Joint United Nations Development Programme / World Bank

ESMAP

Energy Sector Management Assistance Programme

ESM207

A Synopsis of the

Second Roundtable on Energy Efficiency

Institutional and Financial Delivery Mechanisms

Report No. 207/98

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JOINT UNDP / WORLD BANK

ENERGY SECTOR MANAGEMENT ASSISTANCE PROGRAMME (ESMAP)

PURPOSE

The Joint UNDP/World Bank Energy Sector Management Assistance Programme (ESMAP) is a special global technical assistance program run as part of the World Bank's Energy, Mining and Telecommunications Department. ESMAP provides advice to governments on sustainable energy development. Established with the support of UNDP and bilateral official donors in 1983, it focuses on 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 transition economies. ESMAP centers its interventions on three priority areas: sector reform and restructuring; access to modern energy for the poorest; and promotion of sustainable energy practices.

GOVERNANCE AND OPERATIONS

ESMAP is governed by a Consultative Group (ESMAP CG) composed of representatives of the UNDP and World Bank, other donors, and development experts from regions benefiting from ESMAP's assistance. The ESMAP CG is chaired by a World Bank Vice President, and advised by a Technical Advisory Group (TAG) of four independent energy experts that reviews the Programme's strategic agenda, its work plan, and its achievements. ESMAP relies on a cadre of engineers, energy planners, and economists from the World Bank to conduct its activities under the guidance of the Manager of ESMAP, responsible for administering the Programme.

FUNDING

ESMAP is a cooperative effort supported over the years by the World Bank, the UNDP and other United Nations agencies, the European Union, the Organization of American States (OAS), the Latin American Energy Organization (OLADE), and public and private donors from countries including Australia, Belgium, Canada, Denmark, Germany, Finland, France, Iceland, Ireland, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, Sweden, Switzerland, the United Kingdom, and the United States of America.

FURTHER INFORMATION

An up-to-date listing of completed ESMAP projects is appended to this report. For further information, a copy of the ESMAP Annual Report, or copies of project reports, contact:

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The World Bank
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A Synopsis of the

Second Roundtable on Energy Efficiency:

Institutional and Financial Delivery Mechanisms

Washington, D.C., April 24–25, 1997

Contents

Abbreviations and Acronyms

AEL	Asian Electronics, Ltd.
CEO	Chief Executive Officer
CFL	compact fluorescent light
DPS	Department of Public Services
DSM	demand-side management
EBRD	European Bank for Reconstruction and Development
EGAT	Electricity Generating Authority of Thailand
ESCO	energy service company
ESMAP	Joint UNDP/World Bank Energy Sector Management Assistance Programme
EST	Energy Saving Trust
FIEB	Federação das Indústrias do Estado de Bahia
FINEP	Financiadora de Estudos e Projetos
HEECP	Hungarian Energy Efficiency Credit Program
IDAE	Instituto para la Diversificación y Ahorro de Energía
IDB	International Development Bank
IFC	International Finance Corporation
MDB	multilateral development bank
MVV	Mannheimer Versorgungs und Verkehrsgesellschaft mbH
NGO	nongovernmental organization
OECD	Organisation for Economic Co-operation and Development
REEF	Renewable Energy and Energy Efficiency Fund
SEB	state electricity board
SME	Small and Medium-Scale Enterprise Program
UNDP	United Nations Development Programme

1

Introduction

1.1 In recent years, energy sector reforms have begun to take hold in both industrial and developing countries. The focus of these reforms has been on improving energy efficiency—the policies and actions that make the production, distribution, and uses of energy more economical and environmentally sustainable—by fostering competition and market-driven institutional arrangements. Responding to this climate of change, the Power Development, Efficiency and Household Fuels Division (IENPD) of the World Bank's Industry and Energy Department (now named Energy, Mining and Telecommunications) organized the second Roundtable on Energy Efficiency. The roundtable was designed as a forum for the exchange of ideas and information on the most effective means of developing consumer oriented energy-efficient products and services in energy sectors worldwide.

1.2 The second roundtable grew out of a similar gathering held in 1994. The first joint UNDP/World Bank Energy Efficiency Roundtable provided a platform for the discussion of workable energy sector development initiatives, especially the use of demand-side management (DSM) strategies.[1] The issues and findings that emerged from the first roundtable identified the need to find more effective means of promoting energy efficiency with new as well as traditional approaches. Sectorwide reform, economically efficient pricing, adherence to good economic and regulatory principles, and efficiency standards were put forward as key elements of an efficient energy sector. Sustainability would require increased private sector involvement, but investors would need to see that they could capture sufficient returns on their investments. All participants agreed that the lack of easy access to financing constituted the most significant impediment to focused energy-efficiency improvements in the developing world.

1.3 Three years later, the second roundtable offered participants the opportunity to discuss how far energy sectors had come in developing effective means of

[1] The first roundtable was held in Washington, D.C. on September 14–15, 1994. See Joint UNDP/World Bank Energy Sector Management Assistance Programme (ESMAP), *A Synopsis of the Roundtable on Energy Efficiency*, ESMAP Report 171/94, World Bank, Washington, D.C.

delivering energy-efficient services and projects. It focused on best practices in institutional and financial delivery mechanisms rather than on technological applications. Like the first roundtable, the second gathering was intended to bring together professionals and policymakers from diverse regions. The 22 speakers who gave presentations represented energy consulting and service firms, nongovernmental organizations (NGOs), bilateral aid agencies, and multilateral development banks (MDBs, including the Asian Development Bank, Inter-American Development Bank, European Bank for Reconstruction and Development (EBRD), and World Bank Group). In all, the event brought together some 200 people from industrial and developing countries.

1.4 Given the variety of circumstances facing each country and region, it was decided early on that the roundtable would be designed to allow participants to share specific experiences with alternative delivery systems, both financial and institutional. This exchange of experiences was intended to facilitate the design and implementation of energy-efficiency policies and projects that can be adapted to a variety of country settings.

2

Roundtable Structure

2.1 In keeping with the focus on delivery mechanisms, the four sessions highlighted a spectrum of alternatives that ranged from utility-based to private energy-efficiency projects and solutions for different markets. The structure was intended to showcase a variety of projects and to identify the factors essential to their success. The four sessions were:

- Utility- and Regulatory-based Efficiency Projects
- Project Design and Financing Instruments
- Partnerships for Building the Energy Service Industry
- The Emerging Energy Service Industry

The sessions opened with a keynote address and included presentations by expert panelists and discussions with the audience.

2.2 The first day provided general background on types of projects and the incentives behind public-private sector partnerships, as well as on market opportunities and financing mechanisms. The second day had a dual focus. The first session dealt with legal structures, primarily performance contracts, that can be used for energy-efficiency projects. The second session presented innovative approaches involving public-private partnerships that have been implemented primarily through industrial trade associations, ESCOs, and new financing mechanisms.

2.3 Richard Stern, director of the World Bank's Industry and Energy Department, opened the Roundtable with a review of the ongoing transformation of the energy sector business. The sector is currently shifting its attention from managing assets to providing services. In this new, more competitive environment, the range of choices available to consumers has increased. To make products more attractive, energy providers are promoting energy efficiency as a way to keep costs low while increasing quality.

3

Key Messages from the Roundtable

3.1 Two major themes emerged from the conference. First, the transformation of the energy sector from asset manager to service provider, which is already well under way, is one of the key elements to the future upstream potential of energy-efficiency projects. And second, providers now have a variety of options to choose from in delivering energy-efficiency projects.

3.2 A point that recurred throughout the session was that energy efficiency has emerged as a growing market with excellent opportunities for business. In countries outside the Organization for Economic Cooperation and Development (OECD), that market is believed to be worth US$10–20 billion. Energy efficiency has also emerged as a win-win option in the context of environmental concerns. This fact is particularly relevant to the need to encourage competition, as consumers are now concerned not only with the cost but with the environmental impact of providing and using services.

3.3 Key messages from the sessions included the following:

- *Consumer-oriented energy-efficiency initiatives are being implemented using a variety of structures.* Supply-oriented reforms in the energy sector are now fairly standard, but energy-efficiency projects and services are not. The working parameters of these products are still being refined. For this reason, there are no perfect solutions to the issues confronting the energy-efficiency business, only alternative approaches. But all the approaches converge in one respect: their focus on broadening the range and quality of options available to consumers. Energy efficiency is increasingly being treated as a sound business proposition in a deregulated energy market.
- *In the current competitive environment, energy utilities are competing for customers using market-driven tools, including distributed generation, energy service subsidiaries that offer value-added services, and pricing instruments.* Competition is most intense for large industrial and commercial customers, especially in countries where energy sector reforms allow these customers to choose their energy suppliers. In markets that permit customers to choose among fuels (such as natural gas and electricity) as well as suppliers, competition is even more pronounced.

- *The lack of credible sponsors and project and investment expertise is a major obstacle facing energy-efficiency initiatives.* This issue has replaced inadequate financing as the major barrier to energy efficiency. The shortage of sponsors and know-how makes it difficult to present investors with bankable projects. This area is one in which multilateral development and commercial banks can provide invaluable assistance by providing new instruments, credibly disseminating results, and tying programs into different projects.
- *Multilateral agencies like the World Bank need to define more clearly their roles in fostering energy-efficiency projects and services.* Participants differed in their opinions of what this role should be. Some saw it as confined to enabling a regulatory framework that is conducive to energy efficiency. This enabling role would involve ensuring the right prices, subsidizing project development financing, and sponsoring and replicating demonstration programs. Others questioned this view, demanding a radical change from what was called a "procurement and project development mindset" that focuses on building hardware rather than on developing energy management services and encouraging conservation.

4

Key Points of the Sessions

Session I: Utility- and Regulatory-Based Efficiency Projects

4.1 Participants in this session discussed approaches undertaken by public authorities to promote energy efficiency in different economic and cultural contexts. They touched frequently on the evolution of these approaches from DSM strategies to market-based schemes aimed at minimizing and leveraging the involvement of the public sector.

4.2 Panelists included Rick Sedano, commissioner of the Department of Public Services (DPS), Vermont, USA; Surya Sethi, International Finance Corporation (IFC); Suresh Shah, Asian Electronics, Ltd. (AEL, a publicly traded energy service company based in India); the Honorable Arnaldo Baldonado, Philippines; and Sittiphorn Ratanopas, assistant governor, Demand-Side Management Office, Electricity Generating Authority of Thailand (EGAT). Charles Guinn, president of the consulting firm Strategic Guidance, moderated the panel.

4.3 Rick Sedano's presentation underscored the movement that is taking place in the energy sector toward market-based delivery systems. Vermont has begun to rely increasingly on public awareness and market forces instead of the standards, taxes, and utility enrollments it previously used. The DPS has also begun to demonstrate new instruments such as energy service companies (ESCOs). This policy has been well received in the state, where consumers are sensitive to air quality and affordability.

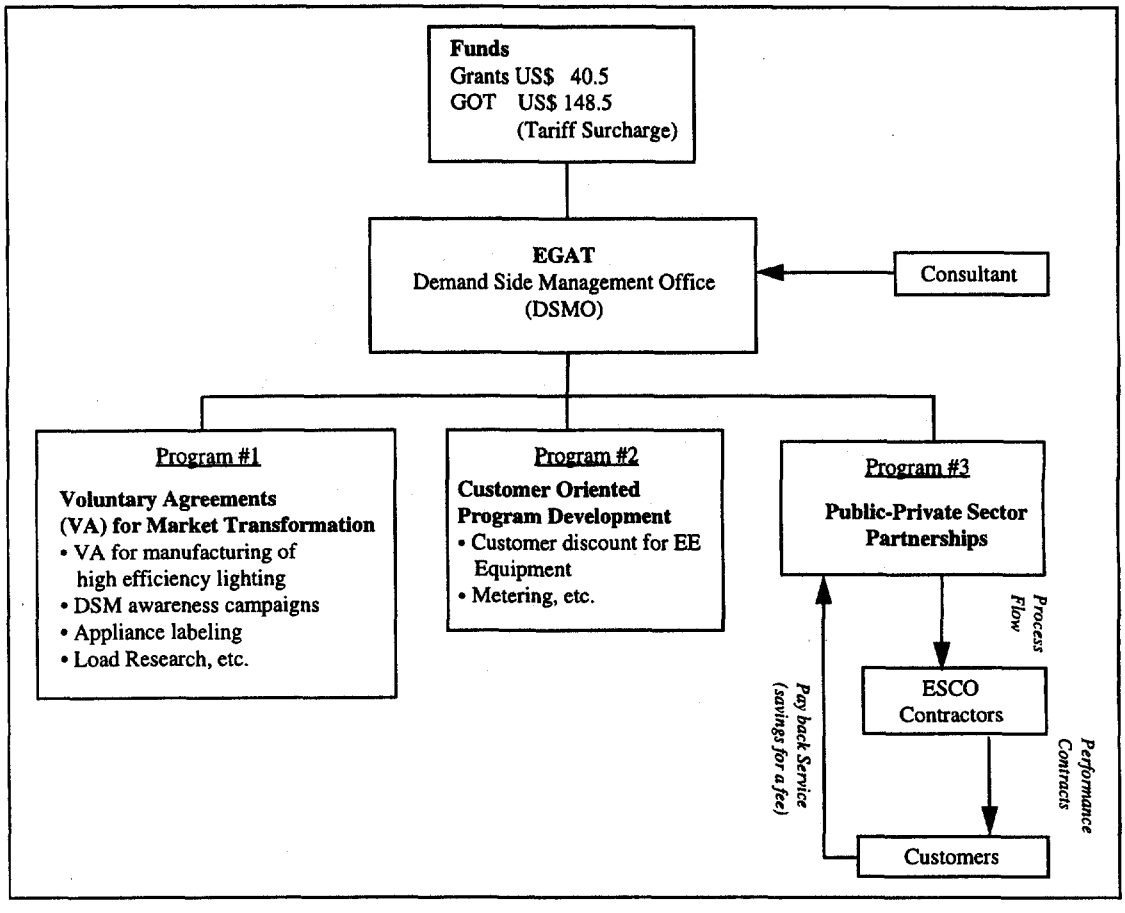
4.4 Although opinion is still divided on how to balance market forces and government involvement in regulation and subsidies, supporting ESCOs has become a popular proposition for utilities, governments, and MDBs. Performance contracts and off-balance-sheet financing are ESCOs' basic tools for promoting energy efficiency. ESCOs are able to accommodate the technology, financing, and management of multiple projects and to mobilize private lenders. They also help overcome one of the primary barriers to implementing energy-efficiency initiatives—investors' reluctance to lend—by providing technical guarantees that reduce perceived risk.

4.5 Opinion was also divided on how energy-efficient projects and services are best developed. One difficulty is that the level of legal and financial infrastructure they require is beyond the reach of many developing countries. Methods of encouraging energy-efficient projects and services therefore vary widely with the economic climate. Suresh Shah and Surya Sethi pointed out that in India, where end-users have no pricing signals to provide efficiency incentives and the state electricity boards (SEBs) have limited access to financial markets, traditional supply-side approaches have enjoyed some success. For example, since installed capacitors could not be used as collateral, the commercial prospects for mobilizing long-term private capital were very poor. An IFC project helped AEL place around US$80 million of power factor correction equipment and other energy-efficiency tools. AEL became a hybrid ESCO-leasing company, providing the SEBs with ten-year leases and guarantees on capacitors. The contracts were secured with the savings that the capacitors would provide.

4.6 The public sector often actively invites the involvement of the private sector in energy-efficiency initiatives. Sittiphorn Ratanopas explained that in Thailand, EGAT has provided a bridge between publicly implemented energy-efficiency projects and private participation through ESCOs and energy appliance and equipment suppliers (box 4.1). EGAT decided to support projects that were economically profitable by creating private entities and financial instruments. This decision has led to the emergence of a local ESCO industry that is able to demonstrate its viability to local banks, with EGAT providing soft financing until the ESCOs can recover their costs. In India, the beneficiary finance company bought back AEL's ten-year lease to take advantage of the 100 percent depreciation opportunity the Indian government grants to energy-efficiency investments. And in the Philippines, the regulator has initiated a consultative process that involves public and private partnerships.

4.7 Despite these successes, many barriers to developing energy-efficient projects and services still exist. In developing countries, consumers frequently require subsidies. Utilities and manufacturers may need to be motivated, and some utilities may not be creditworthy. Commercial lenders are often unwilling to accept the risk involved in financing energy-efficiency initiatives. Some economies are unfamiliar and mistrustful of ESCOs, and international ESCOs may not be able to find suitable local partners. In some countries, the public may be unwilling to accept the costs of new initiatives. But the public-private partnerships that are being developed are providing creative ways to overcome these barriers.

Box 4.1 EGAT: A Bridge Between the Private and Public Sectors



Session II: Project Design and Financing Instruments

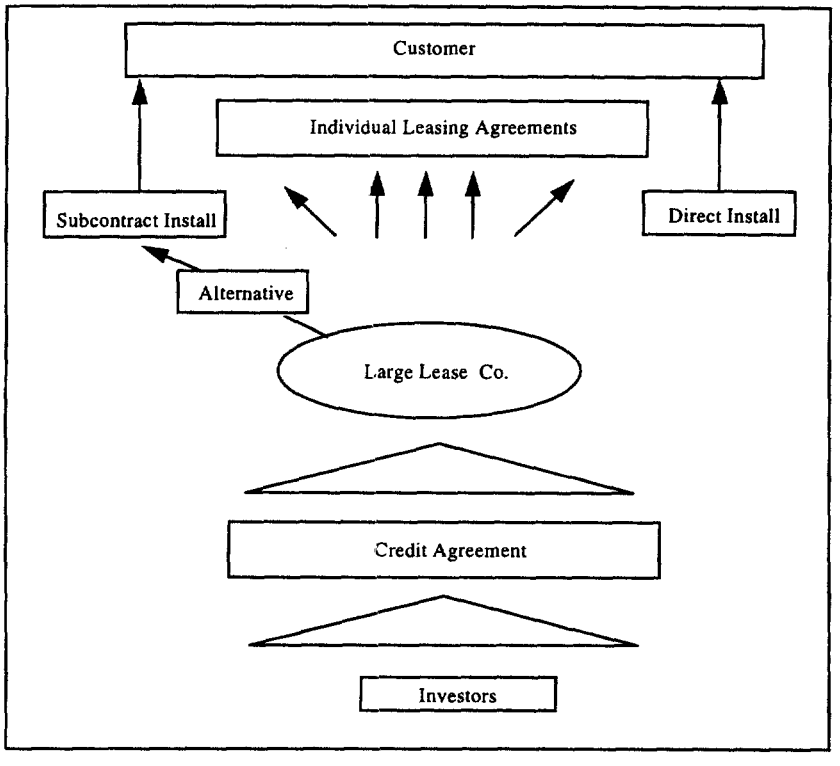
4.8 How to design bankable energy-efficient projects is one of the most pressing issues facing the energy sector today. Panelists in this session discussed methods currently in use in various regions and countries. The panelists included Tim Curtis of the Energy Saving Trust (EST) in the United Kingdom; Peter Garforth, an independent consultant; and Bernard Jamet, head of the Energy Efficiency Unit of the EBRD. Krishna Challa, chief of the Private Sector Development division, Latin America and the Caribbean Region, at the World Bank, moderated the discussion.

4.9 MDBs are already working to support energy efficiency in developing and transition economies. Bernard Jamet used the example of the EBRD's involvement in Eastern Europe to show that MDBs can have an effect in developing the energy service industry. The EBRD has been providing financing for new ESCOs in the region, which has few local resources or commercial banks able to work with small interventions and

public initiatives. The EBRD offers three options for creating bankable energy-efficiency projects (box 4.2): direct loans to large companies (such as district heating facilities), financing for ESCOs as intermediaries, and credit to commercial banks for on-lending. Peter Garforth underscored the importance of the work of MDBs, pointing out that their sponsorship and expertise can help the private sector overcome barriers to energy efficiency.

4.10 This session also highlighted the importance of funding ESCOs and other private financing arrangements rather than the projects themselves. ESCOs provide a number of advantages: they can work with small private projects MDBs and the public sector cannot accommodate; they can work directly with public sector institutions without the guarantees MDBs require for direct funding; and they can work across different sectors.

Box 4.2: Consolidating Financing: ESCOs as Fund Managers



4.11 In non-OECD countries, the energy-efficiency market is growing at about 10 percent a year and is particularly attractive in the following areas:

- reduction of transmission and distribution losses;
- industrial/commercial efficiency, including cogeneration;
- reduction of operational costs in public and commercial buildings;

- municipal street lighting and heating services; and
- reduction of energy use in multifamily homes.

4.12 Even in a competitive environment, however, energy efficiency requires time to take hold, as suppliers perceive it as adding an extra layer of risk. Tim Curtis noted that in the United Kingdom, competition in the energy sector is already well developed. Customers can save money simply by switching suppliers. But the market cannot be expected to develop fully for some years, so the government has set up the EST to design and oversee all energy conservation programs.

4.13 The presentations emphasized the importance of strong support from governments and MDBs for the fledgling energy-efficiency market in developing countries. As well as financing, energy efficiency requires a framework that fosters competition, rational pricing, and appropriate standards and provides a stable legal system, adequate procurement rules, and effective subsidies. MDBs can use their influence to help establish this framework. Governments can work behind the scenes to promote energy efficiency through specialized programs. Subsidies for energy-efficiency projects and services are often legitimate in this context, as an initial ESCO project that requires specific legal, technical, financial, and commercial skills can be expensive because of the need to train staff or hire new workers. Customers and investors may also require education in energy efficiency's best practices.

Session III: Performance Contracting and Partnerships

4.14 The panelists represented public utilities that either have made the transition to ESCOs or are supporting the development of ESCOs in the energy-efficiency market: José Donoso of the Instituto para la Diversificación y Ahorro de Energía (IDAE), Spain; Roland Hartung, CEO of Mannheimer Versorgungs und Verkehrsgesellschaft mbH (MVV), a German public utility; Leila Miragaya, director, and Lourival Monaco, president, Financiadora de Estudos e Projetos (FINEP), Brazil; and José de Mascarenhas, president, Federação das Indústrias do Estado de Bahia (FIEB), Brazil. Shirley Hansen, executive vice president of Kiona International, an energy consulting firm, provided information on performance contracting. Connie Smyser of the International Development Bank (IDB) chaired the panel.

4.15 Roland Hartung discussed the customer-oriented approach his agency has adopted in response to changes in the energy service environment. This traditional German utility supplies electric power, natural gas, water, waste management services, and mass transportation to the Mannheim area. Because it has no competition, it has had to develop in-house marketing skills in order to transform itself into an ESCO. Its new approach is based on reinforcing ties with customers. Account management for large

customers and market management for residential customers are among the innovations it has introduced to facilitate the transformation.

4.16 José Donoso's presentation emphasized the role the state can play as catalyst in the emerging energy-efficiency market. The Spanish public energy-efficiency agency IDAE became a full-fledged ESCO in the later 1980s in response to a lack of interest from industrial customers in financing energy-efficiency projects. The agency revamped its message to emphasize competition, modernization, and environmental priorities. Its focus is now on providing customers with the most reliable solutions, financing the transition, and monitoring and supervising the operation until the investment is recovered. Its primary tools are joint ventures with local banks and equipment suppliers. The results have been a thriving ESCO business in most of the Spanish industrial sectors and a reputation that allows the IDAE to support private ESCO businesses and provide the market with new financial tools for small and medium-sized enterprises.

4.17 Shirley Hansen discussed performance contracting, which she called "the most distinctive feature of ESCOs." Performance contracts guarantee that the customer will see savings in volume or value. Not only must the contracts make this guarantee, but they must also provide a method of monitoring the savings and stipulate the energy-efficiency measures that will be taken. Performance contracts have the advantage of being flexible and in fact vary widely, depending on country conditions and the types of services being provided. While the contracts require audits of both provider and customer, the audits allow ESCOs to understand the risk involved in setting a guarantee level.

4.18 As a first step in developing performance contracts, the FIEB (which represents the industrial association in Bahia, Brazil) and FINEP (a financial intermediary) have put in place a pilot program to demonstrate the applicability of energy management systems to the industrial sector. Monitoring and targeting systems will be imbedded in management systems, becoming part of the industries' basic operating procedures. The object is to avoid one-time energy audits or ESCO projects that may falter once the initial work has been done. The new systems will give plant managers a basis for entering into performance contracts. In this case, the delivery system has been built around the industrial trade associations.

Session IV: The Emerging Energy Service Industry

4.19 The emerging market for energy-efficient services is committed to providing customers with fully integrated energy solutions and access to adequate financial instruments. The final session presented several approaches that are currently in

use in industrial and developing countries. Panelists included Marc Boudier of Générale des Eaux, a French utility company; John Mahoney, president of Viron Energy Services (a U.S. ESCO); and Dana Younger of the IFC Technical and Environment Department. Russell Sturm, president of the International Institute for Energy Conservation, moderated the discussion.

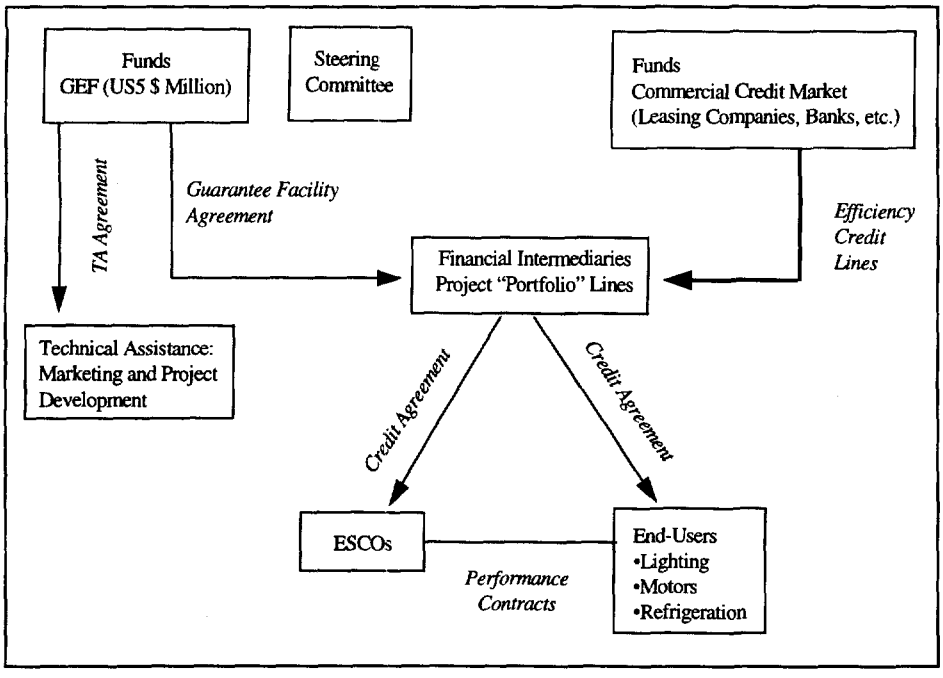
4.20 Panelists emphasized the need for energy service providers to provide a broad range of options, not only to satisfy customers' needs but to take advantage of alternative energy sources, renewable resources, and energy-efficient services already in use. John Mahoney noted that the type of performance contracting Viron uses allows building owners to make capital improvements, finance all associated costs, and operate with the assurance that the resulting energy and operational savings will cover both debt servicing and the initial investment. This approach, he maintained, is "classical ESCO business." Marc Boudier argued that limiting a project—to a specific power plant, for instance—misses the chance to uncover more efficient means of generating large amounts of energy.

4.21 To facilitate the energy sector's ability to provide integrated energy-efficient solutions, the IFC is using direct investment and financial intermediaries to support the private energy-efficiency market. Three innovative financing schemes have been initiated:

- The Renewable Energy and Energy Efficiency Fund (REEF) for ESCOs, end-users, manufacturers, and specialized financial intermediaries in non-OECD countries;
- The Small and Medium-Scale Enterprise Program (SME), which lends to financial intermediaries supporting subprojects and covers incremental environmental costs; and
- Energy-efficiency guarantees and lines of credit that provide partial guarantees, technical assistance, and advisory services to financial intermediaries and local stakeholders (box 4.3).

4.22 The IFC has already been involved in energy-efficiency projects in Argentina, the Baltic states, Egypt, Hungary, India, Morocco, Poland, and Ukraine. In Poland, for instance, the Efficient Lighting Program has expanded the market for compact fluorescent lights (CFLs) by providing US$2.7 million in subsidies to three manufacturers. The result has been price reductions of $7.5 million. These reductions have significantly increased the number of CFLs in use and reduced emissions accordingly. And the Hungarian Energy Efficiency Credit Program (HEECP) is working to overcome commercial banks' reluctance to lend money for energy-efficiency projects by providing guarantees of up to 50 percent for multiproject lending, to a total of $4.5 million.

Box 4.3 HEECP: Support for Energy-Efficiency Projects



4.23 Despite the reported success of the IFC's efforts in the energy-efficiency market, MDBs have been criticized for giving investment-intensive projects high priority and for "clustering" projects in ways that create redundancies and fail to take advantage of integrated approaches. MDBs have also been faulted for allocating money to entities that lack strong management incentives to be efficient.

5

Follow-up Agenda

5.1 Concluding speaker Karl Jechoutek (chief, Efficiency and Household Fuels Division, World Bank Industry and Energy Department) underscored the points that emerged throughout the conference. He noted that the still-young energy-efficiency business resembles other emerging markets in their early stages and faces the same difficulties. The "pioneers" in the business are taking certain risks, but as their successes become evident, the scope for experimentation in the energy sector will broaden. While some failures are unavoidable, with time the market will thrive as buyers take the lead. However, becoming a respectable market with ample financial resources will require the right dose of sponsorship, a reduction in up-front costs, and alliances between the energy and banking sectors.

5.2 The World Bank is taking steps to help fulfill those requirements. One of the central objectives of the roundtable was to provide World Bank staff with the opportunity to listen to outside practitioners in the field of energy efficiency. The practitioners provided the latest information on successful experiences in delivering energy-efficiency services and projects and discussed strategies that can be incorporated into energy sector development initiatives.

5.3 The Bank is taking direct action on several fronts. First, it is preparing a sector strategy paper, *Fuel for Thought*, that will provide operational guidelines for task managers on energy-efficiency and environmental policies and projects. The Bank is also developing external partnerships centered on energy and environmental issues. Institutionally, the Bank has created the Environment and Energy Efficiency Thematic Group, which brings together staff concerned with different regions and countries. In addition, new lending instruments developed at the Bank during the last twelve months are being adapted to the design of energy-efficiency projects, in particular, the Adaptable Lending Program (APL).

5.4 The roundtable and other outreach events will open the way for a new attitude toward integrated resource planning. Resource planning will no longer be a matter of simply optimizing what already exists, but of creating a market framework for innovative and profitable solutions.

Annex: List of Speakers

Richard Stern	The World Bank
Charles Guinn	Strategic Guidance Associates, USA
Rick Sedano	Commissioner, DPS, Vermont
Surya Sethi	IFC
Suresh Shah	AEL, India
Hon. Arnaldo Baldonado	Philippines
Sittiphorn Ratanopas	EGAT, Thailand
Tim Curtis	EST, UK
Peter Garforth	Consultant, Belgium
Bernard Jamet	EBRD
Krhishna Challa	The World Bank
José Alonso Donoso	IDAE, Spain
Roland Hartung	MVV, Germany
Leila Miragaya	FINEP, Brazil
Lourival Monaco	FINEP, Brazil
José de Mascarenhas	FIEB, Brazil
Shirley Hansen	Kiona International, USA
Connie Smyser	IDB
Marc Boudier	Générale des Eaux, France
John Mahoney	Viron Energy Services, USA
Dana Younger	IFC
Russell Sturm	International Institute for Energy Conservation, USA
Karl Jechoutek	The World Bank

Joint UNDP/World Bank

ENERGY SECTOR MANAGEMENT ASSISTANCE PROGRAMME (ESMAP)

LIST OF REPORTS ON COMPLETED ACTIVITIES

Region/Country	*Activity/Report Title*	*Date*	*Number*
	SUB-SAHARAN AFRICA (AFR)		
Africa Regional	Anglophone Africa Household Energy Workshop (English)	07/88	085/88
	Regional Power Seminar on Reducing Electric Power System Losses in Africa (English)	08/88	087/88
	Institutional Evaluation of EGL (English)	02/89	098/89
	Biomass Mapping Regional Workshops (English)	05/89	--
	Francophone Household Energy Workshop (French)	08/89	--
	Interafrican Electrical Engineering College: Proposals for Short- and Long-Term Development (English)	03/90	112/90
	Biomass Assessment and Mapping (English)	03/90	--
	Symposium on Power Sector Reform and Efficiency Improvement in Sub-Saharan Africa (English)	06/96	182/96
	Commercialization of Marginal Gas Fields (English)	12/97	201/97
Angola	Energy Assessment (English and Portuguese)	05/89	4708-ANG
	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
	Pump Electrification Prefeasibility Study (English)	01/86	047/86
	Review of Electricity Service Connection Policy (English)	07/87	071/87
	Tuli Block Farms Electrification Study (English)	07/87	072/87
	Household Energy Issues Study (English)	02/88	--
	Urban Household Energy Strategy Study (English)	05/91	132/91
Burkina Faso	Energy Assessment (English and French)	01/86	5730-BUR
	Technical Assistance Program (English)	03/86	052/86
	Urban Household Energy Strategy Study (English and French)	06/91	134/91
Burundi	Energy Assessment (English)	06/82	3778-BU
	Petroleum Supply Management (English)	01/84	012/84
	Status Report (English and French)	02/84	011/84
	Presentation of Energy Projects for the Fourth Five-Year Plan (1983-1987) (English and French)	05/85	036/85
	Improved Charcoal Cookstove Strategy (English and French)	09/85	042/85
	Peat Utilization Project (English)	11/85	046/85
	Energy Assessment (English and French)	01/92	9215-BU
Cape Verde	Energy Assessment (English and Portuguese)	08/84	5073-CV
	Household Energy Strategy Study (English)	02/90	110/90
Central African Republic	Energy Assessement (French)	08/92	9898-CAR
Chad	Elements of Strategy for Urban Household Energy The Case of N'djamena (French)	12/93	160/94
Comoros	Energy Assessment (English and French)	01/88	7104-COM
Congo	Energy Assessment (English)	01/88	6420-COB
	Power Development Plan (English and French)	03/90	106/90
Côte d'Ivoire	Energy Assessment (English and French)	04/85	5250-IVC
	Improved Biomass Utilization (English and French)	04/87	069/87
	Power System Efficiency Study (English)	12/87	--
	Power Sector Efficiency Study (French)	02/92	140/91
	Project of Energy Efficiency in Buildings (English)	09/95	175/95

Region/Country	*Activity/Report Title*	*Date*	*Number*
Ethiopia	Energy Assessment (English)	07/84	4741-ET
	Power System Efficiency Study (English)	10/85	045/85
	Agricultural Residue Briquetting Pilot Project (English)	12/86	062/86
	Bagasse Study (English)	12/86	063/86
	Cooking Efficiency Project (English)	12/87	--
	Energy Assessment (English)	02/96	179/96
Gabon	Energy Assessment (English)	07/88	6915-GA
The Gambia	Energy Assessment (English)	11/83	4743-GM
	Solar Water Heating Retrofit Project (English)	02/85	030/85
	Solar Photovoltaic Applications (English)	03/85	032/85
	Petroleum Supply Management Assistance (English)	04/85	035/85
Ghana	Energy Assessment (English)	11/86	6234-GH
	Energy Rationalization in the Industrial Sector (English)	06/88	084/88
	Sawmill Residues Utilization Study (English)	11/88	074/87
	Industrial Energy Efficiency (English)	11/92	148/92
Guinea	Energy Assessment (English)	11/86	6137-GUI
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Guinea-Bissau	Energy Assessment (English and Portuguese)	08/84	5083-GUB
	Recommended Technical Assistance Projects (English & Portuguese)	04/85	033/85
	Management Options for the Electric Power and Water Supply Subsectors (English)	02/90	100/90
	Power and Water Institutional Restructuring (French)	04/91	118/91
Kenya	Energy Assessment (English)	05/82	3800-KE
	Power System Efficiency Study (English)	03/84	014/84
	Status Report (English)	05/84	016/84
	Coal Conversion Action Plan (English)	02/87	--
	Solar Water Heating Study (English)	02/87	066/87
	Peri-Urban Woodfuel Development (English)	10/87	076/87
	Power Master Plan (English)	11/87	--
	Power Loss Reduction Study (English)	09/96	186/96
Lesotho	Energy Assessment (English)	01/84	4676-LSO
Liberia	Energy Assessment (English)	12/84	5279-LBR
	Recommended Technical Assistance Projects (English)	06/85	038/85
	Power System Efficiency Study (English)	12/87	081/87
Madagascar	Energy Assessment (English)	01/87	5700-MAG
	Power System Efficiency Study (English and French)	12/87	075/87
	Environmental Impact of Woodfuels (French)	10/95	176/95
Malawi	Energy Assessment (English)	08/82	3903-MAL
	Technical Assistance to Improve the Efficiency of Fuelwood Use in the Tobacco Industry (English)	11/83	009/83
	Status Report (English)	01/84	013/84
Mali	Energy Assessment (English and French)	11/91	8423-MLI
	Household Energy Strategy (English and French)	03/92	147/92
Islamic Republic of Mauritania	Energy Assessment (English and French)	04/85	5224-MAU
	Household Energy Strategy Study (English and French)	07/90	123/90
Mauritius	Energy Assessment (English)	12/81	3510-MAS
	Status Report (English)	10/83	008/83
	Power System Efficiency Audit (English)	05/87	070/87

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Mauritius	Bagasse Power Potential (English)	10/87	077/87
	Energy Sector Review (English)	12/94	3643-MAS
Mozambique	Energy Assessment (English)	01/87	6128-MOZ
	Household Electricity Utilization Study (English)	03/90	113/90
	Electricity Tariffs Study (English)	06/96	181/96
	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
	Status Report (English and French)	02/86	051/86
	Improved Stoves Project (English and French)	12/87	080/87
	Household Energy Conservation and Substitution (English and French)	01/88	082/88
Nigeria	Energy Assessment (English)	08/83	4440-UNI
	Energy Assessment (English)	07/93	11672-UNI
Rwanda	Energy Assessment (English)	06/82	3779-RW
	Status Report (English and French)	05/84	017/84
	Improved Charcoal Cookstove Strategy (English and French)	08/86	059/86
	Improved Charcoal Production Techniques (English and French)	02/87	065/87
	Energy Assessment (English and French)	07/91	8017-RW
	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
	Status Report (English and French)	10/84	025/84
	Industrial Energy Conservation Study (English)	05/85	037/85
	Preparatory Assistance for Donor Meeting (English and French)	04/86	056/86
	Urban Household Energy Strategy (English)	02/89	096/89
	Industrial Energy Conservation Program (English)	05/94	165/94
Seychelles	Energy Assessment (English)	01/84	4693-SEY
	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
South Africa Republic of	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
	Energy Assessment (English)	07/83	4511-SU
	Power System Efficiency Study (English)	06/84	018/84
	Status Report (English)	11/84	026/84
	Wood Energy/Forestry Feasibility (English)	07/87	073/87
Swaziland	Energy Assessment (English)	02/87	6262-SW
	Household Energy Strategy Study	10/97	198/97
Tanzania	Energy Assessment (English)	11/84	4969-TA
	Peri-Urban Woodfuels Feasibility Study (English)	08/88	086/88
	Tobacco Curing Efficiency Study (English)	05/89	102/89
	Remote Sensing and Mapping of Woodlands (English)	06/90	--
	Industrial Energy Efficiency Technical Assistance (English)	08/90	122/90

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Tanzania	Power Loss Reduction Volume 1: Transmission and Distribution SystemTechnical Loss Reduction and Network Development (English)	06/98	204A/98
	Power Loss Reduction Volume 2: Reduction of Non-Technical Losses (English)	06/98	204B/98
Togo	Energy Assessment (English)	06/85	5221-TO
	Wood Recovery in the Nangbeto Lake (English and French)	04/86	055/86
	Power Efficiency Improvement (English and French)	12/87	078/87
Uganda	Energy Assessment (English)	07/83	4453-UG
	Status Report (English)	08/84	020/84
	Institutional Review of the Energy Sector (English)	01/85	029/85
	Energy Efficiency in Tobacco Curing Industry (English)	02/86	049/86
	Fuelwood/Forestry Feasibility Study (English)	03/86	053/86
	Power System Efficiency Study (English)	12/88	092/88
	Energy Efficiency Improvement in the Brick and Tile Industry (English)	02/89	097/89
	Tobacco Curing Pilot Project (English)	03/89	UNDP Terminal Report
	Energy Assessment (English)	12/96	193/96
Zaire	Energy Assessment (English)	05/86	5837-ZR
Zambia	Energy Assessment (English)	01/83	4110-ZA
	Status Report (English)	08/85	039/85
	Energy Sector Institutional Review (English)	11/86	060/86
	Power Subsector Efficiency Study (English)	02/89	093/88
	Energy Strategy Study (English)	02/89	094/88
	Urban Household Energy Strategy Study (English)	08/90	121/90
Zimbabwe	Energy Assessment (English)	06/82	3765-ZIM
	Power System Efficiency Study (English)	06/83	005/83
	Status Report (English)	08/84	019/84
	Power Sector Management Assistance Project (English)	04/85	034/85
	Power Sector Management Institution Building (English)	09/89	--
	Petroleum Management Assistance (English)	12/89	109/89
	Charcoal Utilization Prefeasibility Study (English)	06/90	119/90
	Integrated Energy Strategy Evaluation (English)	01/92	8768-ZIM
	Energy Efficiency Technical Assistance Project: Strategic Framework for a National Energy Efficiency Improvement Program (English)	04/94	--
	Capacity Building for the National Energy Efficiency Improvement Programme (NEEIP) (English)	12/94	--
	EAST ASIA AND PACIFIC (EAP)		
Asia Regional	Pacific Household and Rural Energy Seminar (English)	11/90	--
China	County-Level Rural Energy Assessments (English)	05/89	101/89
	Fuelwood Forestry Preinvestment Study (English)	12/89	105/89
	Strategic Options for Power Sector Reform in China (English)	07/93	156/93
	Energy Efficiency and Pollution Control in Township and Village Enterprises (TVE) Industry (English)	11/94	168/94
	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

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Indonesia	Energy Assessment (English)	11/81	3543-IND
	Status Report (English)	09/84	022/84
	Power Generation Efficiency Study (English)	02/86	050/86
	Energy Efficiency in the Brick, Tile and Lime Industries (English)	04/87	067/87
	Diesel Generating Plant Efficiency Study (English)	12/88	095/88
	Urban Household Energy Strategy Study (English)	02/90	107/90
	Biomass Gasifier Preinvestment Study Vols. I & II (English)	12/90	124/90
	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
	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
	Status Report (English)	07/83	006/83
	Energy Strategy Paper (English)	--	--
	Institutional Review in the Energy Sector (English)	10/84	023/84
	Power Tariff Study (English)	10/84	024/84
Philippines	Commercial Potential for Power Production from Agricultural Residues (English)	12/93	157/93
	Energy Conservation Study (English)	08/94	--
Solomon Islands	Energy Assessment (English)	06/83	4404-SOL
	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
	Rural Energy Issues and Options (English)	09/85	044/85
	Accelerated Dissemination of Improved Stoves and Charcoal Kilns (English)	09/87	079/87
	Northeast Region Village Forestry and Woodfuels Preinvestment Study (English)	02/88	083/88
	Impact of Lower Oil Prices (English)	08/88	--
	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
	Power Sector Reform and Restructuring in Vietnam: Final Report to the Steering Committee (English and Vietnamese)	09/95	174/95
	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 (SAS)		
Bangladesh	Energy Assessment (English)	10/82	3873-BD
	Priority Investment Program (English)	05/83	002/83
	Status Report (English)	04/84	015/84
	Power System Efficiency Study (English)	02/85	031/85
	Small Scale Uses of Gas Prefeasibility Study (English)	12/88	--

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India	Opportunities for Commercialization of Nonconventional Energy Systems (English)	11/88	091/88
	Maharashtra Bagasse Energy Efficiency Project (English)	07/90	120/90
	Mini-Hydro Development on Irrigation Dams and Canal Drops Vols. I, II and III (English)	07/91	139/91
	WindFarm Pre-Investment Study (English)	12/92	150/92
	Power Sector Reform Seminar (English)	04/94	166/94
	Environmental Issues in the Power Sector	06/98	205/98
Nepal	Energy Assessment (English)	08/83	4474-NEP
	Status Report (English)	01/85	028/84
	Energy Efficiency & Fuel Substitution in Industries (English)	06/93	158/93
Pakistan	Household Energy Assessment (English)	05/88	--
	Assessment of Photovoltaic Programs, Applications, and Markets (English)	10/89	103/89
	National Household Energy Survey and Strategy Formulation Study: Project Terminal Report (English)	03/94	--
	Managing the Energy Transition (English)	10/94	--
	Lighting Efficiency Improvement Program Phase 1: Commercial Buildings Five Year Plan (English)	10/94	--
Sri Lanka	Energy Assessment (English)	05/82	3792-CE
	Power System Loss Reduction Study (English)	07/83	007/83
	Status Report (English)	01/84	010/84
	Industrial Energy Conservation Study (English)	03/86	054/86
	EUROPE AND CENTRAL ASIA (ECA)		
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
	Natural Gas Upstream Pricing (English and Polish)	08/98	206/98
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 (MNA)		
Arab Republic of Egypt	Energy Assessment (English)	10/96	189/96
Morocco	Energy Assessment (English and French)	03/84	4157-MOR
	Status Report (English and French)	01/86	048/86
	Energy Sector Institutional Development Study (English and French)	07/95	173/95
Syria	Energy Assessment (English)	05/86	5822-SYR
	Electric Power Efficiency Study (English)	09/88	089/88
	Energy Efficiency Improvement in the Cement Sector (English)	04/89	099/89

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Syria	Energy Efficiency Improvement in the Fertilizer Sector (English)	06/90	115/90
Tunisia	Fuel Substitution (English and French)	03/90	--
	Power Efficiency Study (English and French)	02/92	136/91
	Energy Management Strategy in the Residential and Tertiary Sectors (English)	04/92	146/92
	Renewable Energy Strategy Study, Volume I (French)	11/96	190A/96
	Renewable Energy Strategy Study, Volume II (French)	11/96	190B/96
Yemen	Energy Assessment (English)	12/84	4892-YAR
	Energy Investment Priorities (English)	02/87	6376-YAR
	Household Energy Strategy Study Phase I (English)	03/91	126/91

LATIN AMERICA AND THE CARIBBEAN (LAC)

LAC Regional	Regional Seminar on Electric Power System Loss Reduction in the Caribbean (English)	07/89	--
	Elimination of Lead in Gasoline in Latin America and the Caribbean (English and Spanish)	04/97	194/97
	Elimination of Lead in Gasoline in Latin America and the Caribbean - Status Report (English and Spanish)	12/97	200/97
	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
	National Energy Plan (English)	12/87	--
	La Paz Private Power Technical Assistance (English)	11/90	111/90
	Prefeasibility Evaluation Rural Electrification and Demand Assessment (English and Spanish)	04/91	129/91
	National Energy Plan (Spanish)	08/91	131/91
	Private Power Generation and Transmission (English)	01/92	137/91
	Natural Gas Distribution: Economics and Regulation (English)	03/92	125/92
	Natural Gas Sector Policies and Issues (English and Spanish)	12/93	164/93
	Household Rural Energy Strategy (English and Spanish)	01/94	162/94
	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
	Hydro and Thermal Power Sector Study	09/97	197/97
Chile	Energy Sector Review (English)	08/88	7129-CH
Colombia	Energy Strategy Paper (English)	12/86	--
	Power Sector Restructuring (English)	11/94	169/94
	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
	Recommended Technical Assistance Projects (English)	11/84	027/84
	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
	Energy Strategy Phase I (Spanish)	07/88	--
	Energy Strategy (English)	04/91	--

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Ecuador	Private Minihydropower Development Study (English)	11/92	--
	Energy Pricing Subsidies and Interfuel Substitution (English)	08/94	11798-EC
	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
	Status Report (English and French)	08/85	041/85
	Household Energy Strategy (English and French)	12/91	143/91
Honduras	Energy Assessment (English)	08/87	6476-HO
	Petroleum Supply Management (English)	03/91	128/91
Jamaica	Energy Assessment (English)	04/85	5466-JM
	Petroleum Procurement, Refining, and Distribution Study (English)	11/86	061/86
	Energy Efficiency Building Code Phase I (English)	03/88	--
	Energy Efficiency Standards and Labels Phase I (English)	03/88	--
	Management Information System Phase I (English)	03/88	--
	Charcoal Production Project (English)	09/88	090/88
	FIDCO Sawmill Residues Utilization Study (English)	09/88	088/88
	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
	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
	Recommended Technical Assistance Projects (English)	09/85	--
	Status Report (English and Spanish)	09/85	043/85
Peru	Energy Assessment (English)	01/84	4677-PE
	Status Report (English)	08/85	040/85
	Proposal for a Stove Dissemination Program in the Sierra (English and Spanish)	02/87	064/87
	Energy Strategy (English and Spanish)	12/90	--
	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		
	Energy End Use Efficiency: Research and Strategy (English)	11/89	--
	Women and Energy--A Resource Guide		
	The International Network: Policies and Experience (English)	04/90	--
	Guidelines for Utility Customer Management and Metering (English and Spanish)	07/91	--
	Assessment of Personal Computer Models for Energy Planning in Developing Countries (English)	10/91	--
	Long-Term Gas Contracts Principles and Applications (English)	02/93	152/93

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	GLOBAL (Continuation)		
	Comparative Behavior of Firms Under Public and Private Ownership (English)	05/93	155/93
	Development of Regional Electric Power Networks (English)	10/94	--
	Roundtable on Energy Efficiency (English)	02/95	171/95
	Assessing Pollution Abatement Policies with a Case Study of Ankara (English)	11/95	177/95
	A Synopsis of the Third Annual Roundtable on Independent Power Projects: Rhetoric and Reality (English)	08/96	187/96
	Rural Energy and Development Roundtable (English)	05/98	202/98
	A Synopsis of the Second Roundtable on Energy Efficiency: Institutional and Financial Delivery Mechanisms (English)	09/98	207/98

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