ESM196

Central and Eastern Europe

Power Sector Reform in Selected Countries

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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 by the World Bank's Industry and Energy Department. ESMAP provides advice to governments on sustainable energy development. Established with the support of UNDP and 15 bilateral official donors in 1983, it focuses on policy and institutional reforms designed to promote increased private investment in energy and supply and end-use energy efficiency; natural gas development; and renewable, rural, and household energy.

GOVERNANCE AND OPERATIONS

ESMAP is governed by a Consultative Group (ESMAP CG), composed of representatives of the UNDP and World Bank, the governments and other institutions providing financial support, and the recipients of ESMAP's assistance. The ESMAP CG is chaired by the World Bank's Vice President, Finance and Private Sector Development, and advised by a Technical Advisory Group (TAG) of independent energy experts that reviews the Programme's strategic agenda, its work program, and other issues. ESMAP is staffed by a cadre of engineers, energy planners, and economists from the Industry and Energy Department of the World Bank. The Director of this Department is also the Manager of ESMAP, responsible for administering the Programme.

FUNDING

ESMAP is a cooperative effort supported by the World Bank, UNDP and other United Nations agencies, the European Community, Organization of American States (OAS), 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.

FURTHER INFORMATION

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Table of Contents

Acknowledgments

The idea of assisting the Central and Eastern European countries in streamlining their electric power sectors by making available the experiences of selected countries working toward the same goal was conceived and proposed by EC4IN in late 1995. The subject was of more than academic interest, because the countries in the region had begun to restructure their power sectors. Particular interest was expressed in disseminating information and experience regarding the establishment of new regulatory frameworks, market restructuring, privatization, and the establishment of a favorable environment for efficient power sector operation.

Financed with ESMAP funds, augmented with resources by IENPD in 1996, the report presented in the following pages covers the experience with power sector reform in Hungary, Poland, and Ukraine. The selection of these countries was based on their respective progress as well as the diversity of the "avenues" that they have chosen to reach their goal. While the report notes "lessons to be learned," it is not intended to criticize the actions or steps taken in the process, nor does it try to audit past Bank operations. The focus is on describing the reform process—its phases and the factors that influenced them. The experience is too brief to judge whether the process will lead to lasting, desirable improvements. In the case of reform of the power sector, it is true that the "jury is still out."

Although this report is the result of a joint effort by the authors, specific responsibility for the Hungarian material rests with T. Markus (consultant); that for the Polish and Ukrainian material resides with M. Dussan (IENPD).

The authors are grateful for the significant comments, and particularly for the continuous support, provided by P. Cordukes (IENPD) and L. Lovei (EC4IN). They also wish to thank Dr. I. Bakacs (MVM Rt), Dr. A. Hegedus (National Bank of Hungary), Dr. P. Hegedus (economist), Dr. P Ligeti (Ministry of Industry), and Dr. B Nemeth (HEO) for their exceptionally valuable contributions to the Hungarian material and Messrs. C. Duvigneau (EC2ET), P. Kaminski (EC2PL), and S. Milenski (EC4) for their cooperation in preparing the Polish and Ukranian materials. Their advice, criticism, and observations were essential to the study and the improvement of its quality.

Abbreviations and Acronyms

APV Rt	State-owned company with responsibility for directing the privatization process (Hungary)
CENTREL	An interconnected power system established by the Czech Republic, the Slovak Republic, Poland, and a portion of Ukraine
CHP	Combined heat and power
CMEA	Council for Mutual Economic Assistance
DISCO	Distribution company
ERA	Energy Regulatory Authority (Poland)
EC	European Community
EU	European Union
FSU	Former Soviet Union
GDP	Gross domestic product
GENCO	Generation company
HEO	The Hungarian Energy Office
IPS	Integrated power system
JSC	Join-stock company
MIT	Ministry of Industry and Trade (Poland)
MVM Rt	State-owned electricity holding company (Hungary)
MVMT	MVM Trust; predecessor of the MVM Rt
NDC	National Dispatch Center (Ukraine)
NEC	National Electric Company (Ukraine)
NERC	National Electricity Regulatory Commission (Ukraine)
OC	Office for Competition (Hungary)
OECD	Organization for Economic Cooperation and Development
PM	Prime Minister
PPA	Power purchase agreement
PSE	Polish Power Grid Company
SOE	State-owned enterprise
UCPTE	Western European Power Pool

VAT	Value added tax
WEWB	Power and Brown Coal Board (Poland)

1

Executive Summary

1.1 The operation of public utilities, such as companies that generate, transmit, and distribute electric power, involves complex issues that are not usually present in other sectors and industries. These companies have customarily been large, capital-intensive natural monopolies not subject to competition. They are considered strategic because of their critical role in the economy. Historically, they have been exceptionally vulnerable to political interference in their activities, mainly in the areas of investment, tariff policy, and consumer services. Government practices have frequently led to the imposition of low, controlled prices, which often endangered the financial viability of power enterprises and introduced inefficiencies to the economy.

1.2 While the main objective of the power sectors has been to provide a reliable supply of electricity to meet demand at least cost, in the last ten to twenty years, the declining economic efficiency and reliability of power supplies has been a notable phenomena worldwide. This decline has been brought about primarily by the prevailing sector models—state-owned monopolies, subject to government interference in day-to-day operations and to conflicting social, economic, and political objectives, that operated in a noncompetitive environment that did not provide strong incentives for economic efficiency. The nature and the seriousness of the problem varied from country to country, but it can be said that very few, if any, escaped completely. The social and political framework that determined the economic model for a given country and its stage of economic development influenced the nature and the extent of the problems, but did not provide immunity against them. Similar problems often plagued the power sector in both market and centrally planned economies.

1.3 In the ex-socialist countries, the government's role was particularly overwhelming. Rigid institutional structures were maintained in the energy sector, as in other parts of the economy. Development plans were centrally controlled by the government, and the primary objective was to meet preestablished performance and production targets. Economic criteria were considered only in the context of the overall plans, and only technical and political considerations were taken into account in decisionmaking. Electricity tariffs often did not cover the investment and the operating costs of the power companies because appropriate economic and financial evaluations were lacking. This imbalance frequently led to an unhealthy reliance on government funds.

1.4 The initial achievements of the centrally planned systems were impressive. Increased output, rapid industrialization, and roughly equitable income distribution combined with widespread provision of social services (although often of questionable quality) were seen in most of the economies. But the built-in inefficiencies of central planning gradually became evident. Planning became a personalized bargaining process; together with an absence of legitimate individual incentives, it eventually had a

devastating impact on the economies, which declined or stagnated. By 1989, it was clear to many of these societies that their socialist governments had lost the ability to provide critical services efficiently and to maintain an acceptable economic framework. The response was the rejection of the political system associated with central planning. In Central and Eastern Europe, this culminated in change that established democratic political systems with strong mandates, among other things, for transformation to a market economy. The transformations involved comprehensive packages of structural reforms to introduce competition, tighten government finances, and enhance productivity. In countries with market economies, sector reform has generally been initiated to address a discrete problem—lack of capital for needed investments, fiscal crisis, and the like—but in the former socialist countries, the reasons were much more general. The reforms were an integral part of the profound social and economic transition to a democratic society and a market economy.

1.5 The power sector reforms in Central and Eastern Europe have addressed issues in four broad areas. First, the legal framework required revision in order to establish a level playing field for the provision of electricity services by both private and state-owned enterprises (SOEs). Second, the market and ownership structures had to be changed to introduce commercial practices, increase competition, and facilitate the participation of private capital. Third, a new regulatory framework was needed that would be appropriate for the regulation of private monopolies and the introduction of competition. Finally, energy prices had to be adjusted to reflect economic costs and to improve the financial viability of public utilities.

1.6 Most, if not all, of the Central and Eastern European countries have started the reform process by streamlining their power sectors. They have progressed— at different paces and by a variety of routes—to establish new structures and models. Their achievements to date are distinctive. ESMAP considers it useful to disseminate information on the experiences in power sector reform in the region and has prepared this report with that objective in mind. This report covers the experiences of Hungary, Poland, and Ukraine in implementing their plans and ongoing reforms.

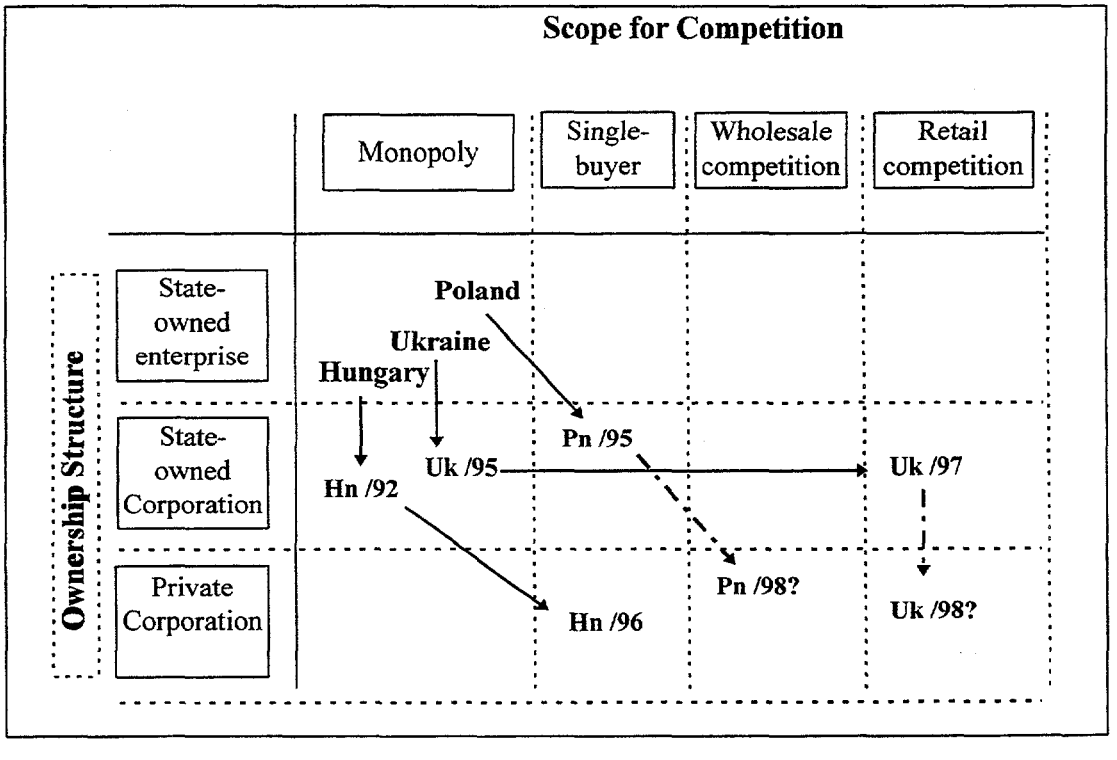
1.7 The power sectors of Hungary, Poland, and Ukraine had much in common before reform. Prior to the collapse of the former Soviet Union (FSU) in 1991, the power systems in these three countries were part of the POKOJ regional power pool, with an installed capacity of about 170,000 MW and a sizable power trade. Electricity demand peaked in the late 1980s and declined for few years thereafter, leaving a large generation reserve in the early 1990s when reform was initiated. The main indigenous primary energy resource, coal, was increasingly supplemented by imported natural gas, mainly for power generation. Generation was based on thermal plants—the majority of these installations required refurbishing to replace old equipment and to meet more stringent environmental standards—with an important share for district heat contributed by combined heat and power (CHP) stations.

1.8 The power sectors of all three countries were dominated by state-owned monopolies that operated under a command-and-control structure. These monopolies, however, were organized as collections of several generation and distribution units, as

well as construction, engineering, and manufacturing companies. These units had good engineering capabilities, albeit a weak tradition of applying commercial practices. Early in their reform processes, the three countries initiated the demonopolization, commercialization, and corporatization of SOEs. By 1994 there were several generation and distribution companies constituted as joint-stock companies, a sufficient number to create a competitive wholesale power market. Prior to reform, electricity prices in Poland and Ukraine were heavily subsidized by the government. In Hungary, it had been well over a decade since the power sector had received direct subsidies from the government, but there have been considerable cross-subsidies created by a distorted tariff structure. Notwithstanding the substantial tariff increases in real terms during the early 1990s, prices still do not fully reflect costs.

1.9 In spite of the similarities, Hungary, Poland, and Ukraine have adopted different strategies for restructuring their power sectors, especially in *scope for competition, privatization, and the sequencing and pace of reform.* While Hungary decided to give priority to privatization of existing SOEs, Poland and Ukraine preferred to establish a competitive wholesale power market as a first stage of the reform process. While Hungary and Ukraine opted for the introduction of relatively fast changes in the sectoral structure, Poland chose a gradual approach. The following figure illustrates the reform paths adopted by the three countries.

Figure 1.1 Power Sector Reform Paths



Scope for Competition

1.10 The three countries meet the basic requirements for the establishment of a competitive market: sizable power markets, large-scale consumption of electricity by the industrial sector, the potential to demonopolize the market structure, a large portion of thermal generation, and the possibility of developing gas-fired power stations using imported natural gas. Nevertheless, while Ukraine opted to establish a competitive wholesale power market right away, Poland decided to introduce a competitive market in stages, and Hungary adopted a single-buyer scheme. It is understandable that Hungary, the country with the smallest power market of the three, adopted the least competitive scheme. But it is remarkable that Ukraine, facing adverse market conditions related to the severe financial problems of the power sector, brought about by a lack of cash and poor collection of electricity bills, decided to establish a competitive spot power market.

1.11 Ukraine is experiencing difficulties in developing a competitive power market, which confirms that only with finances that are healthy overall can a power market operate properly. In 1996, distribution companies were only able to collect about 80 percent of electricity bills, and a mere 15–20 percent of these were paid in cash. Initially, most electricity was traded outside the pool through barter arrangements. The government, concerned that the lack of cash to pay for fuel could bring about a collapse of the power supply, controlled the allocation of the scarce funds collected. Unable to manage fuel supply, spare parts, and receivables, the generation companies could not meet demand and compete effectively in the spot market. The market administrator, unable to enforce the commercial rules of the market, lost credibility. With Bank support, the government is now trying to resolve these problems by providing working capital to power utilities to alleviate the cash flow problem and to improve financial discipline and the enforcement of the market rules.

1.12 In contrast, Poland initially established a power market where the transmission and dispatch company, acting as a single-buyer, purchases energy from generators through long- and medium-term contracts. Prices are set to ensure the financial viability of the generation expansion and rehabilitation projects that are required to meet demand and to bring the average wholesale price into line with the retail tariff adjustment program approved by the government. Poland is planning a gradual transition to a competitive spot market by providing open access to transmission grids, establishing a spot market, allowing the distribution companies to trade in the wholesale market, and transferring the long- and medium-term energy contracts held by the single-buyer to the distribution companies. The generation and distribution companies are not yet privatized, which is likely to facilitate the transition by making it easier for the government to alleviate the financial impact of the new rules. At the same time, it is questionable whether the government will deregulate wholesale prices and establish a competitive market and cost-reflective tariffs, as planned, in the absence of a specific mandate in the energy law.

1.13 A large portion of Hungarian generation and distribution facilities are already in private hands. A wholesale power market is operating on the basis of power purchase

contracts by a single-buyer, with regulated wholesale prices to provide a guaranteed rate of return. A transition to a fully competitive wholesale power market would be difficult, and it is likely that introduction of a more competitive scheme would raise controversial issues regarding windfall profits to private generators and stranded assets. In any case, the need for such development has yet to arise, and in all likelihood will not do so until a financially viable and efficient operation is secured within the existing regulatory framework.

Progress Made in Privatization

1.14 Poland and Hungary implemented rapid economic reform in the early 1990s to begin the transition to a market economy. By 1995 the two countries were among the formerly planned economies that had achieved the greatest economic liberalization and private sector participation. Ukraine, in contrast, was well behind Hungary and Poland in this respect, in spite of having made some progress in economic reform (see "From Plan to Market," *World Development Report 1996*). In the power sector, Hungary had privatized about 50 percent of generation and distribution businesses by 1996, while Poland and Ukraine were still preparing for privatization.

1.15 In the early 1990s, Hungary had established the political consensus needed to privatize the power sector. The government completed the preparatory work for privatization—including the corporatization of state-owned power companies, the development of the legal framework, and the establishment of the regulatory regime—during a period of about five years. It has gradually relinquished its management and ownership roles, and by 1997 was able to sell about 50 percent of generation and distribution companies to strategic investors at reportedly attractive prices. Poland has been more tentative about privatization of its power sector. Although it has restructured the sector in preparation for privatization, there is no clear mandate to proceed with the privatization of thermal generation and distribution companies. Ukraine has reached a broad consensus on the need to privatize thermal generation and distribution companies and is gradually implementing voucher privatization for up to 15 percent of the shares. Nevertheless, its privatization program faces difficulties; current country conditions may not attract strategic investors.

Pace of Reform

1.16 Hungary and Ukraine proceeded faster with sector reforms than Poland. In the period from 1990 to 1996, Hungary introduced the main legislative changes necessary to implement power sector reform, established a new regulatory framework and transparent pricing, and privatized most of the sector. Between 1994 and 1996, Ukraine developed the legal framework for sector reform; implemented the regulations; established a new regulatory agency; and put a new, competitive wholesale power market in operation. Hungary has introduced rapid reforms under relatively stable and favorable conditions and is consolidating a new unbundled sector structure with substantial private

participation. Ukraine has used a small window of opportunity provided by a pro-reform government to implement an ambitious reform under adverse financial circumstances, and it is currently struggling to stabilize and consolidate the new competitive power market and to establish financial discipline in the sector. It is unclear whether a gradual approach would have worked any better than the more rapid transition implemented by Ukraine.

1.17 In Poland there were protracted discussions within government and Parliament about the new legislation required to implement a power sector reform based on demonopolization and privatization. Finally, in April 1997, after four years of preparation and discussions, a new energy law was approved. In the interim, the government progressed in its effort to unbundle and corporatize the SOEs and create and consolidate the Polish Grid Company as a new entity responsible for transmission and dispatch. It is now starting to establish the new regulatory framework, to set up a semiautonomous energy regulatory agency, to gradually implement a competitive market, and to privatize distribution. It is too early to say whether this gradual approach will succeed in establishing a competitive market with substantial private participation.

1.18 The annex to this chapter presents a comparative summary of the power sector reform for the three countries in tabular form. Chapters 2, 3, and 4 present a more detailed analysis of each of the three cases. The focus of the presentation is on describing the reform process and chronicling its phases and the factors that have influenced them. Experience with the transition thus far has been too brief to judge whether the process will lead to lasting improvements, as expected, in the effort to provide the sustainable, long-term development of an efficient power industry and reliable and high-quality electricity service to consumers at a lower cost. One can conclude, however, that these three countries have all made impressive progress in implementing reforms, regardless of the differences in sequence and pace. Power markets are evolving and becoming more competitive, and private sector participation is increasing.

Annex

Comparison of Power Sector Reforms

A. BACKGROUND AND SECTOR STRUCTURE

1. Supply and Demand

	HUNGARY	POLAND	UKRAINE
Supply	Population: 10.3 million.	Population: 38.6 million.	Population: 51.9 million.
	Energy resources: The main resource is coal, most of it with high sulfur and ash content and low calorific value. Imported fuels expected to increase in the total energy supply (48 percent in 1995).	Energy resources: Extensive hard coal and lignite reserves. Generation expansion would be met with hard coal and natural gas (peaking plants and CHP).	Energy resources: Extensive coal reserves, but mining is costly an quality is worsening. Imported oil and gas needed to meet demand.
	Generating capacity: approximately 7,500 MW (25 percent nuclear, 40 percent oil, and gas-fired steam, 27 percent coal, 7 percent gas-based, and 1 percent hydroelectric.	Generation capacity: 33,000 MW (26 percent thermal-lignite, 16 percent CHP, 43 percent coal, 6 percent hydro, 9 percent autogenerator).	Generation capacity: 53,000 MW (25 percent nuclear, 61 percent thermal, 10 percent hydro, 4 percent autogenerators).
	Generation (1995): 34 TWh.	Generation (1995):130 TWh.	Generation (1995):193 TWh.
	Fuel: lignite, 12 percent; oil, 18 percent; nuclear, 38 percent; gas, 15 percent; and coal, 17 percent (hydro less than 1 percent).	Fuel: 40 percent lignite, 53 percent coal, 6 percent hydro.	Fuel: 37 percent nuclear, 28 percent coal, 21 percent gas, 8 percent mazout, 5 percent hydro.
	International interconnection with capacity over 3,000 MW. Power imports, mostly from FSU, represented 28 percent of all the supply in 1990. After that, imports declined, partly because of reduced domestic demand and partly as a result of the collapse of the FSU. In 1992, Poland, Hungary, and the Czech Republic formed CENTREL. In October 1995, the CENTREL network was connected with the UCPTE.	International interconnections with capacity over 4,000 MW with Central and Eastern Europe. International trade with FSU peaked in 1989, but declined sharply after the collapse of the FSU. In 1992, Poland, Hungary, and the Czech Republic formed CENTREL. In October 1995, the CENTREL network was connected with the UCPTE.	International interconnections with capacity over 10,000 MW with Central and Eastern Europe. International trade dropped 90 percent, from a substantial average power flow of about 3,200 MW in 1990 because of the collapse of the FSU.

A. BACKGROUND AND SECTOR STRUCTURE

1. Supply and Demand (Cont.)

	HUNGARY	POLAND	UKRAINE
Demand	Electricity sales peaked in 1989, but declined thereafter because of recession and structural changes. In 1992–93, demand for power dropped to 29 TWh, a historically low level. Signs of demand recovery appear to be pronounced, and growth is expected to be sustained with some 1.1 percent p.a. in the next three years, and over 2 percent p.a. thereafter.	Electricity sales peaked in 1988. Afterward, with recession and changes in the structure of the economy, sales declined about 12 percent, and bottomed out in 1992. From 1992 to 1995, sales increased slightly, at 1.6 percent p.a. Demand is now projected to grow in the medium term at about 2.5 percent p.a.	Since 1991, electricity consumption has decreased about 28 percent because of a dramatic economic decline of 59 percent between 1991 and 1995. Demand is expected to bottom out in 1997 and reach the 1990 level again by 2010.
Generation expansion	Retirements, energy import substitution and the need for refurbishment, have created a need for substantial investment in generation.	In spite of surplus capacity (25 percent reserve margin) and a low expected growth of demand, there is need for substantial investment in generation to refurbish and replace old plants and to meet new environmental regulations.	In spite of large surplus capacity (53,000 MW to serve peak demand of about 30,000 MW), additional generation would be needed (about 4,000 in nuclear and pump storage plants already under construction) before 2010 to replace decommissioned nuclear plants and the old thermal plants that are being closed.

2. Market and Ownership Structures

Pre-Reform	Until 1991, MVM Trust, an integrated utility, dominated the sector, controlling all aspects of the operation on behalf of the government. It was organized into eleven generating, one transmission, six distribution, and four service entities, with centralized management control.	From 1987 to 1990, the power and lignite sectors were consolidated under the Power and Brown Coal Board (WEWB), a state-owned conglomerate of 108 businesses, including 28 generation enterprises; 33 distribution companies; regional and national dispatch centers; 4 lignite mines; and several manufacturing, construction, and maintenance companies.	In 1991, prior to the collapse of the FSU, Ukraine had a Ministry of Power and Electrification (Minenergo)that was responsible for providing electricity service throughout the republic. Minenergo was organized in forty-seven enterprises: eight regional enterprises responsible for generation, transmission, and distribution in their regions; a national dispatch center; and a planning institute. The development of nuclear power stations was controlled directly by the minister of nuclear power of the FSU.

A. BACKGROUND AND SECTOR STRUCTURE

2. Market and Ownership Structures (Cont.)

	HUNGARY	POLAND	UKRAINE
Current structure	To reduce the government role, in January 1992 the MVMT entities were corporatized, which established a legal and administrative basis for commercial governance. The trust was transformed into an SOE (MVM Rt), which became the holding entity (with 50 percent ownership) for eight generating, one transmission, and six distribution companies. In late 1995, the government sold over 50 percent of the shares in three of the seven conventional *generating* companies, representing 55 percent of the total generating capacity, to strategic investors. Over 50 percent of the ownership of the six *distribution* companies has also been privatized. In addition to the private (strategic) investors, some 2 percent of the shares are in the hands of the municipalities. MVM Rt remains the owner of the country's only transmission company, dispatch center, and the nuclear facility. Shares of generation and distribution companies still in the hands of the State are owned by MVM RT and APV Rt (a company created to hold state-owned assets), respectively.	In 1990, when Poland initiated a radical economic reform to substitute a market economy for central planning, WEWB was liquidated and the Polish Power Grid Company (PSE) was created as an independent, joint-stock company, responsible for managing the national transmission grid. The generation and distribution enterprises became autonomous and responsible only to a ministry. After 1993, based on a law enacted by the Parliament, government converted twenty-two out thirty-four generation enterprises (including nineteen CHP plants) and the thirty-three distribution companies to joint-stock companies. PSE was consolidated as a transmission and dispatch company, and it also became a majority shareholder in pumped-storage hydroelectric plants (1,600 MW).	The power sector was restructured during 1994 and 1995 as follows: i) Horizontal unbundling of generation into four joint-stock corporations (JSC), which own the fourteen largest thermal stations; two JSC, which own the hydroelectric stations; and one nuclear-generation SOE. ii) Creation of a National Electric Company (NEC), an SOE responsible for the high-voltage grids 220 kV and above. iii) Creation of the National Dispatch Center (NDC), an SOE responsible for economic dispatch, operation of interconnected systems, transmission expansion planning, administration of the settlement system for energy transactions, and ancillary services. iv) Creation of twenty-seven joint-stock electricity distribution companies, responsible for medium- and low-voltage networks (below 220 kV) and some *embedded generation in the 25 oblasts* and two municipal administrations (Kiev and Sebastopol). v) Separation of the supply activity (purchase of electricity in bulk to sell at retail) from the distribution activity (wires business).

A. BACKGROUND AND SECTOR STRUCTURE (Cont.)

2. Market and Ownership Structures (Cont.)

	HUNGARY	POLAND	UKRAINE
Ultimate structure	Completion of the privatization (with the exception of nuclear generation, dispatch, and transmission, which will continue as SOEs) is expected by end of 1998.	Future restructuring would be implemented according to following guidelines: a)The energy law establishes that generation, transmission, distribution, and trade activities will be subject to license. b)The merging of generation and distribution companies will be determined by initiatives of individual enterprises and subject to general antimonopoly rules. c)Privatization of power utilities would be the last stage of the reform process. The privatization of CHP generation plants and distribution companies would have the highest priority.	The government has selected the twenty-seven DISCOs and four GENCOs responsible for thermal generation, all established as joint-stock companies, as candidates for privatization. NEC and the remaining generators are likely to remain state-owned for the foreseeable future.

B. INSTITUTIONAL ARRANGEMENTS

1. Policymaking and Planning

	HUNGARY	POLAND	UKRAINE
Responsibilities	The government is to ensure the implementation of the energy policy as approved by the Parliament. Within the government, the Ministry of Industry and Trade is responsible for energy sector matters, including strategic planning, conservation, and the preparation of additional legislation as necessary. Through ministerial instructions, among other things, this ministry regulates minimum fuel reserves, establishes procedures, appoints the CEO of the HEO, and until 1997 developed and set the tariffs with the Ministry of Finance.	The Ministry of Economy is responsible for the formulation and coordination of energy policy, primarily through the preparation of energy policy guidelines, definition of criteria for planning the development of fuel and energy supply, evaluation of the national energy security, definition of a policy on energy imports and exports, promotion of energy conservation and development of nonconventional sources of energy, and definition of guidelines for the privatization of sector enterprises.	Minenergo will continue to be responsible for sector policy, including preparing strategic expansion plans, promoting energy efficiency, international relations, technical standards, monitoring the performance of SOEs, and supporting alternative energy resources. Other government agencies are responsible for defining a policy for the safety of nuclear plants and environmental protection.

B. INSTITUTIONAL ARRANGEMENTS

1. Policymaking and Planning

	HUNGARY	POLAND	UKRAINE
Expansion planning	The planning of generation expansion is largely centralized in MVM Rt, which prepares the strategy for generation expansion, as well as specific plans. Parliament's approval is needed to establish a nuclear facility or a plant over 600 MW. The government approves new plants over 200 MW, and the minister of industry approves the (type of) fuel usage for plants under 200 MW.	Power development programs that had been formulated earlier and adopted centrally would be replaced by policy guidelines for generation expansion, which would serve as an indicative plan. During a transition period (four to five years), PSE would act as a single buyer and would be responsible for preparing detailed generation and transmission expansion plans.	Expansion planning is gradually evolving—from master plans prepared by Minenergo and approved by Parliament—to decentralized planning by power utilities under indicative plans. Development of new generation plants is permitted by any company that holds a license, subject only to general regulations and designated antimonopoly conditions.

2. Regulation

	HUNGARY	POLAND	UKRAINE
Regulatory entities	The sector is regulated by the Hungarian Energy Office (HEO). The office was established in 1994 and its duties include consumer protection, licensing generation transmission and distribution, monitoring compliance with license provisions, arbitration between suppliers and consumers, enforcing least-cost operations, defining information requirements for cost-of-service studies, and generally ensuring adherence to the provisions of the relevant acts and decrees. Although the principles for price determination are set out by law, tariffs from 1997 will be approved by the ministers for industry and for finance, and the development of retail tariffs and the prices for transmission and generation are the responsibility of HEO.	The Energy Law creates an Energy Regulatory Authority (ERA) responsible for the regulation of electricity, gas, and district heat. ERA will be a government agency reporting directly to the prime minister (PM). The regulatory functions of ERA include the following: to issue, amend, and revoke licenses; to approve and control tariffs; to control quality standards for customer service; to regulate conditions for third-party access to grids; to impose fines; and to cooperate with antitrust authorities in controlling abuses of monopoly power. The central government would retain substantial power on regulatory matters. The Ministry of Economy will determine: a methodology to calculate electricity tariffs; a licensing policy; and terms for connecting users to the grid, covering connection costs, providing transmission services, electricity trading, and grid operation.	The National Electricity Regulatory Commission (NERC) was created in 1995 as an independent legal body responsible for promoting competition in the provision of electricity services; issuing, modifying, and supervising licenses for main electricity services; formulating pricing policies; supervising compliance with regulations; protecting consumers' rights; and developing regulations for the use of electricity.

B. INSTITUTIONAL ARRANGEMENTS

2. Regulation (Cont.)

	HUNGARY	POLAND	UKRAINE
Staffing	The director general of the HEO is appointed by the minister of industry and trade for an undefined period. The staff are civil servants. At least once a year, the director general reports to the Parliament on the work of the HEO. Organization: Departments for consumer protection and energy policy (among other things, responsible for price regulation, energy efficiency, and consumer complaints); energy supply (among other things, responsible for issuing and monitoring licenses); and finance and administration. The staff, currently about forty-five, are civil servants.	ERA will be managed by a president appointed for a five-year term by the PM. There will be an Advisory Council to the president of ERA, composed of 7 members appointed by PM for 5-year terms, from candidates proposed by industry and consumer groups. Organization: The organization for ERA has not yet been determined.	NERC is composed of three members. They are appointed by the president of Ukraine to staggered six-year periods. Members can only be removed by the president on grounds of incapacity or misbehavior.. Organization: Departments for licensing and pricing and legal, technical, administrative, and information services. Local offices in all oblasts, responsible for consumers affairs, monitoring of licenses, and contact with licensees. A staff of about 200 persons is currently planned.
Funding	HEO's budget was a "line item" in the budget of the Ministry of Industry. Fees for licensing are currently sufficient to cover expenses.	ERA would be funded by annual fees, payable by all licensees. The PM will specify the principles for determining remuneration of ERA staff, taking into account industry practices.	NERC operations are funded by a one-time fee for issuing licenses and annual fees based on installed capacity and volume of energy transactions.
Decision-making	Decisions of the HEO may be appealed in the first instance to the minister of industry and subsequently to the appropriate court.	The president of ERA will make decisions after listening to the opinions of the Advisory Council. ERA decisions can be appealed to the Antimonopoly and Energy Court in Warsaw, in accordance with the Code of Civil Procedure.	Decisions can be appealed to the Antimonopoly Committee or to the courts. NERC's statutes require conduct of its activities with transparency and the establishment of local consumer councils. The Commission organizes open public discussions about the main issues and publishes its decisions.

C. REGULATORY FRAMEWORK

1. Sector Policy

	HUNGARY	POLAND	UKRAINE
	Energy policy was approved by the Parliament in 1993, including the following main goals: i) Restrict the State's role in the sector to the minimum justified level. ii) Liberalize prices so that costs reflect tariffs. iii) Introduce a market economy while controlling monopoly interests. iv) Reduce one-sided energy import dependency. v) Involve the public in energy investment decisions.	In June 1991, the Council of Ministers issued a letter of sector development policy, which defined the main elements of a reform program for the energy sector: i) Restructure the sector by regrouping generation and distribution companies in about half the existing companies. ii) Establish a new regulatory framework. iii) Commercialize the sector by converting SOEs to joint-stock companies. iv) Gradually privatize the power sector.	The power sector reform initiated in early 1994 was based on the following principles: i) The regulatory function will be separate. ii) A competitive wholesale power market, will be created, based on hourly bids. iii) Generation, transmission, dispatch, distribution, and supply services will be unbundled. iv) Wholesale electricity prices will be deregulated. v) SOEs will be corporatized. vi) Existing assets and enterprises will be privatized gradually.

2. Relevant Legislation

	HUNGARY	POLAND	UKRAINE
	While the Electricity Act (1994) was probably the most important single piece of legislation, since 1988–89 a large number of legal provisions, all necessary for the reform process, have been incorporated in different acts, as the political climate permitted. Within the overall legal framework, the detailed regulations were developed by HEO and the government and are manifested in the licenses.	The primary legislation is the Energy Law, which was approved by the Parliament in April 1997 and signed by the PM in May 1997. This law establishes general principles and authorizes the government to set most of the regulatory procedures and criteria through ordinances.	The primary legislation is Presidential Decree 244/94, which unbundles the sector; decrees 738/94 and 213/95, which creates NERC; decree 282/95, which defines the market structure; and resolution 207/96 by the Cabinet of Ministries, which orders the creation of a wholesale power market. By late 1996, NERC had issued most of the licenses, including those for 130 independent suppliers; and an agreement of the members of Energomarket had been signed.

C. REGULATORY FRAMEWORK

3. Governance Mechanisms and Competition Rules

	HUNGARY	POLAND	UKRAINE
	The main regulatory instruments are the licenses that are issued and monitored by the HEO. In 1995 all the facilities were "relicensed" to cover, in addition to technical safety and supply matters, asset management, quality control, accounting systems, financial reserves, and the like. Amalgamations and takeovers are controlled—primarily by the HEO and the Office of Fair Competition—to prevent the emergence of undue economic dominance. There is a clear understanding that the transmission company's independence from other sector companies (and vice versa) will be ensured.	The main regulatory instruments that will establish the terms, rights, and obligations for the provision of electricity services will be the licenses for the generation, transmission, distribution, and trade of electricity, to be issued by ERA. The Energy Law defines general criteria and procedures for issuing licenses. Accordingly, licenses would be issued for fixed periods—from ten to fifty years—but extension of the contractual term can be considered. Licenses could be amended or revoked by ERA under specific circumstances. Horizontal integration would be controlled by antitrust authorities, and decisions would be based on the considerations of market power and abuses of a dominant position. Generators, distributors, and traders cannot be shareholders in the transmission company.	The main regulatory instruments that establish rules, rights, and obligations for the provision of electricity services are the licenses for generation, transmission, distribution, and supply activities and the agreement for the operation of the wholesale power market. Licenses are open-term contracts, and they establish clear rules on vertical and horizontal integration. One generator cannot own more than 25 percent of the total installed capacity, and only in exceptional cases can a generator hold a supply license if it owns more than 4 percent of the total installed capacity. One distribution or supply company cannot serve more than 15 percent of the market.

4. Wholesale Power Market

Organization	MVM Rt is responsible for dispatch and transmission. It acts as a single buyer in the sector, purchasing the power from the generators and selling to distributors. It also has systemwide responsibilities for safe and high-standard operation based on merit order, for forecasting demand and capacity requirements, and for planning capacity expansions.	PSE is responsible for single-buyer functions, providing transmission services, economic dispatch, safe and reliable operation of the interconnected system, and settlement of energy contracts. In the future, PSE will withdraw from single-buyer functions and would become a power-market administrator.	The National Dispatch Center (NDC) is responsible for the administration of the power market, including the services of a clearing house, settlement of energy transactions in the pool, contracting transmission and ancillary services, and safe and reliable operation. The power market is regulated by member agreement. A Board of Directors comprised of five representatives of generators and five representatives of suppliers oversees the market.

C. REGULATORY FRAMEWORK

4. Wholesale Power Market

	HUNGARY	POLAND	UKRAINE
Pool rules	MVM Rt, acting as a single buyer, purchases power from generators under mid- or long-term contracts, ensures network standards for reliability and safety, and sells the power to the distribution companies under contractual arrangements. The contracts, among other things, specify capacity and energy requirements and obligations, and the relevant prices. Appropriate provisions are in place to allow revisions. The purchase prices from the generators reflect the cost of production at individual plants, and prices could thus vary considerably. The (wholesale) prices to all distribution companies, however, are uniform.	A wholesale power market is being developed in stages to manage the transition from administered arrangements under a single-buyer scheme to a competitive market. During the initial stage, which began in 1995, PSE purchased power from generators under long-term (12–15 year) and medium-term (4–5 years) bilateral energy contracts. PSE established capacity and energy charges to cover the fixed and variable costs of the generation stations, respectively. In 1996, about 60 percent of the generation was on long-term and 40 percent was on medium-term contracts. PSE sold energy to distribution companies at a single bulk-tariff that covered the average cost of purchases, plus a transmission charge. It was structured to reflect cost differences by time of use. For the final stage, two markets will be created. A local market, for 110 kV or below, will be based on bilateral contracts. A system market, for voltages above 110 kV, will include a spot market and a contract market. Suppliers will have open access to transmission and distribution grids at regulated prices. During a transition stage, it is envisaged that PSE will introduce a shadow spot market and will gradually transfer the long- and medium-term contracts to distributors.	A competitive wholesale power market started operations in October, 1996. The market comprises the following energy transactions: i) Hourly energy transactions in a spot market based on price bids submitted daily by thermal generators. The market operator determines economic dispatch, based on merit order of bids, and establishes the market clearing price for each hour (spot price). ii) Transactions are carried out at regulated prices under long-term bilateral energy contracts between NDC and hydro, nuclear, and small thermal generators. Suppliers purchase energy at a price equal to a weighted average of the spot price and the price under bilateral contracts, plus transmission charges, the cost of losses, and charges to cover NDC costs. Contracts for differences between generators and suppliers are allowed. Generators will be paid separately for other services provided to NDC for capacity available for dispatch and ancillary services. Suppliers have open access to transmission and distribution grids at regulated prices.

C. REGULATORY FRAMEWORK (Cont.)

4. Wholesale Power Market (Cont.)

	HUNGARY	POLAND	UKRAINE
Economic dispatch	The generating units are dispatched in economic merit order. MVM Rt is in charge of the nationwide grid operation and dispatch through the NDC, supported by six regional and thirty-nine local centers.	PSE is responsible for coordination of the interconnected system to achieve an economic, reliable, and safe operation. Economic dispatch would be based on price bids by thermal generators.	Energomarket is responsible for coordination of the interconnected system to achieve an economic, reliable, and safe operation. Economic dispatch is based on price bids by thermal generators.
Retail competition	Some exceptions regarding direct supply of customers by the generating companies and/or export-import activities by distribution companies can take place under appropriate licensing arrangements.	In the last stage of market development, traders and large consumers (with demand larger than 5 MW) would have open access to transmission and distribution to purchase energy either in a competitive market under long-term contracts or in the spot market.	Retail competition is permitted. Independent suppliers (suppliers at nonregulated tariffs) have access to transmission and distribution grids and can negotiate contracts to supply energy to large consumers and other retail consumers.
Operational experience	The limited-competition character of the single-buyer model may change in four to five years, when a review of performance is planned.	Still in the early stages of market development.	A competitive market was introduced under the difficult circumstances of a severe financial crisis created by lack of cash and nonpayment of electricity bills. Generators, facing major constraints in fuel supplies and maintenance, could not meet demand nor compete effectively in the spot market. In 1996, about 50 percent of the demand was traded on the basis of barter arrangements. These arrangements should be phased out as soon as the financial situation improves and generators are able to build up their working capital.

C. REGULATORY FRAMEWORK

5. Pricing

	HUNGARY	POLAND	UKRAINE
Tariffs and subsidies	Although the power sector did not receive any subsidies from the government for well over a decade, considerable cross-subsidies existed before the SOEs were corporatized. In the 1990s the government kept adjusting regulated electricity prices to improve cost recoveries and to eliminate distortions between classes of consumers. Nevertheless, lack of overall cost recovery and structural anomalies have continued, although they are lessening.	Before the radical economic reform of the early 1990s, electricity prices were kept below economic costs with considerable subsidies for residential consumers. In 1990 and 1991 there was a substantial increase of electricity prices, especially for residential consumers. After 1991, prices kept up with inflation; lately, they have increased in dollar terms because of revaluation of the zloty. In late 1995, the average retail tariff was about $55/MWh, equivalent to about 75 percent of economic costs.	In spite of large increases in average retail electricity tariffs during 1991–94, price adjustments lagged behind costs, and the average tariff in 1994 was $13/MWh, too low to cover financial or economic costs. During 1995 and 1996 there were substantial increases in real terms, and average tariffs reached $37/MWh. There were still major distortions in the tariff structure in late 1996. Average wholesale electricity prices for distribution were set at values in the range from $21/MWh to $34.5/MWh to compensate for differences in consumer mix and financial requirements. About one-third of residential consumers were privileged with large discounts in tariffs for lifeline consumption.
Price regulation	After 1994, legislated tariff policies and regulations further addressed issues to support the privatization process. Three tariff adjustments were introduced in 1995–97 in an effort to reach economic cost recovery. The policy basis for price determination was established, along with a mechanism that included the pricing formula. The profits that could be realized through tariffs were also determined.	Electricity prices have been regulated in the past by several ministries: retail prices have been managed by the Ministry of Finance and transfer prices for wholesale energy transactions between generation and distribution companies have been handled by the Ministry of Industry and Trade.	Traditionally, retail prices were regulated by the Ministry of Economy. Under the new competitive model, tariffs will be unbundled according to service: generation, market administration, transmission, distribution, and supply. Except for thermal generation activities, tariffs will be regulated by a price cap formula to cover reasonable costs of service and provide incentives for efficiency.

C. REGULATORY FRAMEWORK (Cont.)

5. Pricing (Cont.)

	HUNGARY	POLAND	UKRAINE
Price regulation (Cont.)	Beginning in 1997, HEO started to fully exercise its regulatory functions, including the preparation of tariff recommendations based on cost-of-service studies submitted by the power companies. Consistent with the legal requirements, tariffs will be adjusted to ensure economic cost recovery levels and to generate at least an 8 percent return on investment (if the return exceeds 12 percent, a portion will be rebated to the customers). While the prices of the generating companies will vary depending on their cost structure, the wholesale price and the retail tariff will be uniform. Large users may purchase power under individual contracts that reflect their special conditions. The formula to calculate the prices includes three main components: the actual costs of the various input elements; the expected cost changes e.g. due to inflation, different technology, exchange rate variations etc.; and measures for efficiency improvements, for cost increases exceeding inflation and caused by environmental regulations	The Energy Law would gradually introduce substantial changes in price regulation for electricity. The minister of economy would establish the methodology and criteria for calculating prices and the minister of finance would continue to set retail tariffs only during a two-year transition period. Tariffs will be unbundled and should cover costs for each activity. Power utilities will calculate their tariffs based on the selected methodology and will submit them to ERA for approval.	Suppliers to the regulated market are allowed to pass through the costs of the generation, transmission, and distribution services incurred to provide electricity service. The above new scheme for price regulation is being implemented gradually in order to contain sharp increases in retail prices.
Deregulation	No provisions.	The Energy Law authorizes ERA to deregulate tariffs for activities subject to competition. Deregulation of wholesale energy prices would be introduced after the single-buyer scheme is terminated.	Prices for thermal generators were deregulated and are determined based on market forces. Independent suppliers can negotiate electricity prices with retail consumers.

D. PRIVATIZATION PROCESS

	HUNGARY	POLAND	UKRAINE
Objectives, procedures, and policy	The major objectives were to modernize the facilities and to provide for future expansions; to introduce a commercial outlook to management; and to assist in reducing the country's external debt. After five to six years preparatory work, the major prerequisites for privatization—including the legal basis, the regulatory framework, corporatization of the sector entities, and a transparent tariff policy and mechanism—were in place. The tenders for the privatization were published in October 1995. Between 46 and 49 percent of each of the six distribution companies and 50 percent of three generation companies representing 55 percent of generating capacity have now been sold to strategic investors. The government's intention is to complete the privatization by the end of 1998 so that strategic investors control the generating and distribution companies, with employees; municipalities; and the public, including institutional investors, having a minority ownership. Additional shares in MVM RT (an amount between 15 and 40 percent is being contemplated) will be sold, possibly to financial investors. The government will retain, however, "golden shares. Paks will be controlled by MVM Rt.	The government has adopted the following general principles for privatization: i) Sales of shares or assets to strategic investors will help finance the investments required to refurbish power plants and meet new environmental standards. ii) The privatization of CHP generation plants and distribution companies would have the highest priority. iii) PSE and the coal and lignite mines are considered strategic businesses and should be maintained under full control of the State. In early 1997, a few selected generation and distribution companies were authorized to initiate preprivatization studies.	The government has established these general principles for privatization: i) For the time being, the nuclear and hydro generation power companies, the combined heat and power plants, NEC, and NDC are not eligible for privatization. ii) About 15 percent of shares would be offered for voucher privatization, 5 percent for management buyout, 29 percent for sale to strategic investors, and 51 percent would remain in the hands of the State. As of early 1997, five DISCOs and two GENCOs had completed the first step of voucher privatization, and the State Property Fund had initiated preprivatization studies.

E. TRANSITION ISSUES

	HUNGARY	POLAND	UKRAINE
	Although Hungary has advanced considerably in the process of reforming its power sector, the reform is an ongoing process. The actions taken are all long-term measures and their effectiveness cannot be judged on the basis of short-term operational experience. Nevertheless, there are some issues that the government of Hungary almost certainly will address in the short run. These include: • completion of the privatization • phasing out of the old coal-fired power generating units (and closing down the supporting uneconomic mines) and replacing the phased-out generating capacity • further tariff level and structure adjustments to ensure appropriate cost recoveries and to introduce built-in incentives (and disincentives) to encourage economic power usage • reviewing the operational arrangements for the wholesale market to possibly broaden competition • initiating programs for energy management, savings, and efficiencies.	The government has selected a gradual approach to sector reform that relegates privatization and competition to the later stages. This approach seeks to establish first the basic conditions for the operation of a competitive market, and later to attract private investors. There are concerns, however, about the feasibility of a gradual implementation of cost-reflective tariffs and a competitive market if privatization lags behind. Private power companies help to introduce financial discipline and require firm commitments by the government to pricing policies.	Restructuring and the creation of a competitive market had the highest priority in the reform process in Ukraine. Privatization was relegated to a second phase. This strategy was based on the assumption that a power market would help the corporatization process by establishing transparent wholesale prices and financial discipline. This strategy has not worked as planned, however. A severe cash flow problem arose because of the nonpayment of electricity bills: generators cannot meet demand and compete effectively in the spot market. Distributors do not have strong incentives to improve collections. The market administrator, unable to enforce payment agreements and other market rules, loses its credibility as a power exchange. The government, with the Bank's support, is trying to fix this problem by providing working capital to generators and implementing strict collection and cut-off procedures.

2

Case I: Hungary

Of all the ex-socialist countries in Central and Eastern Europe, Hungary has gone farthest in restructuring its power sector and privatizing the power utilities. The sector's strategic importance and Hungary's limited indigenous energy resources led to the development of a sector model that gave priority to privatization through strategic investors rather than to increased competition. During five to six years of preparatory work, the sector entities were transformed into corporations, the previous (vertical, command) linkages were replaced by intercompany contracts, the necessary legislative framework was developed, a regulatory regime was established, and pricing principles and mechanisms were legislated. The government has relinquished its previous management role, and it is in the process of restricting its ownership to transmission and dispatch and nuclear-based power generation, although it is keeping "golden shares" in the privatized entities to safeguard the sector's continuous operation. Strategic investors now hold the dominant ownership in all six of Hungary's distribution companies and three generating companies (out of the seven conventional companies, representing 55 percent of the total generating capacity). The government's aim is to complete the sector's privatization by the end of 1998.

Background

Technical Description of the Power Sector

2.1 The total installed generating capacity in Hungary is about 7,500 MW. Nuclear plants represent 25 percent of this total; oil- and gas-fired steam plants, 40 percent; coal-fired facilities, 27 percent; gas turbines, about 7 percent; and hydropower installations, less than 1 percent. Taking into account imports and losses, the total available capacity provides a satisfactory reserve margin (some 27 percent in 1996). Consumption by power station auxiliaries is about 8 percent of the gross generation, which is also acceptable. The extensive rehabilitation and modernization carried out in preparation for interconnection with UCPTE has improved system reliability considerably during the last four to five years. For example, outage rates for the transmission network have been reduced considerably (3 in 1995, compared with 104 in 1991).

2.2 There is only one *nuclear* plant (Paks), with a level of utilization (81–85 percent) comparable to some of the best Organization for Economic Cooperation and Development (OECD) units. By all known accounts, Paks' safety record is excellent—the emergency stops average one per block annually. There are large differences in the technical levels among the *coal-fired* stations. The majority date back to the 1950s and 1960s; they have high operating costs and are large-scale polluters. With the exception of

one 800-MW plant that was refurbished in the late 1980s, almost all coal-fired units will be retired in around 2001–2005.[1] The bulk of the *oil- and gas*-fired power stations were established in the mid-1970s. Although their thermal efficiency and reliability are acceptable, they are approaching the end of their useful lives. Their highly important role in dispatch and load control make it imperative that these facilities be retrofitted, including the introduction of adequate environmental control measures. In recent years, important gas-turbine projects (some 400 MW) have been completed. Potential for *hydropower* is negligible in Hungary.

2.3 The design of the *transmission* system was influenced by the country's relationship with the CMEA (Council for Mutual Economic Assistance). The system totals about 5,530 kilometers of lines; of these, 260 kilometers are rated 750 kV, crossing the country to support the previously intensive East-West trade. The rest of the grid is the 1,595-kilometer 400-kV line, the 1,190-kilometer 220-kV line, and the 2,535-kilometer 120-kV line. Nationwide *dispatching*, based on economic merit, is controlled by the Dispatch Center, supported by six regional and thirty-nine local centers. Automation of system control is being modernized.

2.4 The six regionally based *distribution* companies serve about 5 million consumer accounts through 145,000 kilometers of network. Of this total, almost 80,000 kilometers are low voltage (less than 1 kV), and the rest is 1–120 kV. In load and number of customers, the largest company is ELMU Rt, which serves Budapest and sold about 7,676 GWh (about 27 percent of the total electricity sold) to some 1.4 million customers in 1995. Each of the other five companies serves a range of customers of 700,000–800,000, with a franchise area between 18,000 and 19,000 square kilometers. Their share of total electricity sales varied between 11 percent and 21 percent in 1995. EDASZ Rt (serving the more urbanized and industrialized northwest part of the country) is somewhat bigger than the others, and its share of the total sale is approximately 21 percent.

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[1] In Hungary, 80 percent of the coal production is used for power generation. The indigenous coal has high sulfur content, is highly polluting, and has low calorific value. Because most of the coal mines were uneconomical, in 1989 a major downsizing program was initiated, an essential change in the earlier policy of promoting coal-based generation. The socioeconomic impacts of the program required its gradual implementation, regardless of the undesirable direct effects, such as the protracted use of inferior fuel. Nevertheless, the results were considerable. Out of the 27 mines, 13 were closed, the output from underground mines was reduced by 5 million tons p.a. to 7.5 million tons, and the number of employees was reduced from 50,000 to some 21,000. The mines with generally acceptable production costs were amalgamated with the power-generating companies they supplied. Presently about 90 percent of coal-mining capacity operates under this arrangement, and only five mines are operating outside the integration. Additional workers will leave mining with the closing of the nonintegrated mines in 1998; between 2003 and 2010, with the depletion of presently known viable reserves, coal mining is expected to be finished for power generation, barring new technological developments.

Power Demand and Supply

2.5 For years, Hungary relied increasingly on imports to meet it's energy requirements. Net import was almost 38 percent of the total energy supply in the mid-1970s, increasing to about 48 percent in 1995. In the future, the share of imports is bound to increase further given the declining (economic) production of mines and the lack of significant petroleum discoveries.

2.6 In the fifteen years leading up to 1989, electricity consumption grew by an average of 3.7 percent annually. After 1989, in keeping with the declining gross domestic product (GDP) (6 percent and 10.2 percent in 1990 and 1991, respectively), consumption was reduced to a historically low 28.5 TWh. While the declining trend appears to be over, consumption in 1995 was still about 15 percent less then the historically high level of 1989. Signs of a demand recovery are pronounced, however, and the growth is expected to be sustained. With an annual growth rate of about 1.1 percent until the end of the century, and an almost 2 percent annual growth rate thereafter, consumption is expected to reach 40.7 TWh by the year 2003. Expansion plan(s) for generation currently under consideration envisage still faster growth. Self-sufficiency in electricity, which was only 72 percent in 1990, is expected to reach 96 percent by the turn of the century. The phasing-out of imports is based primarily on considerations of supply security and politics, but it can only be achieved through ensured primary energy imports commensurate with economic power generating rehabilitation and expansion programs. (It is not technically possible to return to the former level of electricity import. The collapse of the parallel CMEA operation has left Hungary without its former "major source" of imports.)

2.7 The composition of power demand has also changed considerably. About twenty years ago, the share of industry was about 57 percent, while household consumption was only 15 percent. In 1991 industry's share dropped to 38 percent, while domestic consumption reached 32 percent. The changes were brought about by the collapse of large, energy-intensive industrial complexes and the installation of some small industrial and commercial enterprises in sites that allowed them to take advantage of the low domestic tariffs. In the future, the share of industrial consumers is expected to increase, but structural changes in the sector and more energy-efficient processes will preclude industry's return to it's previous dominant role. At the same time, as tariffs for the classes of consumers come to more closely reflect the cost of the services offered, nondomestic customers will lose their incentive to buy power under domestic tariffs, and the relative importance of this consumer class will lessen.

Integration with Western Europe: Investment Scenarios

2.8 Hungary was part of the power system of the CMEA prior to its collapse, and although the supply was relatively reliable, the quality parameters did not meet Western European standards. Partly in anticipation of the breakdown of the CMEA network, the

Czech, Slovak, Polish, and Hungarian power systems (and a small Ukrainian "island" system), all facing similar problems, established an interconnected system called CENTREL, which allowed the systems to operate autonomously from CMEA and in parallel with each other. Members of CENTREL indicated their intention to join the Western European Power Pool (UCPTE), and after establishing the required system reliability, Hungary was connected to the pool in October 1995.

2.9 Although consumption will not return to the 1989 level before the early 2000s, new generating capacity will be needed to replace imports and units to be retired. The investment strategy for the system until about the year 2000 focuses on the conversion of existing plants to combined-cycle cogenerating units with gas-fired combustion turbines; open-cycle combustion turbines to replace imports during peak periods (and to meet UCPTE's high frequency-control standard), and new combined-cycle plants that include units at gas fields to utilize low-pressure gas. The installation of new, fluidized-bed generating units is also being considered for sites of old, retired coal-fired units. To meet demand beyond the year 2000, large base-load options—including additional nuclear-, indigenous lignite-, and/or imported-coal-based stations—are being considered, but these new projects must have demonstrable economic justification and social acceptability.

Market Structure Developments

2.10 The Hungarian power sector has undergone considerable restructuring in recent years. Until 1991, the MVM Trust—an integrated utility—had dominated the sector and controlled all aspects of its operation on behalf of the State. The Trust was arranged in eleven generating facilities, one transmission unit, six distribution entities, and four supporting service units, with centralized management control.

2.11 With an initial objective of reducing the government's role in the sector, in January 1992 the elements of MVMT were corporatized, which provided a legal and administrative framework for commercial governance. The Trust itself was transformed into a state-owned joint-stock company called MVM Rt, which became a holding entity (with 50 percent ownership) for eight generating units, one transmission facility, and six distribution companies. In the process of reorganization, sector assets were revalued for the first time since the early 1960s, and the service companies were separated from the group. Some 48 percent of the shares were in the hands of APV Rt (at that time called AP Rt), a state-owned company that was given the responsibility of directing the privatization process on behalf of the government, and about 2 percent were owned by municipalities. Through a management contract, MVM Rt was entrusted with almost all the ownership rights, with the exception of divestiture.

2.12 MVM Rt had a dominant role in the sector. It was responsible for generation, transmission, and dispatch planning; the contractual arrangements with the generation and distribution entities; the safety and reliability of the network; and the maintenance of the liquidity of the sector. As an owner, MVM Rt could exercise considerable influence through its presence on the companies' boards, although its direct operational control was diminishing.

2.13 In 1995, further changes in the sector reduced MVM Rt's control functions and made the ownership structure clearer and more amenable to privatization. An effort was begun to direct the proceeds from privatization of the distribution companies to the treasury funds and to allow MVM Rt to share the revenues from privatizing the generating companies with the government. Through share swaps between APV Rt and MVM Rt, the latter received almost full ownership of the nuclear generating plant (Paks) and in transmission/dispatch. While the ownership of the distribution companies was transferred to APV Rt, MVM Rt has retained its shares in the seven conventional generating companies.

Current Institutional Arrangements

Sector Policy

2.14 The country's long-term energy policy was approved by the Parliament in April 1993. The following strategic goals were included:

- Reduce one-sided energy import dependence.
- Restrict the State's role in the sector to the minimum justified level.
- Improve energy efficiency.
- Liberalize prices to allow the tariffs to reflect economic costs.
- Assert environmental priorities.
- Involve the public in energy investment decisions.
- Implement organizational and control formulas corresponding to the market economy, while controlling monopoly interests.
- Adopt least-cost solutions and flexible energy systems adaptable to demand, including the involvement of private capital in system-related investments.

(Two years later, the IEA, based on it's country analysis, has recommended virtually identical goals.)

2.15 The operational strategy called for the safe and reliable supply of power to consumers (at the UCPTE-required standard), while a realistic profit is to be assured for investors, over their justified costs, to encourage energy-efficient and environmentally friendly technologies and to increase the utilization of renewable energy sources.

Institutional Responsibilities

2.16 The *Parliament* establishes the acts and laws necessary to provide a broad policy basis, and in some cases, legislates specific details for the sector's operation. The *government* ensures the implementation of the energy policy as approved by Parliament, and issues decrees and directives regarding the implementation of the acts of the Parliament, with particular focus on high- standard and uninterrupted power supply. While the Parliament approves new generating plants over 600 MW and nuclear plants, the government approves new plants over 200 MW. The fuel usage for plants under 200 MW is approved by *the minister for industry and trade,* who is also responsible within

the government for overall matters related to the energy sector, particularly strategic planning, conservation, and additional legislation as necessary. Through ministerial instructions, among other things, the minister regulates minimum fuel reserves, establishes procedures (for example, for the operation of HEO), appoints the CEO of HEO, and developed and set the tariffs until 1997. The sector is regulated by the *Hungarian Energy Office (HEO).*

2.17 MVM Rt is in charge of nationwide grid operation and dispatch. It is also to ensure the "smooth" operation of the sector and the cooperation of the various companies. Expansion planning is largely centralized in MVM Rt, which is preparing load-forecast-based system development plan(s), observing the least-cost principle. This defines the strategy for system capacity expansion, as well as providing the basis for the specific plans submitted through the Ministry of Industry for governmental and Parliamentary approval. Holders of generation licenses can bid for the approval of a new generation plant. Only if fewer than three such bids are received can an open tender be requested. Other parties may also offer to build generating plants outside the "official" program; the evaluation and tendering process is to be applied to such projects. Only strategic investors with at least five years of experience in market economies can submit a bid. The detailed rules of the bidding, however, are still being revised and refined. The first bid is expected to be issued later in 1997 for the commissioning of new capacities in about 2002.

The Hungarian Energy Office (HEO)

2.18 The Hungarian Energy Office (established in March 1994 by the Gas Supply Act) is regulating the sector. The duties of HEO include the approval of contractual frameworks for the sector companies; consumer protection; issuance of operating licenses for generation, transmission, distribution and the construction and operation of new power stations; and the monitoring of compliance with the conditions of licenses and with the Electricity Act. While the act sets the principles for electricity tariffs, their development (such as structures and levels) became the responsibility of HEO in 1997. The tariffs are approved (on behalf of the government) by the ministers of industry and the finance. In addition, HEO determines the information required from sector entities (for example, for cost-of-service studies), arbitrates disputes between suppliers and consumers, and enforces the least-cost approach. HEO is accountable to the Parliament; until 1997 this accountability was carried out through the Ministry of Industry, and after that it is to be done through the Prime Minister's Office (this is not yet final). At least once a year, its director general reports to the Parliament. HEO is legally identical to any other government entity: its decisions, in accordance with the Hungarian legal system, can be challenged in the first instance at the ministerial level, and subsequently in the appropriate court.

2.19 The organizational structure of HEO (see annex 2-1) is commensurate with its objectives and tasks. The director general, appointed for an undefined period by the minister of industry, is the CEO. His possible dismissal would, as a political necessity, require an explanation to the Parliament. The officials (present strength, some forty-five)

are civil servants and the budget for running HEO was a "line item" in the budget of the Ministry of Industry. HEO's current revenues from fees are sufficient to meet it's expenses. Changes in the organization are subject to the government's approval.

2.20 In addition to the Secretariat and the finance and the legal divisions, HEO has two departments with seven divisions. Duties of the *Consumer Protection and Energy Policy Department* include, among other things, development of gas and electricity prices, cost-of-service studies, all supply matters affecting the consumers, follow-up of consumer complaints, and preparation of (legal) matters and regulations regarding energy saving. Duties of the *Energy Supply Department* include, among other things, licensing; monitoring compliance with the license provisions, conditions, and order of "cut-off" and supply restrictions; and dissemination of information to the public.

2.21 HEO is relatively young, still in the process of strengthening it's expertise and professional standing. In purely technical areas, it has already shown considerable independence. Regarding tariffs, it's role is restricted to evaluating requests and developing and updating tariffs based on the legislated (tariff) framework and making recommendations to the government. If the recommendation(s) are not accepted (as it was the case in late 1996), HEO's recourse is recording the "disagreement" in it's report to the Parliament.

Regulatory Framework

Legal Basis

2.22 While the Electricity Act (1994) was probably the most important single piece of legislation in transforming the sector, it would not have provided a sufficient legal basis by itself for reform and privatization. Since 1988–89, a large number of legal provisions, all necessary to the reform process, have been incorporated in different acts as the political climate permitted. Taken together, the numerous amendments and alterations to the Constitution, the Electricity Act, and the many sector-related provisions in a variety of acts and government decrees, provide the legal framework for operation, streamlining, and privatization of the sector. Based on these provisions, detailed regulations were developed in the *Operational Manual* and the *Business Manual* and are incorporated in the various licenses and contracts between sector entities. Annex 2-2 describes the acts and decrees that were particularly relevant to the transition. Their diverse subject areas and large numbers clearly indicate the complexity of developing the required legal framework.

Licenses

2.23 Pursuant to the Electricity Act, each generating, transmission, and distribution company must have an operating license that is not transferable. The licenses are issued by HEO. Licenses for the generating companies are valid for a definite period, depending on the technical conditions and expected useful life of their equipment and environmental requirements. A license can only be given to a financially viable entity

that is incorporated in the country. For transmission and distribution facilities, the licenses are open-ended, without time limits. Prior to 1995, licenses were focused on technical matters, including supply conditions and safety; in 1995 all the facilities were "relicensed." The additional matters covered included:

- Rights and obligations of the licensee, reflecting the operational profile
- Regulations covering asset management, including asset disposal
- The obligation to establish a quality control system
- The establishment of appropriate accounting systems in line with legal requirements
- Rules for the creation of financial reserves
- Regulations governing emergencies.

2.24 For *power generating* entities, the license, among other things, takes into account the kind of facility, its proposed fuel usage, and environmental impacts. Licensing depends on the resolution of issues raised during public hearings and on the opinion of governmental and other entities on matters affecting safety, health, and other general public concerns. (The safety-related technical inspection of all energy facilities, including those of the boilers, pressure vessels, and the like, is carried out by the Technical Safety Department within the Ministry of Industry. The final licensing decision takes into account their findings and recommendations.) The licensed technical parameters of the generating company can be changed only with the approval of HEO.

2.25 The license for the *transmission* company includes provisions for power purchase and sale, import and export activities, establishment of capacity reserves (including secondary reserves), and MVM Rt's obligations toward the generating and distribution units. In addition, its license obliges MVM Rt to undertake systemwide activities such as medium- and long-term demand forecasts, and development of plans and rules for (generating and transmission) capacity expansions, and the development and timely updating of the *Operational Manual* (approved by HEO), a collection of the rules, regulations, and understandings among the sector companies that cover their systemwide cooperation.

2.26 According to their licenses, the *distributors* have the obligation to supply electricity to customers within their franchise areas. The relationship between the distributors and their customers is governed by the *Business Manual*, approved by the government. The regulations, among other things, include the establishment of the individual customer's requirements for power, connections, supply parameters, cut-off, metering, billings, and general safety and security of supply. The distributor's license includes details of the above, as well as provisions for purchasing electricity from the transmission company or, if it is relevant, details for establishing its own power-generating facilities and the right to conduct import and export activities.

The Electricity Market: MVM Rt's Role

2.27 The central role in the market belongs to MVM Rt. It is responsible for transmission and dispatch, in addition to longer-term planning for generation. MVM is a single buyer and wholesaler in the sector (there is no open access to the grid); room for

competition is based on efficiency improvements. For the generators, this could alter the dispatch ranking based on economic merit, and their profitability, like that of the distribution companies, would improve with more efficient operation. According to their licenses, the power-generating entities are obliged to offer their capacity to the transmission company; they can sell directly to distributors only if the transmission company refused the capacity. While these arrangements characterize the sector, some exceptions can be made in the direct supply of customers by the generating companies (for example, at lower voltage than the grid), and export-import activities can take place under individual licensing arrangements. For reasons of supply security, however, such arrangements are limited to 15 percent of the throughput for MVM Rt, and 5 percent for the distribution companies. Nationwide dispatching is controlled by the MVM Rt. Dispatch Center.

2.28 The contracts to purchase power, among other things, specify capacity and energy requirements, the relevant charges, and appropriate revisions. (They have been revised to bring them in line with the reform developments, particularly the legislated tariff framework.) The purchase price from the generators reflects the cost of production of individual plants, and prices could thus vary considerably. The wholesale prices to all the distribution companies, however, are uniform.

2.29 The limited competition of the market may change in four to five years time, when the sector's performance, based on the current structure, is scheduled for review. As the country progresses to full integration in the European Union (EU), there is an incentive to introduce wider competition, probably starting at the wholesale level (common carrier approach, spot purchases, and the like), to comply with the nonrestrictive norms (that is, removing barriers to free competition) contemplated by the EU. Immediate change is not considered prudent. Because of the large differences in the efficiency-based cost structure of the generating companies, direct contracting between distribution and generating companies is perceived to result in price increases. In this case, prices tend to be set at a level close to what the less efficient generators would charge.

2.30 The presence of government in the sector as an owner, in addition to the strategic investors, and the limited room for competition create the potential danger of government favoritism toward its own enterprises through decisions regarding dispatch, dividend policy, and the like, at the expense of the privatized entities. So far, however, this has not been the case in Hungary. On the contrary, the last tariff adjustment (from January 1997), although it introduced a lower increase than recommended by HEO, assured the legislated 8 percent return to the investor-owned companies, while government-owned companies would receive a considerably lower return. To be able to introduce what it considered a sustainable retail tariff adjustment, the government has temporarily waived the right of it's own enterprises to the full return legislated.

Pricing and Tariffs

2.31 There are distinct retail tariffs for the different classes of customers (domestic and nondomestic) and for high-, medium-, and low-voltage supply. The tariff structure distinguishes between peak and off-peak supply periods, and there are separate charges for capacity-end energy. The retail tariffs are uniform countrywide. While quite sophisticated, the tariff structure has been distorted, and still does not depict the cost of supplying the various classes of customers. In addition, although the Hungarian power sector did not receive any subsidies from the government for well over a decade, considerable cross-subsidization existed within the sector. The more efficient generating plants and distribution companies were "carrying" the less efficient, and in this respect, the role of MVM Rt, and it's predecessor, was critical to the determination and administration of the resource transfers between the sector companies. With restructuring of the sector and privatization of the companies, both the need and the possibility for such intrasector subsidization will disappear.

2.32 Prior to corporatization, the transfer pricing of power within the sector was not based on true costs, and the decisions regarding their individual levels and directions often disregarded commercial considerations. Since 1992, when the sector entities were corporatized, annually revised supply and purchase contracts between the generating companies and MVM Rt and between the distribution companies and MVM Rt have replaced the previous system. While the contracts were a good starting point for corporate governance and commercial relationships, the essentially single (State) ownership in the sector meant that they were an MVM Rt–directed vehicle for resource transfers between sector entities.

2.33 After 1994, the tariff policies and regulations announced by the government—both for the period until 1997 and for the time that follows, at least until the end of the century—started to address these issues. They supported the privatization process by introducing three tariff adjustments to reach economic cost recovery levels by 1997; established the policy basis for price determination and the mechanism (including formulas) for the years from 1997 to 2000; and established the extent of profits that the tariffs should bring.

2.34 The new system distinguishes between tariffs and prices for generation, wholesale, and distribution. The generator's "selling price" is not uniform; individual pricing reflects costs of operation and the profit or return on capital. The wholesaler's selling price, in contrast, is uniform. It is based on costs (purchase price plus operational costs) plus profit. The distributor's selling price (retail tariff) is also uniform.

2.35 The formula to calculate the prices is really a "price cap" regulation, and in principle it includes three main components. The first includes the actual costs of the inputs (including fuel) and their functional relationship to each other and to the output. The second component provides for expected future cost changes brought about by inflation, technological changes, exchange rate variations, and the like. The third is determined by HEO and includes measures for efficiency improvements and cost increases caused by environmental regulations that exceed inflation. The measures to

improve efficiency could act as a "brake" in the calculations by allowing the government to directly mitigate tariff increases to some extent.

2.36 In 1997, HEO started to fully exercise its sectoral regulatory functions, including reviewing and preparing tariff revision requests based on the cost-of- service studies submitted by the companies. In this respect, HEO's responsibilities cover electricity, reticulated gas, and energy supplied to district heating companies. Consistent with the requirements of the Electricity Act, tariff levels and structures will be further adjusted to recover economic costs, including all operating costs, depreciation based on asset values at replacement costs, and other costs such as those for environmental, decommissioning, and financial purposes. In addition, the rates must cover a minimum 8 percent return on investment. If the return exceeds 12 percent, a portion of the surplus will be rebated to the consumers.

2.37 While the method used to determine the tariffs includes numerous uncertainties, it appears to provide sufficiently transparent rules for the sector companies, who will be able to gauge the extent and timing of changes in the most important cost component. The companies can apply to HEO for tariff revision (by law this can be done annually, but if warranted, more often; the present practice is quarterly revision to achieve full economic cost recovery, including the minimum legislated rate of return for all the sector entities) by submitting the cost-of-service studies based on published formulas. It is generally understood that revision of the formulas will take place when the conditions for joining the EU require it.

The Privatization Process

2.38 After years of experience with the transformation of the Hungarian power sector, it is clear that earlier expectations of a stable, "blueprint" reform program were not realized. The privatization process is complicated in itself, even in a market economy, because of the numerous administrative, financial, and political problems involved. When sector reform is an integral part of overall economic and political transformation, as in Hungary, and when sector-related problems intertwine with the strategies of the society as a whole, the potential for conflict, side-tracking, stagnation, and general protraction of the process is greatly increased. In resolving such problems, practical politics is usually the dominant factor, and sector issues are often addressed with unrelated matters or as part of political compromises. For all these reasons, no critical path based on professional or technical considerations or technically logical sequence of steps could be clearly observed in the process. Instead of a less meaningful chronological overview, therefore, the privatization process is described through its characteristics. This may make it easier to identify factors that could be useful to future operations and applicable to other sectors and other countries in their efforts to facilitate reforms.

Objectives and Ownership

2.39 The privatization of the power sector included the following basic objectives:

- To modernize the sector facilities, as well as to provide for the needed future expansions, connection with the UCPTE, and the introduction of modern management with a technical and commercial outlook.
- To secure the capital that would be needed for the modernization.
- To assist in reducing the country's external debt and reestablishing the internal and external equilibrium.

2.40 The tenders for privatization were published in October 1995. At the end of 1996, 46–49 percent of each of the six distribution companies and over 50 percent of three power-generating companies, representing 55 percent of total generating capacity, had been privatized (annex 2-2 shows details of the private ownership arrangements). While the prices received were not published, it is widely believed that the receipts were up to expectations, and in the region of $1.3 billion. The government's intention is to complete privatization by the end of 1998, with strategic investors in control of all the generating and distribution companies, while employees, municipalities, and the public, including institutional investors such as the Social Security Fund, will have minority ownership. Although additional shares in MVM Rt may well be sold to financial investors as well (between 15 and 40 percent is contemplated), the strategic role of MVM Rt will require the government to retain a controlling interest. Paks, the nuclear generator, will also be controlled by the government through MVM Rt. The rules for cross-ownership are still evolving. The intention is to maintain MVM Rt's independence, and thus to avoid cross-ownership with the generating and the distribution companies. The investors also agreed not to sell their interests for five years without government concurrence. (While this condition is expected to hold for the remaining privatization as well, there is already an exception. EDF received government concurrence to sell 50 percent of it's holding in EDASZ Rt to Bayernwerk AG). The Office for (fair) Competition (OC) and HEO will monitor plans for mergers, takeovers, and the like, and OC permission is necessary for activities such as mergers if the net revenue of the companies involved is above a legislated level, which would signify undue economic dominance. Also, licensing procedures could prevent ownership arrangements that would be disadvantageous to the public, and the government could achieve the same end by using its "golden shares" to veto undesirable developments. Concurrence of the owner of the golden shares is necessary to implement changes in the capital structure of the companies, to issue new classes of shares; to change the activity profile, to carry out business amalgamations or dissolution; to alter dividend and expansion policy, and so forth.

Political Mandate and Stability

2.41 In Hungary, even under the socialist regime, the private sector never disappeared completely. The malfunctioning economic system forced Hungarians to turn to private sector operations from time to time. Outstanding examples were initiatives in the mid-1950s in agriculture and initiatives to cover broader areas in the late 1960s. Internal and external political conflicts and overall incompatibility with central planning defeated

these initiatives. As the "bankruptcy" of economic activities based on state ownership became increasingly evident (modest but official), privatization has started in the mid-1980s, even before the collapse of the socialist system. By 1990, apart from some insignificant groups, all the political parties were in accord with one another and with the professional community regarding the need to privatize.

2.42 By the late 1980s, the need for political change was accepted by the entire society. Although the changes were drastic, widely based popular discussions preceded them. They took place in a civilized manner, generally within the framework of accepted democratic norms. The first democratically elected government was in office for its full term—four years—and the same is expected for the present government. The two governments were completely different politically, but they fully agreed on the principal objectives of privatization, which was an important part of both their programs. Regarding the power sector, the basic disagreements between the parties involved the models to be employed, the extent of private ownership in MVM Rt and Paks, and the involvement of strategic or financial investors.

2.43 For the decisionmaking process, political will was fundamental. But these decisions included operational and implementation-related matters as well, areas in which personal and short-run political interests were often dominant. Disagreements and time-consuming efforts to reach consensus amid these impediments created a protracted reform process. These or similar problems still exist, but this is normal in a democracy—the phenomena is certainly not unknown to developed countries. Nevertheless, in privatizing the power sector, Hungary laid the groundwork and proceeded to institute changes relatively quickly. The time needed compares favorably with the timetables of many countries with long-established market economies, not to mention the ex-socialist countries and their systems in transition.

2.44 While the economic picture was not too favorable, the situation was stable enough and sufficiently predictable to attract prospective investors. The country was offering rapidly modernizing communication systems and other elements necessary for modern commercial operations. Hungary also has a large, well- educated labor force, a well-trained entrepreneurial class, and professional managers who can interface readily with "Western" business. Largely for these reasons, in the first half of the 1990s Hungary has received more direct foreign capital investment than the other Eastern European ex-socialist countries combined.

The Required Prerequisites

2.45 Establishment of the legal framework—including basic legislation such as amending the Constitution and laws, including the Company Act, taxation legislation, and bankruptcy provisions, in addition to sector-specific laws—was necessary to permit reform of the sector, its appropriate operation within a market economy, and to make privatization possible. Implementation of the new laws required detailed government and ministerial directives. By about 1995, the legal framework was sufficiently developed to start privatization.

2.46 HEO was established in 1994 to regulate the sector; corporatization of the sector entities was completed even earlier, in 1992, establishing separate companies for generation, transmission (and dispatch), and distribution.

2.47 Hungary began adjusting its energy prices toward cost recovery levels well before it was forced to pay world market prices for imported energy. In 1990, Parliament approved an act for price administration: energy prices were to be determined partially by the minister of industry and partially (for district heating) by the municipalities. To support the economic transition, Parliament kept modifying the act, and in 1993 the only prices remaining under government control were those for electricity, natural gas, and district heat. The electricity tariffs (levels and structures) were adjusted several times to improve cost recoveries and to eliminate distortions among different classes of customers. With the published pricing policy and mechanism for future adjustments, the area was made sufficiently transparent and predictable to offer acceptable risk factors to the strategic investors.

The Role of Advisers, Investors, and the Bank

2.48 The Hungarians were well-informed about the sector models used in other countries and the prerequisites to establish them. From 1990 onward, the Hungarian administration worked on developing a model appropriate for local conditions. The Ministry of Industry and Trade and the MVM Rt, in particular, intensified the dialogue with other countries, energy authorities, and power entities. They also started to work with highly skilled foreign advisers of international reputation who were specialists in regulatory and legal matters and in power sector operation. They were from the United States, France, and the United Kingdom, and together offered experience with different systems and models, as well as experience in "EC matters." The resources were provided by the relevant governments as well as by the Bank.

2.49 A local interdisciplinary team with professionals from various ministries, authorities, and sector companies was also organized. This team, together with the foreign advisers, developed proposals for sector organization, legislation, pricing, corporatization, regulatory framework, and for the sector model that was eventually adopted. Also, the local team attended to the necessary (political) networking that was essential to the process. The role of the energy adviser to the Prime Minister (PM), the director of the Energy Department in the Ministry of Industry, and the director for development of MVM Rt were all important in providing administrative and political support, as well as professional direction, for the teams.

2.50 The actual process of privatization (the "selling phase") was essentially developed by APV Rt, together with foreign financial advisers. For a successful privatization, it was necessary to gain the confidence of the interested foreign investors. To ensure success, internationally known and respected firms—such as Rotschild, Schroeders, and others—were retained as financial advisers to assist in this phase of the work, including the preparation of the informational materials and the tendering process. They actively participated in discussions with prospective investors to ensure that the

tender documents included realistic provisions for their expectations as well. These advisers were given a financial interest in the privatization process through a relatively modest retainer and a substantial success fee or price-related commission. They focused on achieving prices that reflected the true business value of the privatized enterprises.

2.51 The nature and importance of the sector to the economy made the investors' expertise an essential element for continued and efficient operation of the privatized facilities. For this reason, the participation of strategic investors was extremely important, both in the process and in the final outcome. The necessary conditions had to be present, of course, to assure the investors that they would be able to operate the facilities without undue interference.

2.52 The Bank's involvement was characterized by a low profile but very intensive assistance. A number of successful investment operations beginning in 1983 had made the Bank well-known in the sector. In about 1989, one important operation was ongoing and a second was in preparation. This second project provided an opportunity for dialogue on matters related to reform and institutional changes. Assistance (consultancy) was provided with project funds, trust fund support, and the opportunity to work with the above-mentioned advisers. With mutual professional respect and confidence established, the Hungarians often consulted the Bank team on a wide range of matters, including asset revaluation, cost control, financial policies, investment strategy, experience of other countries with different models for the sector, and the like. The Bank could not provide professional advice in all these areas, but it could recommend outstanding specialists and arrange their assistance. Assistance ranged from involvement of Bank staff with worldwide experience in privatization, to the participation of an official in charge of tariffs and economic evaluation for one of the largest European power utilities. The reputation of the advisers was often used to facilitate local decisionmaking. By the time the privatization tenders were issued, there was little, if any, demand for this kind of assistance. The reform process was considered irreversible, and with private owners entering the sector, the Bank's role was necessarily changing.

Other Characteristics

2.53 With privatization, the relationship of sector entities that had previously belonged to one owner has changed considerably; independent enterprises with different owners started to dominate the sector. This drastically altered the role of MVM Rt. It's functions of redistributing resources for new investments and expansion and maintaining the liquidity of individual entities disappeared. Because MVM Rt will remain government-owned, however, the new owners, both in generation and distribution, will try to have it carry possible financial burden(s) if tariff increases are lower than requested. This "financial squeeze" on MVM Rt could become critical if it restricted the company's ability to provide appropriate services to the sector. Nevertheless, the contractual relationship between the sector companies is becoming more transparent, reflecting cost and business considerations that, although sometimes in conflict, will lead to healthy adjustments based on compromises that are worked out publicly.

Lessons To Be Learned

2.54 During the last five to six years, a number of major factors characterized the transition process and facilitated its implementation in Hungary. Some of these elements are specific to the sector and country, but they may be useful as general background for other operations:

a) The political will to privatize—combined with a strong political mandate to institutionalize and implement the necessary prerequisites and to carry through the process—is needed.

b) The close involvement of international advisers has been useful:

- For assistance in selecting the sector model suitable for local conditions and in developing the legal, institutional, and regulatory framework
- To establish a relationship with the international financial community and the strategic investors. These advisers were internationally known and respected, were involved in the actual privatization process, and their remuneration included a success fee.

c) The purchase prices reflected the business value of the entities, including long-term business potential, the technical knowledge of the staff, and the organizational standards.

d) Transparency was introduced into the tendering and evaluation process, and the provisions reflected the interest of both the State and the investors.

e) The transfer mechanism ensured uninterrupted operation of the sector. Regardless of the severe winter, the economic and political problems, and some disagreements between the new and the old owners, electricity supply remained trouble-free during the transition.

f) The process involved the overall society through public discussions of matters that directly affected the citizens. This process will continue in the future, and will include issues related to expansion, operation, and environmental matters. The new owners were sensitized to these matters to mitigate the possibilities for future confrontations.

g) The critical time of privatization was close to the joining of the Hungarian system with UCPTE. For this reason, investors had detailed and reliable information about the system, including its operational standard, its prospects, and its hidden reserves.

h) Major factors that involved the Bank included the following:

- It had to be recognized that apart from having the needed prerequisites in place (corporatization, legal framework, and the like), there was no blueprint for the process. The reform was a "stop go, stop go process," with lots of side-tracks and delays, often for apparently irrelevant reasons. The Bank was required to demonstrate considerable flexibility and patience, as well as an

understanding of local culture and politics. While the ultimate aim was clear and accepted by the client, the timing and the nature of the various actions represented a multitude of (potential) conflicts.

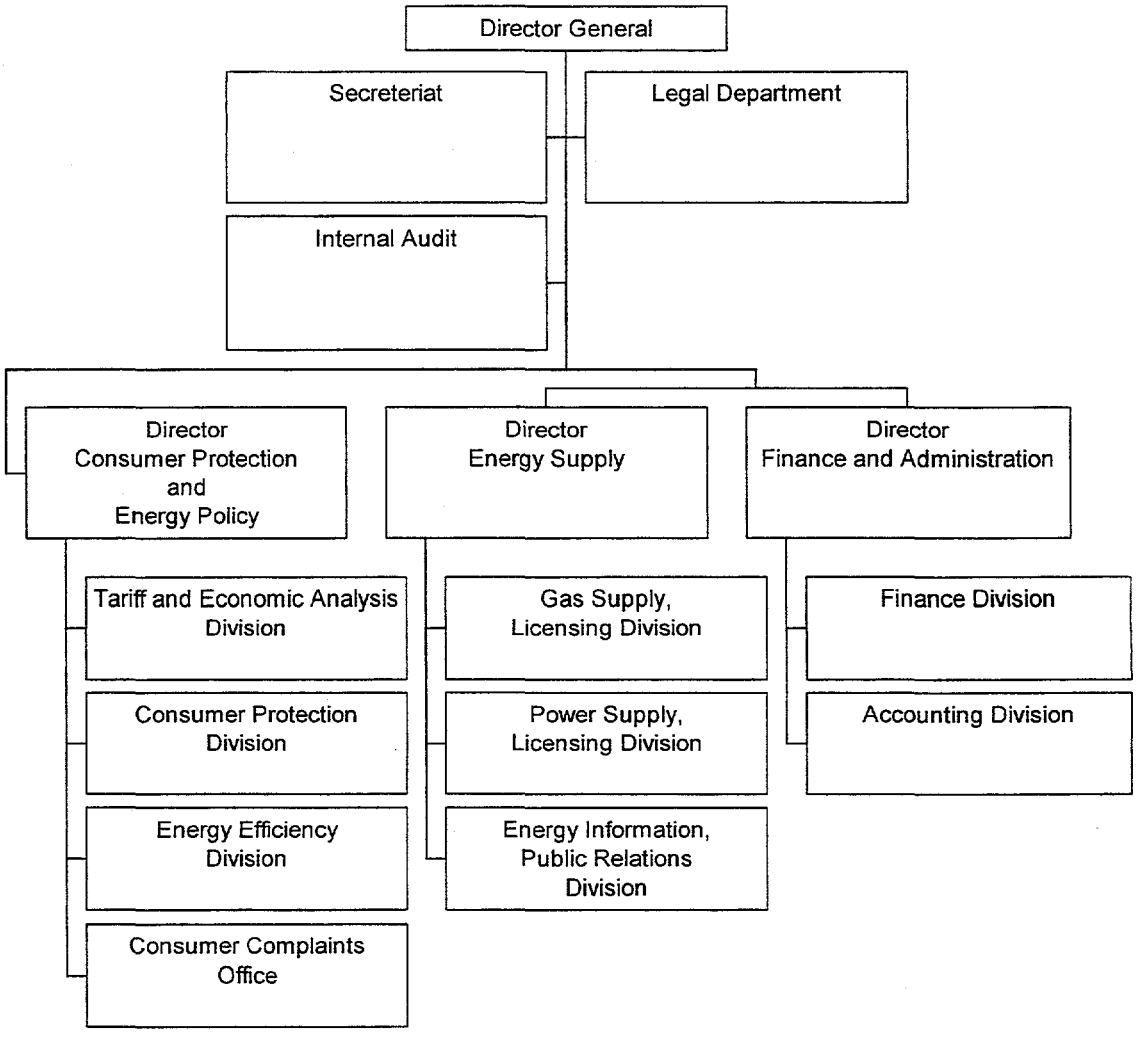
- Areas of the ever-changing action programs (even if they were not on the critical path) on which the Bank and the client could readily agree had to be identified continuously during the process. Giving priority to these areas led to useful progress, as well as bringing the parties closer together. This was invaluable when conflicts arose.
- On the client's side, partners who were committed to the reform process had to be sought. They may have been in disagreement among themselves and with the Bank regarding how, when, and what should be done, but that was considered merely a basis for developing the reforms. The ideal partners were professionally competent and sufficiently influential to arrange the acceleration of reform. The Bank team put a lot of effort into finding the right partners within the MVM Rt organization (where there initially was strong corporate resistance to change) and in ministries such as Finance and Environment, and in maintaining good relationships with them. The main direct support came from the Ministry of Industry and Trade, MVM Rt, and the National Bank. Their contributions were exceptionally outstanding in providing intellectual, technical, administrative, and political support;
- Continuity in the assignment of Bank staff was maintained. For over five years the same core team worked with the client, and this helped to develop and maintain mutual trust, which facilitated the work. An additional positive aspect was that officials in MVM Rt, the National Bank, and the Ministry of Industry who have had key roles in the reform have remained in their (influential) positions during the process.
- Great effort was made to avoid identification of the reform process with any of the political parties. It was emphasized continuously that reform is an economic necessity, and care was exercised not to let any political party appropriate the concept.
- Regardless of the extent of Bank involvement, the reform process was always identified as what it was—the client's property, a Hungarian product.
- It had to be recognized that once privatization had started, new and numerous owners would appear on the scene. They had to be assured that the previous owner's (MVM Rt) obligations to the Bank from the privatization would be reformulated as appropriate, but without hindering the process or adversely affecting the interests of the new owners.

2.55 The reform of the sector is an on-going process. While including some "completed" phases, it must continue to respond to (changing) economic conditions and evolving market and efficiency requirements. The various actions or " completed phases" are all long-term measures, and their effectiveness cannot be judged on the basis of the

relatively short-term operational experience of Hungary. Similarly, it would be highly speculative to prescribe a "correct" action program for the direction and the timing of continuing reforms. Nevertheless, there are some issues and problem areas that the Hungarians will almost certainly address—a process that has already begun—in the short run. These include:

- Completion of privatization
- Phasing-out of the old, coal-fired power generating units (and closing down the supporting, uneconomic mines) and replacing the phased-out generating capacity
- Further tariff level and structure adjustments to ensure appropriate cost recoveries and to introduce built-in incentives (and disincentives) to encourage economical power usage
- Review of the operational arrangements for the wholesale market (and MVM Rt) to possibly broaden competition
- Initiating programs for energy management, savings, and efficiencies.

Annex 2-1. The Hungarian Energy Office: Organizational Chart



Note: There is an Energy Representation Council with a consultative function to the director general; it has fifteen members, three from HEO, three delegated by the gas and three by the power suppliers/distributors, and six members represent various users, NGOs, municipalities, and others. When established, over thirty organizations were invited to elect representatives to the Council, which meets every three months. The logistical support—meeting place, clerical support, and the like—is provided by HEO.

Annex 2-2. The Power Sector in Hungary: The Reform Process, Privatization

List of Relevant Acts, Government Decrees, and Resolutions

1988 _*Company Act* dealt with the establishment, operation, obligation, and liabilities of corporate entities.

1988 ***Foreign Investment Act*** clarified (permissible) investments, the protection of such investments, and profit repatriation.

1990 ***Pricing Act*** established, among other things, tariff structures and levels and the rules/conditions for their application. Subsequently several modifications were introduced.

1990 ***Act about "Unfair" Competition*** dealt with matters ensuring fair competition i the market and with consumer protection. It focuses particularly on "nonmisleading" advertising, handling of confidential information, agreements among suppliers that place the consumer at a disadvantage, and restriction of business amalgamations and agreements that may lead to a monopoly in supply or an unduly dominating economic role. It established the Office for (fair) Competition (accountable to the Parliament) to implement and monitor compliance with the act. The act was revised in January 1997.

1991 ***Act about Concessions*** regulated the operations of (e.g. mining) concessions, contracting for the same, and the method of tendering/evaluation and application for concessions.

1993 ***Act about the Producer (providers) Responsibility for their Product (services)*** for consumer protection, established the clear responsibility of the producer (provider) for the quality of their product or service and the legal responsibility for damages caused by an inferior product. Provisions of the Electricity Act in 1994 reinforced the suppliers' responsibilities for the product (electricity) provided.

1993 ***The Mining Act*** regulated the exploration and exploitation rights of mineral resources. It declared, among other things, the (state) ownership of the underground mineral resources and the state monopoly for reticulated transmission and for the underground storage of hydrocarbons. It also established private exploration and exploitation systems based on the royalty system.

1994 ***Gas (supply) Act*** is basically the same in nature as the following Electricity Act. Its additional significance was that it established HEO.

1994 ***Act about Electricity Production, Transmission, and Distribution*** defined the relevant tasks of the Parliament, the government, the Ministry of Industry, other ministries and HEO. Established the requirements for licensing for consumer protection, and defined the sector entities, their roles, rights, and obligations. Regulated the relationship between the distributors and the users, established the modus operandi and the philosophy for the price determination and security requirements. Although it currently has relatively low economic value, renewable energy is strongly favored by the legislation. (Because of increasing environmental awareness, even before the Environmental Act was passed by the Parliament, the 1994 Electricity Act introduced strict, unambiguous, overall environmental requirements for the sector. Accordingly, environmental impact assessments have to be prepared for each new facility. They must set forth the direct impact of the investment and its operational aspects, and cover matters related to the decommissioning of the facility. The costs—and the sources of the needed finances—for the recommended environmental actions must be identified. In addition, no generating plant can be considered for construction without public hearings. The most sensitive points of discussion in these hearings are now related to the environment. Without an acceptable environmental action program based on impact assessment, and satisfactory solutions to points raised at the public hearings, no license can be given for constructing and operating a power facility. Requirements related to the nuclear facilities are even stricter. For these facilities, Parliament retained the evaluation and final decisionmaking power after extensive consultation with the society.)

1995 ***Act about Divesting (Privatizing) State-Owned Corporations (engaged in economic activities)*** defined the basic rules of the process and the decisionmaking roles. It also defined areas and activities that are not to be privatized.

1995 ***Act to Protect the Environment*** defined the "areas" to be protected, the "endangering factors," the roles of the various authorities, methods of monitoring, enforcement mechanisms, and fines.

In addition, the following more important *government decrees* were issued:

1994 Government's responsibility for power supply to be assured (indirectly, through licensing, for example)

1995 Implementation instructions covering the portions of the Electricity Act that pertain to the government

1995 Modus operandi and regulations for power disruption and rationing

1995 Procedure for developing and commissioning power-generating plants.

Government Resolutions and Instructions by the Minister of Industry (1994/95):

HEO structure and operational procedures

Various energy price resolutions

Cooperation with organizations representing consumers

Regulations regarding minimal fuel stock levels for power generators

Regulations regarding electricity import/export.

Annex 2-3. The Power Sector in Hungary: The Private Investor

Company	Private investor	Percentage of ownership
	Distribution Companies	
Dedasz Rt	Bayenwerk AG	47.3
Edasz Rt	EDF International	47.6
Titasz Rt	Isar-Amperwerke	49.2
Demasz Rt	EDF International	48.0
Emasz Rt	RWE Energie AG/ EVS AG	48.8
Elmu Rt	RWE Energia AG/ EVS AG	46.2
	Generating Companies	
Matrai Eromu Rt (800 MW inst.cap.)	RWE Energia AG/ EVS AG	> 50
Dunamenti Eromu Rt (1965 MW inst.cap.)	Powerlin S.A.	> 50
Tiszai Eromu Rt (1140 MW inst.cap.)	AES Co.	> 90

Note: Figures as of the end of 1996.

3

Case II: Poland

Background and Sector Structure

Technical Description of the Power Sector

3.1 The Polish electric power system has an installed generation capacity of about 33,000 MW: 28,000 MW in thermal power plants, 2,000 MW in hydropower stations, and 3,000 MW in industrial auto-producer plants. The installed capacity in thermal power plants comprises about 8,700 MW adjacent to five large lignite mines; about 5,400 MW in 110 combined heat and power plants (CHP), which meet 60 percent of district heat demand; and 13,900 MW in hard-coal-fired plants. Total generation in 1995 was about 130 TWh—about 40 percent of that total was produced using lignite, 53 percent using coal, and 7 percent using hydroelectric resources.

3.2 Indigenous hard coal and lignite have been the basic fuels for power generation, and lignite is the cheapest available fuel. A combination of factors—environmental considerations, decline in the production of hard-coal mines, and constraints in expanding the production of existing lignite mines—will hold lignite usage at its current level, and the needs of expanded generating capacity will be met by hard coal and natural gas (peaking plants and CHP).

3.3 A national transmission grid at 400 kV, 220 kV, and 110 kV interconnects the country. The Polish power system has major international interconnections (a 750-kV line with Ukraine, transfer capacity of 1,300 MVA; 440-kV and 220-kV lines with Czech Republic, 1,000 MVA; and 400-kV and 220-kV lines with Germany, 2,000 MVA). It was part of the former Integrated Power System (IPS) that included the FSU and other countries of Central and Eastern Europe. Imports from the FSU peaked in 1989 (at about 5 percent of total demand), but declined sharply after its collapse. In 1992, Poland, Hungary, the Czech Republic, and the Slovak Republic formed CENTREL, a regional power pool, which disconnected from the IPS pool in 1993 (except for a small part of the Ukranian power system, with a capacity of 1,000 MW, and the power system of the former German Democratic Republic). In October 1995, after adapting their generation and transmission systems to European standards, the CENTREL network began synchronous operation with UCPTE.

3.4 Electricity sales increased at 2.2 percent p.a. during 1980–88, and peaked in 1988. Afterward, with recession and changes in the structure of the economy, sales declined by about 12 percent and bottomed out in 1992. From 1992 to 1995, sales increased slightly, at 1.6 percent p.a. Demand is now projected to grow in the medium

term at about 2.5 percent p.a. In 1995 there was an ample reserve margin of about 25 percent in the installed capacity to meet a peak demand of 24,200 MW.

3.5 In spite of surplus capacity and a low expected growth in demand, substantial investment is needed in generation to deal with four major challenges. First, about 50 percent of thermal generating plants are, on average, thirty years old and should be refurbished. Second, about 3,000 MW of old thermal plants are candidates for retirement before the year 2000. Third, in 1994 Poland signed the Second Sulfur Protocol of the Geneva Convention,[2] which requires graduated reductions in sulfur emissions until the year 2010. Poland would have to make a substantial investment in pollution control equipment to meet the new regulations. Last, investments in conversion and rehabilitation of CHP plants are required.

Current Structure of the Power Sector

3.6 The Polish power sector has been restructured several times during the past ten years to decentralize and demonopolize sector activities. Prior to 1987, the power sector consisted of five regional state-owned enterprises (SOEs) that were vertically integrated. From 1987 to 1990, the power and lignite sectors were consolidated under the Power and Brown Coal Board (WEWB), a state-owned conglomerate of 108 businesses, including 28 generating enterprises; 33 distribution companies; regional and national dispatch centers; 4 lignite mines; and several manufacturing, construction, and maintenance companies. Although sector activities were fragmented and apparently decentralized, the power industry behaved as a national state monopoly under the direct control of the Ministry of Industry and Trade (MIT).

3.7 In 1989, when Poland initiated radical economic reforms to substitute a market economy for central planning, it needed to adopt a new institutional and regulatory framework for the power sector to promote competition, introduce efficiency incentives, and encourage the participation of private capital. With the assistance of ESMAP, it initiated the preparation of an Energy Sector Restructuring Program. Based on initial recommendations of the study on market structure, in 1990 WEWB was liquidated and the Polish Power Grid Company (PSE) was created as an independent joint-stock company. It is 100 percent state-owned and responsible for managing the national transmission grid. The generation and distribution enterprises became autonomous and responsible only to MIT.

3.8 In June 1991, the Council of Ministers issued a letter of sector development policy that defined the main elements of a reform program for the energy sector. The strategy for power sector reform contemplated *restructuring* the sector by regrouping generation and distribution companies in about half the number of companies then in operation, the establishment of a new *regulatory framework*, initiating *commercialization*

[2] The Parliament in Poland has not yet ratified this protocol.

of the sector by converting SOEs into joint-stock companies, and beginning a *gradual privatization* of the power sector.

3.9 In 1993, the Parliament enacted a law that allowed the transformation of SOEs into joint-stock companies and the transfer of transmission assets from the distribution companies to PSE. Based on this law, the government advanced the commercialization of the sector and transformed thirty-four of thirty-seven generators (including nineteen CHP plants) and the thirty-three distribution companies into joint-stock companies. PSE was consolidated as a company responsible for generation and transmission planning, development of the national transmission grid, control and dispatch of the interconnected system, and the operation of the wholesale market. It also became a majority shareholder in pumped-storage hydroelectric plants, with an installed capacity of 1,600 MW.

Guidelines for Future Restructuring

3.10 No further changes in the market or ownership structure have been made since 1993 to implement the 1991 government policy for sector development. In 1995 and 1996, while a new draft energy law was under the consideration of the Parliament, the Council of Ministers issued two documents[3] that set forth the government energy policy and plans to complete implementation of power sector reform. These documents do not mandate a specific restructuring and privatization program, but instead establish general principles and criteria.

3.11 For market restructuring, the main guidelines are the following:

- There would be four basic activities in the provision of electricity service, subject to license: generation, transmission, distribution, and trade. Trade refers to the purchase of energy in the wholesale power market to supply retail customers. Distribution companies would thus have to separate the "wires" business from commercial activities.
- Once the corporatization of the generating companies is completed, mergers of generation and distribution companies to create larger companies will be determined by the initiatives of individual enterprises reacting to market conditions and will be subject to regulatory constraints. The nine largest generating plants, each with an installed capacity above 1,000 MW, can merge only with smaller plants. The distribution companies can merge as they wish, subject to general constraints on market power.
- PSE will be responsible for expansion planning, development of the national transmission grid, the safety and reliability of the interconnected system, economic dispatch, and coordination of the wholesale energy market. During a transition period, PSE will also be responsible for single-buyer functions. PSE would sell its controlling interest in pumped-storage plants at some future date.

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[3]"Energy Policy Guidelines for Poland until 2010," October 1995 and "Demonopolizattion and Privatization of the Electric Power Sector," September, 1996.

3.12 On privatization, the main principles are:

- As a general policy, restructuring the power market, establishing a new regulatory and legal framework, and implementing cost-reflective tariffs should precede privatization.
- Revenues from sales of shares or assets to strategic investors should be used to help finance the investment program required to refurbish power plants and meet new environmental standards.
- The privatization of CHP generation plants and distribution companies would have priority. Privatization of other thermal generation enterprises can be considered as a pilot project before the implementation of the new regulatory framework.
- PSE and the coal and lignite mines are considered strategic businesses and should remain under the full control of the State.
- Privatization through the issuance of new shares in SOEs to strategic investors would be the preferred model. Employees of power utilities would be able to acquire shares under preferential conditions.

3.13 In 1997, a few selected generation and distribution companies initiated preprivatization studies, with the assistance of international consultants, to study and recommend a privatization strategy.

Proposed Institutional Arrangements

3.14 The Polish power sector has undergone a process of decentralization, demonopolization, and corporatization. The government recently started a process of separating policymaking, regulatory, and ownership functions. In early 1997, the central government was reorganized with the creation of a new Ministry of Economy, which merges policymaking functions that were previously carried out by the Ministry of Industry and Trade, the Central Planning Office, and the Ministry of Central Planning and Construction, and the creation of a Ministry of Treasury, which is responsible for representing ownership rights in SOEs and implementing a privatization policy. The new draft Energy Law, approved by Parliament in April 1997, establishes an independent regulatory agency and new institutional arrangements for sector planning and regulation, as explained below.

Sector Policy

3.15 The Ministry of Economy will be responsible for the formulation and coordination of energy policy. This function primarily entails the preparation of energy policy guidelines to be issued by the Council of Ministers, definition of conditions and criteria for planning the development of fuel and energy supply, evaluation of national energy security, definition of a policy on energy imports and exports, promotion of energy conservation and development of nonconventional sources of energy, and definition of guidelines for the privatization of sector enterprises.

Planning

3.16 The government will adapt the planning function to the new conditions created by the gradual introduction of a competitive market in power generation. The power development programs that were previously formulated and adopted under a centrally planned economy are being replaced by policy guidelines that establish directives on the security of energy supply, investment policy, development of nonconventional energy projects, energy efficiency, general principles for energy pricing, and environmental protection standards. In principle, once a competitive market has been established, the enterprises responsible for electricity supply, whether private or state-owned, will make investment decisions in response to market forces, taking into account these guidelines.

3.17 In practice, during a transition period (two to three years), PSE will continue to perform single-buyer functions in the wholesale market and will be responsible for preparing detailed generation and transmission expansion plans to determine the least-cost solutions to meet expected demand. Based on the expansion plans, PSE will contract long-term PPAs with generators to facilitate the development of power projects (including rehabilitation and investment to meet environmental regulations) in the plan. By and large, this would still be a normative planning scheme.

3.18 After the transition period, the single-buyer function would be eliminated, and the distribution companies would arrange energy purchases directly with generators to meet expected demand. PSE would continue to prepare expansion plans for information to the industry (indicative planning) and to support decisions for investment in the transmission grid.

Regulation

3.19 The Energy Law creates an Energy Regulatory Authority (ERA), which is responsible for the regulation of the electricity, gas, and district heat sectors. ERA would be a government agency and would report directly to the Prime Minister (PM). It would perform the following main functions:

- Issue, amend, and revoke licenses for the provision of services.
- Approve and control tariffs for network services.
- Control quality standards for customer service.
- Determine the conditions for third-party access to grids when the parties do not reach an agreement.
- Agree with transmission and distribution companies on development plans.
- Impose fines.
- Cooperate with antitrust authorities to control abuses of monopoly power.

3.20 The regulatory functions of ERA will be limited to supervising compliance with regulations and resolving disputes. The central government would retain substantial power in regulatory matters. For example, the Energy Law stipulates that the Ministry of Economy will determine: (1) the criteria and methodology to formulate and calculate

electricity tariffs, (2) a licensing policy, and (3) specific terms for connecting users to the grid, covering connection costs, provision of transmission services, electricity trading, and grid operation.

3.21 ERA will be managed by a president appointed by the PM for a five-year term. The president can only be removed by the PM on grounds of incapacity or misbehavior. A vice-president will be appointed and removed by the PM upon the motion of the president of ERA. There will be an Advisory Council to the president of ERA, to be composed of seven members appointed by the PM for five-year terms and selected from among candidates proposed by energy professional organizations and consumer protection groups.

3.22 The regulator (president of ERA) would make decisions after listening to the opinions and positions voiced by the Advisory Council, and all ERA decisions would be published in a bulletin. ERA decisions can be appealed to the Antimonopoly and Energy Court in Warsaw in accordance with the Code of Civil Procedure.

3.23 ERA would be funded by annual fees payable by all licensees. The Energy Law excludes ERA employees from the norms for the remuneration of civil servants and directs the PM to specify the principles for determining their remuneration, taking into account industry practices.

Proposed Regulatory Framework

Relevant Legislation

3.24 The primary legislation that establishes the new legal and regulatory framework for the electricity sector is the Energy Law, which was passed by Parliament in April 1997 and was promulgated the following May. This law establishes general regulatory principles regarding third-party access to transmission and distribution networks, sector licensing activities, and prices. The bill authorizes the Ministry of Economy to define most of the rules and criteria for sector regulation through ordinances (including basic principles for the operation of a competitive wholesale market, principles and methodologies for calculating regulated tariffs, and terms and conditions for access to transmission grids).

3.25 The ordinances to be issued by the Ministry of Economy would constitute a substantial part of the secondary legislation. The document on "Demonopolization and Privatization of the Electric Power Sector," adopted by the Council of Ministers in September 1996, exposes the official vision of the new regulatory framework. Draft ordinances have already been prepared but are still subject to discussion by the Ministry of Economy. The following description of the proposed regulations is based on this document.

Regulatory Controls

3.26 The main regulatory instruments that govern the terms, rights, and obligations for the provision of electricity services are the licenses for the generation, transmission, distribution, and trade of electricity to be issued by ERA. The Energy Law defines general criteria and procedures for granting licenses, which would be issued for fixed periods from ten years to a maximum of fifty years, but the contractual term could be extended. ERA can amend the terms of a license *ex-officio* or upon the request of a power utility. It may also revoke a license for reasons of national security, for violation of the terms of the license, and under other special conditions.

3.27 There are general rules that constrain vertical or horizontal integration. The general policy is that horizontal integration would be controlled by antitrust authorities, based on the consideration of market power and abuses of dominant position. There would be initial constraints on the restructuring of existing generators. In vertical integration, the general policy is that generators, distributors, and traders could not be shareholders in the transmission company, PSE. Otherwise, distribution companies could develop generation projects alone or in joint-ventures with other distribution companies. Licensees, however, should keep separate accounts for individual activities.

3.28 In the future, expansion planning, investment decisions, and system reliability would be based on the decentralized and autonomous decisions of market members. The Energy Law, however, establishes special controls to ensure reliability of service. Generators have the obligation to maintain sufficient fuel reserves to guarantee supply; distribution companies are obliged to supply consumers in a continuous and reliable manner and to periodically prepare and reach an agreement with ERA on investment programs—including purchase of power and demand-side actions—to meet projected electricity demand.

Wholesale Power Market

3.29 A wholesale power market is being developed in stages to manage the transition from administered arrangements for wholesale energy transactions—first to competition for the market under a single-buyer scheme, and finally to a competitive spot market. In the first stage, which began in early 1995, PSE, acting as single buyer, introduced rudimentary market principles. In the second stage, a transition period after the promulgation of the Energy Law, PSE will continue as a single buyer but will gradually withdraw as it introduces elements of a spot market. In the third stage, distribution companies and large consumers will have open access to transmission and distribution grids to purchase locally produced power directly from generators in a competitive market.

3.30 During the initial stage, in 1995 and 1996, PSE purchased power from generators under long-term (12–15 years) and medium-term (4–5 years) bilateral energy contracts. Long-term contracts were used to facilitate financing of new power stations or major investments in the rehabilitation of existing stations. Medium-term contracts were used to facilitate the management of fuel supply contracts with coal and lignite mines by

generators and to adjust the average wholesale price to the target tariff path for retail consumers. PSE used limited competitive bidding procedures to procure power under long-term contracts and established capacity and energy charges to cover, respectively, the fixed and variable costs of the generation stations. In 1996, about 60 percent of generation was on long-term contracts and 30 percent on medium-term arrangements. The remaining energy needed to meet actual demand was settled according to the terms of medium-term contracts. Medium-term contracts will be terminated after 1999. PSE has also sold energy to distribution companies at a single bulk tariff that covers the average cost of purchases, plus a transmission charge, and had a structure that reflected cost differences by time of use.

3.31 During the final stage, after a transition period of about two years, two competitive wholesale markets will be created: a system market for generators connected at voltages above 110 kV (installed capacity equivalent to about 65 percent of total generation) and a local market for generators connected at 110 kV and below (mainly CHP, about 35 percent of total generation). The local market will work through bilateral contracts and will pay reserve capacity to the system market. The system market will comprise a spot market and a contract market. In the spot market, thermal generators will submit hourly price bids, which will be used to determine the market-clearing price (spot price). Ancillary services and generation reserve capacity will be remunerated separately. The contract market will be used by generators and traders (distribution companies, large users, and brokers) as a financial instrument to mitigate price fluctuations in the spot market. Contracts would be settled directly by the two parties involved as contracts for differences.

3.32 During the transition stage—about two years, beginning in early 1997— PSE will introduce a shadow spot market and local markets; unbundle generation and transmission services in the electricity bills to distribution companies; transfer the existing medium-term and long-term power purchase contracts to the distribution companies, which will gradually participate in the system market; and settle the differences between contracted energy quantities and actual hourly energy transactions.

3.33 In the last stage, traders and large consumers will have open access to transmission and distribution networks and would be able to participate in the spot and contract markets. The Energy Law establishes that the Ministry of Energy would determine a timetable, not to exceed a period of eight years after its date of promulgation, to implement retail competition, taking into account electricity consumption levels by large consumers.

Pricing

3.34 Electricity prices have been regulated by several ministries. The Ministry of Finance regulates retail tariffs, effectively controlling total sales revenue for the sector and the pace of tariff increases for consumers. The Ministry of Industry and Trade regulates transfer prices for wholesale electricity transactions between generation and distribution companies, effectively controlling the distribution of total revenues among

the sector utilities. In general, before the economic reform in the early 1990s, prices were kept below economic costs through considerable subsidies to residential consumers. In 1990 and 1991 there was a substantial increase in electricity prices, especially for residential consumers (300 percent increase in real terms). After 1991, prices kept up with inflation; lately they have increased in dollar terms because of the revaluation of the zloty. In late 1995, the average retail tariff was about $55MWh, equivalent to about 75 percent of economic costs. In 1995, the government prepared a tariff adjustment program designed to reach economic cost by 2000 and to equalize the value-added-tax (VAT) for retail electricity sales in three years, 7 percent at that time, with the official VAT for other commercial transactions (22 percent). This program has been implemented with some lags, but by early 1997 the average retail tariff was about $62/MWh.

3.35 The Energy Law will gradually introduce substantial changes in the regulation of electricity prices. The minister of economy would establish the methodology and criteria for calculating prices and the minister of finance would continue to set retail tariffs during a two-year transition period after the enactment of the Energy Law. Thereafter, licensees for generation, transmission, distribution, and trade activities will calculate their tariffs in accordance with the methodology established by the Ministry of Economy and will submit them to ERA for approval. This methodology should ensure that tariffs are cost-reflective and would eliminate cross-subsidies between consumers and between power companies. Furthermore, ERA would be able to deregulate tariffs for activities subject to competition. The Energy Law, however, includes provisions to impose a levy on tariffs to finance investments related to demand-side management and the development of nonconventional generation resources.

3.36 It is envisaged that wholesale and retail prices will be regulated during the transition period according to the tariff adjustment program outlined above. To implement this program, the capacity charge under the bilateral medium-term contracts is being adjusted to yield an average wholesale energy price that is consistent with the target retail tariff path adopted. Furthermore, the Ministry of Finance is gradually introducing regional differences in retail tariffs to reflect the cost of supply, a departure from the previous policy of uniform tariffs in all regions. After the transition is completed, wholesale energy prices will be determined by competitive forces, and transmission and distribution tariffs will be regulated through a formula that will provide incentives for efficiency. Traders would be allowed to pass through the cost of energy purchases to retail consumers, plus the transmission, distribution, and trade costs incurred to meet demand.

Issues Arising from Reform and Privatization

3.37 The government has selected a gradual approach for sector reform. Restructuring and demonopolization of the sector were seen as the first step, followed by the corporatization of SOEs; establishment of a new regulatory regime and the gradual implementation of a competitive market; and, finally, privatization. This approach allows the establishment of the basic conditions for the operation of a competitive market

(unbundling, cost-reflective tariffs, and changes in the regulatory framework) first, to be followed by efforts to attract private investors. Such a strategy has the following benefits:

- It provides flexibility for the implementation of the new regulatory framework and provides an opportunity for the new rules to be adjusted on the basis of experience. It is much easier for the government to change a rule when the financial impact will affect only SOEs than when it affects private companies.
- It reduces the risks faced by private investors created by uncertainties about new rules.
- It avoids the problem of having to amend contracts with private investors that were drawn up too early in the process.

3.38 The government has studied and carefully designed a transition process to a competitive market that is consistent with a gradual tariff adjustment program, using a single-buyer scheme as an interim arrangement. This approach avoids the potential trauma of abrupt changes. As discussed below, however, there are concerns about the feasibility of gradual implementation of cost-reflective tariffs and a competitive market if privatization lags behind.

3.39 The privatization of existing generation and distribution companies is essential to the operation of a competitive market and the consolidation of the reform process. Private generators and distributors will represent firms that have clear incentives to maximize profits, compete in the market, and improve efficiency. Furthermore, the participation of private firms in generation or distribution activities would require a firm commitment by the government that cost-reflective tariffs will be implemented, and it would act to restrain arbitrary actions in the application of the new market rules.

3.40 The question is whether cost-reflective tariffs and a competitive wholesale power market will be introduced as planned if the privatization of SOEs is delayed. The government could then decide to extend the transition phase for the implementation of the competitive market, postpone tariff adjustments and the application of regional differences in electricity prices to retail consumers, delay the introduction of a spot market and the deregulation of wholesale prices, and thus maintain a single-buyer scheme, price controls, and central planning. In this event, the timing of reform might take place more gradually.

3.41 A second, and related, issue is the discretionary power that the government has to change the regulatory framework. The Energy Law is very general. It authorizes the government to define the pricing principles; the criteria for the organization and operation of the competitive market; and the conditions for the access to, and use of, transmission and distribution grids. It remains to be seen if the private investor will be comfortable with a regulatory framework that is largely established by government ordinances.

4

Case III: Ukraine

Background and Sector Structure

Technical Characteristics of the Power Sector

4.1 The Ukrainian power system has an installed generation capacity of about 53,000 MW: 13,000 MW in nuclear power stations, 33,000 MW in steam- thermal stations, 5,000 MW in hydroelectric stations, and 2,000 MW in industrial power stations. About 3,800 MW out of the conventional thermal capacity were combined heat and power units (CHP), which supply about 30 percent of the thermal output required for district heat in major population centers. Total generation in 1995 was 193 TWh (22,000 MW average): 37 percent, nuclear; 5 percent, hydroelectric; and 58 percent, thermal. Fuel consumption for thermal generation was 49 percent, coal; 37 percent, natural gas; and 14 percent, mazout. In spite of large coal resources, the contribution of coal to power generation in Ukraine is declining because mining is costly and coal quality is worsening. Indigenous oil and gas resources are insufficient to meet domestic demand, and natural gas and mazout must be imported at international prices.

4.2 Since the collapse of the former Soviet Union (FSU) in 1991, electricity consumption in Ukraine has decreased by about 28 percent, a result of the dramatic decline in gross domestic product (GDP) of 59 percent between 1991 and 1995. Electricity consumption in industry and agriculture, which now represent 50 percent of total electricity demand, dropped about 40 percent, and total generation decreased about 30 percent during the same period. The substantial fall in demand resulted in considerable spare generating capacity (53,000 MW to serve a peak demand of about 30,000 MW). Electricity demand is expected to bottom out in 1997, and again reach the 1990 level by 2010.

4.3 Ukraine's power system had developed and operated as part of the interconnected power system of the FSU (power transfer capacity of 4,100 MW with Russia and 1,000 MW with Belarus). It also had strong international interconnections with Central Europe (2,000 MW) and Romania/Bulgaria (3,500 MW). In 1990, Ukraine maintained a small net power transfer with other FSU republics (average net import of 20 MW), but it was a large electricity exporter to Central Europe (3,200 MW average). A combination of factors, including a general drop in demand in the region, the demise of the trading system of the former socialist bloc, technical difficulties in maintaining stable and safe operation of the power pool, and financial constraints, led to a 90 percent drop in net electricity trade from 1990 to 1995.

4.4 In spite of the current substantial excess generating capacity, a lack of working capital to pay for fuel, spare parts, and needed rehabilitation of power stations leaves the power system vulnerable. Availability of thermal plants is low, and fuel inventories are too low to withstand a disruption in fuel supply.[4] Substantial investments would be required in the short term to replenish fuel stocks, supply spare parts inventories, and complete deferred maintenance.

4.5 Although it is expected that electricity demand will not reach the 1990 level until 2010, additional generating capacity will be required after the turn of the century to make up for plant retirements. The remaining two units at the Chernobyl nuclear power station (1,000 MW each) will be decommissioned by the year 2000 for safety reasons, and 2,800 MW in old, conventional thermal stations will also be retired by then. In addition, the power system will require additional peaking units to improve frequency regulation. A recent expansion plan for power-generating capacity recommends the completion of the two 1,000-MW nuclear units and seven 324-MW pump storage units currently under construction.

Initial Conditions

4.6 In 1990, Ukraine's power sector enjoyed a privileged position within the republics of the FSU. It was one of the three republics in the FSU with a Ministry of Power and Electrification (Minenergo) that reported to the Council of Ministers of the Union, and it was responsible for providing electricity service in Ukraine and Moldova. Minenergo developed as a vertically integrated monopoly with responsibility for planning, expansion, operation, and maintenance of the generation, transmission, and distribution systems, as well as for operation and control of the interconnected system and several construction and research activities. The South Interconnected Power System, which included Ukraine and Moldova, was the largest of the eleven regional power systems in the FSU. Employees in the sector received superior wages and were highly respected.

4.7 In 1992, after Ukraine declared its independence from the FSU, Minenergo comprised forty-seven production associations or enterprises, including eight regional enterprises responsible for thermal generation, transmission, and distribution activities in each region; an association of hydroelectric power stations; a national dispatch unit; and a planning institute. The nuclear power stations were managed by Ukratomenergoprom, a short-lived institution that was transformed into the State Committee for the Utilization of Nuclear Energy. The Ministry of Economy was responsible for regulation of electricity prices.

4.8 During 1992 and 1993, the government made no major changes in the institutional arrangements and structure of the power sector. The macroeconomic situation was unstable, characterized by a quick adjustment of import energy prices to

[4] In 1995, a strike in the coal mines depleted very low fuel inventories and it was not possible to meet an estimated peak demand of 30,100 MW with an installed generating capacity of 53,000 MW.

international levels, a sharp contraction in trade volumes and GDP, and hyperinflation. Although the government increased electricity prices by a factor of 180 from 1991 to 1993 to cope with sharp increases in fuel prices and wages, the average retail tariff in 1993 was only $5/MWh. Furthermore, arrears in payment of electricity bills increased substantially, primarily because of the desperate financial situation of insolvent industrial state enterprises and other government offices that depended on transfers from the national budget.

4.9 The power sector was confronted by a sharp drop in demand and production, lack of new investments in rehabilitation, and a cash shortage that created major constraints to meeting maintenance and operating expenses. By the end of 1993, the Ukrainian power system was unable to meet the requirements for safe and reliable operation and had to disconnect from the Russian Unified Power System. During the winter of 1993–94, power supply in Ukraine almost collapsed: the national interconnected power system could not maintain synchronism and was split into three islands that operated under major frequency swings, which damaged industrial machinery and compromised the safety of nuclear plants.

4.10 Also during this period, the most developed provinces (oblasts) demanded regional autonomy and obtained special rights to manage state property in their territories, including the assets of the regional power companies. The ownership and management of the generating stations in these provinces became a political issue that threatened the unity of the power sector.

4.11 Since 1992, Minenergo had understood that the existing arrangements for managing the power sector were unsustainable and had started considering reform options to ensure the sustainable development and financial viability of the power system. The near collapse of electricity service, the separatist efforts by the provinces, and the inability of the government to establish cost-reflective tariffs and financial discipline convinced Minenergo that the reform should meet two basic requirements: close the door to the balkanization of the power system by the regional monopolies and reduce the influence of the government in setting electricity tariffs.[5] In late 1993, Minenergo requested the assistance of the World Bank in formulating a plan for sector reform that would meet these requirements.

Current Structure

4.12 In early 1994, the government adopted, with the assistance of international consultants, a model for power sector reform that would lead to a system similar to the competitive power market of the United Kingdom. The model included the following key elements:

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[5] "The Political Economy of Power Sector Reform—The case of Ukraine," by T. Kearney and L. Lovei. The World Bank, Washington, D.C., 1996.

- The regulatory function would be separate.
- A competitive wholesale power market, based on hourly bids, would be created.
- Generation, transmission, dispatch, distribution, and supply services would be unbundled.
- Wholesale electricity prices would be deregulated.
- SOEs would be corporatized.
- Existing assets and enterprises would be gradually privatized.

4.13 This model met the basic requirements established by Minenergo very well: it weakens the power of the regional utilities by unbundling services and creating a competitive market and it limits the discretion of the government in setting electricity prices by deregulating wholesale prices and unbundling prices for different services. In addition, it introduces incentives for an efficient operation and facilitates the establishment of financial discipline.

4.14 The sector was restructured during 1994 and 1995, in keeping with Presidential Decree 244 of May 1994 and additional resolutions, to achieve the following:

- The horizontal unbundling of generation— into four joint-stock corporations that own the fourteen largest conventional thermal station, two joint-stock corporations that own the hydroelectric power stations, and one SOE that is responsible for the five nuclear power stations—was mandated.
- A National Electric Company (NEC), responsible for the development, operation, and maintenance of the high-voltage electricity grids at voltages 220 kV and above, was created.
- A state enterprise, the National Dispatch Center of Electricity of Ukraine (NDC), was formed. It is based on a restructured National Dispatch Center and the dispatch centers of the regional offices, and it is responsible for the core functions of economic dispatch and supervisory control of the interconnected system, as well as for new functions related to the management of the wholesale power market. These functions include the administration of the settlement system for energy transactions, purchase of transmission services, purchase of ancillary services, expansion planning for the high-voltage network, and sales of bulk energy to suppliers.
- Twenty-seven joint-stock electricity distribution companies were created, with the responsibility to develop and operate medium- and low-voltage networks (below 220 kV) and some imbedded generation within the twenty-five oblasts and two municipal administrations (Kiev and Sebastopol).
- The supply activity (purchase of electricity in bulk to sell at retail) was separated from the distribution activity (wires business).

4.15 Thus far, power sector restructuring has been limited to the unbundling, commercialization, and corporatization of SOEs. Transformation of the ownership structure is just beginning. The government has selected the twenty-seven distribution companies (DISCOs) and four generation companies (GENCOs) responsible for thermal generation, all established as joint-stock companies, as candidates for privatization. The

nuclear and hydroelectric power companies, the combined heat and power plants, NEC, and NDC are not yet eligible for privatization. The government has established a general policy that about 15 percent of shares will be offered for voucher privatization, 5 percent for management buyout, 29 percent for sale to strategic investors, and 51 percent would remain in the hands of the State. In early 1997, five DISCOs and two GENCOs had completed the first step of voucher privatization, and the State Property Fund had retained the services of international consultants to assess and recommend changes to existing legislation and to prepare a strategy to attract strategic investors.

Institutional Arrangements

4.16 Ukraine is gradually replacing central planning with a market economy. The power sector in Ukraine is now operating—albeit with severe financial and operational limitations—on the basis of a competitive market model that has been implemented in very few countries. The institutional structure and arrangements are progressively adapting to the new model, which is based on decentralized decisions for generation investment and operation, liberalization of wholesale prices, and competition.

4.17 Minenergo is being transformed from a vertically integrated power monopoly, responsible for expansion planning, sector policy, and regulation,[6] as well as for several construction and research activities, into a ministry that is primarily responsible for sector policy and managing the shares of the State in joint-stock companies in the power sector.[7] A new, independent National Electricity Regulatory Commission (NERC) has taken over regulatory functions, and expansion planning and investment decisions are being decentralized and transferred to the power utilities.

Sector Policy

4.18 Minenergo will continue to be responsible for power sector policy, particularly the preparation of strategic plans to meet energy demand, the promotion of energy efficiency, the conduct of international relations, technical standards, the monitoring of the performance of SOEs, and support for the development of alternative energy resources. Other government agencies will define a policy for the safety of nuclear plants and for environmental protection.

Planning

4.19 The conduct of expansion planning is gradually evolving from the master plans prepared by Minenergo and approved by the Parliament[8] to decentralized planning by

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[6]Except for price regulation, which was a responsibility of the Ministry of Economy.

[7]The State Property Fund is the official owner of the shares, but Minenergo supervises and controls the SOEs.

[8] In early 1996, Parliament approved a National Energy Program to 2010, which recommends a generation rehabilitation program for the next five years and an expansion plan for 2001–10.

power utilities. Any company that holds a generation license is permitted to develop new generating plants, subject only to general norms and regulations and relevant antitrust conditions. Therefore, the generation expansion plan approved by Parliament would become an indicative plan, because the new GENCOs would be able to select and develop generation projects in response to market forces. NDC will be responsible for planning transmission expansion above 220 kV and for contracting the development of new transmission facilities.

Regulation

4.20 Regulation of the power sector is being performed primarily by the National Electricity Regulatory Commission (NERC). Presidential Decrees 738/94 of December 1994 and 213/95 of 1995 created NERC and enacted its statutes. NERC was created as an independent legal body responsible for promoting competition in the provision of electricity services, issuing licenses for main electricity services, formulating pricing policies, protecting consumers' rights, and developing regulations for electricity services.

4.21 NERC has the following main functions:

- It defines pricing policies used to set regulated tariffs.
- It approves the procedures for issuing licenses for generation, transmission, distribution, and supply licenses, as well as to issue, supervise compliance, and negotiate modifications to the licenses.
- It supervises compliance with the rules for the wholesale market.
- It supervises compliance with other rules and regulations.
- It prepares and submits proposals to improve sector regulations.
- It protects consumer rights regarding electricity prices and the quality and reliability of electricity services.
- It applies sanctions to those who violate the conditions of the licenses.
- It refers cases of violations of the anti-monopoly legislation to the Anti-Monopoly Committee.

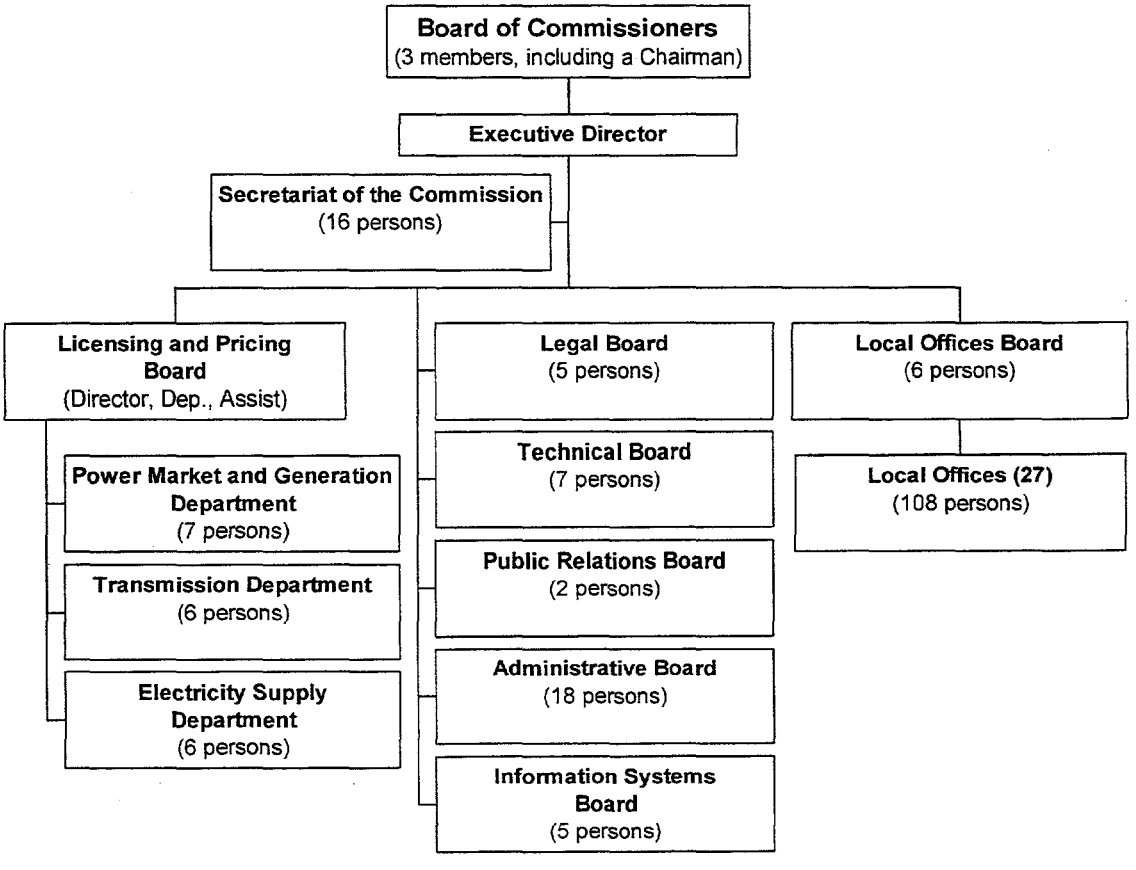
4.22 Although NERC was established as an independent regulatory authority with ample powers to regulate the provision of electricity service, the ministries would play a substantial role in regulatory matters for a transition period of two years. For example, in late 1995 it was established that retail tariffs would have to be agreed upon between NERC and the Ministry of Economy. The procedures for issuing licenses were prepared by NERC, and agreement was reached with interested ministries. Minenergo and the Anti-Monopoly Committee should agree on major changes to the licenses.

4.23 The commission is composed of three members appointed by the president of Ukraine for staggered six-year periods. One of the members is appointed as the chairman. This individual is responsible for organizing and managing NERC, but also holds voting rights equal to those of the other members. Members can only be removed by the president on grounds of incapacity or misbehavior. The first three members, appointed in 1995, were an electrical engineer, a lawyer, and an economist.

4.24 The commission can adopt decisions by simple majority if at least two members are present. Compliance with NERC's decisions is mandatory for all licensees and other enterprises and institutions that provide electricity services. Decisions can be appealed to the Anti-Monopoly Committee or to the courts. NERC's statutes require that it conduct activities with transparency and establish consumer councils through its local offices in all oblasts. The commission is to organize public discussions about the main regulatory issues and publish and document its decisions.

4.25 NERC's organization comprises departments on licensing and pricing, legal, technical, administration, and information services. It is also includes local offices in all oblasts that are responsible for consumers affairs, monitoring of licenses, and contact with licensees. A staff of about 200 persons is currently planned (see figure 4-1).

Figure 4-1. NERC Organizational Chart



4.26 NERC operations are funded by a one-time fee for issuing licenses and annual fees that is calculated on the basis of the installed capacity and the volume of electric energy transactions of licensees. One-time fees are mainly used to finance the initial

investments needed to establish NERC offices, and the annual fees are used to cover the operating costs detailed in the annual budget prepared by NERC. Minenergo funded the expenses of NERC during the initial year of operation.

Regulatory Framework

Relevant Legislation

4.27 The primary legislation that established the new legal and regulatory framework was developed through several presidential decrees and resolutions by the Cabinet of Ministers. The main acts of government were Presidential Decree 244/94, unbundling the power industry; decrees 738/94 and 213/95, creating NERC; decree 282/95, defining the market structure; and resolution 207/96 by the Cabinet of Ministries, ordering the creation of a wholesale power market.

4.28 Secondary legislation has been developed gradually, with the assistance of international consultants. By late 1996, NERC had approved the conditions and rules for generation, transmission, distribution, and supply licenses and had issued the licenses for existing companies, including 130 independent suppliers. In October 1996, the members of Energomarket signed an agreement that established detailed rules for the operation of the wholesale power market, rights and obligations of members, governance arrangements, settlement procedures, and billing and payment arrangements. Finally, in January 1997, NERC issued the principles for regulating retail tariffs, completing most of the required secondary legislation.

4.29 There are concerns about the stability of the regulatory framework that was established on the basis of presidential decrees. In late 1996, a new Parliament, more supportive of reform, convened. The government submitted to Parliament an Electricity Law, to establish general conditions, and rights, and obligations for the provision of electricity services, and a Law on Natural Monopolies, which defines mainly the regulatory arrangements for natural monopolies in infrastructure services. These draft laws are consistent with the existing regulatory framework and would help to clarify and strengthen the position of NERC.

Regulatory Controls

4.30 The main instruments in the regulation of electricity services, establishing rules, rights, and obligations, are the licenses for generation, transmission, distribution, and supply activities and the agreement for the operation of the wholesale power market. The licenses are simple, open-term contracts that establish, among other things:

- *General conditions* for carrying out the licensed activity, related to unfair competition, price discrimination, dominant power, and participation in the wholesale power market
- *Rules* for the supply and use of information, price regulation, economic dispatch, and construction of facilities
- *Provisions* for the control of electricity services by NERC and other agencies
- *Procedures* to amend, suspend, or terminate the licenses.

4.31 The licenses establish clear rules governing vertical and horizontal integration. One generator, for example, cannot own more than 25 percent of the total installed capacity in the country, and only in exceptional cases can a single generator hold a supply license if it owns more than 4 percent of the total installed generating capacity. One distribution or supply company cannot serve more than 15 percent of the market.

4.32 Licenses require regulated suppliers to provide electricity service at regulated tariffs, on a nondiscriminatory basis, to all consumers located within the territory specified in the license. Consumers, however, are permitted to purchase electricity from independent suppliers at unregulated prices. The licenses for independent suppliers are valid nationwide. Licenses do not require suppliers to enter into long-term power purchase agreements with generators. Therefore, expansion of generating capacity to maintain reliable service would be the result of the individual decisions of generating facilities in response to the rules and conditions of the wholesale power market.

Wholesale Power Market

4.33 A competitive wholesale power market began operation in October 1996 after a shadow operation of about six months. The members of the market are generators and suppliers that hold a valid license. The market is regulated by an agreement among the members that establishes each member's rights and obligations, market responsibilities, the procedures to be followed to join and leave the market, the governance structure, the rules for the operation of the market, the settlement and market funds procedures, and provisions for dispute resolution.

4.34 The members' agreement adopted a governance structure for the wholesale market that includes a general assembly, a board of directors with five representatives for the generators and five for the suppliers, and a Dispute Committee of three individuals. The board makes decisions by simple majority, except when amending the members' agreement, which requires 75 percent of the votes and the approval of NERC.

4.35 The members' agreement established the following functions for coordinating the market: a central dispatch, a settlement-system administrator, a market funds administrator, and a market auditor. Energomarket, an organization within the National Dispatch Center, will initially be responsible for the first three functions.

4.36 The market includes the following energy transactions:

- Hourly energy transactions in a spot market that is based on bid prices submitted daily by thermal generators (other than small plants owned by distribution companies)
- Long-term energy transactions at regulated prices under bilateral contracts between Energomarket and hydroelectric, nuclear, and small thermal generators.[9]

4.37 Generators and suppliers trade electricity in the wholesale market according to the rules and conditions established the Energomarket members' agreement. Generators receive payments for energy scheduled in the economic dispatch at spot prices, capacity available for dispatch based on an availability charge, and ancillary services (spinning reserve, voltage regulation, and the like).[10] Suppliers should be billed for hourly consumption based on the average price paid to generators in the spot market, plus transmission charges, the cost of losses, charges to cover Energomarket costs, the costs of bilateral contracts with hydroelectric and nuclear stations, and the price subsidies to designated consumers (administered by regulated suppliers) that have been approved by NERC. As a result of these transactions, Energomarket has a margin—the difference between services billed to suppliers and services paid to generators—sufficient to cover its own costs as well as the cost of transmission services contracted on behalf of generators and suppliers. Suppliers can use long-term power purchase agreements as financial instruments to manage the risks of a volatile spot price. These agreements would be similar to contracts for differences used in the United Kingdom.

4.38 Payments in the spot market include an availability charge paid for each kW of capacity that the generators have available for dispatch. This charge was designed to provide an incentive to expand capacity when needed to maintain reliable service. A simple formula was adopted in the Energomarket members' agreement to calculate this charge: the charge is zero if the system generation reserve margin is greater than 2,000 MW, and increases up to $50/MW[11] for each hour when this margin is less than 1,000 MW.

4.39 The coordination of the interconnected system to achieve economical, reliable, and safe operation is a responsibility of Energomarket. Economical dispatch is determined by market and technical conditions, which are based on demand forecasts submitted by suppliers, the merit order of hourly bids received from thermal stations, and the availability declarations made by nuclear and hydroelectric power stations. All

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[9]In early 1997, the regulated wholesale price for energy delivered by nuclear stations was $24/MWh, and that provided by hydroelectric stations, $10/MWh, while the average wholesale price paid to thermal generators was $31/MWh.

[10]As of February 1997, Energomarket was not paying separately for ancillary services to generators. Frequency regulation was provided by hydroelectric stations.

[11]Assuming peak demand periods of six hours/weekday, this charge would be equivalent to $78/kW-year, about the same as a capacity charge for a gas turbine.

generators operating under a license should render ancillary services and follow all dispatch orders as required by Energomarket to maintain a safe operation.

4.40 Access to the high-voltage transmission system by generators and suppliers is guaranteed by Energomarket, which is responsible for planning the expansion of the transmission grid; contracting transmission services with NEC, the national transmission company; and allocating these costs among the users. The transmission tariffs are currently regulated by NERC, based on a postage stamp charge.

4.41 Retail competition is permitted. Independent suppliers (suppliers at nonregulated tariffs) can negotiate contracts to supply energy to large and retail consumers, other than residential users, and become responsible for energy consumed by their clients in the wholesale market. These suppliers should have a license and become members of the wholesale market.

4.42 The wholesale market has operated for about eight months under very difficult circumstances. There was a severe financial crisis, brought about primarily by nonpayment of electricity bills by consumers in the industrial, agricultural, and municipal sectors; lack of working capital; and subsidized tariffs for designated residential consumers. Suppliers in the regulated market could not pay for purchases in the wholesale market; Energomarket could not pay generators on time; and thermal generators could not pay for required fuel supplies and were forced to reduce fuel inventories, postpone maintenance, and reduce generation. In 1996, suppliers of the regulated market collected, on average, between 70 percent and 80 percent of electricity bills; about 15 to 20 percent of the total was paid in cash. As of late 1996, Energomarket owed $1.3 billion to generators, and suppliers owed Energomarket about $1.1 billion.

4.43 In response to the arrears crisis and the difficulties in fuel supply, the nonregulated market increased substantially in 1996 on the basis of barter arrangements. Private brokers, acting as suppliers, arranged for fuel delivery to thermal plants in return for a share of the electricity generated, and they negotiated with large consumers to deliver this electricity in exchange for industrial products. Thermal generators also bartered electricity for coal transportation services or for equipment and spare parts. In 1996 about 50 percent of electricity demand was supplied through a variety of barter agreements.

4.44 Although these barter agreements proved useful as a temporary instrument to reduce the arrears of otherwise insolvent consumers, they have burdened the accounting and administration of the wholesale market, clouded the transparency of the financial flows in the market, and jeopardized economical dispatch. To phase-out these barter arrangements, NERC decided that as of April 1997, all energy transactions in the interconnected system would have to be conducted through the wholesale power market. Energomarket also rescheduled debts for accounts payable and receivable accumulated in 1996. In May 1997, the government issued a resolution strengthening payment discipline by budgetary entities and authorizing the cut-off of nonpayers, except for a small group of protected customers, such as military units in a state of alertness. This recovery

program is supported by a recent Bank loan that will finance the replenishment of fuel and spare parts stocks.

4.45 A spot market based on hourly bids was introduced in stages. Beginning in April 1996, a shadow pool was established to simulate hourly bids and check the software for the operation of the wholesale power market. Economic dispatch and energy transactions, however, continued under the previous rules of a centralized operation. In October 1996, an economic dispatch based on live hourly bids by thermal generators was introduced, and spot prices were used to settle energy transactions in the wholesale market. The payment arrangements established in the Energomarket members' agreement, however, were not implemented, because Minenergo controlled the distribution of the scarce cash collected by suppliers. Finally, in March 1997, Energomarket began to apply the new rules for the spot market established in the members' agreement. Furthermore, NERC introduced a transitory price cap of $35/MWh on hourly bids, which was increased to $40/MWh in December 1996 to neutralize possible manipulation of pool prices and abuses of monopoly power. The government agreed to eliminate this price cap by July 1997.

Pricing

4.46 Retail prices had traditionally been regulated by the Ministry of Economy, based mainly on social, financial, and political considerations. In spite of large increases in average retail tariffs during 1991–94, price adjustments lagged cost increases, and the average retail tariff in 1994 was $13/MWh, too low to cover financial or economic costs. During 1995 there were substantial increases in real terms, and average retail tariffs reached $35/MWh, reducing the gap with economic costs[12], but maintaining major distortions in the tariff structure. Average residential tariffs (consumers connected at low voltages) were lower than average prices for large industrial consumers connected to high voltages. About one-third of residential consumers had the privilege of large discounts in their electricity bills, which created a financial and administrative burden for the suppliers and was a source of price discrimination and waste in electricity consumption.

4.47 The new competitive model for the power sector introduces a radical change in the regulation of electricity prices. Tariffs will be unbundled according to services: generation (energy, capacity, ancillary services), wholesale market operation, transmission, distribution, and supply. Generation prices were deregulated and are determined based on market forces. Tariffs for other services will be regulated to cover reasonable cost of service and to provide incentives for efficiency according to criteria and procedures established in licenses. Suppliers of the regulated market will be allowed to pass through the costs of generation, transmission, distribution, and supply services to the consumer. Finally, NERC will be responsible for regulating prices.

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[12]Average incremental costs are $39/MWh, a low figure that reflects the excess capacity in the power system brought about by the drop in demand.

4.48 The new scheme for price regulation is being implemented gradually in order to contain sharp increases of retail prices. During the initial phase of the creation of a competitive market, NERC applied the following basic, transitory arrangements:

- Retail prices are still regulated by NERC, in agreement with the Ministry of Economy, according to a tariff adjustment program that would phase out subsidies by the end of 1997. In 1996, residential tariffs were increased about 30 percent and NERC limited the application of privileged tariffs to lifeline consumption of 75 kWh/month for eligible consumers. The average retail tariff by late 1996 had increased to $37/Mwh.
- Nuclear and hydroelectric power generators sell electricity in the wholesale market under contract, at prices regulated by NERC. NERC also established a cap for price bids in the spot market. As a result, the average bulk power purchase price paid by Energomarket in late 1996 was $26/kWh. After adding a postage stamp of $2/MWh for transmission charges (voltages >= 220 kV) and other costs, Energomarket sold bulk power to suppliers at $31/MWh, on average.
- NERC established price differentials in the wholesale prices for the twenty-seven distribution companies, taking into account the consumer mix and financial requirements of each company. The average wholesale price in late 1996 was $31/kWh, but varied in a range from $21/MWh to $34.5/MWh.

Issues Arising from the Reform and Privatization Processes

4.49 The preceding text provided a chronology of the power sector reform process and a discussion of the main forces and motivations behind this reform. This section comments on the reform strategy and identifies major issues related to its implementation.

4.50 The power sector reform process in Ukraine, as in some other countries, responded to a set of problems—in this case, created by the collapse of the FSU and the ensuing dramatic economic decline. This helps to explain some of the incongruities in the process. A ministry that had complete control of the power sector promoted unbundling and a competitive power market, a paradigm of decentralized decisionmaking, to preserve the integrity of the interconnected power system. This competitive market had to be introduced in a hostile environment, which included political instability; an anti-reform parliament; no framework legislation for the power sector; and a sector with no tradition of commercial enterprises, in financial disarray, and subject to major technical constraints.

4.51 Restructuring and the creation of a competitive market had the highest priority in the reform process. The legal framework was developed gradually, based on presidential decrees and resolutions by the Cabinet, as it was needed to support the restructuring program. Privatization was relegated to the second phase. This sequence—unbundling, introducing a competitive market, corporatization, and privatization—was required to

weaken the influence of the oblasts on the regional power companies by unbundling and creating a competitive wholesale power market, while at the same time preserving the control of Minenergo on the operation and management of SOEs during the corporatization process. This was considered prudent, because (1) a power market would help the corporatization process by establishing transparent wholesale prices and financial discipline; (2) the power system had excess generating capacity, and it was thus not urgent to attract private capital to finance a large investment program; and (3) it was possible to introduce a competitive market without jeopardizing the expansion plans or the reliability of the power system.

4.52 Nevertheless, this strategy has not worked as planned. It was impeded by severe cash flow problems created by the lack of political will to cut off electricity supply to delinquent consumers. The government, concerned about a collapse of the power supply, maintained control over the allocation of scarce cash resources among generators and distribution companies—in principle, taking into the account individual cash needs to meet operating expenses and efficiency considerations—during the winter of 1996–97. Generators, with limited access to credit and unable to manage fuel supply, spare parts, and receivables, could not meet demand and compete effectively in the spot market. Distributors, unable to manage their cash, did not have strong incentives to improve collections. Energomarket, unable to enforce payment agreements and other market rules, lost credibility as an effective power exchange. In summary, unbundling and competition have not worked properly thus far, and have not been effective in improving financial discipline and efficiency.

4.53 The government, with the Bank support, is trying to fix this problem. It is providing working capital to generators to ease the constraints, enforcing the procedures established to manage market funds, and gearing up to implement strict collection and cut-off procedures. It is still to be seen whether these arrangements will lead to the desired outcome.

4.54 The privatization of state-owned generation and distribution companies, planned for implementation during a second phase, is essential to the operation of a competitive market and the consolidation of the reform process.[13] The participation of private, independent suppliers has been spurred by the need for barter arrangements, but it is unclear if they will have the financial strength to play a stable and active role in the market once the problem of working capital is resolved. In contrast, private generators and distributors will be strong firms with clear incentives to compete in the market, improve efficiency, and enforce financial discipline. Furthermore, the participation of private firms in generation or supply activities would restrain arbitrary actions by NERC or the government in the application of the new market rules, particularly the pricing policies.

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[13]Some people claim that this is not necessary; they point out that in Norway, a competitive market is operating with SOEs. What they fail to recognize is that in this case, many of the SOEs are owned by municipalities, which behave as independent entities.

4.55 Although the Cabinet of Ministers has authorized the privatization of the four thermal generators and the twenty-seven local distribution companies, there is still no clear vision of how these enterprises will be privatized. The main motivation of the government for privatizing existing SOEs is to attract capital and technical expertise to upgrade existing facilities and improve efficiency. There does not appear to be strong support for selling SOEs simply for the sake of providing funds to the national budget. Furthermore, Parliament is quite reluctant to give up ownership control of the power utilities.

4.56 The Parliament would favor privatization options that will keep 51 percent of the shares in the hands of the State and allow the participation of workers, management, and private investors as minority shareholders. Nonetheless, most of the government agencies have come to accept that regardless of the portion of shares that will be offered to private investors, it will be necessary to allow strategic investors to take managerial, operational, and financial control of the enterprises.

4.57 The implementation of the privatization program faces additional difficulties. First, the primary legislation that supports the new regulatory framework has been established piecemeal by presidential decrees, and there is a need for comprehensive framework legislation to provide a complete and more stable legal environment that will attract foreign capital. Second, a foreign investor participating in a distribution company would perceive substantial market risks related to the huge collection problem and the cross-subsidies still in place. Third, a private generator would be concerned with the lack of a track record on the part of a new competitive market that has operated with major distortions (barter agreements, constraints in fuel supplies, and so forth) and with the interference of NERC in the spot market (establishment of price caps). The latter two factors would be likely to reduce the price that foreign investors are willing to pay for shares in these enterprises, making it politically difficult to justify their privatization.

4.58 In conclusion, the participation of strategic investors will be a key issue in the consolidation of the new competitive scheme. Private generators and suppliers are essential to the successful operation of a competitive market. Privatization of SOEs, however, may be delayed because of the continuing market and country risks and the lack of political consensus on how and when to give up managerial control to these investors.

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
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
	Household Energy Strategy (English and French)	01/94	163/94
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

Region/Country	*Activity/Report Title*	*Date*	*Number*
Mauritius	Bagasse Power Potential (English)	10/87	077/87
	Energy Sector Review (English)	12/94	3643-MAS
Morocco	Energy Sector Institutional Development Study (English and French)	07/95	173/95
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
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
Togo	Energy Assessment (English)	06/85	5221-TO

Region/Country	*Activity/Report Title*	*Date*	*Number*
Togo	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
Indonesia	Energy Assessment (English)	11/81	3543-IND
	Status Report (English)	09/84	022/84
	Power Generation Efficiency Study (English)	02/86	050/86

Region/Country	*Activity/Report Title*	*Date*	*Number*
Indonesia	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	--
India	Opportunities for Commercialization of Nonconventional Energy Systems (English)	11/88	091/88

Region/Country	*Activity/Report Title*	*Date*	*Number*
India	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
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
Eastern Europe	The Future of Natural Gas in Eastern Europe (English)	08/92	149/92
Poland	Energy Sector Restructuring Program Vols. I-V (English)	01/93	153/93
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)	05/95	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
	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

Region/Country	*Activity/Report Title*	*Date*	*Number*
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
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
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	--
	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	--

Region/Country	*Activity/Report Title*	*Date*	*Number*
Jamaica	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	--
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	Roundtable on Energy Efficiency (English)	02/95	171/95
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	A Synopsis of the Third Annual Roundtable on Independent Power Projects: Rhetoric and Reality (English)	08/96	187/96

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