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Report to the Chairman, Committee on Energy and Natural Resources, U.S. Senate

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EAST EUROPEAN ENERGY

U.S. Business Opportunities in and Assistance to Poland's Energy Sector

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United States
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National Security and
International Affairs Division

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May 16, 1991

The Honorable J. Bennett Johnston
Chairman, Committee on Energy
and Natural Resources
United States Senate

Dear Mr. Chairman:

As you requested, we are providing information on (1) Poland's energy needs, steps being taken or planned to address them, and the resulting potential trade and investment opportunities for U.S. firms; (2) the impediments to realizing these opportunities and ways in which the U.S. government is trying to overcome them; and (3) the current status of U.S. programs to support Poland's energy sector.

As agreed with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days from the date of this letter. At that time, we will send copies to the Secretaries of State, Commerce, and Energy; the Director of the Office of Management and Budget; the Office of the U.S. Trade Representative; the Agency for International Development; the Environmental Protection Agency, the U.S. Export-Import Bank; the Overseas Private Investment Corporation; and other interested parties. Copies will also be made available to others on request.

Please contact me at (202) 275-4812 if you or your staff have any questions concerning this report. The major contributors to this report are listed in appendix II.

Sincerely yours,

Allan I. Mendelowitz

Allan I. Mendelowitz, Director
International Trade, Energy,
and Finance Issues

Executive Summary

Purpose

In 1989 Poland's political revolution precipitated a period of economic transformation from a centrally planned to a market-oriented economy. Since energy is a vital component of economic development, reinvigorating that sector of Poland's economy is considered essential to achieving overall national progress.

The Chairman of the Senate Committee on Energy and Natural Resources asked GAO to provide information on (1) Poland's energy needs and the steps being taken or planned to address them as well as the resulting potential trade and investment opportunities for U.S. firms, (2) the impediments to realizing these opportunities and the ways in which the U.S. government is trying to overcome them, and (3) the current status of U.S. programs to directly support Poland's energy sector.

Background

U.S. policy in Eastern Europe endeavors to support the region's economic transition and encourage the development of emerging democracies. Its primary legislative programs for doing so—the Support for Eastern European Democracy Act of 1989 and the Foreign Operations, Export Financing, and Related Programs Appropriations Act for 1991—authorized funding for U.S. government aid, including programs for energy and the environment. But most experts agree that massive private sector investment will also be required to ensure success.

Results in Brief

Poland has projected that if its economy is to achieve desired growth rates, its demand for energy will increase by 24 percent in the next 10 years and 54 percent over 20 years. Demand for electricity alone is expected to increase by 30 percent in the next 10 years and by 80 percent within 20 years.

To meet these needs Poland will have to overcome serious problems in virtually every part of its energy sector, from developing basic sources of energy to generating power and using energy more efficiently. It must improve its use of coal as a basic fuel and find alternatives to meet its growing energy demands. It must modernize large portions of its power generation and distribution infrastructure. And it must encourage both businesses and individuals to become more efficient in their energy use.

While this variety of needs could open trade and investment opportunities for U.S. firms, how much and how quickly they develop will depend on the speed of Poland's energy price reforms and the availability of

government or private financing. Moreover, to take advantage of trade and investment opportunities, U.S. firms will have to deal with economic and legal risks in Poland that discourage business activity. The Polish government recognizes these difficulties and is taking steps to address them.

The U.S. government has developed programs to reduce the risks of U.S. businesses conducting trade with and investment in Poland. However, the U.S. Agency for International Development's Trade Credit Insurance Program covers the U.S. Export-Import Bank's risk only for short- and medium-term trade credit guarantees and insurance for sales to Poland's private sector. These restrictions limit the ability of U.S. firms to arrange financing for sales to Poland's energy sector because sales of this kind require long-term financing and because energy projects typically involve the public sector.

U.S. agencies have also initiated programs to provide the skills and expertise to (1) help Poland's energy sector make the transition to a market economy, (2) demonstrate energy efficiency and clean coal technologies, and (3) provide information on conservation techniques. However, these programs are still in the early stages of implementation.

Principal Findings

Poland's Energy Sector Faces Major Problems

Poland relies on domestically mined coal, mainly hard coal, to meet most of its energy needs. Its few other domestic energy sources are limited. However, producing hard coal causes extensive water pollution and is becoming more expensive. Poland is planning to reduce its dependence on coal and rely more on oil and gas. The Soviet Union traditionally supplied Poland with cheap oil and gas, but it has recently decreased deliveries and raised prices to world market rates. The Persian Gulf crisis temporarily increased prices even further and cut off a major source of Poland's oil supply. For example, Iraq has not delivered 5.5 million barrels of oil that is owed Poland as partial payment for a $500-million debt.

Poland's power-generating infrastructure is outdated, inefficient, and polluting as well. Between 20 and 30 percent of the power plants need to be modernized because they use technology from the 1950s. The coal-fired power and heating plants also need pollution reduction technology.

Poland ended construction of its only nuclear power plant because of high construction costs and public concern about the safety of nuclear power. Industrial and residential consumers use energy inefficiently because energy prices have been kept artificially low, providing little incentive to conserve. According to the World Bank, some of Poland's industries waste at least 35 percent more energy than their counterparts in Western Europe.

Potential Opportunities for U.S. Trade and Investment Exist

Poland's actions to address its energy needs will provide a number of new trade and investment opportunities for U.S. firms. Poland wants to upgrade its equipment and technology to make coal mining and use more economical and less polluting. Its plans to better exploit its limited domestic gas reserves and import more oil and gas will provide opportunities for trade and investment. Poland also wants to acquire modern equipment and technology to help update its electric power-generating and distribution facilities, and it plans to construct new facilities to generate additional power to meet expected future demand. Also, Polish industry will need to increase the efficiency of its production processes and install equipment to monitor energy use.

Huge sums will be required to fund these improvements. Polish officials estimate that modernizing the energy sector will require billions of dollars each year. For the electricity sector alone, Polish officials estimate that $20 billion is needed in the next 10 years.

Artificially low energy prices and a lack of funds have restricted Poland's ability to modernize the energy sector in the past. Within Poland, natural gas prices are one-tenth of the market price, and the domestic coal price is one-half the export price. But Poland is committed to reforming its pricing structure, and this commitment should encourage foreign trade and investment. Also, multilateral agencies are conducting studies and considering funding for energy-related projects in the near future. For example, the World Bank has given $250 million to finance investment projects to develop Poland's natural gas sector and plans to finance projects in other energy sectors. U.S. firms can compete for contracts associated with these projects.

U.S. Programs Mitigate Business Risks

U.S. firms will have to deal with many risks that discourage business activities in Poland, such as the lack of property ownership laws, restrictive labor laws, an undeveloped banking system, and poor communications systems. The United States has developed programs to mitigate these economic and legal risks by sharing the costs of feasibility studies for investment and providing trade credit guarantees and insurance. However, the funds available for feasibility studies fall short of requests. The $200 million in trade credit guarantees and insurance offered to Poland through the U.S. Export-Import Bank are restricted to short- and medium-term coverage for sales to privately owned companies. Trade and investment in Poland's energy sector, however, requires long-term (more than 7 years) trade credit guarantees and insurance for sales to Poland's public sector enterprises, including infrastructure development projects.

U.S. Programs Assist Poland's Energy Sector

A variety of U.S. assistance programs are becoming available to help revitalize Poland's energy sector. The Environmental Protection Agency has recently established Energy Efficiency Centers in Warsaw and Katowice to provide information on conservation techniques, and the Department of Energy is developing programs to demonstrate energy efficiency and clean coal technologies. The Agency for International Development has implemented programs to increase the efficiency of energy production and use and is developing training and technical exchange programs that will help Poland's energy managers gain the necessary skills to operate in a market environment. The State Department has established an interagency process to coordinate U.S. assistance to East European countries, including Poland.

Recommendations

GAO is making no recommendations in this report.

Agency Comments

As requested, GAO did not obtain official agency comments on this report. However, GAO did discuss the information contained in the draft with program officials at the Departments of State, Commerce, and Energy; the Agency for International Development; the Environmental Protection Agency; the Office of the U.S. Trade Representative; the Export-Import Bank; the Overseas Private Investment Corporation; and the U.S. Trade and Development Program. Their comments have been incorporated in the report where appropriate.

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Abbreviations

AID	Agency for International Development
DOE	Department of Energy
EPA	Environmental Protection Agency
Eximbank	U.S. Export-Import Bank
GAO	General Accounting Office
IEA	International Energy Agency
OPIC	Overseas Private Investment Corporation
SEED	Support for East European Democracy Act of 1989
TCIP	Trade Credit Insurance Program
TDP	Trade and Development Program

Introduction

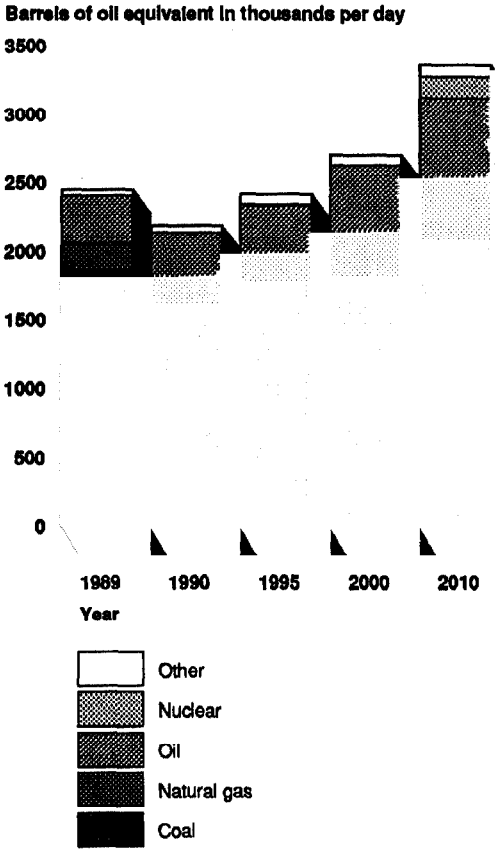
Poland's 1989 political revolution began a period of economic transformation away from a centrally planned economy toward a market economy. Although the reforms have revealed major economic problems and have been painful for the nation, Poland's President Lech Walesa has stated his commitment to continuing the economic transformation. Since energy is a vital component of economic development, revitalizing the energy sector is a key factor in Poland's overall progress. The U.S. government has enacted legislation to support Poland in this process, including funding various energy efficiency activities and a clean coal technology demonstration project.

Developing Poland's Energy Sector Is Key to Its Economic Growth

Over the next 20 years Poland will need more energy to meet the demands of economic growth. While both energy production and consumption declined due to a 1990 recession and economic restructuring, Poland estimates it will need to increase energy production by 24 percent within 10 years and 54 percent within 20 years to supply the energy needed for economic growth[1] (see fig. 1.1). Demand for electricity alone is expected to increase by 30 percent in the next 10 years and by 80 percent within 20 years.

[1]These figures assume an average of 5-percent growth a year for the next 20 years. Although Polish officials used this rate for planning purposes, they expect the actual growth to be somewhat lower.

Figure 1.1: Projected Trend of Poland's Primary Energy Consumption, 1990-2010



Notes: A medium-growth scenario is assumed: a 25-percent decline in national income in 1990 and 5-percent annual average growth for 1991-2010. Additional assumptions include (1) a restructuring of the economy with a decrease in the role of high energy consuming sectors, (2) a gradual adoption of more energy efficient technologies, and (3) compliance with government environmental standards.

Figures for 1989 are included for comparative purposes.

Source: Polish Ministry of Industry, Status and Assumptions for Future Development of Polish Energy Sector in the Years 1990-2010 (Oct. 1990).

Poland's Ministry of Industry has the overall responsibility for the country's energy sector, while other individual agencies have responsibilities related to coal, gas and oil, and electricity. The Ministry of Environmental Protection is responsible for pollution problems, the Ministry of Ownership Transformation has responsibility for privatizing state-owned enterprises, and the Foreign Investment Agency is responsible for approving foreign investment. As Poland moves toward a market

economy, more responsibility is being delegated to local authorities, and it is likely that some energy enterprises will eventually be privatized.

Congress Has Authorized Programs to Assist Poland's Energy Sector

A long-term goal of U.S. policy in Eastern Europe is to encourage the region's economic transition to a market economy. To help meet this goal, the Support for East European Democracy (SEED) Act of 1989, designed to promote democracy and economic pluralism in Poland and Hungary, authorized U.S. government assistance, including programs related to energy and the environment. To continue these activities, the Foreign Operations, Export Financing, and Related Programs Appropriations Act for 1991 appropriated $65 million for U.S. assistance to Poland and other East European countries for energy and environmental activities.

Under the SEED act, a principal ingredient in the U.S. approach is private sector participation. To help stimulate U.S. private sector activity, the act extended U.S. Export-Import Bank (Eximbank) and Overseas Private Investment Corporation (OPIC) programs to Poland. These programs provide loans, guarantees, and insurance to mitigate the risks associated with trade and investment in the unstable economies of Eastern Europe.

The act gave the Department of State responsibility for coordinating U.S. assistance to Poland and other East European countries. The Department of Energy (DOE) and the Environmental Protection Agency (EPA) both have responsibilities for energy-related projects. The U.S. Agency for International Development (AID) manages the distribution of SEED program funds to participating agencies.[2]

The United States also provides assistance to Poland indirectly by supporting the programs of several international organizations. These programs include the International Energy Agency's (IEA) policy development activities, the Group of 24[3] industrialized nations' international coordination of assistance efforts, the International Monetary Fund's program to stabilize the Polish currency, and the World Bank's programs to institute economic reforms in Poland and other East European countries.

[2]See Eastern Europe: Status of U.S. Assistance Efforts (GAO/NSIAD-91-110, Feb. 26, 1991) for more information about U.S. assistance programs for Eastern Europe.

[3]The Group of 24 industrialized nations consists of the United States, Canada, Japan, Australia, New Zealand, and 19 European countries, including Austria, Belgium, Denmark, France, Finland, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, and the United Kingdom.

Objectives, Scope, and Methodology

The Chairman of the Senate Committee on Energy and Natural Resources asked us to provide information on

- Poland's energy needs and the steps being taken or planned to address them as well as the resulting potential trade and investment opportunities for U.S. firms,
- the impediments to realizing these opportunities and ways in which the U.S. government is trying to overcome them, and
- the current status of U.S. programs to support Poland's energy sector.

To identify Poland's energy needs and the steps being taken or planned to address them, we interviewed officials of U.S agencies and international organizations and obtained their reports and analyses of Poland's energy sector. In the United States, we obtained information and records from the Departments of State and Energy and the Environmental Protection Agency. In Brussels, Belgium, we interviewed representatives from the European Commission and the Group of 24. In Paris, France, we met with representatives of the Organization of Economic Cooperation and Development and the IEA.

We visited Warsaw and Krakow, Poland, to obtain information on the potential trade and investment opportunities for U.S. firms. We interviewed officials of Polish government agencies responsible for managing coal, oil and gas, and electricity enterprises (see app. I). We also collected available reports about Poland's plans to address the problems of its energy sector. We used the long-range energy sector projections made in reports by Poland's Ministry of Industry. We did not validate the reasonableness of estimates in these reports because we used them primarily to describe Poland's plans to develop its energy sector.

To help identify the impediments to realizing possible U.S. trade and investment opportunities, we met with Polish officials and representatives of three U.S. firms conducting energy-related activities in Poland. In addition, we interviewed officials of several energy and business associations and attended two conferences on business opportunities in Eastern Europe.

We interviewed officials and reviewed records of the U.S. Departments of Commerce and the Treasury, the Eximbank, OPIC, the Trade and Development Program, and the Office of the U.S. Trade Representative to obtain information on U.S. efforts to remove trade barriers associated with U.S. regulations and on the types of actions they have taken to assist U.S. firms entering into commercial relationships in Poland.

We collected information on the current status of U.S. programs to support Poland's energy sector. We gathered data on the overall programs for Eastern Europe and identified the status of activities to assist Poland's energy sector. We obtained information on the implementation of DOE's clean coal technology demonstration project in Krakow from Polish officials responsible for managing the electric power plant that will receive the equipment. We also met with local officials and citizen groups who are knowledgeable about the project's impact and interviewed DOE and AID officials who are responsible for project implementation. (App. I provides a detailed list of organizations we contacted during this review.)

We conducted our work between September 1990 and April 1991 in accordance with generally accepted government auditing standards.

As requested, we did not obtain official agency comments on this report. However, we discussed the information contained in a draft of this report with responsible program officials at the Departments of State, Commerce, and Energy; the Agency for International Development; the Environmental Protection Agency; the Office of the U.S. Trade Representative; the Export-Import Bank; and the Overseas Private Investment Corporation. Their comments have been incorporated in the report where appropriate.

Modernizing Poland's Energy Sector Will Create Potential Opportunities for U.S. Trade and Investment

Poland recognizes the need to overcome serious problems in virtually every part of its energy sector, from developing basic sources of energy to generating power and using energy more efficiently. To improve its energy sector, Poland plans to modernize its coal extraction methods, increase its production and use of oil and gas, expand and modernize power production and distribution, and encourage efficient energy use. While they have not yet completed setting energy sector priorities, Polish officials have already identified general modernization plans that could create a variety of business opportunities for U.S. firms. The availability of adequate financing and the ability of businesses to make profits will determine how quickly and extensively U.S. firms can take advantage of whatever opportunities exist. Various multilateral programs will provide funding in the near term for projects for which U.S. firms can compete.

Poland Plans to Improve Its Use of Coal and Develop Alternative Energy Sources

Coal has been the primary source of most of Poland's energy. It will continue in this role, despite mounting costs caused by mining difficulties and environmental problems, because Poland lacks substantial alternative domestic resources. However, Poland plans to improve its coal extraction methods to reduce production costs and minimize pollution. At the same time, it plans to expand oil and gas imports and explore other sources of energy. Accomplishing these tasks will require considerable help from foreign companies.

Coal Extraction Methods Need to Be Modernized

Production of hard coal, Poland's main energy source, is increasingly difficult and costly. Poland relies on hard coal to meet 61 percent of its primary energy needs, and this dependence will continue for at least 10-15 years since Poland has few other domestic energy resources.[1] However, Poland has not modernized its mining operations, making it difficult to gain access to its hard coal, which is mined underground. The average mining depth is 656 yards and increases 9-11 yards per year. A substantial amount of production takes place below 1,200 yards. At these depths, worsening geologic conditions and outdated mining operations make production difficult and increase mining costs.

Coal production also creates much pollution. Half of all dust and gas air pollution in the Upper Silesia area, the region that generates most of

[1] According to Poland's Ministry of Industry, in 1988 Poland had 65.9 billion metric tons of hard coal, 45 percent of which were proven recoverable reserves. Poland also had 12.9 billion metric tons of brown coal, with 90 percent of it as proven recoverable reserves.

Poland's hard coal, is estimated to originate from the mines. Salt water waste from the mines corrodes mining equipment and pollutes nearby rivers; 500-million tons of solid mine waste had accumulated at the surface by 1987. The Ministry of Environmental Protection has established pollution-related objectives that will require the mines to address these problems, thus increasing mining costs.

Unless costs and pollution are reduced, some mines may have to close. State subsidies, which supported mining costs in the past, are being reduced. As individual mines become more responsible for their own economic autonomy, they will face higher costs without the present subsidies. As a result, coal production costs will need to be substantially reduced and coal prices will need to increase. The Hard Coal Agency estimates that 25 of the 70 coal mines may have to close when government subsidies are eliminated. In addition, some mines will have to close if their low quality coal is not cleaned to reduce its sulphur content to the level now required by foreign and domestic users for compliance with pollution control standards.

According to the Ministry of Industry and other Polish energy sector officials, Poland plans to obtain foreign help to upgrade its coal mining equipment and technology. Better coal extraction equipment is needed to make mining more productive and less costly. To reduce pollution, Poland plans to install coal cleaning plants at 4 mines that produce the worst quality hard coal and later at 12 other mines. Desalinization plants are needed to treat the waste water runoff from hard coal mines. Polish Hard Coal Agency officials told us that American firms have the appropriate equipment, technology, and expertise to help modernize Poland's coal production.

Polish government officials have not yet determined the total amount of investment necessary to modernize the coal sector. However, the World Bank is conducting a study on restructuring the coal mining sector, and the results will provide more information on the scope of coal sector needs.

Poland Plans to Increase Use of Oil and Gas

To meet its expected energy demand and pollution reduction goals, Poland plans to augment its use of coal by using 43 percent more oil and oil products and 77 percent more natural gas by the year 2000. Poland imports most of its oil and gas, but supplies from its usual source (the Soviet Union) are declining and import costs are increasing. Thus, Poland plans to develop its domestic reserves while trying to increase

imports from alternative foreign sources. This plan will require modern equipment and technology from foreign businesses to tap domestic supplies and to update port, pipeline, and refining facilities.

The Soviet Union has traditionally supplied Poland with at least 90 percent of its oil at discounted prices payable in rubles. However, the Soviet government has reduced oil shipments to Poland and is now requiring payment for oil in hard currency at market prices. Oil imports from the Soviet Union in 1990 were expected to be approximately 20 to 22 million barrels less than the 99-million barrels originally planned—more than a 20-percent reduction—and more than double in price.

The crisis in the Persian Gulf exacerbated the oil supply situation. Poland had planned to use more oil from sources in the Middle East, including Iraq, but the crisis raised oil prices initially and cut off anticipated supplies. In fact, Iraq has not yet delivered 5.5 million barrels of oil that is owed Poland as part payment of its $500-million debt.

While Poland is continuing to rely mainly on the Soviet Union for its oil, it plans to increase oil use and diversify its supplies, primarily by importing oil from other countries. For example, Iran has agreed to provide Poland with 15-million to 22-million barrels of oil in 1991. To handle increased imports, pipeline networks and port facilities need to be expanded, according to a number of officials. They also said existing oil refineries need to be upgraded and new ones built to handle these additional oil supplies. In addition, more exploration is needed to locate new domestic oil reserves, although the size of any new reserves is likely to be small.[2]

Poland also plans to increase its use of natural gas by importing gas from Western Europe and possibly northern Africa and by further developing its own domestic gas resources.[3] The Soviet Union has provided Poland with all of its imported gas in the past, but as Poland starts to rely on other sources, a liquefied natural gas terminal may be needed to handle these imported supplies, Polish officials said. Equipment and technology are needed to modernize existing local gas fields,

[2]According to Poland's Ministry of Industry, in 1988 Poland had only 28.6-million barrels of proven crude oil, 41 percent of which were proven recoverable reserves.

[3]Poland had estimated reserves of 167.8-billion cubic meters of natural gas as of 1988, with about 80 percent of it as proven recoverable.

locate and develop new ones, and expand storage and transmission facilities. Finally, coal gasification and coal-bed methane technology is needed to tap the gas resources from coal.

Because Poland plans to substitute gas for coal to help reduce pollution, officials said some coal-burning district heating systems need to be converted to natural gas. Moreover, some residential consumers will need gas stoves to replace coal-burning stoves. Gas will eventually be used to generate more electric power after domestic gas supplies are developed.

Officials of the Polish Oil and Gas Company estimate that it will need to invest $300 million a year for the next 10 years for oil and gas exploration and distribution and will need the same amount over the same period from foreign investors. Several U.S. government and Polish officials told us that U.S. oil and gas companies could play a major role in helping provide Poland with the equipment and technology it needs to diversify its energy supplies and use them more effectively.

Additional Energy Sources Being Sought

Aside from coal and gas, Poland has few other energy resources for generating power. It ended construction of its only nuclear power plant because of high construction costs and public concern about the safety of nuclear power. Hydropower contributed less than 3 percent of Poland's electricity in 1989. In addition, Poland currently has no credible renewable energy program.

In order to meet future energy demands, Poland plans to construct hydroelectric and nuclear facilities that can provide additional energy. The Ministry of Industry determined that only 15 percent of the hydroelectric potential has been utilized. The Polish Power Grid plans to construct 11 hydroelectric plants along the Vistula River using foreign technology, and it also plans to modernize existing hydroelectric facilities. Poland also expects to introduce western nuclear technology to begin providing power by the year 2005. However, any decision about using nuclear energy will be preceded by an examination of related costs and safety issues. According to IEA reports, such a decision would have to be made by about 1995 in order to meet projected energy needs.

Power Production and Distribution Need Expansion and Modernization

To meet its growing demand for electric power, Poland plans to modernize its outdated and polluting power infrastructure and expand its power-generating facilities. Its current power-generating and distribution infrastructure is outdated, and a heavy reliance on coal-burning power plants causes much pollution. To meet future demand, Poland plans to construct additional capacity, modernize and expand the electricity grid, and use more pollution control equipment and technology to comply with environmental protection requirements.

Poland has the capacity to generate 32,000 megawatts of electricity through 56 thermal power stations and 119 hydro-electric plants. Thermal stations that burn hard coal generate over 60 percent of Poland's electricity, while brown coal generates 36 percent of the domestic electricity supply. Many of these coal-fired plants use technology from the 1950s. Some industrial facilities rely on their own power plants to produce electricity, but these plants have not been upgraded. Moreover, the main transmission system and the local distribution systems have suffered from a lack of investment. The World Bank estimates that Polish power transmission and distribution losses are among the highest in Europe. According to the IEA, these losses are about 11 to 12 percent.

Poland plans to acquire new equipment and technology to modernize its power generation and distribution infrastructure. Energy sector officials believe Poland needs to renovate about 20-30 percent of its existing electricity plants using foreign technology and equipment, and all of the coal-fired power and heating plants need clean coal technology to reduce pollution. Some industrial users that generate their own electricity will need to modernize their own power generation facilities or build new ones. In addition, the electricity transmission system needs to be improved to reduce waste, and transmission technology is needed to connect the different electrical systems of Eastern and Western Europe.

Polish Power Grid officials estimate that $20 billion will be needed over the next 10 years to build additional electricity-generating plants (including hydroelectric and nuclear plants), modernize the electricity grid, and comply with environmental protection requirements. They told us that the Polish Power Grid will be able to finance half of this amount once electricity prices rise, but it will need to obtain the remaining $10 billion through credit or investment from other sources. Through the Department of Energy's domestic clean coal program, U.S. firms have developed technology to produce cleaner coal-generated power, and

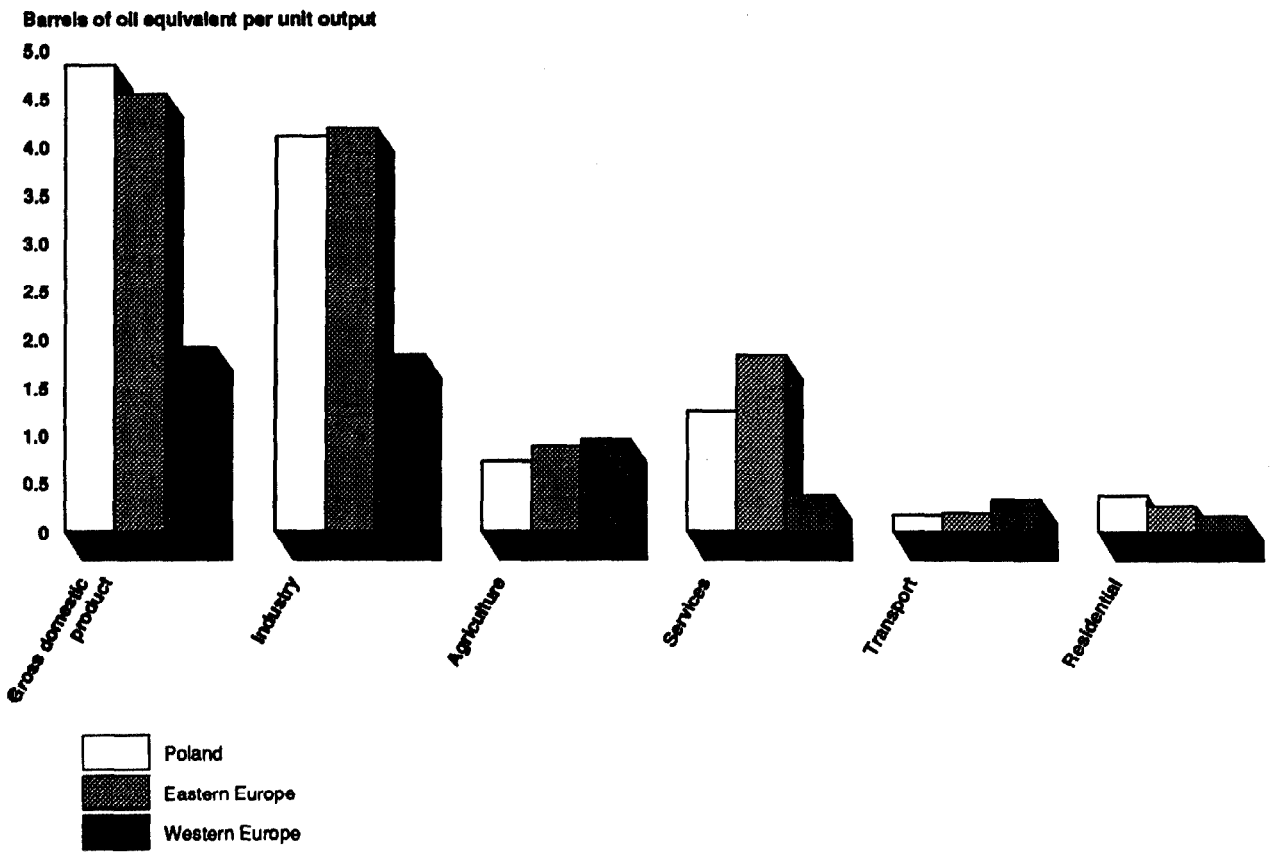
Poland can use these technologies to help modernize its coal-dominated power infrastructure.

Modernization Needed to Improve Energy Efficiency

Lacking market incentives to save energy, Polish industries and residential consumers have in the past used energy extremely inefficiently. The Polish government is now beginning to allow prices to rise to market levels to rebuild its energy sector and improve efficiency. Poland also plans to more carefully monitor the amount of energy consumed, use better construction and insulation techniques, and modernize equipment to bring down the energy intensity of its industries and increase the efficiency of household usage.

Poland's economy, like those of the other East European countries, is more than twice as energy intensive as the West European average (see fig. 2.1). This high energy intensity results from factors such as low energy prices; the overall structure of the Polish economy, which relies on heavy industry; and the inefficient use of energy.

Figure 2.1: Comparison of Poland's Energy Intensity by Sector With Eastern and Western Europe, 1987



Notes:Energy intensity is a ratio of energy used per unit of output. For example, Poland uses 4.1 units of energy for each $1,000 of industrial production while Western Europe uses 1.8 units of energy for each $1,000 of industrial output.

For gross domestic product and the industry, agriculture, and service sectors, energy intensity is measured as barrels of oil equivalent (BOE) per $1,000 of output. The service sector excludes transport. Energy intensity for the transport sector is measured as BOE per passenger or ton kilometer of road and rail transport. For the residential sector, it is BOE per square meter of housing.

Eastern Europe includes Bulgaria, Czechoslovakia, the former East Germany, Hungary, Poland, Romania, and Yugoslavia.

For the transport and residential sectors, Western Europe includes France, West Germany, Italy, and the United Kingdom. For all other categories, Western Europe refers to the European countries of the Organization for Economic Cooperation and Development.

Source: International Energy Agency, The Energy Situation in European Economies in Transition (Apr. 1990).

While we did not address the economic factors, we found a number of indicators of how inefficiently energy is used. For example, the World Bank has said that industrial energy use in Poland would need to be reduced by 25-30 percent to make it comparable to industries in Western Europe. The Polish cement and steel-rolling industries alone use 35 and 39 percent more energy, respectively, than their West European counterparts, according to the World Bank.

Poland also uses inefficient district heating systems to provide heat to business and residential consumers. According to the IEA, Poland is one of the most intensive users of district heating in the world. Those systems have poor insulation, lose hot water, and lack modern control stations in the heating plants. Moreover, heat and hot water are not metered for residential consumers, who thus have little incentive to conserve their use.

Poland plans to encourage energy efficiency by providing market incentives. This plan, along with steps to restructure the economy away from energy-intensive industry and acquire more energy-efficient equipment, is expected to reduce the overall energy intensity of the economy.

Potential opportunities exist for foreign trade and investment to help Polish energy consumers monitor their energy use and consume energy more efficiently. Industrial consumers need meters to monitor the amount of electricity used in different parts of their plants, and residential consumers need meters to measure the amount of heat used by each household unit. Residential consumers also need building and pipeline insulation to reduce heat loss. In addition, industrial and residential consumers need to acquire a wide range of equipment and technology that have higher energy efficiency ratings, such as typical household appliances.

Pricing Policies and Financing Will Determine Ability to Exploit Opportunities

The level of trade and investment opportunities available for U.S. firms will depend on how successfully market prices can be established and on the availability of financing for modernization plans. Several studies are underway to help the Polish government establish priorities for modernizing its energy sector.

Poland generally places low priority on privatizing or giving government funds to its energy industries. Most of the energy sector will likely remain under state ownership, but Polish authorities do not think state

ownership of individual energy sector enterprises is an obstacle to foreign investment through joint ventures.

Eventually, the government of Poland intends to have energy enterprises become self-reliant. However, low energy prices deprive energy producers of the revenue needed to modernize their operations and deny investors adequate profit potential. For example, the director of one power plant told us that end-use electricity prices need to be increased 300 percent before the plant can make the profit necessary to finance the purchase of needed technology. Natural gas prices have been significantly less than the market price, and the domestic coal price is less than half the export price. Moreover, until consumers have to pay market prices for energy usage they will have little incentive to conserve and become more energy efficient. Without market prices, the motivation to use more efficient equipment and technologies is being diminished.

Accordingly, Poland plans to raise energy prices for industry users to world market levels by 1992; electricity and gas prices will be raised for residential consumers by 1993 and 1995, respectively, as shown in table 2.1.

Table 2.1: Polish Energy Price Increases (in Percent)

Energy resource	Increase in Jan. 1990	Additional increase as of Jan. 1991	Additional real increase required to reach West European level
Hard coal			
Industry	400	50	70
Residential	600	50	70
Lignite (brown coal)	150	50	10
Natural gas			
Industry	370	60	20
Residential	400	260	400
Electricity			
Industry	280	15	60
Household	400	120	170

Note:The figures for 1990 and 1991 are nominal price increases. The figures in the last column reflect increases in real prices that are adjusted for inflation.

Source:International Energy Agency, Energy Policies, Poland, 1990 Survey (Mar., 1991).

Under the government plan, higher prices would enable individual energy sector enterprises at the local and national level, such as coal

mines and national power authorities, to raise the funds needed to begin modernization. Once enterprises begin generating profits, the government believes the enterprises would be better able to purchase foreign equipment and technology required for modernization. Improved profitability would enable enterprises to obtain loans for modernization, and some will modernize by establishing joint ventures with foreign firms. More efficient operations will further improve profitability.

Multilateral agencies will provide additional funding for the modernizing process as Poland raises prices and determines its priority needs. The World Bank, IEA, European Community, and other groups are conducting studies that will help Poland identify needed energy-related priorities. Meanwhile, various multilateral organizations are beginning to provide funding for projects based on Poland's commitment to reform energy prices.

For example, the World Bank and the European Investment Bank are providing a total of $310 million to help finance a project to increase domestic production of natural gas and handle increased gas supplies. The World Bank also plans to loan $240 million to improve district heating systems, and it expects to make another loan for energy conservation activities. Both World Bank loans are conditioned on Poland's implementing energy price reforms. The Group of 24 has identified several energy-related projects in Poland that require foreign participation. The European Bank for Reconstruction and Development, a new bank that will focus on Eastern Europe, expects to provide funding soon for energy-related projects. American firms can compete for these multilateral projects.

Federal Trade Programs Promote U.S. Firms' Access to Poland's Energy Markets

An undeveloped legal and financial infrastructure, combined with economic instability, creates risks for businesses that invest time and resources in revitalizing Poland's energy sector. U.S. trade credit insurance and trade development programs have been designed to mitigate these risks by transferring them to the U.S. government, therefore providing incentives for U.S. firms to enter the Polish market. However, AID's Trade Credit Insurance Program (TCIP) to cover the Eximbank's exposure in Poland does not allow the financing of long-term or public-sector projects, and funding is limited for feasibility studies to help businesses properly assess proposed projects.

Poland's Business Climate Presents Many Risks for Trade and Investment

Poland's laws discourage foreign involvement in Polish business. According to the Departments of Commerce and State, limitations on profit repatriation, i.e., permitting profits to be exported, are a major hindrance to foreign investment in Poland. Profit repatriation in 1991 is limited to 15 percent of the net zloty profits generated by domestic sales. Commerce Department officials have also told us that present laws do not adequately protect copyrights on intellectual and private property of foreign investors, and no laws yet exist to determine who will have the responsibility for environmental cleanup. In addition, Commerce officials said that Poland lacks laws on how to bid for government contracts. These laws are needed to deter fraud, bribery, and unfair practices.

Limited credit also hinders foreign firms that want to do business in Poland. Poland's $48-billion foreign debt has limited its ability to back enterprises financially; therefore, commercial banks have generally been unwilling to provide additional credit. Although Poland's debt situation dramatically improved in March 1991 when major governmental lenders agreed to forgive about half of the $33 billion that Poland owes them, it is uncertain whether commercial lenders will be able or willing to provide significant loans until Poland establishes its creditworthiness for paying current and future debts.

Other impediments create difficulties for firms conducting business in Poland. The banking system and fledgling stock exchange in Poland are inadequate to aid domestic or foreign commerce. Foreign firms also have difficulty establishing the value of enterprises they wish to acquire because enterprises have not followed recognized western accounting principles—Polish enterprise records do not accurately reflect market operations because of their government subsidies, barter agreements, and trade that relies on unrealistic ruble exchange rates. Other factors,

such as an underdeveloped telephone system, a shortage of office space and staff experienced with a market system, a changing political situation and governmental reorganizations, cumbersome bureaucracy and red tape, and restrictive labor laws, also discourage foreign business involvement.

Poland is taking steps to address some of these problems. It plans to amend its foreign investment laws to protect foreign investment and property rights, allow more profit repatriation, and simplify bureaucratic procedures. It is revising its banking provisions to establish a banking system that will be patterned after West European systems and opened a limited stock exchange in April 1991. Moreover, Poland is reportedly considering the use of internationally recognized accounting principles and standards to assess the value of local enterprises. The legislative and institutional reforms being pursued in Poland are expected to improve the business environment, and lending countries have agreed to reduce Poland's official foreign debt. However, the reforms will likely take several years to implement and, therefore, foreign firms must continue to deal with the risks in the near future.

U.S. Programs Are Designed to Help Firms Enter Poland's Energy Sector

The U.S. government has several programs to facilitate U.S. trade and investment in Poland, including projects in the energy sector. The Department of Commerce provides a variety of services to help private companies, and other federal agencies have taken action to support business activity in Poland. However, the credit guarantees and insurance available through the TCIP are limited, and Trade and Development Program (TDP) funds to support feasibility studies are expected to fall short of requests.

The International Trade Administration in the Department of Commerce is responsible for promoting U.S. exports and strengthening the international trade and investment position of the United States. Its primary involvement in Eastern Europe is through the American Business and Private Sector Development Initiative, a $45-million, 2-year project designed to facilitate the transfer of U.S. capital and commercial expertise to the region. The project consists of six individual programs to be carried out by Commerce, AID, TDP and OPIC. Commerce has a $3-million grant program to assist in the formation of U.S. business consortia in Eastern Europe. It has created an American Business Center in Warsaw to provide marketing and other support services for U.S. firms. It also established the Eastern Europe Business Information Center in Washington to provide information on trade and investment opportunities in

Poland and other East European countries. In addition, Commerce sponsors trade missions and trade fairs for U.S. businesses in Poland and other East European countries.

Other federal agencies provide support for business activity in Poland. The Office of the U.S. Trade Representative, the Department of State, and the Department of Commerce negotiated a U.S.-Poland Treaty on Business and Economic Relations in March 1990 to protect U.S. companies engaged in all forms of commercial activity, particularly investment. It provides guarantees for treatment of investment, transfer of profits, expropriation of property, dispute settlement, business rights, and intellectual property rights. The U.S. Senate ratified the treaty in October 1990; it has not yet been ratified by the Polish Parliament.

The SEED act made Poland eligible for OPIC programs, which provide financing, information services, and political risk insurance for American businesses investing in developing countries. OPIC has developed two new programs that will support investment in Eastern Europe.

- The Central and Eastern European Growth Fund, with a target capitalization of $200 million, is being established with the assistance of financial guarantees from OPIC to invest in productive business enterprises in the region.
- The Environmental Investment Fund, with a target capitalization of $100 million, will invest in business enterprises in developing countries, including Eastern Europe, that use natural resources on a sustainable basis and practice sound environmental management. OPIC plans to provide $40 million of guaranteed long-term funds for this project.

OPIC's 1990 activity in Poland included $16.5 million in financing projects and $12.6 million in political risk insurance. Although none of these projects were in the energy sector, OPIC is currently in the process of negotiating several energy-related projects in Poland.

AID offers several potential sources of financial assistance for U.S. energy companies interested in trade and investment in Poland. As part of the American Business and Private Sector Development Initiative, AID plans to support feasibility studies, joint ventures, and management training associated with infrastructure investment projects through the $20-million Capital Development Initiative. U.S. energy firms can also request feasibility study assistance from AID's $1.2-million global Private Sector Energy Development Feasibility Study Fund, which has already funded two projects in Poland.

Trade Credit Insurance Program Is Not Available for Long-Term or Public-Sector Projects

AID's Trade Credit Insurance Program covers the Eximbank's risk only for short- and medium-term guarantees and insurance for sales to Poland's private sector. These restrictions limit the ability of U.S. firms to arrange financing for sales to Poland's energy sector, because sales of this kind require long-term financing, and because energy projects typically involve the public sector.

The SEED act of 1989 authorized the Eximbank to extend its programs to Poland. The act also required AID to establish the Trade Credit Insurance Program to cover Eximbank exposure in Poland. The act allows the Eximbank under TCIP to extend up to $200 million in short-term (1 year) guarantees and insurance coverage for exports of goods and services to private sector companies in Poland. The Foreign Operations, Export Financing, and Related Programs Appropriations Act for 1991 extended the coverage of TCIP to include medium-term financing. Under TCIP, AID reinsures Eximbank commitments. TCIP protects the Eximbank against nonpayment by Polish importers.

According to U.S. government and private sector officials, TCIP does not fully meet the needs of U.S. energy companies interested in exporting to Poland. The TCIP does not permit the Eximbank to extend long-term (7 years and over) financing for major projects. This restriction limits the ability of U.S. firms to make sales that normally require long-term financing, including sales for infrastructure projects in the telecommunications, electric power generation, power distribution, and environmental technology sectors.

Limiting TCIP to private sector projects in Poland may also discourage U.S. trade and investment because Poland's private sector is still very small. Most investment opportunities are still in public or quasipublic sector enterprises. This is especially true for the energy sector, which will likely remain public for a long time. While the Eximbank had only received two requests for financing from U.S. companies interested in making sales to Poland's energy sector as of April 1991, the provisions of TCIP may restrict the Eximbank's ability to offer guarantees and insurance to these companies. To date, the Eximbank has made no commitments to finance energy-related exports to Poland.

According to Eximbank and AID officials, the executive branch is not expected to seek renewal of TCIP from the Congress in fiscal year 1992. Recent events, including the decision by foreign governments to forgive about 50 percent of Poland's debt and the International Monetary

Fund's April 1991 agreement with Poland to provide $2 billion in financial support over a 3-year period, have prompted the Eximbank to reevaluate Poland's creditworthiness and consider making its long-term loan, guarantee, and insurance programs available under its own risk account. The availability of Eximbank's long-term financing and financing for sales to Poland's public sector will remain uncertain until congressional and agency decisions are finalized.

Funds for Feasibility Studies Fall Short of Industry Requests

The TDP has a limited capacity to help U.S. firms determine the feasibility of possible investments in Poland's energy sector. As of April 1991 TDP officials expected that their fiscal year 1991 funds for feasibility studies would fall short of requests.

The TDP, an independent U.S. government agency, funds feasibility studies for major projects in middle income and developing countries where there is a potential for exporting U.S. technology, goods, and services. Its total program and administrative budget for fiscal year 1991 is $35 million.

Contracts funded by TDP grants must be awarded to U.S. companies, but host governments play an active role in developing the scope of work, selecting the U.S. company to carry out the study, and monitoring the progress of the project. To be eligible for a TDP grant, a project must represent a development priority for the sponsoring country; project financing must be identified; the potential for U.S. exports must be significant; and the TDP must be able to play an essential role in enhancing U.S. exports to the project.

According to a TDP official, the demand for TDP funding for feasibility studies in Eastern Europe has risen sharply since 1990 and is expected to continue to increase over the next 3 to 5 years. This will be a crucial period for U.S. companies to get involved in East European infrastructure projects in sectors such as energy, transportation, and telecommunications and to gain a foothold in these markets.

TDP officials expect that their fiscal year 1991 funds for projects in the region will fall short of requests. In the first half of fiscal year 1991, East European governments have made requests totaling about $11 million for projects that TDP has identified as viable according to its program criteria. Without additional funding, TDP will have to limit its projects in Eastern Europe to between $7 million and $8 million. In the

first half of fiscal year 1991, TDP had committed $4.97 million for projects in the region.

In Poland, TDP has committed $800,000 in fiscal year 1990 and $1.2 million in 1991 to fund a feasibility study to be carried out by the Westinghouse Corporation for the rehabilitation of seven power plants. It has also committed $40,000 to fund an orientation visit for Polish Oil and Gas Company officials to observe U.S. oil exploration technology. This visit will take place in conjunction with a $250-million World Bank project to assist Poland in developing its oil and gas sector.

The U.S. Government Has Programs to Directly Assist Poland in Developing Its Energy Sector

The U.S. government has a variety of programs to provide direct assistance to Poland's energy sector. EPA and AID have implemented programs to increase Poland's energy efficiency, and DOE is developing its energy efficiency activities. AID is developing technical training and professional exchange programs that will help Poland's energy sector managers operate in a market environment.

U.S. and Polish government officials raised some concerns about whether initial U.S. government assistance programs effectively targeted Poland's energy needs. The State Department has established an interagency coordination process that should help ensure that agency projects match the priorities identified by Poland.

EPA's Energy Efficiency Programs

EPA has taken an active role in providing energy efficiency assistance to Poland through the establishment of Energy Efficiency Centers in Warsaw and Katowice. These centers were set up in December 1990 to conduct policy research and development, develop private joint ventures in efficiency technology and services, fund training and demonstration projects, and provide public education and information services.

EPA provided the initial core funding for the Energy Efficiency Centers with $125,000 from a special fiscal year 1990 appropriation from the Congress to support EPA's programs in Poland and $25,000 from its global climate change budget. The centers are designed to be profit-making institutions operated by the Foundation for Energy Efficiency in Poland. Since the establishment of the centers, the foundation's activities have included testifying in the Polish Parliament on the Ministry of Industry's energy plan and its implications for energy efficiency in Poland; developing linkages with the United Nations Development Program in Warsaw and the Regional Environmental Center in Budapest; and organizing initial research projects.

AID's Energy Efficiency Programs

AID has included energy efficiency measures in two of its East European programs; these programs are in the early stages of implementation. AID's $10-million Emergency Energy Program is designed to help East European countries implement short-term energy efficiency measures and improve their capacity to purchase oil effectively on the international "spot" and oil futures markets. The program is also expected to pave the way for longer-term investments from private and public sources and further U.S. cooperative energy projects. As part of this project, AID has organized teams of experts from U.S. energy companies

to identify and implement low-cost measures to improve energy efficiency in industries, including energy audits and installation of energy-saving equipment. Implementation of the project in Poland began in February 1990.

AID has also developed a $14-million Regional Energy Efficiency project to encourage regional cooperation in promoting energy efficiency and environmentally sound energy use and in reorienting energy supply and trade systems to a market environment. This program will be carried out in conjunction with DOE, EPA, and international organizations including the World Bank, the European Community, and the IEA. AID expects to award contracts or cooperative agreements to several private companies or industry associations and to begin implementing this project in May 1991.

DOE's Energy Efficiency Programs

The SEED act requires DOE to assist Poland in putting in place energy-saving measures such as more efficient motors, lighting, gears and appliances, and building insulation and design. In fiscal year 1991 DOE plans to carry out its energy efficiency responsibilities primarily through its Krakow Clean Fossil Fuels and Energy Efficiency project, a $20-million, 3-year program designed to reduce low-level emissions from industrial and residential boilers and to increase energy conservation. In addition, DOE will receive funding to participate in AID's Regional Energy Efficiency project.

DOE's Krakow project is expected to get between $3 million and $5 million in funding for fiscal year 1991; allocation of the remaining $15 million to $17 million in future years is subject to approval of both the State Department Coordinator of Assistance to Eastern Europe and of the Congress. About $1.5 million of the fiscal year 1991 appropriation for the Krakow project is expected to be allocated specifically for end-use energy efficiency activities. DOE officials visited Krakow in November and December 1990 and submitted a list of proposed projects to Polish city government officials for their review.

Proposed measures to promote energy efficiency in Krakow's buildings and residential units include describing the current pattern of energy use in the city; assessing the costs and efficiency of the district heating system in providing hot water; and analyzing the costs and energy savings associated with the installation of thermostats, meters, valves, and insulation. A U.S. interagency team visited Poland in March 1991 to further develop the project design, and agreement with Polish authorities

on fiscal year 1991 project activities was anticipated in April 1991. AID expects to conclude an interagency agreement in May 1991 authorizing DOE to begin project implementation. In addition, DOE and AID officials told us that DOE has been an active participant in AID's energy efficiency activities in Poland and expects to become more involved in the activities of EPA's energy efficiency centers in Warsaw and Katowice.

According to DOE officials, DOE was delayed in initiating its energy efficiency activities by recent internal reorganizations and uncertainty about funding. For fiscal year 1990 the funds appropriated to DOE for activities in Poland were allocated to the modernization of a power plant boiler in Krakow; fiscal year 1991 funding allocations for agency programs in Eastern Europe were not finalized until the second half of fiscal year 1991. DOE officials also stated that DOE was reluctant to use its regular appropriations to fund activities in Eastern Europe. As of September 30, 1990, DOE had obligated about $150,000 for its activities in Eastern Europe, while AID and EPA had obligated about $500,000 each.

U.S. Government Is Developing Training Programs

Polish government officials have identified technical and management training in the energy sector as an immediate need. U.S. agencies are developing training programs that will help energy technicians and managers operate in a market economy.

According to AID, DOE, and State Department officials, providing technical training and professional exchange programs is a cost-effective way to give assistance and create opportunities for U.S. trade and investment. Training does not require costly capital investments, and it can foster the long-term business and government contacts that U.S. companies need to be competitive in the East European energy market.

Polish government officials have also emphasized the need for technical, business, and management training to develop their energy sector. Officials from each major energy organization in Poland told us that their energy sector managers and technicians need to acquire the skills necessary to operate in a market economy. According to these officials, under the prior centrally planned economy, energy sector managers were rewarded on how well they met production quotas and, as a result, they do not have the management skills in accounting, budgeting, and marketing that are needed to compete in a market economy. They also told us that their technicians need computer and electronics training to utilize new technology.

Initial U.S. government training programs for Poland's energy sector were limited to short-term workshops and seminars. For example, in 1990 the State Department's Science and Technology Program transferred $200,000 to DOE to conduct a series of energy efficiency seminars relating to building construction and industrial energy use. In September 1990 DOE's Office of Fossil Energy sponsored an environmental controls symposium in which U.S. companies discussed their technologies with Polish power plant directors, environmental technicians, and energy officials. Energy agency officials in Poland told us these seminars were helpful, but that Poland needs extensive training for managers and technicians to operate in a market economy, and this training cannot be attained in brief seminars or workshops.

A joint U.S. public and private sector training program is being developed to meet many of Poland's training needs. AID developed the program in cooperation with the U.S. Information Agency to provide management and market economics training in Eastern Europe. The program has received $18 million in funding for fiscal year 1991 and is expected to receive another $18 million in 1992.

AID's portion of the program, which accounts for $13.7 million of the total $18-million package, will provide grants to U.S. universities and private education institutions to give short- and long-term training to managers in Eastern Europe. Training programs will be designed for managers of state-owned enterprises and educators in areas such as agriculture, energy, banking and capital markets, privatization issues, and small- to medium-sized businesses. Market economics education for educators and government officials will include both short- and long-term courses and scholarships to U.S. universities. AID expected to award about 10 large grants to universities and private sector institutions in early 1991 and start implementation in the latter part of the year.

Several of AID's other programs in Eastern Europe include training components. The Emergency Energy Program contains plans to train Polish officials in performing industrial energy efficiency audits, oil spot-market trading, and energy price reform. The Regional Energy Efficiency project will offer technical assistance and training in energy efficiency and other energy and environmental management areas. As a participant in this program, DOE plans to arrange professional internships for Polish technicians and economists in U.S. power generation and distribution companies. AID's American Business and Private Sector Development Program also contains plans to detail Polish managers and

technicians to U.S. energy companies and to conduct management training in-country. Such private sector exchanges can help to bring new technical expertise to Poland's energy sector and, at the same time, develop important business contacts for U.S. firms.

Concerns Raised About Whether U.S. Government Programs Meet Polish Energy Needs

Implementation of DOE's initial project to assist Poland's energy sector raised concerns among some Polish and U.S. State Department officials about whether U.S. programs matched Poland's energy priorities. However, this project was initiated before the State Department had fully established its interagency coordination process to ensure that agency programs met specific needs identified by recipient countries.

One of the first U.S. projects developed to assist Poland's energy sector was DOE's Krakow power plant demonstration project. During his visit to Poland in July 1989, President Bush told the Polish government that the United States would help the city of Krakow to address its air pollution problems. This promise was fulfilled by provisions of the SEED act that authorized $10 million for DOE to demonstrate a U.S. clean coal technology at a power plant in the Krakow area.

In consultation with Polish authorities, DOE selected 1 of 11 boilers at the Skawina power plant as the site for the demonstration. The objectives of this project are to (1) allow Poland to continue to use its abundant supply of coal while taking steps to reduce sulphur emissions from coal-burning power plants and (2) promote U.S. energy technology exports. In March 1990 the United States signed a bilateral agreement with Poland to implement the project and formed a joint U.S.-Polish Steering Committee to coordinate the effort and select a U.S. contractor. The bilateral agreement also called for DOE to assist Krakow in developing a plan for a follow-on effort to reduce air pollution from industrial and residential sources.

Although the project was approved by the Polish government, some U.S. government and Polish officials have questioned whether the Skawina project is the most cost-effective way to meet Poland's needs. According to State Department officials, DOE's project may not be the most effective use of U.S. government assistance funds because it will have a limited impact on Krakow's air pollution and requires expensive equipment at a time when Poland cannot afford to make large capital investments. Thus, duplication of this technology at other plants in Poland may not be economically feasible. Some Polish officials have expressed concerns that the project will take several years to complete and is expected to

reduce Krakow's air pollution by less than 1 percent. These officials stated that the $10 million could have had a greater and more immediate impact if spent on addressing other sources of air pollution. State Department officials told us that the Polish government was reluctant to formally state its reservations about the project because it feared the U.S. government would respond by withdrawing the $10 million in assistance rather than offering alternative programs.

In response to the questions raised about the Skawina project, DOE told us that (1) the equipment chosen will be conventional U.S. technology appropriate for Poland's needs, (2) a plan to replicate the technology at other plants in Poland is one of the criteria for selection of a U.S. contractor, (3) institutions such as the World Bank may be able to provide financing for replicating this technology at other Polish power plants, (4) Krakow citizens' groups have participated in the project planning committee, and (5) the project is part of an integrated plan to cost-effectively address the major sources of air pollution in Krakow and is fully supported by the Polish government.

State Department Has an Interagency Process for Coordinating Assistance to Eastern Europe

State Department officials explained that the Skawina plant project was implemented before the interagency process to review and coordinate assistance to Eastern Europe was fully in place. State has since taken steps through its interagency coordination process to ensure that U.S. assistance programs match Polish needs.

The President designated the Deputy Secretary of State as Coordinator of U.S. Assistance to Eastern Europe. The Coordinator, assisted by two deputies, leads an interagency Coordinating Council composed of U.S. agencies that are providing, or could provide, either direct or indirect assistance to Eastern Europe. To analyze issues and develop consensus on policy direction and strategy, the State Department established cluster groups within the Coordinating Council focusing on areas such as the financial sector, technical assistance, training and human resources, energy, and the environment. The State Department Coordinator or his deputies must approve the policies and initiatives proposed by the cluster groups.

The State Department Coordinator has begun to take steps to improve coordination of U.S. assistance to Eastern Europe. For example, the Coordinator has formally requested that all East European governments submit lists of their assistance priorities to the U.S. government to better match agency programs to the needs of recipient countries. The

Coordinator also requires that all projects involving energy and the environment go through an interagency review process to assess how they fit in with East European energy needs and to determine funding levels.

In addition, the Coordinator has directed AID to increase its role in the interagency coordination process by reviewing program proposals in coordination with other agencies and managing contracts and interagency agreements to fund agency programs. AID's Bureau for Europe and the Near East has established a new Office of European Affairs to manage U.S. assistance to Eastern Europe. Directors for East European energy and the environment who support this office told us they hold regular meetings with the interagency working groups on energy and the environment. Both DOE and EPA participate actively in these meetings. DOE is planning to detail an agency staff member to AID to assist in the coordination effort.

Improvements in the coordination process to increase emphasis on the energy needs of the recipient countries are reflected in the Coordinating Council's review of DOE's Krakow Clean Fossil Fuels and Energy Efficiency project. Since the SEED act did not specifically appropriate funds for this project, the State Department Coordinator required that it be reviewed in conjunction with other agency assistance programs to determine its funding level. During the review process, the Council requested modifications to the project to ensure that it fits in with the energy and environmental plans of the city of Krakow. As a result of the Council's review, DOE modified the project to include several alternative approaches, consulted closely with Krakow authorities to verify that the project will meet the city's needs, and expanded the energy efficiency component. AID expects to conclude an agreement with DOE to begin implementation of the project by late May 1991.

Organizations GAO Contacted

Federal Government

Department of Commerce
Department of Energy
Department of State
Department of the Treasury
Agency for International Development
Environmental Protection Agency
Export-Import Bank of the United States
Office of the U.S. Trade Representative
Overseas Private Investment Corporation
Trade and Development Program

Private Sector

Coal Exporters Association
National Electrical Manufacturers Association
European Council of Industrial Chemical Federations
U.S. Chamber of Commerce
Polish Chamber of Commerce (Warsaw)
American Chamber of Commerce (Warsaw)
Control Data Corporation
General Electric
Southern Electric International
Westinghouse Corporation

Multilateral Organizations

European Community
Group of 24
International Energy Agency
Organization for Economic Cooperation and Development
World Bank

Polish Contacts

Central Planning Office
Foreign Investment Agency
Hard Coal Agency
Ministry of Environmental Protection, Natural Resources and Forestry
Ministry of Foreign Economic Relations
Ministry of Industry
Ministry of Ownership Transformation
Polish Academy of Sciences
Polish-American Enterprise Fund
Polish Ecological Club
Polish Oil and Gas Company
Polish Power Grid

Power Research Institute
Skawina Power Plant

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