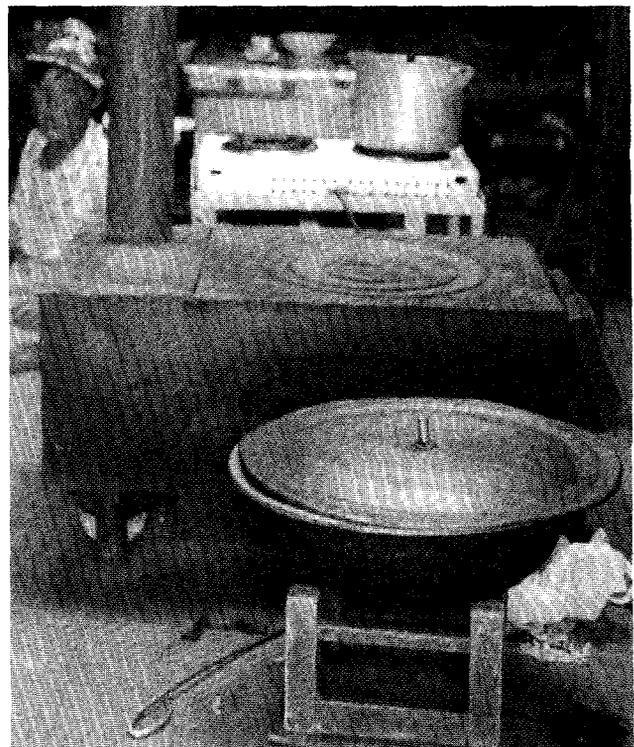
Clean Air Initiatives

ESMAP has expanded its support for three programs: *Lead Elimination in Gasoline and Harmonization of Fuel Specifications*; the *Clean Coal Initiative*; and the *Reduction of Gas Flaring*. The work on *Lead Elimination* which was originally initiated in Latin America has now been widely disseminated in that continent. In Peru, for example, a comprehensive Clean Air Strategy has been adopted following the decision to phase out lead by year 2004. In Venezuela, a new joint World Bank/PAHO initiative is planned for the first quarter of 1999, to discuss phase out plans with the new government. To take this one step further, ESMAP is now working in cooperation with the World Bank Latin America Region (LAC) and the

World Bank Institute, on the Clear Air Initiative in LAC, in which four municipalities are participating: Buenos Aires (Argentina), Lima (Peru), Mexico City (Mexico), and Rio de Janeiro (Brazil). The objective is to develop city-specific action plans in order to reduce air pollution.

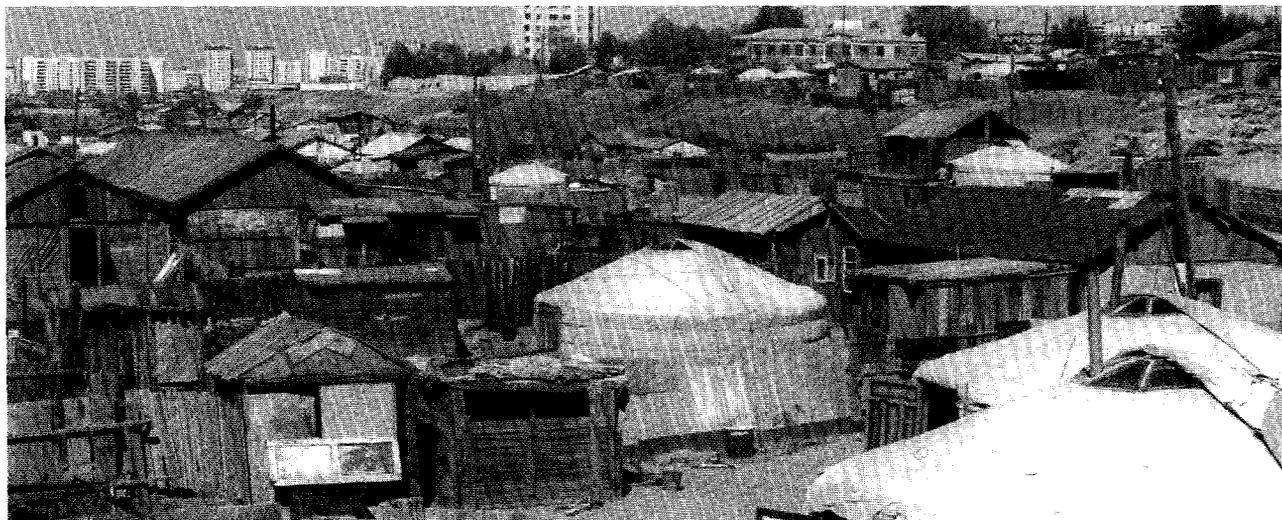
Building-up on the Latin American experience, ESMAP is proceeding with similar work on lead elimination in Middle East and North Africa, and, in South Asia, with financial assistance from the UK-DFID. Late in 1998, a new project was launched in Central Asia, thereby completing a first round of activities on lead elimination across the world. Follow-up activities are expected, in particular technical assistance for the implementation of new legislations or regulations, and analyses of their impact on the refinery and car manufacturing industries.

Another aspect of the ESMAP work on air pollution concerns indoor air pollution which most affects the poor using wood, charcoal, or coal briquettes as their main household fuels. This is the main objective of the *Mongolia-Coal Stove Improvement Program*. The first phase of the project, now completed, was centered on the poorest peri-urban neighborhoods of the capital city, Ulaan Baatar, where nomads come and settle. The project has identified a redesign of existing stoves which will improve their efficiency and reduce emissions, and to improve the production and marketing of fuelwood and coal briquettes. In order to minimize the cost of improving stoves, new standardized components have been designed, such as improved combustion chambers to put inside the tra-



ditional stove, and new commercialized inlets, which can be installed without having to replace the stove. The benefits of such improvements include not only reduced emissions, and therefore, less bronchial or pulmonary infections, but also reduced energy costs from improved combustion and heat efficiency.

The Clean Coal Initiative seeks to encourage the production and use of clean coal, through price incentives that include the cost of environmental mitigation, coal washing, and various technological improvements, such as fluidized-bed combustion, coal gasification, and desulfurization equipment. With financial support from the European Union and from



Improving coal stove in Bolivia - Traditional habitat in Urban Baatar (above) and improved stove promoted by ESMAP (top right).

Japan, a major program is now underway in China. The lessons from this activity should benefit other major coal producers and users, in particular India, Russia, and Ukraine. One of the key issue is the financial viability of these investments, especially as gas prices are at a low-time low. Another step for ESMAP would be to assist in evaluating the relative merits of introducing clean coal technologies in power plants relative to gas switching when this is a genuine possibility.

Environment and Social Impact of Hydrocarbon Development.

The development of hydrocarbon resources in areas inhabited by indigenous people gives rise to complex environmental and social issues, which ESMAP is helping address. The objective is to develop safety

and environmental protection regulations which will prevent the risks of accidents from the development of these areas and will protect the biomass resources necessary to indigenous people. Such work is already underway in Bolivia and Peru. In Bolivia, the ESMAP supported-work contributed to the formulation of an amendment to the Constitution which now recognizes the rights of the indigenous people. In addition, safety regulations have been agreed both by industry and by the indigenous people. In Peru, a draft regulation to complement the legal framework for industry in indigenous people lands is being prepared through a tripartite negotiation process, which includes government bodies, industry, and NGO's intermediating with indigenous people. This work is to be continued in 1999. The broad aim is to arrive at an harmonization of legislations in the various countries and at a "Code

Box 5 Harmonization of Fuels Specifications in Latin America and the Caribbean

The harmonization of petroleum products specifications in Latin America and the Caribbean has great potential economic and environmental benefits for the region. Coupled with the overall economic reform now happening in the region, it should permit a more rapid integration of markets which, in turn, will facilitate the development of trade and of larger and more efficient supply units.

In the first instance, the harmonization of petroleum products was required to improve the quality of fuels in response to environmental and public health concerns. In particular, airborne lead from leaded gasoline is an immediate health hazard from inhalation, as well as a more insidious, long-term problem from accumulations of residues in the soil. Lead contaminates drinking water and enters the food chain, eventually resulting in lead poisoning. One of the better-known, well-documented consequences of lead poisoning is the impairment of intellectual development in children.

Governments in the region needed to harmonize their fuel specifications and eliminate the use of lead in gasoline to improve health conditions and living standards.

With support from the Canadian International Development Agency (CIDA), ESMAP helped governments design and implement national plans to phase out the use of lead in gasoline, and provided technical assistance to define and implement attainable specifications in fuels.

First, ESMAP reviewed all product specifications and laboratory test methods used in the region, and undertook an inventory of the specifications currently in use. Current fuels standards in the United States and in Europe were analyzed to evaluate the direction and potential national impacts of international specifications.

An expert was hired by ESMAP to draft specifications believed to be achievable throughout the region, given the complexity of refineries, the state of the vehicle fleet, and environmental concerns. In 1997, two regional workshops organized by ESMAP-in Quito at the Organization of Latin America

for Energy and in Montevideo at the offices of Asistencia Recíproca Petrolera Empresarial Latinoamericana (ARPEL)-served to exchange views between members of a multi-country steering committee, the Review Committee for the Elimination of Lead in Gasoline and Harmonization of Fuels Specifications in Latin America and the Caribbean.

At these workshops, the Review Committee modified the proposed specifications to reflect feedback from participant countries and ensure that the adopted standards were sensitive to regional differences. Conflicts among participants on the proposed specifications were solved by proposals developed by the ESMAP team, which facilitated the formation of a consensus. Specifications for gasoline, diesel, liquefied petroleum (LPG), and light fuel oil were proposed and adopted.

ESMAP is now disseminating the new harmonized specifications in a report available in English and Spanish, and through seminars with government officials and refinery experts. Presentations have already been made by ESMAP staff to sub-regional country groups, notably to the Central American Committee for Hydrocarbons Supplies and to representatives from Caribbean governments.

Intra-regional trade of petroleum products is expected to increase as common specifications eliminate one of the physical barriers to trade. The use of cleaner-burning fuels is now being promoted throughout the region, thus addressing unhealthy emissions in many large urban areas. The complete elimination of leaded gasoline throughout the region is recommended by 2005, except for countries that import only gasoline. These are expected to eliminate lead by 2001.

The specifications proposed by ESMAP may have an immediate adverse effect on smaller refineries that are unable or unwilling to make the necessary investment to comply with more stringent criteria. The overall effect for the region, however, is expected to be positive, as regional economic efficiency improves through economies of scale, increased intra-regional trade and productivity, value added production from new investments, and reduced health costs.

Eleodoro Mayorga-Alba

of Good Conduct” by which industry would be expected to abide when obtaining concessions for the exploration and development of hydrocarbon resources. Complex issues are still to be further defined and solved, for example, the need for mechanisms to ensure that indigenous people benefit from the income generated by the development of hydrocarbon resources from their lands.

Energy and Environment Policies

As agreed at the 1998 meeting of the ESMAP Consultative Group, ESMAP expanded its support for the preparation of *Energy Environment Reviews (EERs)*. The aim of these reviews is to assist governments first to assess the environmental impact of the current energy policies, regulations, and practices; second, to identify policy and institutional changes to foster environmen-

tally sustainable energy services; third, to identify potential investments to mitigate environmental degradation; and fourth, to provide the framework for potential investors. EERs should be viewed as an opportunity to identify win-win strategies for developing environmentally sustainable energy services for economic and social development (see Figure 7).

The first such review, carried out in India with financial assistance from the UK-Department for International Development and the World Bank (see Box 6), was completed in June 1998. It has provided a number of key lessons for the preparation of such reviews.

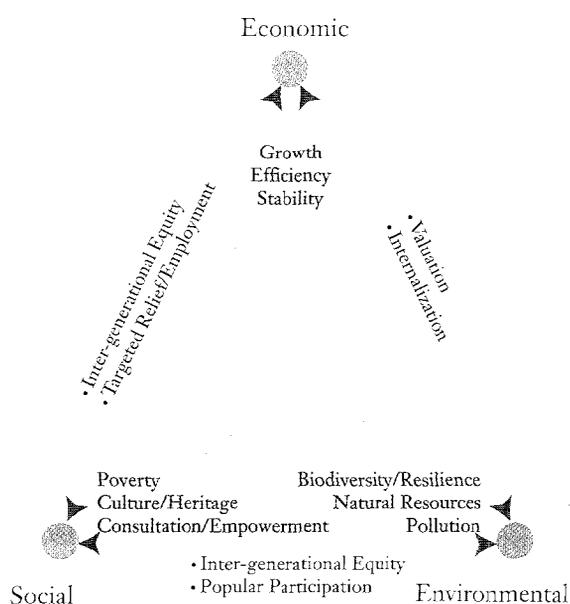
- EERs have to be demand driven. They must respond to a specific need from the country concerned, whether on global, regional, or local pollution or environmental degradation issues. Not

all EERs will be the same. What is key is to agree on a motivating “entry point”. EERs must also take into consideration macroeconomic and poverty alleviation objectives.

- EERs must be carried out with the participation and consultation of a large number of stakeholders in the country, both public and private, including industry and civil society, as the successful implementation of solutions on environmental mitigation requires negotiating a consensus amongst key interest groups.
- EERs are likely to be more successful where substantial progress on sector reform is already underway as they will lead to the increased use of market instruments for environmental mitigation.
- The scope of EERs will vary depending on the tools already in place in the country. For example, in India, sector planning tools had first to be developed, and the staff trained, before any data collection or analysis could be undertaken.
- Because of the participatory process required to generate consensus on issues and solutions, EERs are time consuming and costly exercises. Depending on the scope of the EERs, several outputs can be expected. For example:

- *A methodology* to analyze a) the direct and indirect impacts of current energy practices (from production to end-use) on the local, regional, and global environment; b) options for the future; c) the economic and financial impact of such options, including the geographical and income distributional impact; d) investment opportunities; and e) institutional options/needs for policy formulation and implementation, and for monitoring the outcomes. As an illustration, the structure of the methodology used in India is given in Figure 8;
- *A set of analytical tools for policy options*, including quantitative models, and qualitative tools (e.g. rapid rural appraisals), which will have been generated or adapted for specific country case (e.g. BRUS II-Mexico; see below);
- *An investment Program*, which would identify investment opportunities with possible financing options, including the Clean Development Mechanism;
- *A set of policy options*, which would include sector policy reforms (towards market determined pricing including the internalization of externalities), taxation, norms and standards, etc;
- *An action plan*, outlining the steps to move towards implementation of the analytical results (e.g policy measures, legislative or regulatory measures, economic incentives to encourage switching from detrimental to friendly energy practices, investors/financing conferences, institutional strengthening measures e.g. to monitor results, outstanding agenda for economic, and social or technological research);
- *A strengthened institutional capacity*, from having developed or adapted analytical tools in-country, and trained staff to their use; and possibly a strengthened policy-making body or legal framework for investors; and
- *A process*, for public consultations, in particular for consensus building and public information, which could be of value to resolve other critical development issues.

Figure 7 Elements of Sustainable Development



Box 6 India: Addressing Environmental Issues in the Power Sector

In India, coal is abundant and still considered to be the cheapest fuel to generate power. However, the wide use of coal raises concerns over the environmental impact. In particular, the burning of coal pollutes the air and contributes to greenhouse gas emissions; while the accumulation of ash at power stations makes land inappropriate for other uses and endangers both ground and surface water. Also, when more coal is burned, more must be produced, which in turn degrades more land, displaces population, destroys forest cover, depletes more water resources, and causes more water pollution.

The Government of India recognized the need for an independent assessment of the environmental consequences of coal burning in power plants and asked the World Bank and ESMAP to look into the issue, in consultation with all affected groups and people.

In 1996, with funding from the Department for International Development (DFID) of the United Kingdom, ESMAP, launched a far reaching examination of environmental issues in the power sector. The objective was to develop a decision-making tool, which would enable government officials and institutions in India to evaluate alternative options for power development. The activity ended in June 1998, and the results are now being disseminated to several states.

The work started with an initial questionnaire and a series of seminars and workshops in Delhi, to encourage the participation and interest of a wide audience. One workshop, for Indian and international technicians, discussed the modeling tools available to help in the analysis. Another involved non-governmental organizations (NGOs) who were invited to voice their views and to nominate their representatives to attend subsequent workshops for the duration of the study. These preliminary workshops were followed by a major Inception Seminar in July, 1996, attended by key decision makers from the Indian ministries and from the industry.

The decision-making tool was developed through two state-level case studies, supplemented by a set of special studies. The case studies were done in the states of Andhra Pradesh (AP) and Bihar. The special studies provided generic data and covered: demand-side management; interfuel substitution; market-based instruments for pollution control; the welfare effects of abatement policies; renewable energy options; ash pond management, ash disposal, and ash utilization; and mitigation options for power development. A synthesis report pulled together the findings of the work as a whole and attempted to draw some preliminary conclusions at the all-India level. The case studies and special studies were carried out almost entirely by Indian teams, supported by a firm of international consultants (*Environmental Resource Management*, of the United Kingdom) which also prepared the synthesis report

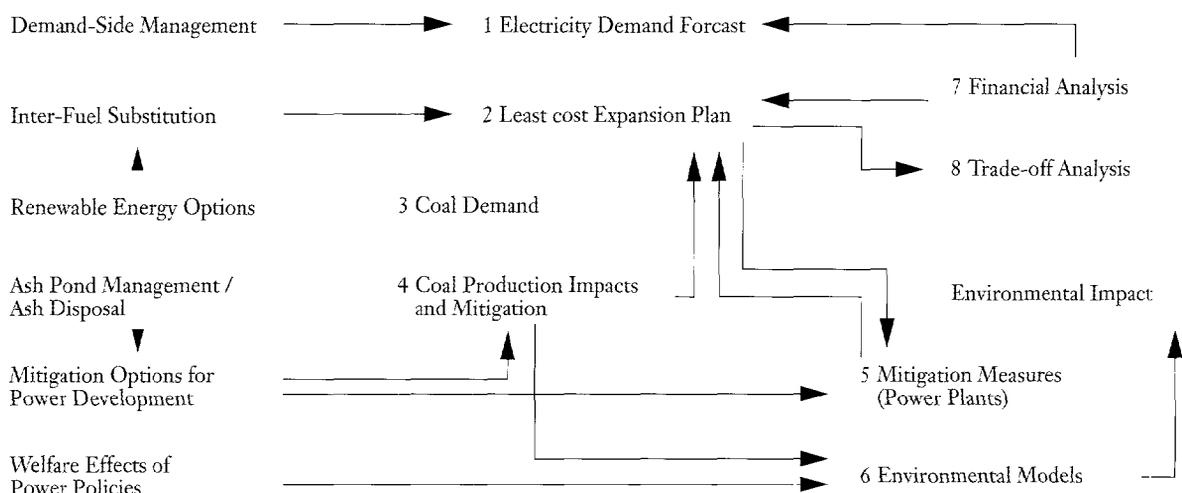
Although no two states can adequately represent the complexity of the Indian power sector, AP and Bihar, with populations of 100 million and 75 million, respectively, offered a good cross-section of the environmental issues and options facing India. Bihar is relatively poor, and the Bihar State Electricity Board is in a particularly precarious financial and technical condition. About 40 percent of electricity demand comes from heavy industry. The high degree of dependence of its power sector on coal permits an in-depth analysis of the environmental impacts of coal mining and coal use in power generation. Also, Bihar is comparatively remote from alternative sources of energy, although other options are available in the long term. AP, on the other hand, has wider range of power

options, including hydropower, wind, and solar. Its good ports offer better possibilities for importing fuels. Agriculture accounts for about 40 percent of the electricity demand, and the financial performance of the AP State Electricity Board has been better than that of the electricity board in Bihar.

The study resulted in a set of analytical tools and a decision-making process that will assist power system planners in making decisions that are environmentally more sustainable; the seven special studies; two case studies; and the synthesis report. The work is now being disseminated to a wider audience, notably through: a *Manual for Environmental Decision-making*, in which the objectives, methodology, outputs, and interpretation of the outputs of the tools prepared for AP and Bihar will be described; and a series of workshops and training activities in other states. It is anticipated that the analytical tools and decision-making process will be taken up as part of the implementation of ongoing Bank projects for power sector reform in Haryana and Orissa; and the planned project in AP. Moreover, the experience gained during the study and the methodology developed for it are to be used in a series of country energy-environment reviews undertaken by FSMAP.

Robin Bates

Figure 8 India's Energy Environment Review: Structure of the Decision Making-Tool



Source: Robin Bates

Three additional energy environment reviews were initiated in 1998: in Mexico, Sri Lanka, and Romania. The *Mexico EER* was initially prompted by a Government request to address global issues in preparation for the Buenos Aires meeting, in November 1998. The first phase of the EER, which focused on the adaptation of the Danish model

BRUS II to the Mexican economy, has been completed, and the local staff have been trained to use it. The second phase of the EER, which is to provide an analysis of the policy options and refocus on local pollution issues, was to be reviewed by the Mexican Government in 1999. The *EER for Sri Lanka* was launched in December 1998, to comple-

ment, through an analysis of policy options targetted at local pollution issues, the work already underway on global issues. One of the primary concerns is to identify environmentally sustainable investment options to meet the growing demand for energy services, now that Sri Lanka has virtually reached the maximum development of its hydro resources for power production. For Romania, 'seed money' (resources from the ESMAP Project Development Facility) has been allocated to define the scope of the EER. As Romania is in the Group II of countries for accession to the European Union, the Government's concern is to meet the environmental regulation of the EU and to improve the energy efficiency — and therefore competitiveness — of its economy.

Energy Environmental Reviews will be a significant component of the ESMAP work program in 1999. It is expected that a full scale EER will be undertaken in Romania and another EER should be initiated in Turkey which will also focus on improving the energy efficiency of the economy. In addition, a series of identification missions are now planned to familiarize clients with the opportunity for undertaking such reviews with ESMAP support, and determine on a case by case basis the scope of each review. In certain cases, such as the Caribbean countries, it is expected that regional reviews will also be appropriate.

Energy Efficiency

Energy Efficiency represents the most powerful win-win strategy to reconcile environmental quality with sector and economic performance. Many developing and transition economies are in dire need of energy efficiency. High energy intensities in formerly planned economies, in particular of Eastern and Central Europe and Central Asia, have impeded their recovery to economic growth as they moved to market economies, jeopardizing their competitiveness, balance of payments, and government and household budgets. Energy costs are also very high in landlocked and poorly endowed countries; and local pollution from energy use is serious in highly urbanized and fast growing areas. Inefficient use of traditional fuels in the developing world contributes to accelerating the rate of biomass depletion, to increasing the

energy burden on households' cash or time resources, thereby further contributing to their impoverishment.

Opportunities for energy efficiency gains are numerous. The most significant gains over the past decade have undoubtedly come from market reforms, at both macroeconomic and sector levels. With the liberalization of energy markets and the introduction of the proper regulatory framework, fuels at economic prices become available to industrial users who, in turn, make the most economic choices in order to remain competitive, both in terms of fuel choices and use. Likewise households—in particular poor households—will make the most rational choices on energy expenditures, as the fuel choices and efficient technologies become available.

Besides market development, energy efficiency interventions vary in scope and application, ranging from supply such as retrofitting power or heat plants, to end-user efficiency (DSM) through improved traditional or industrial processes, building retrofits, and home stoves. Improvements in urban water and distribution systems should also be prime targets, for energy efficiency gains.

In spite of the substantial economic, financial, and environmental benefits to be expected, progress on energy efficiency has been slow and remains hampered by a number of issues:

- Low energy prices: subsidized tariffs or failure to meter or collect payment kills users' interest.
- Lack of technical and financial information: the available technologies for energy efficiency, and their technical and financial merits are not necessarily well documented or easily made available to the public.
- Asset valuation: energy efficiency improvements do not necessarily affect the resale value of buildings or plants.
- Returns on investments: energy efficiency improvements compete with investment alternatives which may have a higher pay-off in the short term.
- Energy efficiency impacts long-term returns.
- Lack of financing: households and small enterprises may have difficulty accessing bank lending for energy efficiency improvements; shareholders may favor more visible investments.

Box 7 District Heating in Central and Eastern Europe

In Central and Eastern Europe, “district heating” or DH has been in place since the 1950s. In this system, hot water is produced in central plants and distributed to commercial, public, and residential buildings through a network of pipes. In cities in the region, DH supplies up to 90 percent of buildings with heat and hot water.

The climate in the region makes it possible to exploit the advantages of co-generation of power and heat. The efficiency of a combined heat and power (CHP) generation plant can reach 90 percent, compared to 35 percent in typical thermal condensing power plants. The competitive advantage of DH is its ability to produce heat at a lower cost than individual boilers, whereas the high cost of transporting heat to consumers is a disadvantage. Thus, the extent of heat produced in co-generation and the heat load density are crucial factors in investment decisions.

In Central and Eastern Europe, the benefits of CHP have been modest. Only a minor part of power supply is based on CHP. In fact, DH had become a symbol of energy waste because of bad maintenance and lack of investment in upgrading networks. In the early 1990s, the high costs of DH became apparent when energy prices increased to world market levels. Consequently, expenditures for heat became major drags on household incomes and municipal budgets. Customers cannot control heat, and they react to overheating by opening windows, thus provoking more waste. In many cities, DH contribute to air pollution, causing severe health problems for residents.

As investors ponder the economic merits of DH, compared for example to gas-fired boilers in buildings, ESMAP studied the factors determining the most economic heating option, the circumstances under which DH could be the preferred choice, how the institutional environment should change to encourage cost-effective heat supply and demand, and how the preferred option could be implemented during a difficult economic transition.

In 1995–96, case studies were conducted in six cities where DH was dominant: Dnipropetrovsk in Ukraine, Kaunas in Lithuania, Orenburg in Russia, Sofia in Bulgaria, Timisoara in Romania, and Wroclaw in Poland. These case studies used a common methodology emphasizing the scope for interfuel substitution between DH and alternatives, such as boilers for individual buildings, or apartment boilers using natural gas. The impact of including energy efficiency measures in buildings and external costs—on health or the environment for example—were also considered by ESMAP, as well as the needed institutional and policy changes.

The case studies confirmed the general superiority of established DH systems supplied by CHP plants in densely populated areas. However, this result depends on low heat costs. In most countries of Central and Eastern Europe, there is a surplus capacity of power, which leads to a relatively low power tariff, so that the price of heat has to cover most of the cost of CHP production. In these cases, building boilers are at an advantage.

One conclusion from the ESMAP study, however, is that decentralized systems, such as gas heaters or boilers in apartments, are not an alternative in existing buildings. Their costs are very high, and they have a significant environmental impact. Furthermore, switching to individual heating in buildings would not be easy, because of the difficulty for households to make joint decisions and bear considerable investment costs.

The high costs of heat delivery, both in absolute terms and relative to the quality of heat supply can be reduced by funding the rehabilitation and upgrading of supply systems, or by investing in more decentralized solutions. But, to ensure maximum sustainable benefits from these investments, other actions at the institutional and policy level and at the corporate level are needed. Many countries in the region have already advanced toward such measures such as the following:

- An efficient macroeconomic and sector framework, which will allow for sound competition and which will establish the rules for necessary tariff reforms.
- The establishment of a commercial DH company with accounts separate from the municipality.
- The replacement of existing tariff rules at CHP plants, which discriminate against heat generation with a more equitable treatment of heat and electricity. Under the guiding principle that both products need to be competitive in their respective markets, it should be investigated for each CHP plant whether most of the combined cost advantage could be passed on to heat for several years to facilitate the large modernization investments.

Issues and Required Actions in the Heating Sector

Issue	Efficient Macro and Sector Framework	Streamlining Companies in the Heating Sector	Technology and Investment Choices
High cost of heat	CHP cost of Heat Planning Safety, licensing and efficiency standards	Commercialization: strict profit accountability and financial discipline; use of a management information system (MIS) and performance indicators Rationalization/divestment Leasing and operating agreements Heat Planning	Modernize DH networks Low-cost heat sources Where heat load is low and heat generation costs are high, switch to decentralized heat supply Optimize the use of CHP (dispatching of heat sources)
Inefficient use of heat	Change in standards Consumption-based pricing Incentives: tariff reform Financing/technical assistance	Tariff structure/level Financing	Demand-side investments
Nonpayment	Social safety net with targeted subsidies Cut-off of non paying customers	Commercialization Marketing Settlements of forward and backward arrears	Prepayment Decentralized heat supply
Inadequate tariffs	Tariffs based on full-cost recovery Adequate depreciation charges	Fixed/variable two-part tariffs based on metered consumption	–
Environmental problems	Environmental standards Effective enforcement existing standards	–	Fuel switch Change in technological/Integration of DH islands

As of September 1998, there was already some positive follow-up to the ESMAP study:

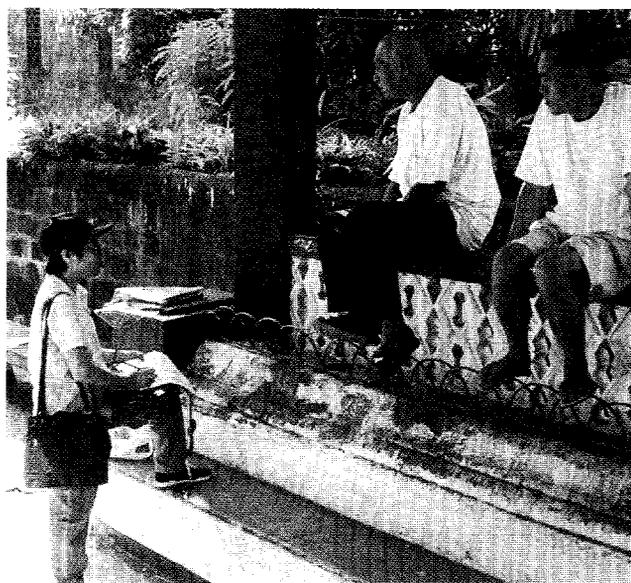
- In Dnipropetrovsk/Ukraine, the ESMAP activity was extended to a demonstration project with cofinancing from the Netherlands. Two buildings were cut off from the DH system. A more cost-effective separate boiler house was installed, and energy conservation measures were implemented in the buildings.
- In Russia, Orenburg is a potential candidate for a World Bank loan.
- In Lithuania, a loan by the European Bank for Reconstruction and Development for DH modernization in Kaunas is under consideration, in addition to a DH project in Vilnius to be funded possibly by the World Bank.
- In Bulgaria, a DH project funded by the World Bank is under preparation in Sofia.

Anke Meyer

In 1998, ESMAP has continued to pursue its strategy of complementing market reforms with local grassroots projects designed to remove or reduce obstacles to the introduction of market driven and more energy-efficient practices, equipment, and technology. The main activities have been centered essentially on:

- Supply efficiency in district heating, gas, and power supply systems;
- End-use efficiency, mainly in rural or urban medium-sized industries.

The study of *District Heating in Central and Eastern Europe* was completed in June 1998. Under this four year effort, a methodology was developed to assess the criteria under which it is profitable to invest in new district heating systems or in retrofits. Four case studies were carried out, in Lithuania, Poland, Russia, and Ukraine. Several seminars were conducted to share the results of this work (see Box 7). The results are valuable for all countries with cold climates. Similar objectives were pursued in the study on *Increasing Efficiency of Gas Distribution Networks* which aims to analyze the economic and institutional conditions under which urban natural gas networks can be soundly constructed, operated, and expanded. The first phase of the project, i.e., case studies in Tunisia, Turkey, and Denmark, has been completed. Additional case studies are needed to make the study more meaningful, and will be undertaken as soon as the financing is mobilized.

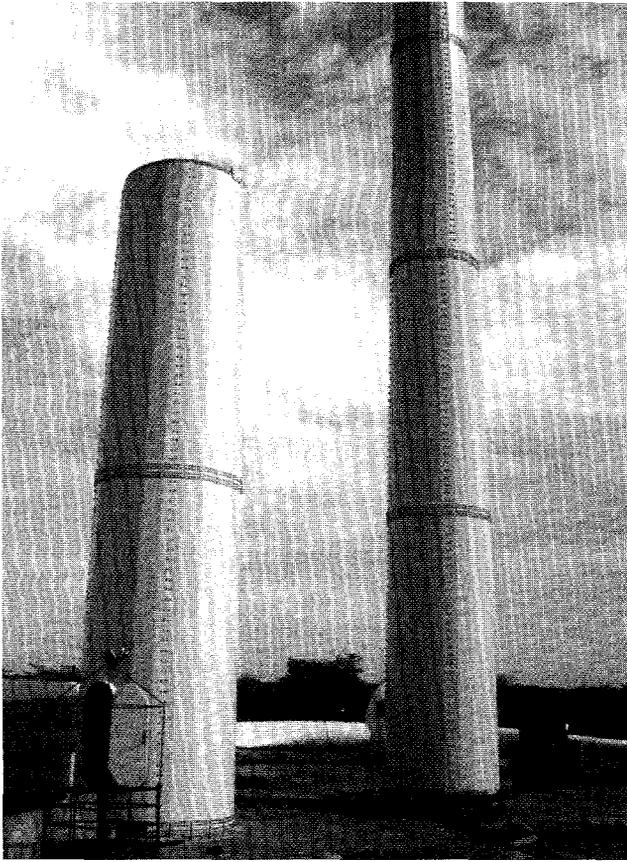


Collecting data for an energy survey in the Philippines.

Energy efficiency gains are often possible through better management systems. This was the emphasis given in the *China- Power Efficiency Pilot Study* which analyzed the power systems in two rural counties of China, and helped them prepare a power loss reduction program. A training handbook for power distribution system planning and loss reduction studies has been prepared in Chinese, tested with trainees, and is now widely used in China. It will be available in English shortly so that it can benefit a wider audience as it offers a pragmatic diagnostic tool which could be used in environments which have limited human resources and institutional capacity.

Improving end-use efficiency in industrial enterprises has been the focus of several studies in Latin America and Central Europe. In Brazil, for example, the *Bahia End-Use Energy and Effluent Management Strategy Project* aims to create a portfolio of good practice case studies at 5 or 6 industrial sites in the state of Bahia which would use the Monitoring and Targeting (M&T) systems for energy management and waste minimization. The M&T systems involves carrying out energy audits, establishing “accountability centers” in each industrial site, benchmarking those with industry standards, and a performance plan which is regularly monitored. Similar projects have been supported by ESMAP in Peru, Colombia, and Slovakia, with financial support from the Netherlands and Switzerland, in cooperation with the EU-THERMIE program. Finding financing for implementing energy savings which involve some investments is at times difficult. ESMAP has therefore supported the establishment of Energy Savings Companies (ESCOs), private enterprises which are contracted to carry out the initial energy audits and/or to implement the performance plans; in some cases they are remunerated from a percentage of revenues from the energy savings actually generated.

The *Bolivia- Energy Efficiency and Environment Project*, supported by the Netherlands, offers a particularly interesting concept. It involves both energy conservation and a unique capacity building program with the private sector. The Chamber of Industry and Commerce of La Paz has benefitted from ESMAP technical assistance, and has become



Construction of pylone supporting a wind turbine

the prime agent to encourage member industries to join in this energy efficiency program, and to do the project appraisals on behalf of the local banks when industries apply for financing. The results of this project which could be replicated in many other economies are to be published shortly. As a follow-up to this project, ESMAP is supporting a

Biomass and Energy Efficiency Project which aims at biomass conservation and energy efficiency for rural industries in particular. The institutional concept is fairly similar to the first project except that it proposes to work with NGOs as intermediaries between the rural industries and the banks.

ESMAP will continue its work on energy efficiency in 1999, not only replicating the available experience into other ESMAP projects, but with the main objective of mainstreaming the results as has already been successfully done in China and Brazil. For both countries, the results of the ESMAP projects have been integrated into the lending operations of the World Bank, with loans for \$450 million and \$250 million respectively. The experience acquired through these ESMAP projects can become standard features of many investments, regardless of the source of financing, public or private.

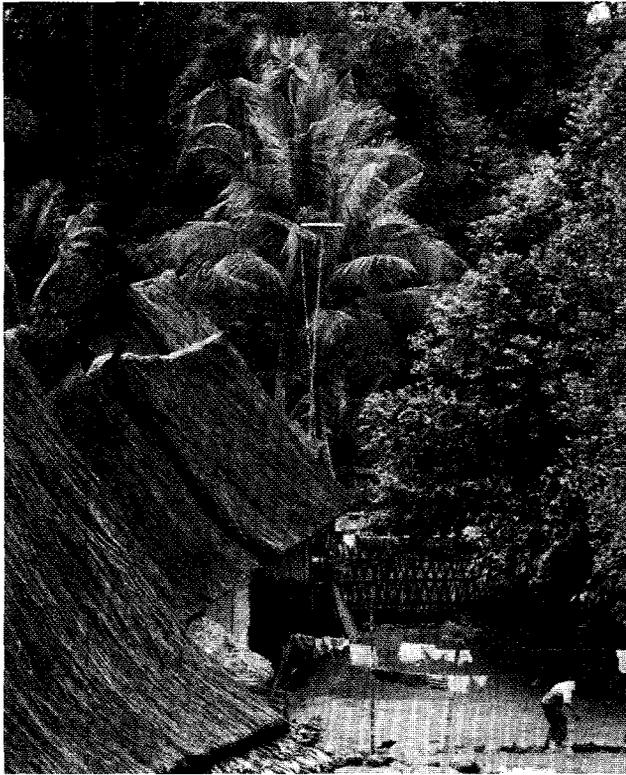
Renewable Energy

ESMAP activities in 1998 have continued to support its strategy to contribute to national and 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 like the World Bank Group.

The *Solar Initiative Regional Strategy Project* provides an extensive desk review of on-going renew-



Wind turbine for a local network in Asia.



Solar panel installed on top of a pole for a village home power system.

able energy activities in various regions. Following field missions in countries (Argentina, Brazil, Bulgaria, Cape Verde, Chile, Morocco, Peru, Russia, and Tunisia), several opportunities for investments in renewable energy were identified. A report consolidating lessons from solar projects is to be published shortly. Meanwhile, lending institutions and investors have already taken advantage of this work. Projects are to be financed in Argentina, Brazil, and Peru. This work will also provide a most valuable input for energy-environment reviews.

The *West Africa Solar Project* has led to the design of components for projects to be financed by the World Bank in Benin, Cape Verde and Togo once the pre-investment studies, and the institutional and financial mechanisms are finalized. Similarly, the work carried out in Bolivia has led to a GEF financed project on renewable energy for \$8.5 million. A renewable energy project is also being considered for financing by the World Bank in Northeast Brazil, on the basis of the analytical and technical work done with ESMAP's support. Particular emphasis was put in this project on institutional and financing mechanisms. It reviewed the possible role of private con-

cessionaires, service providers, equipment leasing firms, and energy service companies, and on community participation through cooperatives or non-governmental organizations.

In the *Egypt-Solar Thermal Power Options* project, various options for using solar thermal resources at plant and power system level were reviewed. The project, whose findings are available, has been successful in catalyzing preparatory studies for a Bank/GEF investment project in a solar thermal power plant using private sector participation.

Options for integrated renewable energy sources are now systematically analyzed when ESMAP or other institutions provide assistance to countries to define their energy strategies. As more experience is gained on the management of decentralized systems, and as more institutional and financing options also become available, the market for renewable energy is expanding. Renewable energy is therefore an attractive option not only as an environmentally benign technology but as an essential component of the 'access' paradigm on which ESMAP's work will continue.

Rural and Peri-Urban Household Energy

Lack of access to modern forms of energy is still one of the major deterrent to the economic and social development of the poorest populations in developing countries and in some transition economies. Those populations usually live in rural areas where grid or decentralized electrification has not yet been possible and where the availability of other energy sources: petroleum, LPG, natural gas, and renewables, is limited and extremely costly. They also live increasingly in peri-urban areas where infrastructure services for energy, water, and sanitation cannot keep up with the rate of immigration. While rural populations migrate to urban areas in the hope of finding employment and earning incomes to improve their living standards, they often find themselves in conditions worst than their previous ones.

Many efforts have been carried out to improve the access of modern energy services to poor households in rural and peri-urban areas. Yet, progress

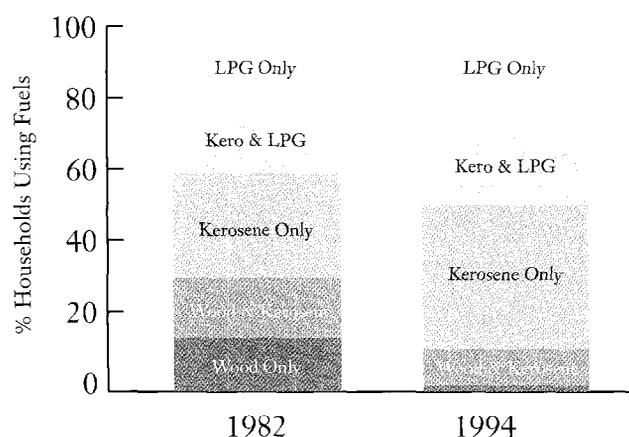
has been slow and remains constrained by a number of issues:

- Lack of resources of poor households to purchase energy services;
- Lack of more affordable energy services and technologies;
- Lack of information on technologies or delivery mechanisms which are available, at times, in other parts of the world;
- Inefficient market interventions, in particular on product trade;
- Disconnect between energy planners and decision makers, and poor energy users, leading to a limited understanding of poor households' economic behaviors in relation to energy services;
- Limited access to funding, public or private, to improve access to energy services by the poor;
- Onus of the environmental responsibility, in particular for the utilization of biomass and hydro resources;

ESMAP's agenda on energy services for poor rural and peri-urban households attempts to respond to the issues listed above. Continuing on the work from previous years, ESMAP efforts have been focussed on three main themes:

- Rural Electrification.
- Specific applications, such as lighting, and delivery mechanisms.
- Urban energy.

Figure 9 Change in Households' Choices for Cooking Fuels, Hyderabad, 1982 to 1994



Solar powered sewing machine in India. An example of renewable energy used to increase production and productivity in a rural area.

Rural Electrification

The work on rural electrification has ranged from studies to assess the success factors for rural electrification and to develop a methodology to assess the benefits from it, to technical assistance to help governments prepare their rural electrification strategies and pilot projects and test decentralized rural electrification systems. A first set of country cases for the study on *Rural Electrification: Success Factors* has already been completed. The results were presented at the Village Power Conference held under the aegis of the World Bank and of the National Renewable Energy Laboratory (NREL), of the United States, in October 1998. Rural electrification strategies were completed for India, Laos, Malawi and Uganda. The Uganda and Malawi studies have become major inputs for the development of the energy strategies of the respective governments. The India work is being integrated into a major lending operation of the World Bank for electricity distribution. One of its major contribution is to have identified the potential for energy conservation in agricultural pumping, and assessed the potential for substitution of renewable energy/modern fuels for traditional fuels. In Cameroon, as a result of the *Decentralized Rural Electrification* project, new regulations for decentralized rural electrification have been designed, and included in the new Electricity Law which was scheduled to be voted by the National Assembly in 1999.

Lessons learned from pilot projects on decentralized rural electrification supported by ESMAP are now constituting a rich body of new knowledge.

For example, the pilot projects carried out in Cameroon and Guinea have led to test the possibility of using local capabilities to build, install and run pico-hydro schemes, to develop PV-solar home systems, and to run economically micro-diesel grid systems. In both countries, new institutional, financial, and procurement mechanisms have been identified. They are based on building-up an effective partnerships between government institutions, local communities, and new entrants in the market of electricity generation and distribution. Comparable results have been obtained in the *Peru-Rural Electrification* project which has trained rural electrification organizations in the development and management of small or micro-hydro plants, in order to reduce the cost of rural electrification.

Specific Applications

A whole body of knowledge is also being generated on how the poor meet their energy needs, in particular for lighting. Under several projects, in Uganda, Zimbabwe, India, and through the project *Lighting Services for the Rural Poor*, field surveys have documented both the significant amount of expenditures the poor spend on energy, principally for cooking and lighting, and the extremely extensive use of car batteries for direct lighting or to recharge other batteries for other lighting devices. These findings stress the need to pursue the adaptation of available technologies to meet the needs of the poor. This would extend the availability of energy services to more affordable levels and reduce the share of expenditure in poor households on basic services such as lighting. These findings also corroborate the existence of significant unmet demand for home-PV systems.

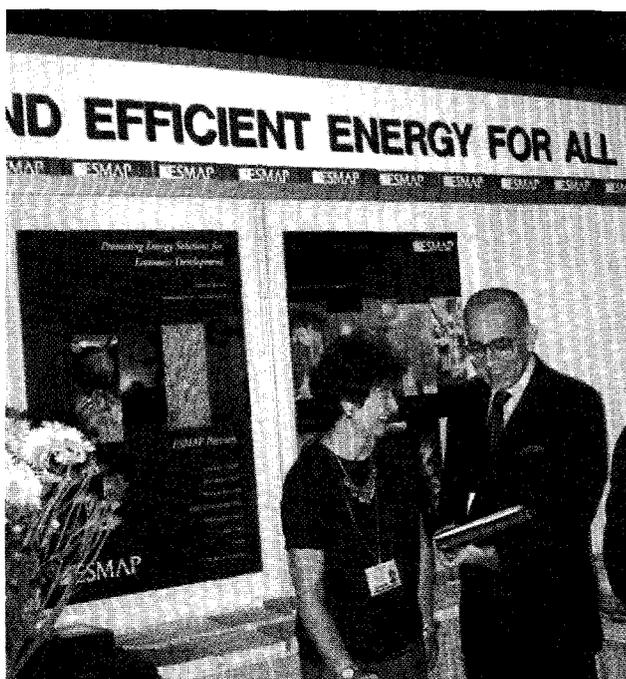
Urban Energy

A large part of the work done on decentralized rural energy services is of direct benefit to understanding how to meet the needs of the poor in the peri-urban areas, where grid electricity is often not available. The *India-Urban Energy Study* has corroborated these assumptions, by conducting surveys of households in Hyderabad (see Figure 9). The results show that interfuel substitution is taking place very rapidly as people move from wood to kerosene, from kerosene

to LPG, and even sometimes directly from wood to LPG. This substitution is taking place in spite of limited income growth, which suggests that much of the fuel substitution has resulted from the liberalization of energy markets. It can also be concluded that the liberalization of fuels leading to fuel switching combined with forestry policies that stress conservation of forests and changing land used patterns in rural areas has helped slow down deforestation rates in the metropolitan areas.

The surveys confirmed that fuel subsidies do not benefit the poor. They benefit the middle and upper class households who can afford market rates for fuels or electricity. The study offered some constructive options to supply electricity services to lower income households, in particular to maintain the current lifeline rate for the first 50kWh, to keep connection charges for minimal service low, but to strictly enforce the policing of illegal connections. Such a policy would be affordable and equitable and would help increase access to electricity of the 30% poorest households in Hyderabad. The lessons from this project are certainly applicable to other peri-urban environments.

The advent of much affordable technologies for decentralized energy services provides a definite opportunity to enhance access to energy services by the poor. This will continue to be a key area of emphasis for ESMAP in the coming years. The focus may vary, depending on the regions. For example, in Africa, it is expected that the work will focus more on energy services to increase the productivity of the poor, testing new financial and institutional models for the delivery of energy services, in particular with the participation of the communities, and on trade liberalization to allow for fuel switching and greater access to new technologies. In South Asia and Latin America, the emphasis may be given to addressing the issue of growing peri-urban areas and a greater integration of policies to meet the rural and urban demands rather than favoring one sector at the expense of the other. Continued emphasis will also be given to environmentally benign options to benefit from the available technical options and financing mechanisms.



At the World Bank Annual Meeting exhibit, the ESMAP Manager, Dominique Lallement updates World Bank's Vice President Massoud Ahmed on ESMAP's strategy.

Dissemination

In 1998, ESMAP has strengthened its approach to disseminate the results generated by the projects in the portfolio. In addition to participating in several international events, including the exhibit organized on the occasion of the World Bank Annual Meeting efforts have been on the following:

On-going projects

Several on-going projects were redesigned to include dissemination components, and when necessary, some additional financing was provided. For example, the results of the *Peru-Rural Electrification Project* was to be discussed in a national forum in early 1999, so that the result of local pilot studies can be replicated elsewhere in the country. Likewise, the results of the *Bolivia-Rural Energy Strategy* have been conveyed to the Government and the results integrated into the new rural energy policy and investment program.

New projects

Some projects have been started, specifically to disseminate the results of previous efforts. This is the case of the *India-Dissemination on Environmen-*

tal Issues in the Power Sector. This activity provides for holding seminars in India in the states which were not associated with the initial energy-environment review. Emphasis is put on the states which are committed to, or already, undertaking major sector policy reforms. For all new projects, ESMAP now seeks to systematically build-up on previous knowledge and experience, so that the projects actively contribute to accumulating knowledge for the developing and transition economies. All new projects now have to be designed with a dissemination component – seminars, conferences, publications. ESMAP also agreed to participate with the World Bank in the *Energy and Development Report*, a new publication aimed at improving the state of knowledge and thinking on energy issues for the twenty first century. The first report includes a collection of topical essays from eminent thinkers and practitioners from developing and developed countries on the impact of the global financial crisis on energy investment, in particular private capital flows. The report also carries estimates of the financing requirements for energy services. It should reach a wide audience, world-wide, both in the private and the public sector.

Publications and Internet web site

ESMAP has increased the rate at which it releases its publications, in particular in the latter part of the year. The fruit of these efforts will be borne in 1999. The list of ESMAP publications available to the general public is in Annex 3. In addition, it prepared an information pamphlet on ESMAP which has been widely distributed in conferences attended by ESMAP staff and project managers. ESMAP has also revamped its web site and will continue to upgrade it in 1999. It will be used, in particular, to publish short summaries on completed projects, and 'news' from on-going projects so that the information generated from field studies and pilot projects can be made available in real time. ESMAP is also linked to the World Bank knowledge management data base, as a means to further disseminate the results of its work.

Governance and Management

The Consultative Group

The governance structure of ESMAP includes a Consultative Group (CG) composed of representatives of donors and members “at large” from the regions receiving ESMAP assistance. Since July 1997, the CG has been chaired by *Richard Stern*, Vice President for Human Resources and previously Director of the Industry and Energy Department of the World Bank. Two of the *members “at large”* offered their resignation in the last quarter of the year: *Prof. Jose Goldemberg*, energy efficiency specialist from Brazil, and *Prof. Edward Ayensu*, who has joined the inspection panel of the World Bank. During their tenure, Prof. Goldemberg and Prof. Ayensu brought exceptional expertise and knowledge to the meetings of the Consultative Group and helped shape the current ESMAP strategy. *Mr Ketane Sithole* of Botswana was identified as a candidate to join the Consultative Group as of April 1, 1999. No successor to Professor Goldemberg has yet been appointed.

The CG Annual meeting was held on April 3, 1998, at the United Nations in New York. The CG reviewed a proposed strategy for ESMAP prepared by ESMAP Management, and agreed that ESMAP’s

mission is to help address the role of energy in the development process, with the objective of contributing to poverty alleviation, improving living conditions and preserving the environment in developing and transition economies. It was agreed that ESMAP should continue to center its interventions around three priority areas:

- increasing access to more efficient forms of energy by the poor;
- energy sector reform and restructuring to facilitate the sustainable production, distribution and use of energy resources;
- promoting environmentally sustainable energy practices.

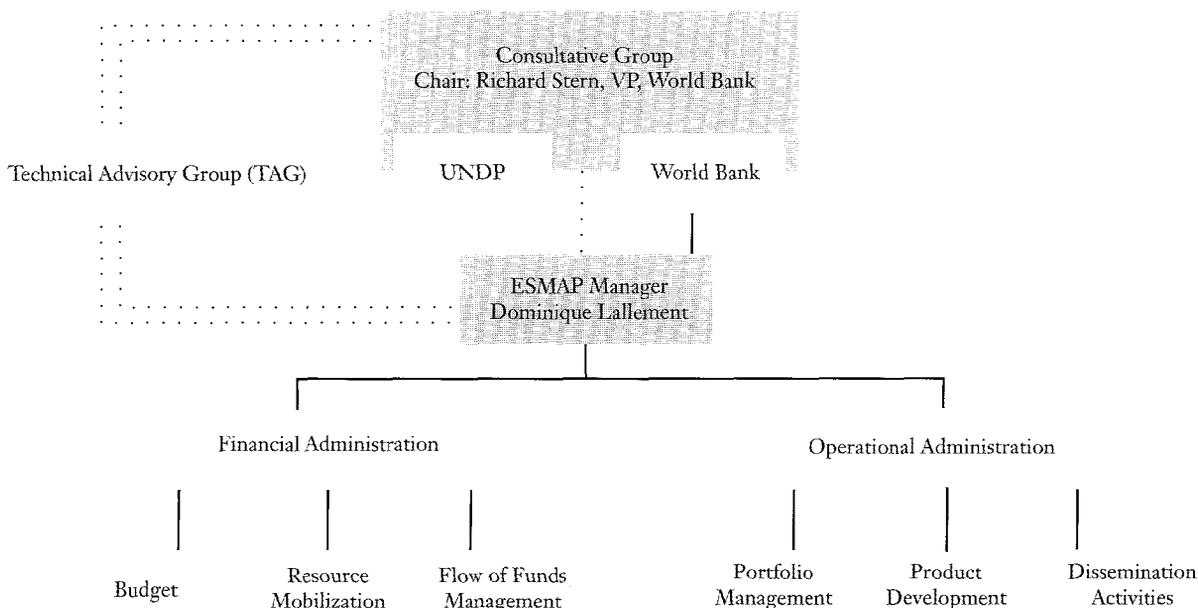
The Final Communiqué of the CG is attached as Annex 1.

The Technical Advisory Group (TAG)

The Technical Advisory Group comprises three to five members. The TAG’s mandate is approved by the CG through the terms of reference for the TAG, and its line authority is exercised through the Chair of the CG.

The TAG focuses on issues of ESMAP’s vision and strategic direction, and has a role in advising the CG and ESMAP’s Management on the processes for project selection and monitoring in order to

Figure 10 ESMAP Organization



assure donors that the portfolio composition reflects the agreed strategy. It also review certain activities to draw lessons from past projects, including on the functioning of ESMAP.

Several changes affected the composition of the TAG in 1998.

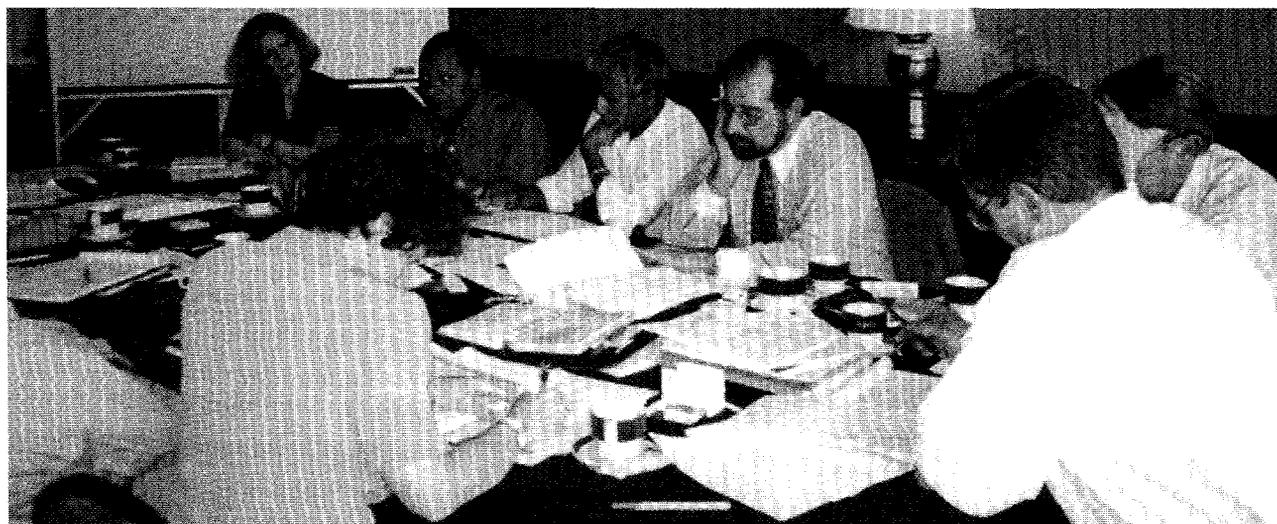
- In August 1998, *Ing. Herbert Muller Costas* was appointed Minister of Finance for Bolivia. As a result of his appointment, he resigned from his position as TAG Moderator which he had assumed in October 1997. During his tenure, he brought invaluable experience as a policy maker in the energy sector, and vision to address crucial issues affecting the delivery of energy services for the poorest populations and economies. He was most instrumental in steering the program to its current priorities and management structure.
- In November 1998, the Chairman of the Consultative Group renewed the mandates of *Dr. Andrew Barnett* from the United Kingdom, an independent energy and development consultant, and *Dr. Youba Sokona* from Mali, Director of the energy program of the non-profit organization ENDA in Senegal. This confirmation of the two incumbent TAG members was for another two-year mandate.
- A new Moderator, *Mr. Alfredo Mirkin*, former minister of energy of Argentina, was identified to replace *Ing. Muller Costas* and was expected to take up his position in 1999. The chairman also appointed *Dr. Andrew Barnett* as

acting Moderator, a function which he will assume until the appointment of the new Moderator. Mr. Barnett has brought effectiveness and hard work during the transition period, leading the TAG to a smooth transition for the new Moderator.

- It was also decided to appoint an additional member from Asia to the TAG, in order to better address the new demands generated by recent economic developments in Asia.

The TAG met on three occasions in 1998, first in April (immediately before the Consultative Group meeting), in June in Washington, and informally in December, in London. The latter meeting was held to keep up the momentum gained during the previous meetings and provided an opportunity for the TAG to clarify its role and develop a plan of action for 1999. During 1998, the TAG focussed on review and advice on the Strategy for ESMAP. Dr. Andrew Barnett also conducted a Review of the Renewable Energy Projects in ESMAP Portfolio. In addition, the members of the TAG maintained frequent contacts with the ESMAP management team and with several task managers, providing informal advice and guidance.

ESMAP Management, Staffing and Procedures Management. The year 1998 was a year of change in the management, operations, and administration of the Programme. In response to the donors, the management of the World Bank appointed a full-time manager for the Programme. On April 15, 1998



Meeting of the ESMAP Technical Advisory Group (TAG): Nancy Pinto (World Bank), Dominique Lallement (ESMAP Manager), Dr. Youba Sokona, Dr. Suresh Hurry (UNDP), Ing. Herbert Muller Costa, Jan Moen, and Dr. Andrew Barnett.



Dr. Andrew Barnett, acting moderator of the Technical Advisory Group in 1998.

Ms. Dominique Lallement was appointed manager of ESMAP, replacing *Mr. William Porter* who had been appointed in July 1997. Mr. Porter had initiated a series of discussions, consultations and dialogues to redefine ESMAP's strategy. Ms. Lallement, an economist, comes with a long development and managerial experience at the World Bank in developing and transition economies. She joined the Programme with a relentless commitment to poverty alleviation.

Staffing. With the new organization of the World Bank relying on World Bank-wide professional networks, the staffing of the Programme has also evolved. There are no longer ESMAP "dedicated" staff, other than a small managerial and administrative unit. The projects are now carried out by staff members from the World Bank Group energy practice and others with expertise in energy policy and reform, energy efficiency, environment, primary energy resources (biomass, oil and gas, coal renewable), and rural or urban household issues. The staff involved in ESMAP work can be active both on ESMAP projects and on regular World Bank Group activities, thereby bringing their innovative approaches from ESMAP into the regular work program of the World Bank Group. Some of these experts are made available through secondment and special assignments arranged with partner organizations from the private sector and official donors.

Procedures. In order to further mainstream the ESMAP work program throughout the World Bank

energy practice, a new procedure for generating proposals was introduced. It is based on the Logical Framework (LogFrame) approach as had been recommended by the TAG and suggested by several donors.

The new procedures aim to enhance transparency, quality, and fairness in the evaluation of the proposals. Calls for proposals are directed to all the members of the World Bank Group energy practice, the evaluation criteria are published (see Box 8), and the evaluation of the proposal is done by World Bank Group and outside experts with the participation of the UNDP. Project managers can be located in any part of the World Bank Group where the needed expertise is available. This new procedure has strengthened the relevance of ESMAP projects with respect to the regional strategies of the World Bank, led to the expression of a considerable increase in the demand for support from the Programme, and to a strengthening of the relationship with UNDP.

Monitoring of Implementation

The Logical Framework (LogFrame) approach adopted by ESMAP in 1998 aims at facilitating more rigorous project design and monitoring. This approach establishes the links between goals, objectives, outputs and inputs with verifiable indicators and specifications of the assumptions that underlie these relationships. Steps have been taken to adapt the LogFrame to ESMAP needs, as well as provide guidance and training to all current and prospective project managers.

The *ESMAP's Purpose and Approach* paper demonstrates its diverse and cross-disciplinary objectives and activities in regional and thematic areas. Both monitoring and evaluation methodologies and program frameworks are dependent on well developed indicators. These indicators provide the basis for before and after analyses and describe the effects (positive and negative) of program and project interventions, anticipated and unanticipated; intended and unintended. They fall broadly into four categories:

- *Program and project implementation.* The delivery of technical services, operating funds and capital inputs with related disbursements and resulting

Box 8 Project Proposals: Basic Selection Criteria

Assesment Ratings
Pass/Fail

1. Commitment of local Government
2. Supports ESMAP priority areas
3. ESMAP has comparative advantage
4. Relevant lessons of experience reflected in project design
5. Can generate new knowledge for which there is clear demand

0 - 5

6. Compatibility with CAS and World Bank Energy Policy
7. Focus on poverty alleviation
8. Innovative in developing, testing and/or mainstreaming new ideas/methods
9. Potential to be replicated
10. Contributes to institutional and capacity building
11. Dissemination plan
12. Potential for attracting investments
13. Performance indicators identified and linked to objectives and outputs
14. Focus on gender issues
15. Focus on social issues

0 = Not applicable
1 = Unsatisfactory

2 = Marginally Satisfactory
3 = Satisfactory

4 = Fully Satisfactory
5 = Outstanding

- outputs (facilities created, activities and participatory processes organized, etc.);
- *Institutional change* which demonstrates capacity development, attitudinal awareness shifts, and policy reorientations;
- *Socioeconomic conditions* which bring out the consequences of project interventions; and
- *Specific indicators* (e.g. environmental impact) which demonstrate the environmental achievements.

Financial Review

Funding

ESMAP's funding is categorized into four types distinguished by the degree to which their use is prescribed by the donors. These categories are unrestricted core funds, which may be applied at the Program Manager's discretion to any project or activity of the Program; thematic funds which can be applied only to projects addressing a particular thematic area such as renewables, or environment; country program funding, which is restricted to technical assistance to a specific country; and project-specific funding which may be used only for projects or activities for which specific approval has been obtained from the donor, prior to the commencement of work.

It is the flexibility offered by core funding which allows ESMAP to respond to opportunities as they arise. Core funding is also used to pull together lessons across the entire program in order to ensure that best practice are made available to the energy development community. In terms of administrative

efficiency, both core and thematic funding allow ESMAP to deploy funds to projects flexibly without the additional burden to ESMAP or the donor of executing and monitoring tedious administrative conditions.

Contributions Received

ESMAP receipts totaled \$8.2 million in 1998, about the same level as during the two previous fiscal years. Eight donors, in addition to the World Bank, contributed to the Programme. The World Bank's contribution of \$1.4 million was down from the 1997 level of \$1.6 million, and its share of total contributions dropped to 17% from 19% in 1997. Table 6 shows actual receipts by donor by year for the period 1996-1998.

In an environment of contracting aid budgets, for which there is strong competition, ESMAP management has been gratified with the continued support of its donors. However, in order to ensure a

Table 6 ESMAP Receipts, 1996-1998 (thousand US\$)

	1996	1997	1998	Total	Percent of total, receipts	of which core*	Percent of total core*
UNDP	0.0	0.0	112.0	112.0	0.5%	0.0	0%
World Bank	1,496.0	1,600.0	1,400.0	4,496.0	18.1%	0.0	0%
Belgium	646.9	0.0	0.0	646.9	2.6%	190.0	5%
Canada	809.3	732.4	255.3	1,797.0	7.2%	0.0	0%
Denmark	0.0	392.8	0.0	392.8	1.6%	392.8	9%
Finland	0.0	0.0	91.5	91.5	0.4%	91.5	2%
France	0.0	518.6	0.0	518.6	2.1%	0.0	0%
Germany	258.1	566.4	603.6	1,428.1	5.7%	824.4	20%
Netherlands	1,045.0	2,284.0	3,536.9	6,865.9	27.6%	0.0	0%
Norway	1,087.7	0.0	0.0	1,087.7	4.4%	1,087.7	26%
Sweden	371.1	633.6	302.3	1,307.0	5.3%	334.9	8%
Switzerland	0.0	0.0	507.8	507.8	2.0%	0.0	0%
United Kingdom	2,382.3	1,623.2	1,401.7	5,407.2	21.8%	1,093.6	26%
Private Sector	198.2	0.0	0.0	198.2	0.8%	198.2	5%
Total	8,294.6	8,351.0	8,211.1	24,856.7	100.0%	4,213.1	100%

*/ Excludes the World Bank's and UNDP's contributions, which are considered core.

level of funding sufficient to maintain an impact in the energy development arena, ESMAP management recognizes that funding from other partners – in particular private sector partners – needed to be sought. In the course of 1998, contacts with a number of potential private sector partners were made, at least three of which were expected to result in contribution agreements in 1999. Fund raising efforts will continue in the coming year, as ESMAP management pursues opportunities to involve interested private sector partners in the work of the Programme.

Core and Thematic Funding

In 1998, core contributions from donors other than the World Bank totaled \$1.6 million, equal to approximately 24% of non-World Bank contributions. The World Bank's contributions as well as the contribution from UNDP should also be considered as core contribution since they are not linked to any specific project. The donors who made contributions to core included Finland, Germany, Sweden and the United Kingdom. Work on a new agreement for core funding from Norway is

underway, and a contribution is expected in 1999.

Thematic contributions totalling \$ 1.3 million were made in 1998. All of this amount was contributed by the Netherlands, who initiated and contributed to three new umbrella thematic funds in the course of the year namely, the non conventional energy fund for Africa, the end-use energy efficiency fund, and the fossil energy/environment fund. Core and thematic contributions, excluding the World Bank's contribution, for 1996-1998 are shown in Table 7. Table 8 shows all contributions received in 1998 by type of funding.

Country Program Funding

Country program funding totaled \$2.3million, representing the second tranches of the Bolivia Country Programme-Phase II, the Bolivia National Biomass Program, both funded by the Netherlands, and the final tranches of the Peru Country Program funded by CIDA (Canada).

Project Specific Funding

Project specific funding totaled \$1.5 million, or 22% of total funds received in 1998.

Table 7 Core/Thematic Contributions, 1996-1998 (million US\$)

Year	Total Donor a/ Contributions	of which Core	of which Core plus Thematic	Core as % of Total Donor Contributions	Core plus Thematic as % of Total Donor Contributions
1996	6.99	2.66	3.39	38.1%	48.5%
1997	6.80	1.65	2.35	24.3%	34.6%
1998	6.80	1.61	2.95	23.7%	43.4%
Total	20.6	4.3	8.7	20.9%	42.2%

a/ Does not include World Bank.

Table 8 Funding Breakdown in 1998 (million US\$)

1998 Funding Breakdown by Fund Type	Amount
World Bank Contribution	1.4
UNDP	0.112
Core	1.609
Thematic	1.34
Project	1.469
County Program	2.28
Total	8.21

Expenditures

Expenditures in 1998, or disbursements, against ESMAP funds totaled \$6.5 million, down from \$8.5 million in 1997. This drop in disbursements largely was the result of three factors. First, efforts were undertaken to clean up the existing stock of projects, closing out old activities and canceling balances on projects with little chance of successful outcome (typically because of a change in client country interest in the activity). Second, although 17 new operations were approved and became operational during the year, disbursements on these new operations were not yet significant. Anticipating the introduction of a new system for review of proposals, several new projects were deferred, to ensure that all proposals were reviewed for merit on a consistent and transparent basis. The first call for proposals under the new system was introduced in October 1998, and since that time the stock of new projects increased

significantly. This is expected to lead to a surge in overall ESMAP disbursement in 1999, as these new projects get underway. Finally, the uptake of the new EER product line was slower than expected. However, lessons from the few EERs undertaken in 1998 are expected to contribute to a robust pipeline of EERs in 1999 and beyond.

Of the total \$6.5 million disbursed in 1998, approximately \$1.2 million was applied to program management and administration costs, including the cost of CG and TAG Meetings, the TAG evaluation of the ESMAP Renewable Energy program, and non-project specific publications and communications. Of that, the UNDP contributed \$112,000 to the costs associated with the TAG activities. Table 9 summarizes ESMAP's actual operational and overhead costs by year for the period 1996-1998. Table 10 shows CG and TAG expenses for the same period.

Table 9 Operational and Overhead Expenses, 1996-1998 (thousand US\$)

	1996	1997	1998
Staff Costs			
Donor Funded	2,120	1,122	1,548
World Bank Funded	885	1,005	807
Subtotal	3,005	2,127	2,355
Consultant fee and contractual services			
Donor Funded	3,489	4,104	2,695
World Bank Funded	30	75	120
Subtotal	3,519	4,179	2,815
Travel			
Donor Funded	977	1,316	720
World Bank Funded	79	100	139
Subtotal	1,056	1,416	859
Other Expenses			
Donor Funded	341	340	23
World Bank Funded	436	408	300
Subtotal	777	748	323
Total Operational and overhead	8,357	8,470	6,352
CG and TAG expenses	116	73	146
Total ESMAP Expenses	8,473	8,543	6,498
of which:contribution from the World Bank	6,977	6,943	5,098
of which:contribution from donors	1,496	1,600	1,400

Table 10 ESMAP Consultative Group and Technical Advisory Group Expenses, 1996-1998
(thousand US\$)

Expense Item	1996	1997	1998
CG Meeting	42	12	21
TAG Meetings and Evaluations			
Honoraria and Fees	40	24	95
Travel	33	34	30
Miscellaneous	1	3	
Subtotal	74	61	125
of which Donors	50	61	112
of which Bank	24	0	13
Total CG and TAG Expenses	116	73	146
of which Donors	50	61	112
of which Bank	66	12	34

Cash Position

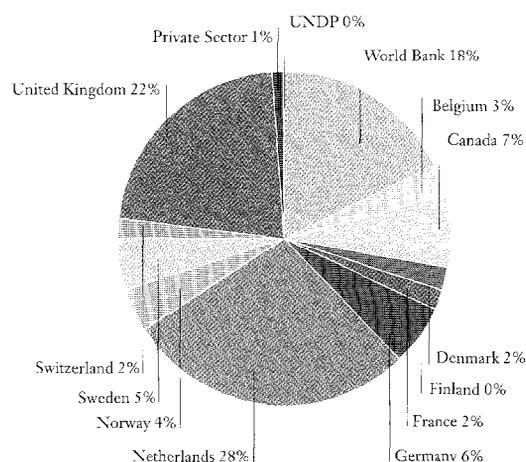
As of December 31, 1998, cash balances in ESMAP trust fund accounts totaled \$13.5 million, reflecting the low level of disbursement during the period. This balance is up from \$10.8 million at end-December 1997. Of the total fund balance, approximately \$6 million had not been committed to projects at end 1998. Since then approximately \$4 million has been allocated to projects approved in 1998, bringing uncommitted core funds to nearly zero, and uncommitted project funds to approximately \$2 million. At the same time, resource requirements for projects already approved exceeded available funding by more than \$ 1.0 million.

Single Audit Process

In June 1995, the Bank instituted a 'single audit' process whereby the Bank provides donors, if they so agree, with an annual management assertion together with an attestation from the Bank's external auditors on the satisfactory performance of the procedures and controls used by the Bank in administering trust funds. Most ESMAP donors have agreed to the single audit process and as such, specific audits of individual

funds are no longer carried out routinely. One audit for a project initiated prior to June 1995 was undertaken in 1998 – the audit of the Dutch Grant to Poland Energy Sector Restructuring. The financial statement for the project was judged to present fairly the financial position of the project.

Figure 11 Receipts 1996-98



List of Abbreviations and Acronyms

AP	Andhra Pradesh (India)
ARPEL	Asistencia Recíproca Petrolera Empresarial Latinoamericana
BOT	Buid-Operate-Transfer
CEE	Central and Eastern Europe
CG	Consultative Group
CHP	Combined heat and power
CNG	Compressed natural gas
CY	Calendar year
DFID	Department for International Development (DFID)
DH	District heating
DSM	Demand side management
EER	Energy environment review
ESCO	Energy savings company
ESMAP	Energy Sector Management Assistance Programme
ESOP	Employee share ownership plan
EU	European Union
FSU	Former Soviet Union
GDP	Gross Domestic Product
GEF	Global Environment Facility
IFC	International Finance Corporation (World Bank Group)
IPP	Independent power producer (or project)
ITP	Independent transmission project
kW	Kilowatt
kWh	Kilowatt per hour
LogFrame	Logical framework
LPG	Liquefied petroleum gas
MIS	Management information system
M&T	Monitoring and Targeting
NGO	Non-governmental organization
NREL	National Renewable Energy Laboratory (United States)
OCDE	Organization for Economic Cooperation and Development
ONE	Office National de l'Electricité (Morocco)
PV	Photo-voltaic
PVMTI	Photo-Voltaic Market Transformation Initiative
SAPP	Southern Africa Power Pool
TAG	Technical Advisory Group
UNDP	United Nations Development Programme
URE	Energy Regulatory Authority (Poland)
US	United States

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Annex 1

Final Communiqué

Meetings of the Consultative Group of ESMAP
New York, NY - April 2-3, 1998

The Seventh Meeting of the Consultative Group of the Joint UNDP/World Bank Energy Sector Management Assistance Programme (ESMAP), was held at the United Nations headquarters in New York, on April 3, under the Chairmanship of Mr. Richard Stern, Deputy Vice President of the World Bank.

The meeting was preceded on April 2, by the ESMAP Donors' Roundtable on Energy for Sustainable Development, with participation from energy and development experts from industrial and developing countries. The Roundtable included four sessions on Emerging New Policies for Sustainable Energy, Emerging Good Practices in Sustainable Energy, Financing Renewable and Rural Energy; and Financing Sustainable Energy After Kyoto.

The first session of the roundtable examined emerging policy and industrial issues related to the needed enabling environment—at the national and global level—to promote more sustainable energy systems. This session also focused on the interface between energy and poverty alleviation, and energy and the environment, and examined key development bottlenecks to be addressed to facilitate the creation of sustainable energy systems.

The second session considered new promising approaches in energy systems, development assessment, and delivery mechanisms. In particular, technological and institutional innovations in renewable energy and energy efficiency were discussed.

The third session considered alternative mechanisms for financing the delivery of sustainable energy services through new institutional, administrative and market arrangements to promote both energy efficiency and renewable energy. The role of government in establishing and promoting a supportive enabling environment to reach the social, economic and environmental objectives for financing sustainable energy was considered.

The last session of the roundtable reviewed new issues and opportunities for promoting sustainable energy investments and initiatives as a follow up to the conclusion of the Kyoto Protocol. National interests, economic efficiency and environmental benefits related to lowering carbon emissions were discussed from the perspective of industrialized and developing countries.

The Consultative Group (CG), reviewed the operations of ESMAP in 1997 and examined the ESMAP Work Program for the current year. The CG reviewed a proposed strategy for ESMAP prepared by the Management of ESMAP at the request of ESMAP's Technical Advisory Group (TAG). The CG agreed that ESMAP's mission is to help address the role of energy in the development process; with the objective of contributing to poverty alleviation, improving living conditions and preserving the environment in developing countries and economies in transition. It was agreed that ESMAP should continue to center its interventions around three priority areas:

- energy sector reform and restructuring to facilitate the sustainable production, distribution and use of energy resources;
- increasing access to more efficient forms of energy by the poor;
- promoting environmentally sustainable energy practices.

The CG received a report from the TAG addressing administrative and strategic issues facing ESMAP. The TAG emphasized that ESMAP should clearly remain an energy program, even though environmental concerns have to be part of its mission. The TAG also estimated that ESMAP's emphasis should be on energy development as an essential factor for poverty alleviation. As a vision for ESMAP, the TAG suggested that ESMAP would be most effective as a \$10 to 15 million a year program, with 60% to 70% of

core funding. This would give to the Programme the ability to move fast in providing assistance and innovative solutions, both in the traditional and non-traditional energy sectors. ESMAP's comparative advantage is in providing governments of developing countries and economies in transition unbiased advice on energy strategic issues, most notably on the relation between energy, poverty alleviation and sustainable development.

The TAG also endorsed two new types of activities that ESMAP proposes to launch shortly: for assessing the result of energy sector reform, and for assessing, on a country by country basis to define more clearly the linkages between energy production, transportation and use, and the impact of the activities on the environment.

The CG endorsed the TAG report and expressed its appreciation for the work accomplished by the TAG and the Management of ESMAP since the last meeting of the CG. Donors confirmed their support to the Programme as a unique interface between the donor community and the recipient community to promote effective approaches for sustainable energy. They agreed that the emergence of climate change considerations has important consequences on the production and use of energy that ESMAP, as an energy program, cannot ignore. It was recognized that ESMAP could play a useful role in raising the awareness on new mechanisms being developed to address climate change issues and in helping establish the basis for using such mechanisms. Donors recommended that ESMAP coordinates closely its activities in this area with other bilateral and multilateral efforts, including those conducted by the World Bank, the GEF and UNDP.

During the discussion of the ESMAP strategy and work program, donors asked the management of ESMAP to ensure that the Programme remains focused and that the number of activities be maintained at a level consistent with the overall dimension of ESMAP. They emphasized that when tackling issues of energy access for poverty alleviation ESMAP should address the provision of energy to the poor in urban as well as rural areas, and pay attention to gender issues.

The CG reviewed the intention of ESMAP to assess the result of energy sector reform and confirmed the view, also expressed by the TAG, that in this assessment ESMAP should look at the social and environmental consequences of sector reform and privatizations.

The CG welcomed the strengthened participation of UNDP in ESMAP and encouraged the management of ESMAP and UNDP to investigate ways to cooperate more closely on individual activities.

The CG expressed its gratitude to Mr. William Porter who served as Manager of ESMAP since July 1997, and welcomed the appointment of Ms. Dominique Lallement who was appointed Manager of ESMAP, effective April 15, 1998.

In addition to the co-sponsors of the Programme—the UNDP and the World Bank—the following donors were represented at the Consultative Group: Canada, Denmark, Finland, France, Germany, the Netherlands, Norway, Sweden and the United Kingdom. The CG expressed its appreciation to UNDP for hosting its meeting and for supporting the Technical Advisory Group of ESMAP.

The Consultative Group of ESMAP will reconvene in about one year.

Annex 2

Activities Completed, Launched and Ongoing in 1998

Table A2.1 Activities Completed in 1998

Africa	Commercialization of Marginal Gas Fields	December 97	145,656	36,189
	A study to identify ways of commercializing gas fields too small for LNG and too far away from conventional fuel markets.			
Central Asia ¹	Gas Trade	December 97	1,147,366	389,882
	A study to assist the governments of gas producers in Central Asia in developing a sound strategy for natural gas investment, use and trade.			
Global	1997 Energy Efficiency Roundtable	September 98	85,127	85,127
	A roundtable and summary report on the meeting between representatives from developing countries, the financial sector and energy efficiency professionals.			
Global	1997 Rural Energy Roundtable	May 98	61,592	61,592
	A roundtable to provide an opportunity for donors, development agencies, multilateral banks, NGOs, private sector firms and host country officials to participate in an open discussion on recent developments in rural energy and future strategies.			
Global ²	Techniques for Financing Photovoltaics	February 98	29,565	29,565
	A proposal for expanding the commercial sales of photovoltaics for household and commercial use in rural areas of developing countries.			
India	Environmental Issues in the Power Sector	June 98	1,963,123	1,963,123
	A study aimed at reducing the environmental impact of power generation in India and presenting a menu of options for decision makers to mitigate those effects.			
Morocco	Gas Pricing Study	October 98	180,826	180,826
	A study to establish and define a gas pricing policy for Morocco, to define domestic gas tariffs and to analyze the impact of gas pricing on fiscal revenues.			
Poland	Energy Sector Restructuring Program	October 98	1,151,864	1,073,612
	A study to identify alternative natural gas import options and support the Polish government in reforming the energy sector along market lines, as well as promote private sector participation.			

¹ This project was formerly called Natural Gas Investment Strategy. ² Formerly called Mc Solar Techniques for Financing Photovoltaics.

Table A2.1 Activities Completed in 1998

Country/Entity	Description	Date Completed	Total cost (US\$)	Of which ESMF
Poland	Natural Gas Upstream Pricing A study to prepare a critical review of the natural gas upstream pricing policies for a number of diverse countries offering differing degrees and types of risk for domestic and foreign private investors.	August 98	86,227	56,266
Swaziland	Household Energy Strategy Study A report to develop an integrated household energy strategy for Swaziland with a view to identify the main policy and institutional issues and recommend changes, financial and technical assistance.	October 97	77,190	77,190
Tanzania	Power Loss Reduction and Distribution Expansion A study to assist the Tanzanian electric utility to identify and quantify sources of technical and non-technical losses in the power system, and to develop programs to reduce these losses to economically feasible levels.	June 98	765,331	765,331
Tunisia ³	Renewable Energy (RE) Strategy Study A study to identify the potential for renewable energy development and a proposed plan of action for overcoming existing barriers.	December 98	197,514	32,053

³ French version of the report has been issued.

Table A2.2 Activities Launched in 1998⁴

Africa	RegionSouthern African Conference on Regional Energy Regulation	July 1998	80,000	80,000
	A conference on regional energy regulation cooperation to identify sector restructuring needed in individual countries and to promote efficient electricity markets for regional economic growth.			
Global	Financing Decentralized Rural Electrification	March 99	15,000	15,000
	A study to review and evaluate the experience of rural financing mechanisms and extract best practices for dissemination.			
Global	Global Overlay – GHG Emissions in India Power Sector	March 98	125,000	50,000
	A study and report on Greenhouse Gas emissions in the India power sector for the states of Andhra Pradesh and Bihar, focusing on alternative policy options including the restructuring of the power and coal sectors.			
Global	Peri-urban Electrification Project	January 99	15,000	15,000
	A deskstudy to summarize worldwide experience with methodologies on how to extend electricity services to peri-urban customers in a cost effective manner.			
Global	Oil & Gas Development Promotion Project	April 98	150,000	150,000
	A program designed to assist investors, including the Bank Group and its client countries, in the identification and effective promotion of oil and gas development opportunities on the best obtainable terms.			
Global	Review of Status of Energy Sector Reform	April 98	150,000	150,000
	A study to provide the financial community with a preliminary assessment of energy sector reforms introduced in developing and transition economies and issues involved in energy sector reform.			
India	Dissemination of Environmental Issues in the Power Sector	March 98	297,000	297,000
	Workshops and training programs to disseminate the report <i>India: Environmental Issues in the Power Sector</i> to various states.			
India	Electricity Sector of Goa – Regulatory Development and Tariff Modeling	December 1998	506,000	299,000
	Technical assistance to the government of Goa State to establish a regulatory framework for the restructured electricity sector, and to design a sustainable and efficient tariff schedule.			

⁴Does not include the Global Energy Environment Sector Work which was dropped from the work program in the course of the year.

Table A2.2 Activities Launched in 1998

Country/Region	Project Name	Date Launched	Funds received (US\$)	Funds Disbursed
Mekong Region	Mekong Regional Market A workshop and follow-up technical assistance program to address regional electricity trade issues and to share knowledge and experiences between interested partners in the Mekong region.	June 1998	140,000	140,000
Mexico	Environmental Strategy for the Energy Sector A study and technical assistance to public and private institutions to assist in the development of an integrated, strategic vision of the interactions between the energy and environmental sectors and the implications for the economy, and to develop the required analytical tools.	August 98	145,000	145,000
Mongolia	Coal Stove Improvement Program A project to collect data on residential cook stove emissions and to field test alternative technologies to reduce energy expenditures of the poor peri-urban families of Ulaan-Baatar.	June 1998	50,000	50,000
Pakistan	Clean Fuel Project A study and recommendations which specify steps needed for total elimination of lead in gasoline, and cost-effective measures for reducing particulate emissions from the combustion of automotive diesel and fuel oil.	September 1998	542,956	542,956
Philippines	Strengthening of Rural & Non-Conventional Energy Development Program A study and workshop to review and provide recommendations for the implementation of the national non-conventional energy development program	January 1998	210,000	210,000
Sri Lanka	Energy-Environment Review A study and workshops to develop an integrated strategy and practical policy options to address key energy-environment issues, develop appropriate analytical tools, and strengthen local capacity through collaborative work with stakeholders.	September 1998	150,000	150,000
Sub-Andean	Sub-Andean Basin Socio-Economic Guidelines Technical assistance to establish common approaches in forming and implementing policy and frameworks to promote environmentally and socially acceptable oil and gas industry operations.	July 1998	130,000	130,000

Table A2.3 Activities Ongoing in 1998

Africa	Forum on Downstream Petroleum	February 97	50,912	50,912
Africa	Africa Gas Initiative Phase I	March 94	769,002	601,890
Africa	Gas Training	February 97	273,000	43,000
Africa	Improving Efficiency of Petroleum Procurement and Dissemination	March 94	148,000	100,000
Africa	LPG Options	October 96	125,665	108,665
Africa	Petroleum Transportation Corridors	March 97	150,000	150,000
Africa	Product Specifications Standardization	July 96	227,500	80,000
Africa	Regional Electricity Demand Management TA Phase II	January 96	100,000	100,000
Africa	West Africa Solar Project	April 95	360,000	360,000
Bolivia	Assisting Regulatory Agencies Following the Capitalization of the National Oil Company	January 97	388,210	388,210
Bolivia	Country Programme Phase II	December 97	494,475	494,475
Bolivia	Energy Efficiency and Environment	March 94	405,431	405,431
Bolivia	Energy Strategy for Rural Sector	September 94	330,000	330,000
Bolivia	National Biomass Programme	December 97	918,590	918,590
Bolivia ¹	Renewables for Rural Electrification	April 96	10,944	10,944
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 Identification	March 96	110,054	110,054
Brazil	Special Initiative on Energy Efficiency	February 97	225,000	135,000
Cambodia	Commercialization of a Power Company	December 95	362,381	362,381
Cameroon	Decentralized Rural Electrification	May 96	250,000	250,000
Cameroon	Energy Strategy	December 96	426,467	426,467
Central America and Panama	Rural Electrification and Power Reform	October 97	300,000	300,000
Central and Eastern Europe	District Heating I	March 95	674,091	601,591

Table A2.3 Activities Ongoing in 1998

Region/Country	Description	Initiation	Planned amount of US\$	Actual amount of US\$
Central and Eastern Europe	Ukraine Integrated Heat Demonstration Project	January 97	210,913	210,913
China	Institutional Strengthening and TA in Rural Power Sector: Power Efficiency Pilot Study	March 92	324,108	324,108
China ⁵	Natural Gas Development Strategy	February 95	78,142	78,142
Comoros	Solar Market Development	August 95	168,120	168,120
Egypt	Renewable Energy Strategy and Institutional Strengthening Study	December 95	113,029	75,029
Egypt	Solar Thermal Power Options	March 97	50,000	50,000
Ghana	Corporatization of Distribution Concessions Through Capitalization	April 97	140,000	140,000
Global	Argentina and the Netherlands - CNG - LPG Experience	July 97	12,760	12,760
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	Electricity Benefits Assessment	April 96	237,000	237,000
Global	Energy and Environment Steering Committee	April 96	138,050	138,050
Global	Energy, Transport, Environment Study	February 96	28,000	28,000
Global	Environment Manual for Power Development	June 95	455,700	455,700
Global	Gas Flaring Reduction	October 96	75,000	75,000
Global ⁵	Gas Leakage from Natural Gas Operations in Developing Countries	November 97	8,499	8,499
Global	Increasing Efficiency of Gas Distribution Networks	December 95	156,624	126,324
Global	Lighting Services for the Rural Poor	February 96	143,631	143,631
Global	Oil Spills Occurrence Database, Modeling, Remediation and Prevention	November 97	421,300	50,000
Global	Regional Project Identification Strategy II	February 96	112,000	112,000
Global	Rural Electrification Success Factors	June 96	50,000	50,000
Global	Solar Initiative Regional Strategy	March 95	171,294	75,000
Guinea	Decentralized Rural Electrification	December 95	250,000	250,000
India	Rural Energy Study	July 89	389,466	389,466

⁵ China Natural Gas Development Strategy has been dropped from the work program.

Table A2.3 Activities Ongoing in 1998

India	Urban Energy Study	March 93	389,466	389,466
Kenya	Photovoltaics-Financing Mechanisms for Solar Electric Equipment	September 95	255,000	255,000
Lao PDR	Decentralized Rural Electrification	April 96	208,662	208,662
Latin America and the Caribbean	Improving Fuel Quality in Latin America (Lead Elimination Phase II)	January 97	363,022	363,022
Malawi	Rural Energy Development	February 96	322,554	322,554
Middle East and North Africa	Lead Elimination	February 97	50,000	50,000
Mongolia	Energy Efficiency Program	January 96	590,150	50,000
Morocco	Gas Development Plan, Phase 2	March 93	525,407	525,407
Nicaragua	Modernization of Fuelwood Sector	August 97	175,000	175,000
Pakistan	Energy Efficiency Technical Assistance to ENERCON	March 95	152,569	152,569
Peru	Environmental Impact of Hydrocarbons Production	September 95	207,199	207,199
Peru	Rural Energy Electrification	September 95	178,668	178,668
Peru	Training: Energy Management Services	October 95	307,198	307,198
Peru/Colombia	End-Use Energy and Effluent Management Strategy Study	May 96	50,000	50,000
Philippines ⁶	Strengthening of the Rural & Nonconventional Rural Development Program	August 97	210,000	210,000
Slovak Republic	Energy Efficiency Technical Assistance	August 94	301,659	301,659
Slovenia	Workshop on Private Participation	May 97	54,000	54,000
Southern Africa	Renewable Energy for Rural Electrification	December 95	94,098	94,098
Southern Africa	Development of an Electricity Market	May 96	130,000	130,000
Tanzania	TA to DOE and TANESCO	January 93	757,284	757,284
Uganda	Power Restructuring Implementation Study	January 97	99,932	99,932
Uganda	Rural Electrification Study	May 96	170,000	170,000
Vietnam	Environmental and Safety Aspects of the Downstream Gas Industry	June 97	454,000	77,000
Vietnam	Institutional Reform and Restructuring of Petrovietnam Gas Company	January 97	165,285	66,000

⁶ Project name changed from Options for Privatization of Electricity Supply for Small Islands.

Note: Does not include the projects listed in Table A2.1, "Activities Completed During Calendar 1998," or Table A2.2, "Activities Launched During Calendar 1998."

Table A2.3 Activities Ongoing in 1998

Country	Description	Start Date	Amount Received (US\$)	Amount Disbursed (US\$)
Vietnam	Power Sector Regulation and Electricity Law	May 96	329,700	329,700
Vietnam	Reservoir Management Workshop and Upstream Fiscal Systems	April 97	106,000	66,000
Zambia	Energy Sector Restructuring	June 93	583,071	583,071
Zimbabwe	Decentralized Rural Electrification	September 97	169,860	169,860

Annex 3

List of Reports on Completed Activities by Region and by Theme

ESMAP Reports Available to the Public

Region/Country
(language availability)

SUB-SAHARAN AFRICA

Region/Country (language availability)		Date of Publication	Reference	Focus Area						
				Energy and Environment	Rural & Peri-urban Energy	Renewable Energy	Policy & Sector Reform	Energy Efficiency	Energy Trade	Other
Africa Region	Anglophone Africa Household Energy Workshop (English)	07/88	085/88		■					
Africa Region	Regional Power Seminar on Reducing Electric Power System Losses in Africa (English)	08/88	087/88					■		
Africa Region	Institutional Evaluation of EGL (English)	02/89	098/89				■			
Africa Region	Biomass Mapping Regional Workshops (English)	05/89	—		■	■				
Africa Region	Francophone Household Energy Workshop (French)	08/89	—		■					
Africa Region	Interafrican Electrical Engineering College: Proposals for Short-and Long-Term Development English	03/90	112/90				■		■	
Africa Region	Biomass Assessment and Mapping (English)	03/90	—		■	■				
Africa Region	Symposium on Power Sector Reform and Efficiency Improvement in Sub-Saharan Africa (English)	06/96	182/96				■	■		
Africa Region	Commercialization of Marginal Gas Fields (English)	12/97	201/97				■		■	
Angola	Energy Assessment (English and Portuguese)	05/89	4708-ANG				■			
Angola	Power Rehabilitation and Technical Assistance (English)	10/91	142/91				■			
Benin	Energy Assessment (English and French)	06/85	5222-BEN				■			
Botswana	Energy Assessment (English)	09/84	4998-BT				■			
Botswana	Pump Electrification Prefeasibility Study (English)	01/86	047/86		■					
Botswana	Review of Electricity Service Connection Policy (English)	07/87	071/87				■			
Botswana	Tuli Block Farms Electrification Study (English)	07/87	072/87		■					
Botswana	Household Energy Issues Study (English)	02/88	—		■					
Botswana	Urban Household Energy Strategy Study (English)	05/91	132/91		■					
Burkina Faso	Energy Assessment (English and French)	01/86	5730-BUR				■			
Burkina Faso	Technical Assistance Program (English)	03/86	052/86				■			
Burkina Faso	Urban Household Energy Strategy Study (English and French)	06/91	134/91		■					
Burundi	Energy Assessment (English)	06/82	3778-BU				■			
Burundi	Petroleum Supply Management (English)	01/84	012/84				■		■	
Burundi	Status Report (English and French)	02/84	011/84				■			
Burundi	Presentation of Energy Projects for the Fourth Five-Year Plan (1983-1987) (English and French)	05/85	036/85				■			
Burundi	Improved Charcoal Cookstove Strategy (English and French)	09/85	042/85	■	■	■				
Burundi	Peat Utilization Project (English)	11/85	046/85	■	■					
Burundi	Energy Assessment (English and French)	01/92	9215-BU				■			
Cape Verde	Energy Assessment (English and Portuguese)	08/84	5073-CV				■			
Cape Verde	Household Energy Strategy Study (English)	02/90	110/90		■					
Central African Republic	Energy Assesment (French)	08/92	9898-CAR				■			
Chad	Elements of Strategy for Urban Household Energy: The Case of N'djamena (French)	12/93	160/94		■					

Region/Country (language availability)		Date of Publication	Reference	Focus Area						
				Energy and Environment	Rural & Peri- urban Energy	Renewable Energy	Policy & Sector Reform	Energy Efficiency	Energy Trade	Other
SUB-SAHARAN AFRICA										
Comoros	Energy Assessment (English and French)	01/88	7104-COM				■			
Congo	Energy Assessment (English)	01/88	6420-COB				■			
Congo	Power Development Plan (English and French)	03/90	106/90				■			
Côte d'Ivoire	Energy Assessment (English and French)	04/85	5250-IVC				■			
Côte d'Ivoire	Improved Biomass Utilization (English and French)	04/87	069/87		■	■				
Côte d'Ivoire	Power System Efficiency Study (English)	12/87	—					■		
Côte d'Ivoire	Power Sector Efficiency Study (French)	02/92	140/91					■		
Côte d'Ivoire	Project of Energy Efficiency in Buildings (English)	09/95	175/95					■		
Ethiopia	Energy Assessment (English)	07/84	4741-ET				■			
Ethiopia	Power System Efficiency Study (English)	10/85	045/85					■		
Ethiopia	Agricultural Residue Briquetting Pilot Project (English)	12/86	062/86		■	■				
Ethiopia	Bagasse Study (English)	12/86	063/86	■	■	■				
Ethiopia	Cooking Efficiency Project (English)	12/87	—		■			■		
Ethiopia	Energy Assessment (English)	02/96	179/96				■			
Gabon	Energy Assessment (English)	07/88	6915-GA				■			
The Gambia	Energy Assessment (English)	11/83	4743-GM				■			
The Gambia	Solar Water Heating Retrofit Project (English)	02/85	030/85			■				
The Gambia	Solar Photovoltaic Applications (English)	03/85	032/85			■				
The Gambia	Petroleum Supply Management Assistance (English)	04/85	035/85				■		■	
Ghana	Energy Assessment (English)	11/86	6234-GII				■			
Ghana	Energy Rationalization in the Industrial Sector (English)	06/88	084/88					■		
Ghana	Sawmill Residues Utilization Study (English)	11/88	074/87	■	■	■				
Ghana	Industrial Energy Efficiency (English)	11/92	148/92					■		
Guinea	Energy Assessment (English)	11/86	6137-GUI				■			
Guinea	Household Energy Strategy (English and French)	01/94	163/94		■					
Guinea-Bissau	Energy Assessment (English and Portuguese)	08/84	5083-GUB				■			
Guinea-Bissau	Recommended Technical Assistance Projects (English & Portuguese)	04/85	033/85				■			
Guinea-Bissau	Management Options for the Electric Power and Water Supply Subsectors (English)	02/90	100/90				■			
Guinea-Bissau	Power and Water Institutional Restructuring (French)	04/91	118/91				■			
Kenya	Energy Assessment (English)	05/82	3800-KE				■			
Kenya	Power System Efficiency Study (English)	03/84	014/84					■		
Kenya	Status Report (English)	05/84	016/84					■		
Kenya	Coal Conversion Action Plan (English)	02/87	—	■				■		
Kenya	Solar Water Heating Study (English)	02/87	066/87			■				
Kenya	Peri-Urban Woodfuel Development (English)	10/87	076/87		■					
Kenya	Power Master Plan (English)	11/87	—				■			
Kenya	Power Loss Reduction Study (English)	09/96	186/96					■		

ESMAP Reports Available to the Public

Region/Country (language availability)		Date of Publication	Reference	Focus Area							
				Energy and Environment	Rural & Peri- urban Energy	Renewable Energy	Policy & Sector Reform	Energy Efficiency	Energy Trade	Other	
SUB-SAHARAN AFRICA											
Lesotho	Energy Assessment (English)	01/84	4676-LSO				■				
Liberia	Energy Assessment (English)	12/84	5279-LBR				■				
Liberia	Recommended Technical Assistance Projects (English)	06/85	038/85				■				
Liberia	Power System Efficiency Study (English)	12/87	081/87					■			
Madagascar	Energy Assessment (English)	01/87	5700-MAG				■				
Madagascar	Power System Efficiency Study (English and French)	12/87	075/87					■			
Madagascar	Environmental Impact of Woodfuels (French)	10/95	176/95	■	■	■					
Malawi	Energy Assessment (English)	08/82	3903-MAL				■				
Malawi	Technical Assistance to Improve the Efficiency of Fuelwood Use in the Tobacco Industry (English)	11/83	009/83	■					■		
Malawi	Status Report (English)	01/84	013/84						■		
Mali	Energy Assessment (English and French)	11/91	8423-MLI				■				
Mali	Household Energy Strategy (English and French)	03/92	147/92		■						
Islamic Republic of Mauritania	Energy Assessment (English and French)	04/85	5224-MAU				■				
Islamic Republic of Mauritania	Household Energy Strategy Study (English and French)	07/90	123/90		■						
Mauritius	Energy Assessment (English)	12/81	3510-MAS				■				
Mauritius	Status Report (English)	10/83	008/83				■				
Mauritius	Power System Efficiency Audit (English)	05/87	070/87					■			
Mauritius	Bagasse Power Potential (English)	10/87	077/87	■					■		
Mauritius	Energy Sector Review (English)	12/94	3643-MAS				■				
Mozambique	Energy Assessment (English)	01/87	6128-MOZ				■				
Mozambique	Household Electricity Utilization Study (English)	03/90	113/90		■						
Mozambique	Electricity Tariffs Study (English)	06/96	181/96				■				
Mozambique	Sample Survey of Low Voltage Electricity Customers	06/97	195/97		■						
Namibia	Energy Assessment (English)	03/93	11320-NAM				■				
Niger	Energy Assessment (French)	05/84	4642-NIR				■				
Niger	Status Report (English and French)	02/86	051/86				■				
Niger	Improved Stoves Project (English and French)	12/87	080/87	■	■	■					
Niger	Household Energy Conservation and Substitution (English and French)	01/88	082/88	■	■				■		
Nigeria	Energy Assessment (English)	08/83	4440-UNI				■				
Nigeria	Energy Assessment (English)	07/93	11672-UNI				■				
Rwanda	Energy Assessment (English)	06/82	3779-RW				■				
Rwanda	Status Report (English and French)	05/84	017/84				■				
Rwanda	Improved Charcoal Cookstove Strategy (English and French)	08/86	059/86		■						
Rwanda	Improved Charcoal Production Techniques (English and French)	02/87	065/87	■	■	■					

Region/Country (language availability)		Date of Publication	Reference	Focus Area						
				Energy and Environment	Rural & Peri- urban Energy	Renewable Energy	Policy & Sector Reform	Energy Efficiency	Energy Trade	Other
SUB-SAHARAN AFRICA										
Rwanda	Energy Assessment (English and French)	07/91	8017-RW				■			
Rwanda	Commercialization of Improved Charcoal Stoves and Carbonization Techniques Mid-Term Progress Report (English and French)	12/91	141/91	■		■	■			
SADC	SADC Regional Power Interconnection Study, Vols. I-IV (English)	12/93	—						■	
SADCC	SADCC Regional Sector: Regional Capacity-Building Program for Energy Surveys and Policy Analysis (English)	11/91	—						■	
Sao Tome and Principe	Energy Assessment (English)	10/85	5803-STP				■			
Senegal	Energy Assessment (English)	07/83	4182-SE				■			
Senegal	Status Report (English and French)	10/84	025/84				■			
Senegal	Industrial Energy Conservation Study (English)	05/85	037/85	■				■		
Senegal	Preparatory Assistance for Donor Meeting (English and French)	04/86	056/86				■			
Senegal	Urban Household Energy Strategy (English)	02/89	096/89		■					
Senegal	Industrial Energy Conservation Program (English)	05/94	165/94					■		
Seychelles	Energy Assessment (English)	01/84	4693-SEY				■			
Seychelles	Electric Power System Efficiency Study (English)	08/84	021/84					■		
Sierra Leone	Energy Assessment (English)	10/87	6597-SL				■			
Somalia	Energy Assessment (English)	12/85	5796-SO				■			
Republic of South Africa	Options for the Structure and Regulation of Natural Gas Industry (English)	05/95	172/95				■		■	
Sudan	Management Assistance to the Ministry of Energy and Mining	05/83	003/83				■			
Sudan	Energy Assessment (English)	07/83	4511-SU				■			
Sudan	Power System Efficiency Study (English)	06/84	018/84					■		
Sudan	Status Report (English)	11/84	026/84				■			
Sudan	Wood Energy/Forestry Feasibility (English)	07/87	073/87	■	■					
Swaziland	Energy Assessment (English)	02/87	6262-SW				■			
Swaziland	Household Energy Strategy Study	10/97	198/97		■					
Tanzania	Energy Assessment (English)	11/84	4969-TA				■			
Tanzania	Peri-Urban Woodfuels Feasibility Study (English)	08/88	086/88	■	■					
Tanzania	Tobacco Curing Efficiency Study (English)	05/89	102/89					■		
Tanzania	Remote Sensing and Mapping of Woodlands (English)	06/90	—	■	■					
Tanzania	Industrial Energy Efficiency Technical Assistance (English)	08/90	122/90					■		
Tanzania	Power Loss Reduction Volume 1: Transmission and Distribution System Technical Loss Reduction and Network Development (English)	06/98	204A/98					■		
Tanzania	Power Loss Reduction Volume 2: Reduction of Non-Technical Losses (English)	06/98	204B/98				■	■		
Togo	Energy Assessment (English)	06/85	5221-TO				■			
Togo	Wood Recovery in the Nangbeto Lake (English and French)	04/86	055/86	■	■					

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				Energy and Environment	Rural & Peri-urban Energy	Renewable Energy	Policy & Sector Reform	Energy Efficiency	Energy Trade	Other	
SUB-SAHARAN AFRICA											
Togo	Power Efficiency Improvement (English and French)	12/87	078/87						■		
Uganda	Energy Assessment (English)	07/83	4453-UG				■			■	
Uganda	Status Report (English)	08/84	020/84				■				
Uganda	Institutional Review of the Energy Sector (English)	01/85	029/85				■				
Uganda	Energy Efficiency in Tobacco Curing Industry (English)	02/86	049/86						■		
Uganda	Fuelwood/Forestry Feasibility Study (English)	03/86	053/86	■	■				■		
Uganda	Power System Efficiency Study (English)	12/88	092/88						■		
Uganda	Energy Efficiency Improvement in the Brick and Tile Industry (English)	02/89	097/89						■		
Uganda	Tobacco Curing Pilot Project (English)	03/89	UNDP Terminal Report	■					■		
Uganda	Energy Assessment (English)	12/96	193/96				■				
Zaire	Energy Assessment (English)	05/86	5837-ZR				■				
Zambia	Energy Assessment (English)	01/83	4110-ZA				■				
Zambia	Status Report (English)	08/85	039/85				■				
Zambia	Energy Sector Institutional Review (English)	11/86	060/86				■				
Zambia	Power Subsector Efficiency Study (English)	02/89	093/88						■		
Zambia	Energy Strategy Study (English)	02/89	094/88				■				
Zambia	Urban Household Energy Strategy Study (English)	08/90	121/90		■						
Zimbabwe	Energy Assessment (English)	06/82	3765-ZIM				■				
Zimbabwe	Power System Efficiency Study (English)	06/83	005/83						■		
Zimbabwe	Status Report (English)	08/84	019/84						■		
Zimbabwe	Power Sector Management Assistance Project (English)	04/85	034/85				■				
Zimbabwe	Power Sector Management Institution Building (English)	09/89	—				■				
Zimbabwe	Petroleum Management Assistance (English)	12/89	109/89				■			■	
Zimbabwe	Charcoal Utilization Prefeasibility Study (English)	06/90	119/90		■		■				
Zimbabwe	Integrated Energy Strategy Evaluation (English)	01/92	8768-ZIM				■				
Zimbabwe	Energy Efficiency Technical Assistance Project: Strategic Framework for a National Energy Efficiency Improvement Program (English)	04/94	—						■		
Zimbabwe	Capacity Building for the National Energy Efficiency Improvement Programme (NEEIP) (English)	12/94	—						■		

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				Energy and Environment	Rural & Peri- urban Energy	Renewable Energy	Policy & Sector Reform	Energy Efficiency	Energy Trade	Other
EAST ASIA AND PACIFIC										
Asia Regional	Pacific Household and Rural Energy Seminar (English)	11/90	—		■					
China	County-Level Rural Energy Assessments (English)	05/89	101/89		■					
China	Fuelwood Forestry Preinvestment Study (English)	12/89	105/89		■	■				
China	Strategic Options for Power Sector Reform in China (English)	07/93	156/93				■	■		
China	Energy Efficiency and Pollution Control in Township and Village Enterprise (TVE) Industry (English)	11/94	168/94	■				■		
China	Energy for Rural Development in China: An Assessment Based on a Joint Chinese/ESMAP Study in Six Counties (English)	06/96	183/96		■					
Fiji	Energy Assessment (English)	06/83	4462-FIJ				■			
Indonesia	Energy Assessment (English)	11/81	3543-IND				■			
Indonesia	Status Report (English)	09/84	022/84				■			
Indonesia	Power Generation Efficiency Study (English)	02/86	050/86					■		
Indonesia	Energy Efficiency in the Brick, Tile and Lime Industries (English)	04/87	067/87					■		
Indonesia	Diesel Generating Plant Efficiency Study (English)	12/88	095/88	■				■		
Indonesia	Urban Household Energy Strategy Study (English)	02/90	107/90		■					
Indonesia	Biomass Gasifier Preinvestment Study Vols. I & II (English)	12/90	124/90		■	■				
Indonesia	Prospects for Biomass Power Generation with Emphasis on Palm Oil, Sugar, Rubberwood and Plywood Residues (English)	11/94	167/94		■	■				
Lao PDR	Urban Electricity Demand Assessment Study (English)	03/93	154/93		■			■		
Malaysia	Sabah Power System Efficiency Study (English)	03/87	068/87					■		
Malaysia	Gas Utilization Study (English)	09/91	9645-MA				■	■	■	
Myanmar	Energy Assessment (English)	06/85	5416-BA				■			
Papua New Guinea	Energy Assessment (English)	06/82	3882-PNG				■			
Papua New Guinea	Status Report (English)	07/83	006/83				■			
Papua New Guinea	Energy Strategy Paper (English)	—	—				■			
Papua New Guinea	Institutional Review in the Energy Sector (English)	10/84	023/84				■			
Papua New Guinea	Power Tariff Study (English)	10/84	024/84				■	■		
Philippines	Commercial Potential for Power Production from Agricultural Residues (English)	12/93	157/93	■		■				
Philippines	Energy Conservation Study (English)	08/94	—	■				■		
Solomon Islands	Energy Assessment (English)	06/83	4404-SOL				■			
Solomon Islands	Energy Assessment (English)	01/92	979-SOL				■			
South Pacific	Petroleum Transport in the South Pacific (English)	05/86	—					■	■	
Thailand	Energy Assessment (English)	09/85	5793-TH				■			
Thailand	Rural Energy Issues and Options (English)	09/85	044/85		■		■			
Thailand	Accelerated Dissemination of Improved Stoves and Charcoal Kilns (English)	09/87	079/87	■	■					

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				Energy and Environment	Rural & Peri- urban Energy	Renewable Energy	Policy & Sector Reform	Energy Efficiency	Energy Trade	Other
EAST ASIA AND PACIFIC										
Thailand	Northeast Region Village Forestry and Woodfuels Preinvestment Study (English)	02/88	083/88	■	■	■				
Thailand	Impact of Lower Oil Prices (English)	08/88	—				■		■	
Thailand	Coal Development and Utilization Study (English)	10/89	—				■	■		
Tonga	Energy Assessment (English)	06/85	5498-TON				■			
Vanuatu	Energy Assessment (English)	06/85	5577-VA				■			
Vietnam	Rural and Household Energy-Issues and Options (English)	01/94	161/94		■					
Vietnam	Power Sector Reform and Restructuring in Vietnam: Final Report to the Steering Committee (English and Vietnamese)	09/95	174/95				■			
Vietnam	Household Energy Technical Assistance: Improved Coal Briquetting and Commercialized Dissemination of Higher Efficiency Biomass and Coal Stoves (English)	01/96	178/96		■	■		■		
Western Samoa	Energy Assessment (English)	06/85	5497-WSO				■			
SOUTH ASIA										
Bangladesh	Energy Assessment (English)	10/82	3873-BD				■			
Bangladesh	Priority Investment Program (English)	05/83	002/83				■			
Bangladesh	Status Report (English)	04/84	015/84				■			
Bangladesh	Power System Efficiency Study (English)	02/85	031/85					■		
Bangladesh	Small Scale Uses of Gas Prefeasibility Study (English)	12/88	—					■		
India	Opportunities for Commercialization of Nonconventional Energy Systems (English)	11/88	091/88		■	■				
India	Maharashtra Bagasse Energy Efficiency Project (English)	07/90	120/90		■	■				
India	Mini-Hydro Development on Irrigation Dams and Canal Drops Vols. I, II and III (English)	07/91	139/91		■	■				
India	WindFarm Pre-Investment Study (English)	12/92	150/92		■	■				
India	Power Sector Reform Seminar (English)	04/94	166/94				■			
India	Environmental Issues in the Power Sector	06/98	205/98	■			■			
Nepal	Energy Assessment (English)	08/83	4474-NEP				■			
Nepal	Status Report (English)	01/85	028/84				■			
Nepal	Energy Efficiency & Fuel Substitution in Industries (English)	06/93	158/93					■		
Pakistan	Household Energy Assessment (English)	05/88	—		■		■			
Pakistan	Assessment of Photovoltaic Programs, Applications, and Markets (English)	10/89	103/89			■				
Pakistan	National Household Energy Survey and Strategy Formulation Study: Project Terminal Report (English)	03/94	—		■					

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				Energy and Environment	Rural & Peri- urban Energy	Renewable Energy	Policy & Sector Reform	Energy Efficiency	Energy Trade	Other
EAST ASIA AND PACIFIC										
Pakistan	Managing the Energy Transition (English)	10/94	—				■			
Pakistan	Lighting Efficiency Improvement Program Phase I: Commercial Buildings Five Year Plan (English)	10/94	—		■			■		
Sri Lanka	Energy Assessment (English)	05/82	3792-CE				■			
Sri Lanka	Power System Loss Reduction Study (English)	07/83	007/83					■		
Sri Lanka	Status Report (English)	01/84	010/84					■		
Sri Lanka	Industrial Energy Conservation Study (English)	03/86	054/86	■				■		
EUROPE AND CENTRAL ASIA										
Bulgaria	Natural Gas Policies and Issues (English)	10/96	188/96				■			■
Central and Eastern Europe	Power Sector Reform in Selected Countries	07/97	196/97				■			■
Eastern Europe	The Future of Natural Gas in Eastern Europe (English)	08/92	149/92				■	■		■
Kazakhstan	Natural Gas Investment Study, Volumes 1, 2 & 3	12/97	199/97				■			■
Kazakhstan & Kyrgyzstan	Opportunities for Renewable Energy Development	11/97	16855-KAZ			■				
Poland	Energy Sector Restructuring Program Vols. I-V (English)	01/93	153/93				■			
Poland	Natural Gas Upstream Pricing (English and Polish)	08/98	206/98				■			■
Poland	Energy Sector Restructuring Program: Establishing the Energy Regulation Authority	10/98	208/98				■	■		
Portugal	Energy Assessment (English)	04/84	4824-PO				■			
Romania	Natural Gas Development Strategy (English)	12/96	192/96				■	■		
Turkey	Energy Assessment (English)	03/83	3877-TU				■			
MIDDLE EAST AND NORTH AFRICA										
Arab Republic of Egypt	Energy Assessment (English)	10/96	189/96				■			
Morocco	Energy Assessment (English and French)	03/84	4157-MOR				■			
Morocco	Status Report (English and French)	01/86	048/86				■			
Morocco	Energy Sector Institutional Development Study (English and French)	07/95	173/95				■			
Morocco	Natural Gas Pricing Study (French)	10/98	209/98				■	■		
Syria	Energy Assessment (English)	05/86	5822-SYR				■			

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				Energy and Environment	Rural & Peri-urban Energy	Renewable Energy	Policy & Sector Reform	Energy Efficiency	Energy Trade	Other
MIDDLE EAST AND NORTH AFRICA										
Syria	Electric Power Efficiency Study (English)	09/88	089/88					■		
Syria	Energy Efficiency Improvement in the Cement Sector (English)	04/89	099/89					■		
Syria	Energy Efficiency Improvement in the Fertilizer Sector (English)	06/90	115/90					■		
Tunisia	Fuel Substitution (English and French)	03/90	—					■		
Tunisia	Power Efficiency Study (English and French)	02/92	136/91					■		
Tunisia	Energy Management Strategy in the Residential and Tertiary Sectors (English)	04/92	146/92					■		
Tunisia	Renewable Energy Strategy Study, Volume I (French)	11/96	190A/96			■				
Tunisia	Renewable Energy Strategy Study, Volume II (French)	11/96	190B/96			■				
Yemen	Energy Assessment (English)	12/84	4892-YAR				■			
Yemen	Energy Investment Priorities (English)	02/87	6376-YAR				■			
Yemen	Household Energy Strategy Study Phase I (English)	03/91	126/91		■					
LATIN AMERICA AND THE CARIBBEAN										
Latin America & Caribbean Region	Regional Seminar on Electric Power System Loss Reduction in the Caribbean (English)	07/89	—					■		
Latin America & Caribbean Region	Elimination of Lead in Gasoline in Latin America and the Caribbean (English and Spanish)	04/97	194/97	■				■		
Latin America & Caribbean Region	Elimination of Lead in Gasoline in Latin America and the Caribbean - Status Report (English and Spanish)	12/97	200/97	■				■		
Latin America & Caribbean Region	Harmonization of Fuels Specifications in Latin America and the Caribbean (English and Spanish)	06/98	203/98	■				■		
Bolivia	Energy Assessment (English)	04/83	4213-BO							
Bolivia	National Energy Plan (English)	12/87	—					■		
Bolivia	La Paz Private Power Technical Assistance (English)	11/90	111/90					■		
Bolivia	Prefeasibility Evaluation Rural Electrification and Demand Assessment (English and Spanish)	04/91	129/91		■					
Bolivia	National Energy Plan (Spanish)	08/91	131/91		■					
Bolivia	Private Power Generation and Transmission (English)	01/92	137/91					■		
Bolivia	Natural Gas Distribution: Economics and Regulation (English)	03/92	125/92					■		
Bolivia	Natural Gas Sector Policies and Issues (English and Spanish)	12/93	164/93					■		
Bolivia	Household Rural Energy Strategy (English and Spanish)	01/94	162/94		■			■		
Bolivia	Preparation of Capitalization of the Hydrocarbon Sector	12/96	191/96					■		
Brazil	Energy Efficiency & Conservation: Strategic Partnership for Energy Efficiency in Brazil (English)	01/95	170/95						■	
Brazil	Hydro and Thermal Power Sector Study	09/97	197/97			■		■	■	
Chile	Energy Sector Review (English)	08/88	7129-CH					■		

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				Energy and Environment	Rural & Peri- urban Energy	Renewable Energy	Policy & Sector Reform	Energy Efficiency	Energy Trade	Other
LATIN AMERICA AND THE CARIBBEAN										
Colombia	Energy Strategy Paper (English)	12/86	—				■			
Colombia	Power Sector Restructuring (English)	11/94	169/94				■			
Colombia	Energy Efficiency Report for the Commercial and Public Sector (English)	06/96	184/96					■		
Costa Rica	Energy Assessment (English and Spanish)	01/84	4655-CR				■			
Costa Rica	Recommended Technical Assistance Projects (English)	11/84	027/84				■			
Costa Rica	Forest Residues Utilization Study (English and Spanish)	02/90	108/90		■	■				
Dominican Republic	Energy Assessment (English)	05/91	8234-DO				■			
Ecuador	Energy Assessment (Spanish)	12/85	5865-EC				■			
Ecuador	Energy Strategy Phase I (Spanish)	07/88	—				■			
Ecuador	Energy Strategy (English)	04/91	—				■			
Ecuador	Private Minihydropower Development Study (English)	11/92	—		■	■				
Ecuador	Energy Pricing Subsidies and Interfuel Substitution (English)	08/94	11798-EC				■	■		
Ecuador	Energy Pricing, Poverty and Social Mitigation (English)	08/94	12831-EC				■			
Guatemala	Issues and Options in the Energy Sector (English)	09/93	12160-GU				■			
Haiti	Energy Assessment (English and French)	06/82	3672-HA				■			
Haiti	Status Report (English and French)	08/85	041/85				■			
Haiti	Household Energy Strategy (English and French)	12/91	143/91		■					
Honduras	Energy Assessment (English)	08/87	6476-HO				■			
Honduras	Petroleum Supply Management (English)	03/91	128/91				■		■	
Jamaica	Energy Assessment (English)	04/85	5466-JM				■			
Jamaica	Petroleum Procurement, Refining, and Distribution Study (English)	11/86	061/86				■		■	
Jamaica	Energy Efficiency Building Code Phase I (English)	03/88	—					■		
Jamaica	Energy Efficiency Standards and Labels Phase I (English)	03/88	—					■		
Jamaica	Management Information System Phase I (English)	03/88	—				■	■		
Jamaica	Charcoal Production Project (English)	09/88	090/88		■	■				
Jamaica	FIDCO Sawmill Residues Utilization Study (English)	09/88	088/88		■	■				
Jamaica	Energy Sector Strategy and Investment Planning Study (English)	07/92	135/92				■			
Mexico	Improved Charcoal Production Within Forest Management for the State of Veracruz (English and Spanish)	08/91	138/91		■	■				
Mexico	Energy Efficiency Management Technical Assistance to the Comision Nacional para el Ahorro de Energia (CONAE) (English)	04/96	180/96					■		
Panama	Power System Efficiency Study (English)	06/83	004/83					■		
Paraguay	Energy Assessment (English)	10/84	5145-PA							
Paraguay	Recommended Technical Assistance Projects (English)	09/85	—				■			
Paraguay	Status Report (English and Spanish)	09/85	043/85				■			
Peru	Energy Assessment (English)	01/84	4677-PF				■			
Peru	Status Report (English)	08/85	040/85				■			

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				Energy and Environment	Rural & Peri- urban Energy	Renewable Energy	Policy & Sector Reform	Energy Efficiency	Energy Trade	Other	
LATIN AMERICA AND THE CARIBBEAN											
Peru	Proposal for a Stove Dissemination Program in the Sierra (English and Spanish)	02/87	064/87		■						
Peru	Energy Strategy (English and Spanish)	12/90	—				■				
Peru	Study of Energy Taxation and Liberalization of the Hydrocarbons Sector (English and Spanish)	120/93	159/93				■				
Saint Lucia	Energy Assessment (English)	09/84	5111-SLU				■				
St. Vincent and the Grenadines	Energy Assessment (English)	09/84	5103-STV				■				
Trinidad and Tobago	Energy Assessment (English)	12/85	5930-TR				■				
GLOBAL											
GLOBAL	Energy End Use Efficiency: Research and Strategy (English)	11/89	—					■			
GLOBAL	Women and Energy—A Resource Guide: The International Network: Policies and Experience (English)	04/90	—								■
GLOBAL	Guidelines for Utility Customer Management and Metering (English and Spanish)	07/91	—					■			
GLOBAL	Assessment of Personal Computer Models for Energy Planning in Developing Countries (English)	10/91	—					■			
GLOBAL	Long-Term Gas Contracts Principles and Applications (English)	02/93	152/93							■	
GLOBAL	Comparative Behavior of Firms Under Public and Private Ownership (English)	05/93	155/93				■				
GLOBAL	Development of Regional Electric Power Networks (English)	10/94	—							■	
GLOBAL	Roundtable on Energy Efficiency (English)	02/95	171/95					■			
GLOBAL	Assessing Pollution Abatement Policies with a Case Study of Ankara (English)	11/95	177/95	■							
GLOBAL	A Synopsis of the Third Annual Roundtable on Independent Power Projects: Rhetoric and Reality (English)	08/96	187/96				■				
GLOBAL	Rural Energy and Development Roundtable (English)	05/98	202/98		■						
GLOBAL	A Synopsis of the Second Roundtable on Energy Efficiency: Institutional and Financial Delivery Mechanisms (English)	09/98	207/98					■			

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