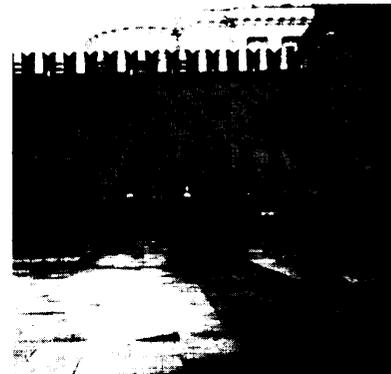


Policy Considerations 6

The countries of Central and Eastern Europe all have energy problems, some extremely serious, as has been described in the previous chapters. The problem is not a lack of regional resources, but economic and political disruption. Even in energy producing countries such as Russia, energy shortages have become a constraint on economic activities. Some problems can be corrected by these countries themselves or could be alleviated by overall economic reform (e.g., ending subsidies of energy prices that encourage waste). As market prices and incentives improve decision making, and obsolete manufacturing facilities are replaced, energy efficiency will rise. However, that presumes they will successfully navigate the transition.

The process of raising energy efficiency can be greatly accelerated by technology transfer from the West, thereby contributing substantially to the transition. The notable gains in efficiency in the United States since 1973 came from myriad technological improvements, many of which can be transferred to these countries. In a few years, energy savings could far exceed direct financial assistance from the West and help finance overall economic revitalization.

Assistance in increasing energy efficiency could return several benefits to the United States. First, improving energy efficiency appears to be one of the most cost-effective contributions to economic revitalization. There is a clear U.S. national interest in promoting revitalization because the present economic chaos could lead to security concerns if hostile, authoritarian regimes emerge. It is likely that savings in the U.S. defense budget from the end of the cold war will be small if economic reforms fail in the former Soviet Union (FSU). Second, some of the energy saved will be available on the world oil market (and some very



Jaime M. Sedor

The Kremlin Wall by Lenin's tomb.

Box 8-A-Example of U.S. Benefit From Energy Efficiency Assistance

If the **petroleum consumption of the former East Bloc (about 10.5 million barrels/day (MMB/D) in 1989) is reduced sufficiently to expand exports by 1 MMB/D**, world oil supplies (out side the former Bloc) effectively would increase by about 4 percent. Such an increase might decrease world prices about 3 percent (the actual number would vary with time and the outcome of many variables including the behavior of other exporters and importers; this is an estimated composite). Since the United States imports about 7 MMB/D which now cost \$20/barrel, savings would be \$1.5 billion/year. These savings would continue **until the facilities or equipment to which the improvements are made are replaced, probably at least a decade on the average.**

Estimates of what it would cost to achieve these savings are very uncertain, but the total would be about **\$7 billion total if, as appears likely, sufficient opportunities to save this much energy are available with one year payback**. For example, the United States could supply a combustion control system and other equipment costing **\$200,000 to a factory in Eastern Europe that saves 10,000 barrels of oil per year, worth \$200,000. If a total of \$7 billion** was supplied to save energy, the nations of Central and Eastern Europe would save \$7 billion/year. The United States would save \$1.5 billion/year, recouping its investment within 5 years **and** continuing to enjoy the dividends for many more. However, not all oil saved will be exported. Some of the savings will allow very expensive or high-sulfur oil to be left in the ground. Therefore, additional efficiency gains must be **attained to achieve 1 MMB/D** additional exports. Countering this factor are the contributions of other countries, particularly in Western Europe. The United States need supply only its share, not the entire remedy. All importers benefit from lower prices not matter what the source.

Price decreases normally lead to consumption increases, which could negate the advantage. That need not happen if an energy tax such as on gasoline, imported oil, carbon, or general energy was imposed to raise the price to consumers. This combination of tax plus increased assistance would capture economic advantages for the nation without encouraging increased imports of oil. It would, however, come at the expense of oil exporting countries, including U.S. allies such as Mexico and Venezuela.

This simplistic calculation is only indicative, not predictive, but it shows that the benefits to the United States of energy efficiency assistance to Eastern Europe could be very large even without counting indirect benefits such as increased stability and trade, and an improved environment.

SOURCE: U.S. Congress, Office of Technology Assessment, 1993.

expensive or dirty fuel will simply not be produced), keeping prices lower than they otherwise would be. As a major oil importer, U.S. economic savings could be substantial (see box 6-A).

Third, energy is one of the major sources of pollution in Central and Eastern Europe and there will be major environmental benefits from reducing consumption. In particular, improved energy efficiency in this region may well be the most cost-effective way to reduce emissions of carbon dioxide, the main concern for global climate change.

Efforts to assist Central and Eastern Europe must be shaped by the urgency of the political and

economic crises facing these countries, caution because of the complexity of the situation, and recognition that the United States can supply only a small fraction of the help that is needed. The outcome of reform efforts for many of these nations is very uncertain. The reforms may succeed, resulting in friendly, productive trading partners. They may fail catastrophically, resulting in total chaos and great human suffering. Or they may be terminated violently by new, authoritarian leaders. The latter two prospects are likely to be far more expensive for the United States than even a massive aid program. Western involvement may well be crucial in averting disaster in this region.

Table 6-1—Policy Options To Promote Technology Transfer

Increase Funding for Energy Assistance
Information programs-policy assistance and technical assistance. Material support-purchase equipment and support private investment.
Reorganize Assistance Programs
Rationalize procurement policies Review "Buy-America" policy Re-organize for efficient cooperation
Investment and Export Assistance
Expand TDP and AID feasibility studies Institute insurance for economic risks Support CORECT Export-Import Bank assistance for small companies Expand FCS and other assistance programs
Training and Education Programs
Ensure all assistance programs include training when feasible. Establish programs to bring trainees to the U.S. Encourage university programs Train energy analysts directly. Create a legislative energy policy course for parliamentarians.
Federal Agency Cooperation
Increase DOE and EIA roles in advising governments. Support Federal and State regulatory agency advice programs. Collaborate in R&D efforts.
International Assistance Programs
Encourage multinational agencies to give higher priority to efficiency.

SOURCE: U.S. Congress, Office of Technology Assessment, 1993.

However, it is clear that the impact of U.S. aid will be small unless the nations of Eastern Europe provide the conditions to make assistance useful. Most technology transfer and foreign investment will be from private enterprise. Much is now deterred by political and institutional instability, uncertain legal requirements, punitive taxation, and other problems. Some nations are actively addressing these problems, others have barely started. U.S. Government technical assistance must be targeted to where it can be used most effectively. There is little point in trying to improve the energy efficiency of enterprises that have no market incentives to improve themselves. Greater energy assistance can have major benefits, but only if **carefully directed**.

The previous chapter discussed the programs that have already been initiated. Most of these

programs involve technology transfer, usually in the form of information (e.g., policy advice, access to databases), specific technical assistance (training, energy audits), and material (financial assistance to procure equipment). This chapter suggests how these programs might be strengthened and the potential results if they are. A recent OTA report¹ on energy in developing countries has further information on the agencies and institutions involved. The nations of Central and Eastern Europe are technologically, economically, and socially quite different from developing countries. Nevertheless, the mechanisms for expediting technology transfer and supplying foreign assistance are largely the same, and much of the policy discussion in that report is relevant here.

The major areas to consider are shown in table 6-1 and discussed below.

U.S. POLICY OPTIONS TO INCREASE TECHNOLOGY TRANSFER

I Increase Funding for Energy Assistance

The current level of foreign assistance funding for Central and Eastern Europe is substantial, as discussed in the previous chapter. Nevertheless, far more assistance could be used effectively and may be essential in avoiding disintegration of some states. It is not the intent of this section to analyze where the additional funds would come from. However, the budget deficit is inescapable, so it is worth noting that there are only three options:

1. The overall foreign aid budget could be increased, putting further pressure on the deficit;
2. Funds could be redirected from other regions of the world, further reducing already diminished programs in developing countries that may need assistance even more desperately;

¹U.S. Congress, Office of Technology Assessment *Fueling Development: Energy Technologies for Developing Countries*, OTA-E-516 (Washington DC: U.S. Government Printing Office, April 1992).

3. Energy efficiency projects could be given a higher priority for the funds already earmarked to Central and Eastern Europe. However, the needs are so great across the region and across these economies that it is difficult to argue that energy efficiency is necessarily such a high priority.

All three of these options involve major liabilities, yet the need for the funds is also very great. Congress will have to balance some very important national goals in considering this issue.

Several of the following sections discuss specific areas where funding increases may be warranted. This section is an overview of what might be done for energy efficiency if an overall increase is seen as in the national interest. Two general areas should be considered to accelerate energy-efficiency technology transfer: increases in programs involving the transfer of information, and increased support for investment and the purchase of equipment.

INFORMATION

Unlike developing countries, Eastern Europe has substantial technical capabilities. The main reason that efficiency is so low is because the system provided no incentive to minimize costs, not because decisionmakers couldn't have figured out how to do it had that been their goal. Now, even though elements of the market are being introduced, it will take a long time before the incentives are completely in place. Decisionmakers must learn how to react to them and become acquainted with opportunities to do so. Energy-efficiency information programs are intended to accelerate the latter two shifts. Policy assistance improves the understanding of decisionmakers, while technical assistance provides the necessary skills and data at the local level.

Policy assistance is rendered primarily by the Agency for International Development (AID) and the Department of Energy (DOE) through the Regional Energy Efficiency Project, in particular the Energy Pricing, Energy Efficiency, and Energy Restructuring component (\$6.4 million,

which includes technical assistance). Increases in energy-policy assistance would logically come from the same agencies, plus perhaps the Environmental Protection Agency, through information exchanges, visits, and other contacts. Enhanced contacts are discussed below in the section on Federal Agency Cooperation. Generally, this need not be a very costly nor long-term program. However, increased funding would accelerate the growth of expertise needed for energy system market reforms.

Technical assistance encompasses a variety of activities including the promising centers for energy efficiency. These appear to be well received in the areas they are starting to serve, and expanding the concept could be considered. The United States has sponsored centers in Prague, Warsaw (with an office in Katowice), and Moscow, and another is being created in Sofia, Bulgaria. Others could be initiated in Ukraine, Belarus, Hungary, and elsewhere. Since these centers employ primarily local people, care has to be taken to ensure that the proper expertise and support are available. These centers could lose credibility if they are expanded too rapidly. However, they also appear to be among the most effective forms of U.S. assistance, and if additional funds can be supplied, centers should be a high priority. The centers are funded by AID through DOE.

Another activity that could be effectively expanded is for demonstrations of technologies unfamiliar in eastern Europe. Techniques such as combustion control, waste heat recovery, energy management systems, and power systems monitoring are well known in the West but not in Eastern Europe. Before plant managers commit to making changes, they will want to be sure that changes are worthwhile. Demonstrations have been important in this country to accelerate penetration of new technologies. They will be even more important in eastern Europe where the whole concept of innovation to reduce costs is new. For example, several combustion control systems have been installed on boilers in factories

and district heating plants. The results have surprised the operators who had no idea how cheap and easy it is to save energy.²

AID's industrial audit program already includes some demonstrations. It could be expanded to include a greater emphasis on the installation of energy-saving equipment, with follow-up monitoring and information programs for other facilities with similar needs. The audit program itself could also be expanded to Russia and other FSU nations.

The third area of technical assistance that appears to be particularly appropriate for expansion is *training*, such as for energy managers and auditors. This is discussed below under training and education programs.

Adding several million dollars to the Energy Pricing, Energy Efficiency and Energy Restructuring component would significantly increase the value of these programs. More might be required if many demonstration projects are desired. Such a strong program would help build relationships among U.S. companies and new customers, leading to longterm commercial benefits.

MATERIAL ASSISTANCE

The second general area for increased assistance, support for investment and purchases, would be more expensive, though results could be commensurate and there would be considerable benefit to U.S. companies. Lack of money is one of the greatest barriers to improved efficiency as these nations introduce market economies. In many cases, managers know what should be done, but they simply can't afford to do it. Making additional funds available for enterprises to purchase new equipment, revamp energy intensive production lines, upgrade buildings and heating systems, and increase production of energy-efficient equipment would be the most effective

thing the U.S. Government could do. Clearly, there are far more opportunities for funds to be productively spent than are likely to be funds available. Nevertheless, any increase, if targeted appropriately (see below), would be useful.

The major approach to assisting directly in improving energy efficiency is through AID. AID could expand its assistance with the purchase and installation of the equipment recommended in its energy audits of industrial facilities and district heating plants. Such a program would be similar but much larger than the demonstration program discussed above. Results should be significant because in many cases, without assistance, the improvements will not be made. In addition, AID could supply the expensive instrumentation needed for sophisticated energy audits. Training in audits does little good if the auditing team cannot afford the means to perform the work.

Naturally, there will be considerable pressure to buy American equipment under such a program. However, OTA has heard reports that this approach sometimes has failed because the American supplier has not had adequate service representation in eastern Europe, or because American equipment was not appropriate for the task. This problem is discussed in the following section.

Another cautionary note is that it is necessary to be careful about who receives the funds. Supporting bankrupt facilities will accomplish little. In countries where implementation of market incentives is lagging, central ministries may not make good use of assistance. Funding for energy efficiency must be targeted directly to where it can be used effectively.

Other programs to support exports and investment overseas are discussed in the section below on export assistance. These are not primarily foreign assistance programs.

² Michael Ellis, "Energy Efficient Technologies and Methods in Industries: USAID Industrial Energy Efficiency Program in Lithuania," paper delivered by Mark Hanson at a conference "Improved Energy Efficiency in Former Centrally-Planned Economies," Kaunas, Lithuania, Oct. 19-21, 1992.

| Reorganize Assistance Programs

Much of the U.S. program for assistance to Central and Eastern Europe has been well-planned and has produced encouraging results. However, there also is some evidence that operations could be more effective. The strategic planning for assistance to Central and Eastern Europe appears to be inadequate. Aside from the G-7 agreements, no one has determined how much aid is required and the most effective way to deliver it. Even within AID, responsibility is divided among several divisions, and intergroup communications appear to be less than complete. There appears to be ample opportunity to streamline the programs, although that is beyond the scope of this assessment.

A common operational complaint is that procurements are too cumbersome, in large part because they seem burdened with excessive safeguards to ensure fairness and honesty. While these are certainly laudable goals, rigid application of tight controls, especially where the controls are not appropriate, can result in virtual paralysis. For example, staffing for the energy efficiency centers was delayed because of a requirement for proof that the salaries to be paid were comparable to those for similar jobs. It is almost impossible to determine comparability during the economic turmoil that exists now, but getting the requirement waived was very difficult. No one seems to have the authority or the incentive to restrict the review to those regulations that make sense for a particular procurement.³

The procurement process also deters potential contractors who may have the expertise or products needed but who lack the resources to learn the system. The net effect, at least for AID procurement, is a concentration on familiar contractors who know how to navigate the process. For example, the specialized energy auditors who analyze U.S. industrial facilities feel shut out of



Larry Markel

U.S. advisors training Polish technicians in weatherization techniques.

the AID process. Contracts are often large and cover many separate tasks. Small contractors are unable to respond even if they find out about the opportunity, and don't have the resources to persevere through the contracting process. If the audits are to be expanded past the current basic stage, it will become increasingly important to tap this specialized expertise.

Nonprofit institutions also find the process formidable. For example, a consortium of environmental organizations led by the Natural Resources Defense Council has proposed an energy efficiency program, involving training and assistance in developing integrated resource planning (IRP) concepts in the North Caucasus region of Russia. The idea appears worth considering, but the group has had difficulty applying for funding

³ This was a recurrent theme of the OTA workshop on Sept. 18, 1992 and in the "Report of the Task Force on Foreign Assistance" to the Committee on Foreign Affairs, U.S. House of Representatives, Document 101-32, Government Printing Office, February 1989.

because it does not fit neatly into any existing activity.

Some of the problems encountered are generic to the U.S. Government, rather than specific to AID. Congress might consider whether all the accountability and other requirements imposed on government agencies are taking an excessive toll in governmental efficiency and creativity. An evaluation of procurement practices and reform is well beyond the scope of this study. However, three modest steps to expedite the process would be particularly relevant to Central and Eastern Europe. First, quite frequently only one or two local contractors are qualified (especially since command of English is one of the necessary qualifications). Simply easing the standards for sole source procurement would facilitate contracting with little or no loss of competition. Second, a small portion of the funding could be exempted from some of the controls to encourage agencies to experiment with unorthodox approaches and creative ideas. The energy efficiency centers were not initiated through an AID plan, but because outsiders, working through DOE, were able to make the case they were needed and persevere through the process of securing funding.

Third, funds now transferred from AID to another agency could be appropriated directly. In particular, the energy efficiency centers are paid for by AID through DOE, because of the latter's expertise on the subject. The Environmental Protection Agency also receives funds from AID for various programs. Centralizing the appropriations helps to coordinate activities, especially when the activities are in a state of flux. However, if a specific item is likely to receive funds for a period of years (such as expanding the number of energy efficiency centers), appropriating the money directly to the disbursing agency would save a step that requires time and effort.

Another issue has been pressure to spend funds in this country rather than transferring them to the

recipient country. Up to a point, such a practice is both necessary and reasonable, and all donor countries engage in it to some extent. It would be hard to justify spending our funds for equipment supplied by our trade competitors. However, as noted in the previous section, American equipment can also be useless equipment if it fails and cannot be serviced. In the long run, this damages American interests and wastes assistance.

Overemphasis on "Buy American" can also conflict with the SEED Act, which seeks to build up the capabilities of Central and Eastern Europe. If, as assumed in this report, the object of aid is economic revitalization, then the latter must have priority. Aid that does not promote development will have very limited results. The old adage that you can feed a man for a day if you give him a fish, but he can feed himself for life if you give him a fishing rod has a modern counterpart. Sending an American team to install a combustion control system on a boiler in Moscow will save energy for that facility. Helping a local enterprise design and build control systems, and training energy engineers in how to use them, will create a flourishing business and help many facilities save energy. The impact of aid that conveys new capabilities, i.e., technology transfer, will continue to grow far beyond the ability of the West to give goods and services.

Naturally, there must be a balance. Giving business to American companies is very often appropriate. Training and demonstrations accompanying American equipment and services can be very effective technology transfer. However, the desire to help American companies should not conflict with the basic mission of the aid program, which is to help other countries develop. In the long run, development will contribute far more to the U.S. national interest. The difficulty appears to arise not in the legislation⁴ but in policies carrying out the law.

⁴ 'Buy American Act of 1988,' Title VII of Public Law 100-418.

| Investment and Export Assistance

The greatest strides toward development and energy efficiency will come with new industrial and commercial facilities. However, none of the nations of Central and Eastern Europe have the capital to build many new facilities. Western companies are likely to be the key to overcoming this barrier to development, through investments in productive facilities. Manufacturing facilities there generally are in great need of upgrading to produce appropriate, modern products while reducing pollution. Not only do such investments directly provide needed facilities, but they also facilitate technology transfer for further development. Large companies are accustomed to investing in many countries in expectation of earning a profit, at least eventually.

Relatively little investment by American companies has taken place yet, in part because of the economic turmoil surrounding the transitions underway, compounded by soft markets at home. Many American companies also seem to lack the staying power of European and Japanese competitors in building a base for the long term. Small companies are particularly deterred by lengthy

negotiations, legal and institutional uncertainties, and the high cost of visits. If building economic health in eastern Europe is seen to be in the U.S. national interest, then additional efforts to promote investment are likely to be required. Promotion is likely to be important in ensuring that U.S. companies develop a strong presence and maintain competitiveness relative to European companies which are much closer geographically. Such efforts might involve financial incentives from the U.S. Government to build in the region. However, great care must be taken to ensure that the program will help create new demand, not transplant American jobs abroad.

Another cause of the reticence of American companies to invest is the risk involved. The Overseas Private Investment Corp. (OPIC) insures against political risk, such as expropriation. Commercial insurance also is available for some economic risks. However, small enterprises, such as some in this country that invest in energy efficiency projects with industry and share the savings, may feel too exposed in eastern Europe. Many enterprises there will go bankrupt, leaving investments stranded, and it can be difficult to

determine which ones are vulnerable. Partnerships to share energy savings could be effective ways to promote energy efficiency if ways can be found to reduce this risk. One suggested way is through an additional insurance plan that would be based on extensive analysis of the prospects of the industrial facilities and on the U.S. national interest in promoting energy efficiency. Such a plan might be initiated by OPIC. An alternative approach would be additional financing by the U.S. Government, which would share the risk.

The programs discussed in the previous chapter appear to be effective, and could be usefully expanded. Feasibility studies, such as supported by AID and the Trade and Development Agency (TDA) frequently lead to the purchase of American equipment and supplies. These studies are not very expensive and may return many times their cost in business. However, most of the energy

U.S. AID



A computer in the central control room of a pharmaceutical plant in Prague.

studies to date have been supply, not efficiency oriented.

The Committee on Energy Efficiency Commerce and Trade (COEECT), an interagency coordination body modeled on CORECT (Committee on Renewable Energy Commerce and Trade) relies on industry input to identify U.S. Government assistance necessary to increase U.S. exports and technology transfer in various world markets. CORECT currently is being formed with fiscal year 1993 appropriations.

Two factors suggest that attention to the Export-Import Bank (Eximbank) may help to increase sales of energy-efficiency products. First, most support for exports at present is for energy supply projects because they usually are large transactions that are compatible with conventional procedures. Greater efforts may be required to convince the efficiency industry to look for exports and Eximbank to emphasize those exports. Second, energy-efficiency products often are produced by small companies unfamiliar with Eximbank services, which are geared to larger companies. Exim's new Small Business Set Aside Program should alleviate that problem, but Congress may want to monitor its activities to ensure it. In addition, agreements must still be reached with the remaining countries in the region to make them eligible for Eximbank loans.

As has been noted several times, the lack of funds, especially hard currency, has prevented badly needed investment and purchase of equipment. Financing can be the key to increased U.S. exports. The enterprise funds discussed in the previous chapter have the potential to be major contributors, but as yet have little experience with energy efficiency. Total financing may have to be in the range of many billions of dollars to both support the competitiveness of U.S. companies and provide the needed investment for Central and Eastern Europe. Energy should receive a reasonable share of the total, but it may be necessary to stipulate that energy-efficiency projects get special handling.

Commercial sales of equipment services could benefit from a more aggressive government policy. Sales of energy-efficient equipment and techniques could become large. However, many of the leading American companies in the field are small and need assistance to realize their potential. Expansion of the Small Business Administration's Export Revolving Line of Credit could be the key for many small companies, especially if combined with information on how to do business in the region. Small businesses are frequently unaware of information and other services provided by the Department of Commerce (DOC), the Foreign Commercial Service (FCS) and sometimes AID, Greater outreach, including notification of opportunities, trade missions, data collection, and other promotional activities can make it possible for American companies to market where otherwise they would find logistics too difficult. AID contacts have already led to significant sales as noted in chapter 4, even though that is not the main function of the assistance programs.

| Training and Education Programs

All the nations considered in this analysis have well-educated work forces. In fact, the fraction of the population with a technical education is higher than in many western countries, including the United States. What they are missing is expertise important in a market economy, e.g., energy and financial analysis; management, including an understanding of the importance of minimizing costs; and specific information on opportunities to do so. At the factory level, many engineers, managers and other personnel can quickly absorb this information. Thus training programs can be very cost-effective ways to accelerate efficiency.

For example, OTA has heard from both Americans and Eastern Europeans that some industrial facility auditors performed their analysis by themselves, wrote up their recommendations, and left. Such limited contact may leave the facility

personnel with a general idea of what an audit is, but at best it provides a one-time improvement. The exercises that included training in the detailed techniques of energy auditing and the necessary instruments allowed plant personnel to follow-up with continuing improvements and ensure that new equipment was working as predicted. There is a need for expanded training for the emerging private consultants as well as for the industry plant personnel directly involved in managing energy to assure that the skills are developed and energy-efficiency work continues in these countries.

Another possibility would be to augment programs bringing East Europeans to this country to study modern energy management. AID and various private institutions already have related activities. Cooperative work/study programs in industry and academia could be arranged with a focus on energy. This approach would provide total immersion in modern industrial practices, including technology, quality control, innovation, marketing, and management methods. This approach can be a very effective form of technology transfer, conveying critically needed skills.

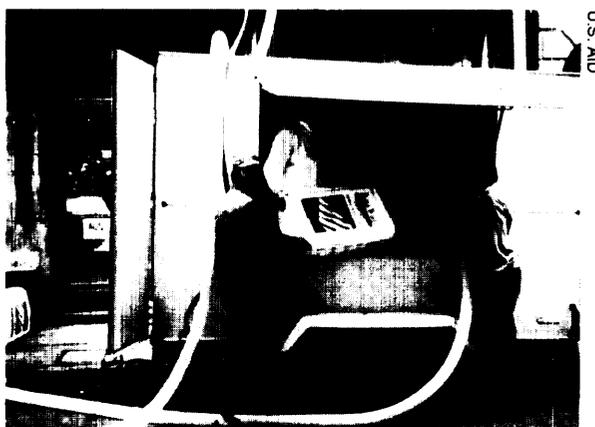
The nations of Central and Eastern Europe are also deficient in broadly trained energy analysts, including data collection and policy analysis. Many people have a relevant technical background and can be easily retrained to understand how energy markets work and the national implications of various decisions. Ensuring that energy ministries have access to this expertise should help put demand options on an equal footing with supply. AID activities under the Regional Energy Efficiency Project could be expanded to include the transfer of this expertise, perhaps with the cooperation of DOE and the Energy Information Administration.

The energy efficiency centers provide training (including training of trainers) and policy consultation to governments. Expanding their activities would be one way to contribute to the growth of this expertise. One form of training is with retired

Americans who visit the centers for a period to share their expertise.

Various non-Federal Government initiatives also could be supported to increase training. For example, many large cities in Central and Eastern Europe have sister city connections in the United States. Many American cities have implemented energy saving programs, especially in low income housing. DOE has been involved in these programs and could be funded to help local governments transfer this experience. DOE and AID also have sponsored a sister utility project which is transferring expertise on electric power operations. Many American utilities have extensive programs to help their customers conserve energy in order to avoid having to build new powerplants. Transferring this type of information could be accorded a higher priority, which would expedite energy efficiency and allow the shutdown of particularly polluting or dangerous powerplants.

It is worthwhile to note that very few students from the FSU are enrolled in American universities. In contrast, China has had tens of thousands of students here, most of them in science and engineering. Government/private programs to bring Eastern European science and engineering students here would be one of the most effective



Polish technicians with insulation blowing machine supplied by U.S. AID.

forms of technology transfer, though the effect would not be noticeable for a decade or more. Similarly, there is no Russian equivalent to the Dalian Management Institute in China, a school that teaches modern management using visiting American professors. It is sponsored in part by DOC and has been playing an increasingly important role in China's surging economy. DOC could fund such schools in Eastern Europe.

Congress plays a direct role by sharing expertise on legislative activities and support services with the parliaments of Eastern Europe. This program could be expanded to include detailed information on energy. That would be particularly pertinent because of the major legislation⁵ that was enacted in 1992. The negotiation process that achieved balance among the various perspectives, interests, and options would be of great interest to many parliamentarians involved in energy policy. Operations in a parliamentary form of government are quite different from the American model, but many of the considerations that go into legislation are common. Congress could invite members of the various parliaments, senior staff, university professors and others to spend several months here, working with committee staffs and support agencies. This program might have to include travel and per diem expenses because of the severe economic problems in Eastern Europe, so the total cost might be on the order of \$5,000 to \$15,000 per visitor, depending on the length of stay, plus the staff time that would be involved. Existing private programs such as in universities and other institutions might cooperate with this activity.

| Federal Agency Cooperation

The sophistication of our understanding of key energy issues (e.g., the role energy plays in the U.S. economy; how to maximize its benefits to the country and minimize its problems) has grown considerably over the past 20 years. Making

DOE's expertise on energy issues and technology more available (e.g., attending conferences, assisting ministries) could convey substantial advantages. Many governments appear not to understand how much energy their economies waste, how much that costs them, or what to do about it. DOE plays a role in Eastern Europe, but it is largely secondary to AID. As noted above, DOE/EIA training programs for counterparts in Eastern Europe should strengthen energy policy decisionmaking. A direct role by DOE advising and training government officials could go even further.

For example, poor energy data is an obvious deficiency that makes analysis and policy making quite uncertain. It is impossible to determine the best allocation of limited funds for investment when you have very limited understanding of the costs and benefits you are trying to adjust. EIA collects and analyzes vast quantities of information. They could transfer their expertise in knowing what data are critical, how to collect it with minimum disruption, and how to prepare it for use by policymakers. This could be done by extended visits in both directions,

Another potential area for cooperation is regulation. The Federal Energy Regulatory Commission and various State regulatory agencies should have much to offer in determining equitable rate making for electricity and natural gas. In addition, State agencies are pioneering energy planning, including IRP. At present, electric power companies in Central and Eastern Europe have little need for IRP because they have excess capacity, but the planning concepts should become more useful as their economies stabilize. State agencies could assist in determining what would work and how to initiate it.

A third possibility is for shared R&D projects in energy efficiency. Funding projects there would help direct attention to efficiency opportunities as well as expand those opportunities. Such

⁵ The Energy Policy Act of 1992, PL 102-486, made great changes in many aspects in an attempt to make the energy system, both supply and demand, work more effectively.

a program would capitalize on the low labor costs due to the collapse of the ruble and other currencies, and might yield substantial benefits here if the R&D is successful. Some collaborative efforts already have been initiated, such as with fusion R&D. DOE's proposed ADEPT program (Assisting Development of Energy Practices and Technology) could be an appropriate mechanism.

| Raise Priority of Energy Efficiency Among Multilateral Agencies

The multilateral development banks (MDB) such as the World Bank and the more recent European Bank for Reconstruction and Development (EBRD) tend to focus mainly on large energy supply projects.⁶ Projects to improve energy efficiency usually are small and dispersed (an exception is entirely new manufacturing facilities where high efficiency is designed in as only one of the benefits), and are harder to organize, administer, and monitor. However, efficiency is so low in the emerging market economies that a great many opportunities exist for investments with returns far greater than are available for most supply projects. Improving the use of energy will greatly ease requirements for new supply facilities, which should benefit both economies and environments.

As discussed in the previous chapter, the World Bank's record in supporting end use projects is quite weak, though there are some signs of improvement. Giving equal weight to energy-efficiency improvement would almost certainly improve the economical balance of the Bank's projects, but it would also demand changes in the Bank's policies and practices. Some shift in emphasis may be instigated if Congress makes it clear that funding should be based insofar as possible on a least-cost analysis. Full equality might require a major renegotiation of principles.

CONCLUSIONS

Ideally, one would like to be able to identify the probable results of any given U.S. policy in Eastern Europe. That is not possible because of the great uncertainties and complexities of the situation. We don't know which countries are going to succeed with economic reform and democratization, or the paths that the others will take. Nor can we quantify the impact that U.S. energy-efficiency initiatives would have, largely because the economic situation is so confused.

Some countries appear likely to succeed economically: Hungary, Poland, and the Czech republic. The Slovak republic and the Baltics also have a good chance after current difficulties are overcome. All of these countries will encounter many major problems and setbacks, but the questions seem more related to how fast, rather than if, they will recover.

Russia, Ukraine, and other republics of the FSU are less predictable. Replacing 70 years of entrenched central planning and one-party rule will be excruciatingly difficult. Current leaders seem committed to economic reform of some sort, but it is not at all clear how political struggles will evolve and whether future leaders will be as cooperative.

| The Case for Major Assistance

If U.S. policy makers see such constructive cooperation as being in the U.S. interest, then major increases in foreign assistance should be considered, particularly for Russia and other FSU republics. Most of the economic infrastructure needs to be rebuilt over the next several decades, which is likely to cost hundreds of billions of dollars, most of which will have to be generated internally. U.S. assistance over the next few years can help stabilize economies and point them in the right direction. Even though the impact of U.S. assistance cannot be accurately quantified, it certainly can be substantial if targeted appropri-

⁶U.S. Congress, Office of Technology Assessment, *Fueling Development: Energy Technologies for Developing Countries*, OTA-F? 516 (Washington DC: U.S. Government Printing Office, April 1992) p.278.

ately. Major increases in aid, perhaps to several billion dollars per year, will greatly increase the chances for Russia and the other countries in the region to avert economic chaos and political authoritarianism, and move onto a path of economic recovery. It would also help control potential proliferation of both nuclear weapons and conventional arms. If these countries are to be our friends, now is when they need help.

The energy efficiency assistance considered in this report will directly improve the economic situation and encourage economic reform. The leverage on both goals should be quite high because energy is used so wastefully. In addition, the United States will gain some benefits because the conserved petroleum will be available for the world oil market. Energy-efficiency improvements are likely to be beneficial no matter what happens politically and economically, and the gains should greatly outweigh the costs.

I The Case Against Increased Assistance

Few people are against economic progress in Eastern Europe, and probably none are against

democratization. However, there are other priorities also. This country has its own great needs, including reducing the budget deficit. It is difficult to ask the U.S. taxpayer to support former adversaries when the same funds could produce direct benefits here. Furthermore, foreign assistance may be largely wasted if it does not “work” in promoting economic reform and democratization. If it does work, these countries could turn into future competitors or even adversaries, and we would have contributed to their strength.

Neither of these perspectives can be explicitly refuted. Economic assistance in general, and energy efficiency in particular, will almost certainly be beneficial for people who badly need help, and will serve U.S. national interests. However, it cannot be shown that increases in assistance definitely will avert economic disaster or political instability. Generous assistance just makes these possibilities less likely. Whether that improvement is worthwhile is a matter of judgment of national priorities.