



Energy Efficiency Technologies for Central and Eastern Europe

Much of the energy consumed in the former Communist countries is wasted. Efficiency improvements requiring only modest investments will permit these economies to operate with dramatically less energy. However, constraints such as inadequate capital and expertise are limiting the implementation of these measures.

Improving the efficiency of energy use would assist in the transition to a market economy. Russia is a major producer of oil and gas, and it could finance much of the rebuilding of its economy by exporting fuels freed up by reducing waste. The Baltic nations, Ukraine, Poland, Hungary, and the former Czechoslovakia lack hard currency for economic revitalization, due in part to the high costs of imported energy.

It is in the U.S. national interest to see these countries succeed in the transition to prosperous, democratic societies because:

- international political stability will increase,
- U.S. defense budgets can drop, and
- commercial markets for U.S. goods and services will grow.

In addition, increased energy efficiency will reduce the pressure on world oil markets and address environmental concerns, notably global climate change.

Efficiency can be improved through a wide variety of measures in all energy-consuming sectors. The industrial sector is especially well suited for rapid gains in efficiency. Implementing energy-efficient technologies will require incentives to make changes, awareness of the opportunities, and capital for investments. Simple changes, such as fixing steam leaks, can be done immediately with little capital; improved boilers, process control systems, and electric motors will take greater investment. As outdated factories are replaced with modern ones, major improvements will be realized because energy efficiency can be integrated throughout the plants.

In the residential sector, radiator valves can reduce space heating needs; improved lighting and appliances can conserve electricity; and improved

controls and insulation can reduce coal use at district heating plants. However, even well-retrofitted existing buildings are much less efficient than properly designed new buildings, and construction of new buildings is likely to be slow. Transportation sector efficiency improvements will be even more dependent on the replacement of existing equipment and on major system upgrades, which will take many years.

In the long term, economic reform and revitalization will be key to improving energy efficiency. **Modern technology in all sectors offers major economic and environmental gains, as well as energy efficiency.** Decisionmakers must be given proper incentives to minimize costs, including energy, and they must have information on their opportunities. **Current energy efficiency assistance is a vital element in creating the expertise and funds that will be needed to develop a modern economy.**

Technology transfer contributes directly to development because it builds a foundation for a country's capabilities. Industry supplies most technology transfer through information accompanying the sale of products and services, investments in production facilities, or through the direct sale of expertise. The government can expedite industry's transfers and also supply information and capital directly through funding specific assistance projects.

Most energy assistance has focused on supply-side projects, i.e., the development and rehabilitation of supply infrastructure (primarily the natural gas and power industries), but interest in energy efficiency projects is growing. The United States is the largest aid source for energy efficiency and conservation projects, followed by the European Community. The World Bank and the European Bank for Reconstruction and Development (to which the United States is the largest contributor) have provided the bulk of energy financing, but very little (as low as 1 percent of energy lending) has gone to efficiency projects.

The potential market for energy-efficient products is very large if these countries can develop sufficiently to afford them. One estimate is \$20 billion for energy-efficient industrial products. However, the United States is not well positioned relative to its competitors to tap this market because:

1. overall assistance to Central and Eastern Europe is not large enough to support more than a small fraction of the potential market;
2. there are few U.S. Government export assistance programs that support smaller firms which account for much of the energy efficiency industry; and
3. energy efficiency companies are not well organized to export, and relatively few appear to have the experience or long-term perspective needed to deal with the uncertainties inherent in Central and Eastern Europe at this time.

The U.S. Government is supporting a variety of efforts to supply the information and financial support needed to improve efficiency. Energy efficiency centers have been established in Poland, Russia and the Czech Republic to provide advice and assistance. An energy audit program for industrial facilities is providing recommendations for improvements and limited support for implementation. Training and demonstrations also appear to have been effective.

A strong assistance program can be a major element in helping Central and Eastern Europe through their present difficulties. Energy efficiency assistance will be beneficial for both the

United States and the recipients regardless of political developments. If Congress is willing to increase assistance, substantial increases in several elements of the current program would be effective. In particular, information programs such as the energy efficiency centers, technical demonstrations, and training could be expanded. In addition, assisting enterprises in purchasing new energy-efficient equipment and upgrade production and buildings, etc., would address the problem of lack of investment funds. Increasing assistance would benefit American companies and help position them for the future, but it would be expensive for the U.S. Government. Modifications to the assistance program, particularly eliminating restrictions (e.g., on procurement), can make it work more effectively.

Increased export promotion, such as helping American companies find market opportunities, would also provide benefits to the American economy. However, these programs will require increased Federal funding, even if they provide net benefits, and must compete with other national needs.

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Potential Energy Savings

The energy savings potential in Central and Eastern Europe, although poorly documented, is considerable by all accounts. The iron and steel industry in the former Soviet Union, for example, uses about 50 percent more energy per unit of output than does the United States. Similarly, buildings in the FSU require about 50 percent more energy per square foot to heat.¹ Overall, the FSU used 57 quadrillion BTUs (quads) of energy in 1991, two-thirds of what the United States required (82 quads) for an economy several times larger. If *all* energy use in the FSU were cut one-third (and this is a modest goal considering that other countries are more efficient than the United States), the savings would be about 19 quads, equivalent to about **\$40 billion dollars per year.**²

Although considerable investment would be needed to realize this \$40 billion savings potential, most investments would be paid back rapidly—in some cases in less than one year, equivalent to a financial return of over 100 percent. Although these estimates are uncertain, they do suggest that the technical and financial savings potential is huge.

¹ This estimate controls for climate differences as discussed in chapter 4.

² FSU consumption by fuel from Energy Information Administration, International Energy Annual, p. xiii. Energy prices from Energy Information Administration, Annual Energy Review 1991, pp. 69, 229.

SOURCE: Office of Technology Assessment, 1993.