Energy Efficiency in the Czech Republic: From an Energy-Intensive Economy to Sustainable Development

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This paper describes the current energy efficiency policy environment in Central and Eastern Europe and analyzes the incentives and obstacles to implementation of energy efficiency measures. SEVEn's proposal follows for **a** feasible energy efficiency strategy for the Czech Republic in light of the government's current approach. The energy efficiency strategy presented here has been broken down into 14 individual points that can be implemented gradually. The paper concludes with an examination of energy efficiency efforts in the country within the context of SEVEn's proposal for implementing a national energy efficiency strategy.

Introduction

The Czech Republic is one of the youngest countries in the world. Since the division of Czechoslovakia into two countries in 1992, two-thirds of the population have become citizens of the Czech Republic. The country lies in the heart of Europe, with a population of over 10 million and an area of about 70 thousand square km. As did many countries in the former "Soviet bloc, " the country suffered from an inefficient, industrialized economy with a heavy impact on the environment.

Low energy efficiency seems to be a common feature of all countries in transition in Central and Eastern Europe. The benefit of increasing energy efficiency is obvious: in addition to considerably easing the environmental strain, the economy can become more competitive if the cost of production is reduced by decreasing the energy budget. Implementing energy-efficient technologies also stimulates a rise in employment, because energy-saving measures are more labor-intensive than energy production.

Two contrasting approaches arise in East European discussions about energy efficiency:

- Energy efficiency is a natural part of a healthy economy, and there is no need to pay any special attention to its growth.

- When energy efficiency is not rationally introduced it can deteriorate the efficiency of the whole economy and become a significant future burden for countries in transition.

As in neighboring countries, the former view prevails in the Czech Republic. There are two main reasons that energy savings programs are not considered very attractive:

> The former communist regime ceremoniously announced several huge energy conservation programs and forced enterprises to formally participate in them. The actual results were poor due to the obstacles of the centralized system. As a consequence, energy conservation programs are perceived as part of centralized power and as an opposite to the free market.
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> Governments and companies are faced with a serious lack of investment capital. Concerned with this immediate problem, governments do not look toward long-term benefits from current actions. Moreover, they have no experience with government energy efficiency programs that are not capital intensive. Many decisionmakers argue that no efficiency programs are needed so as to avoid reductions of their budgets.

This attitude may appear to be merely a short-sighted view, and it is. But can we label this view as generally unwise? Most energy efficiency activities turn into an investment in the end. Who dares claim that it is unwise to refuse mid- and long-term investments (which energy savings often are) in an economy with inflation of twenty, forty or one hundred percent and with a shortage of capital resources?

Table 1. 1993 Inflation Rates for Various Countries

	1993 Inflation Rates
Czech Republic	21%
Bulgaria	60%
Hungary	23%
Poland	40%
Romania	275%
Russia	900%
Slovakia	25%

This example shows only one of the problems involved in implementing any efficiency measures in an economy that is not stabilized. Successful energy efficiency strategy has to be designed as an integral part of the whole economic transformation process.

Transition periods provide an unique opportunity to increase efficiency. As many other features of the economy, energy efficiency is being formed into a new shape. In spite of the fact that transforming economies suffer from many diseases, changes are much easier than in any stabilized country. That means that an energy efficiency strategy can be easily adopted if there is a real political will.

We have to realize that this opportunity cannot last for long. Time is short, and the first step toward implementing an energy efficiency strategy (EES) is to gain political support or to reach a "political consensus" that will ensure that the EES complies with the main features of the economic transformation strategy. Thus our EES, described below, has not been designed as an ideal proposal. It was influenced by Czech economic reforms, and SEVEn has attempted to present a sober reflection of reality.

Design of the Path to Energy Efficiency

SEVEn based the philosophy of an EES on two principles:

- the gradual transformation of the energy market for the end-user to an energy-service market. The idea is basically a natural growth in the quality of services. The end-user does not want mere energy. His only interest is that he gets the energy services he needs (room heating, lighting, motor power).
- the development of an energy efficiency industry as competition for energy production. To give energy efficiency the ability to compete, it is necessary to grant it operating conditions that are equivalent to those that classic energy production enjoys.

The Proposal

Reach Economic Stability

An unstable economy cannot implement a successful EES. Energy efficiency is always at least partially motivated by an effort to make a profit in the long run. In an unstable economy, this motive disappears and cannot be substituted by anything else.

Availability of Financial Sources

An efficient banking sector that is able to provide loans in domestic currency is necessary. Energy efficiency is a very diversified activity; it is very difficult to find big projects that are comparable to energy production projects. The competition lies in the number of small projects. Small projects are always more difficult to finance with anything other than domestic funds in economies that do not have a relatively stable and freely convertible currency. Although special plans can exist to bring foreign resources into the country for small efficiency projects (credit lines, special-purpose funds), access to them is never simple. Moreover, project uncertainty increases by the level of currency risk. The unavailability of ready domestic sources always decreases the ability of small projects to compete.

Accelerate Privatization

Accelerated privatization encourages interest in energy efficiency. Management in state-owned companies generally has little or no use for implementation of energy efficiency.

Non-Subsidized Energy Prices

a) Energy prices must be freed of all subsidies, including cross-subsidies, where one group of end-users subsidizes other groups.

b) Prices must also include environmental externalities; it is necessary to institute a Polluter Pays Principle.

Open Market for Energy Performance Contracting

The most economic way of implementing energy efficiency measures is to combine many activities at one site. To

design, implement and finance them requires experience in various skills and specialized knowledge. This package can be offered by Energy Service Companies (ESCo). For ESCos, business requires a high energy savings potential and high energy prices when compared to energy-saving technologies.

Implement Integrated Resource Planning

Energy utilities should be transformed into companies that will deliver energy services to end-users. Consequently, energy conservation will become an important component of DSM. This form of energy conservation should not suffer from lack of capital, because utilities have large financial resources. IRP is a tool which can ensure the desired result.

Clean Air Policy Implementation

In the past, economic development in the Czech Republic has been based on energy-intensive branches of heavy industry and use of domestic primary energy resources, primarily low-quality brown coal. These practices have led the Czech Republic to the position of one of the greatest air polluters in Europe. Clean air requirements will encourage energy efficiency, thus reducing air pollution impacts.

Introduce Energy Standards

A system of energy standards must be developed in the areas of:

a) buildings
b) electrical appliances

Introduce Mandatory Energy Labeling

Widely used electrical appliances should bear information about annual energy consumption.

Provide Metering

All energy on the market must be metered. It is necessary to make energy savings investments as well as to collect complete energy data to monitor macroeconomic results in energy efficiency.

Appropriate Taxation

a) Taxing energy should not be more profitable than taxing energy efficiency technology, so that it can compete with energy.
b) Consider an energy tax for carbon emissions that would be implemented as part of a larger global initiative.

Introduce Special Government Programs (Narrow Focus)

Special programs should focus on areas not covered by other instruments. The primary areas are energy management for socially disadvantaged groups, one-time projects to spur business activity in conservation, and similar efforts.

Provide Information

The state's irreplaceable role lies in its efforts to widely distribute the information necessary to implement energy efficiency projects.

Demonstration Projects

Demonstration projects are important to show the technical possibilities and financial benefits of energy efficiency.

Achievements in the Czech Republic

Due to the economic transition taking place, the GDP and energy consumption dropped in all Central and East European countries. In the Czech Republic, energy efficiency went down in 1991 and 1992 and became stable in 1993.

Reach Economic Stability

The economy of the Czech Republic is continually improving but is still not at the desired level of stability. Inflation in 1993 was 21% and should fall to 10% in 1994.

Availability of Financial Sources

Acquiring financing is the most difficult aspect of initiating energy efficiency projects. The investments that have been made have gone first to expanding production rather than financing conservation measures. Consumers do not have enough of their own capital to finance energy efficiency projects, and banks in the Czech Republic have such strict terms that only superior projects with short payback periods receive financing. The capital shortage problem is receding, but it is still almost impossible to receive mid- and long-term loans (The limit is four years.).

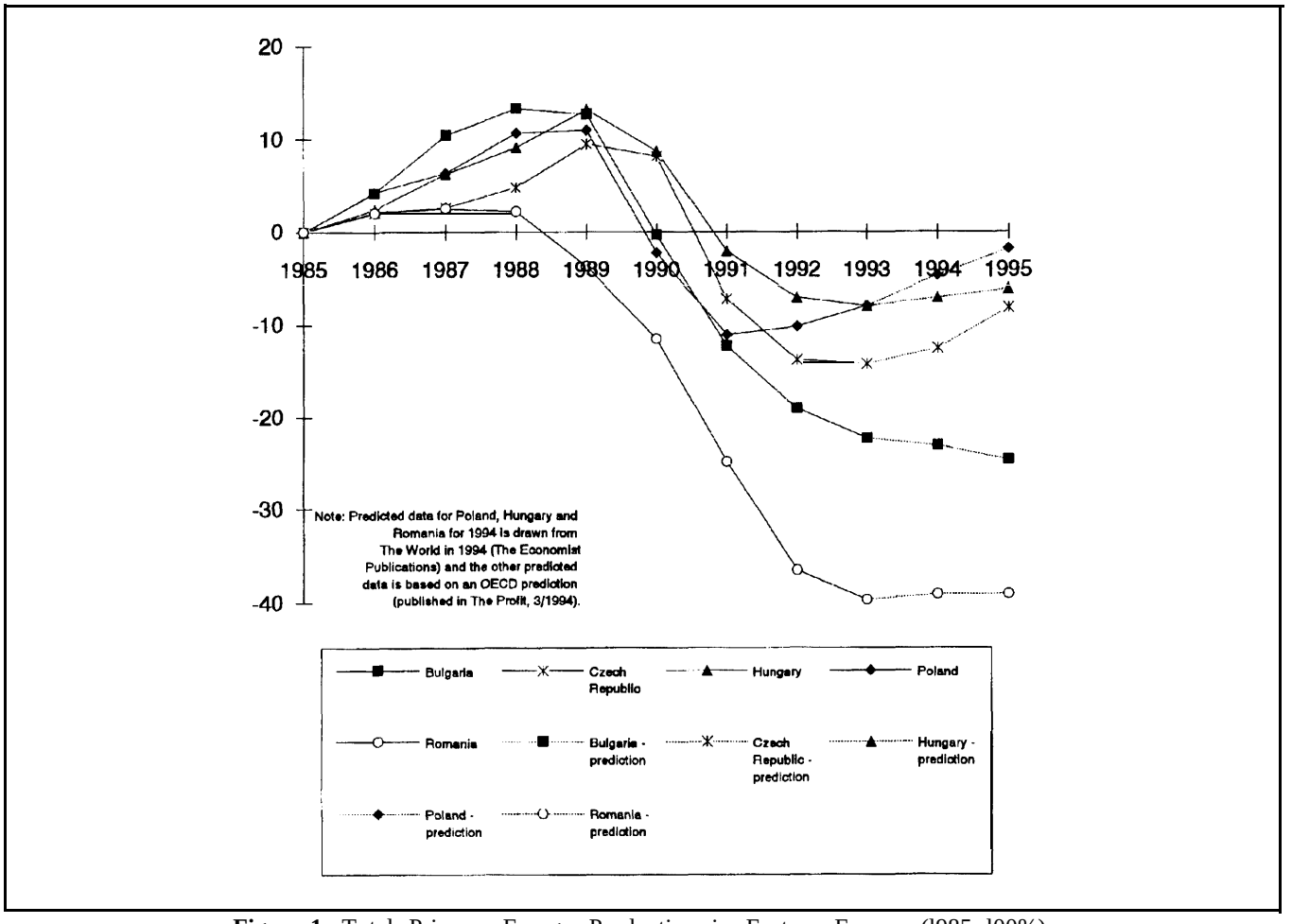

Figure 1. Total Primary Energy Production in Eastern Europe (l985=l00%)

Accelerate Privatization

After a certain delay caused by the division of the Czech and Slovak Federal Republic, development has again begun to pick up speed. The second stage of the privatization process is taking place in 1994, and direct sale of property continues. State-owned utilities are also being transferred to municipal ownership. In the year 1995 we anticipate the majority of enterprises will be privately owned,

Non-Subsidized Energy Prices

a) Subsidies have been eliminated in all areas except heat prices for the residential sector. Energy prices, however, are still influenced by the state (maximum prices established), which must maintain low prices for residential consumers. After subsidy elimination, prices for residential consumers are still cross-subsidized by industrial consumers. This system slows energy conservation in the residential sector.

b) Environmental externalities are a broadly discussed issue, but as yet there has been no success in introducing them. The problem is that monetary value can be assigned to a harmful impact? The Polluter Pays Principle has begun to be applied in a limited form through the Czech Clean Air Act of 1991 (Regulation 309/91).

Open Market for Energy Performance Contracting

A large energy savings potential still exists, and energy prices continue to rise. When compared to energy-saving technologies, a greater increase of energy prices is required, especially in the residential sector, and/or the prices of energy-saving technologies need to go down. Imported technologies are especially expensive. The current exchange rate is three times higher than the Power Purchasing Parity (PPP) exchange rate.

There are two or three ESCos in the Czech market, and all of them are foreign or joint-venture firms. Several

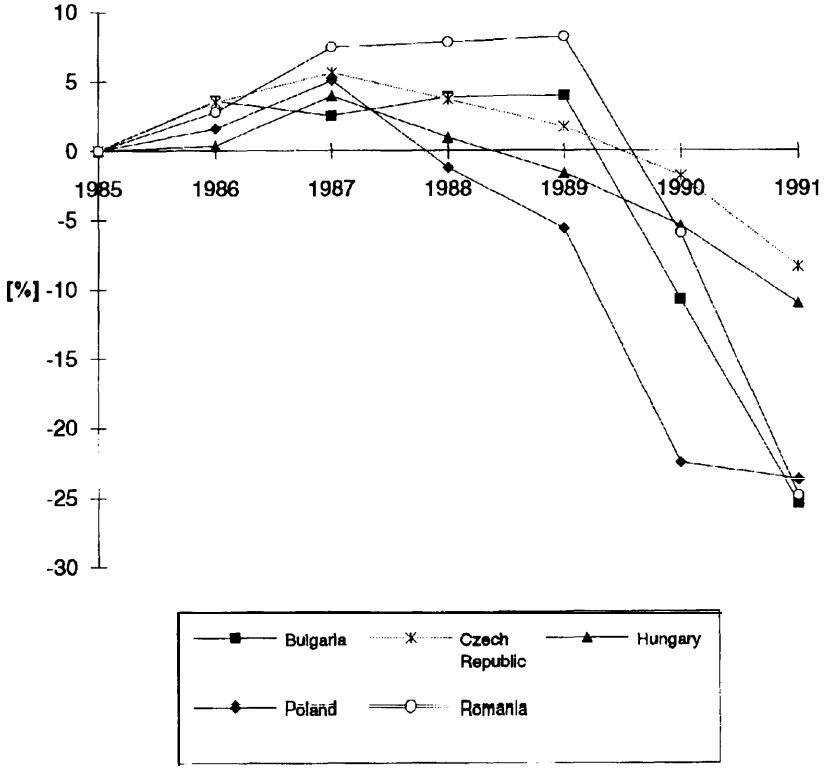

Figure 2. Economic Output in Eastern Europe (constant prices, 1985=100%)

Czech companies intend to learn more about Energy Performance Contracting (EPC), but as yet they lack experience, especially in financing.

Implement Integrated Resource Planning

In spite of the fact that several detailed studies have recommended implementing IRP, there has been no real success in the electricity sector. The Czech Republic's largest electricity producer, CEZ, has received governmental approval to finish Temelín, a nuclear power plant currently under construction. Thus the utility is facing overcapacity rather than a lack of power. CEZ has made the first small attempts at efficiency measures (selling 5000 compact fluorescent lamps at a reduced price), but it is unlikely to introduce any large DSM/conservation program. Because the distribution network is divided into 8

Table 2. Generally Applicable Emissions Limits in the Czech Republic

Type of Emissions	Mass Flow of Polluting Materials [kg/h]	Emissions Limit [mg/m^3]	Notes
Solid Materials	less than 2.5	200	
	more than 2.5	150	
SO_2	more than 20	2,500	
NO_x	more than 10	500	calculated on NO_2 content; does not apply to selected industries
CO	more than 5	800	does not apply to selected industries

independent distribution companies, an IRP program for distribution is being prepared. Certain legislative foundations could be established by approval of the new energy law submitted to Parliament. It stipulates a regulatory role for the Ministry of Industry and Trade, but the text is brief and the language vague. The success of IRP depends upon the amendments that will necessarily follow this law if it is approved.

Clean Air Policy Implementation

The Clean Air Act was approved in the former Czech and Slovak Federal Republic and is still valid in today's Czech Republic. Fines for pollution rise each year, and since 1988, any power plant that does not meet the limits of SO_x, NO_x, or CO can be shut down. CO_2 is not regulated.

Introduce Energy Standards

a) Buildings: the heat insulation characteristics of buildings are established by standards. These coefficients were improved considerably in 1993.

Table 3. Czech Building Standards for Buildings

Czech Building Standards	up to 1992 k [W/m^2,K]	since 1993 k [W/m^2,K]
Wall Insulation	0.79	0.46
Roof Insulation	0.43	0.32

In addition to these classic standards, the Czech Republic has approved a regulation requiring automatic temperature control. Unlike standardization for insulation, this regulation also applies to existing buildings. The measures must be in place by September 1995.

b) Electrical appliances do not yet have any consumption standards .

Introduce Mandatory Energy Labeling

Energy labels have appeared only temporarily in the Czech Republic, as part of SEVEn's experiment in Prague's largest department store. The efficiency of a group of refrigerators and washing machines was measured and labels were designed. The necessary regulation requiring appliances to bear efficiency labels, however, still does not exist.

Provide Metering

Electricity and gas metering has been standard in the Czech Republic for a long time. Heat consumption metering is already in place. A 1991 law requires that all district heating system (DHS) owners implement precise metering at the entry point into buildings as of September 1993, and that all building owners implement evaporation meters on every radiator in the building as of September 1995.

The amount and quality of energy data collected by the Statistical Office has gone down significantly from that collected by the former regime. This year the current system of statistics is being reconsidered to provide more reliable data for energy efficiency.

Appropriate Taxation

a) In the Czech Republic there is a 0% VAT for special goods, a 5% VAT on selected products, and a 23% VAT on the majority of goods. Energy has a VAT of 5%, while for energy efficiency technology it has been possible to get a 5% VAT only for compact fluorescent lamps.

b) The energy tax is a little-known concept in the Czech Republic. There is little hope that the government will agree to its implementation without international pressure.

Introduce Special Government Programs (Narrow Focus)

The first post-revolution energy efficiency program was approved in 1991: "Principles for State Participation in the Reduction of Fuel and Energy Consumption in Residential Buildings." This program was the government's effort to stabilize the steep increase in energy prices for the public. This program is continuing in the new Czech Republic, with annual funding of 500 million Kc ($17 million). Most of the funds go toward supplemental apartment insulation. It covers up to 50% of improvement costs or up to 100% of interest payments on loans. This program also supports the development of the energy consulting and information centers (EKIS) network, demonstration energy efficiency projects in buildings, and renewable energy resources. The problem is insufficient program funding (approximately 0.1% of the national budget) that is always quickly exhausted.

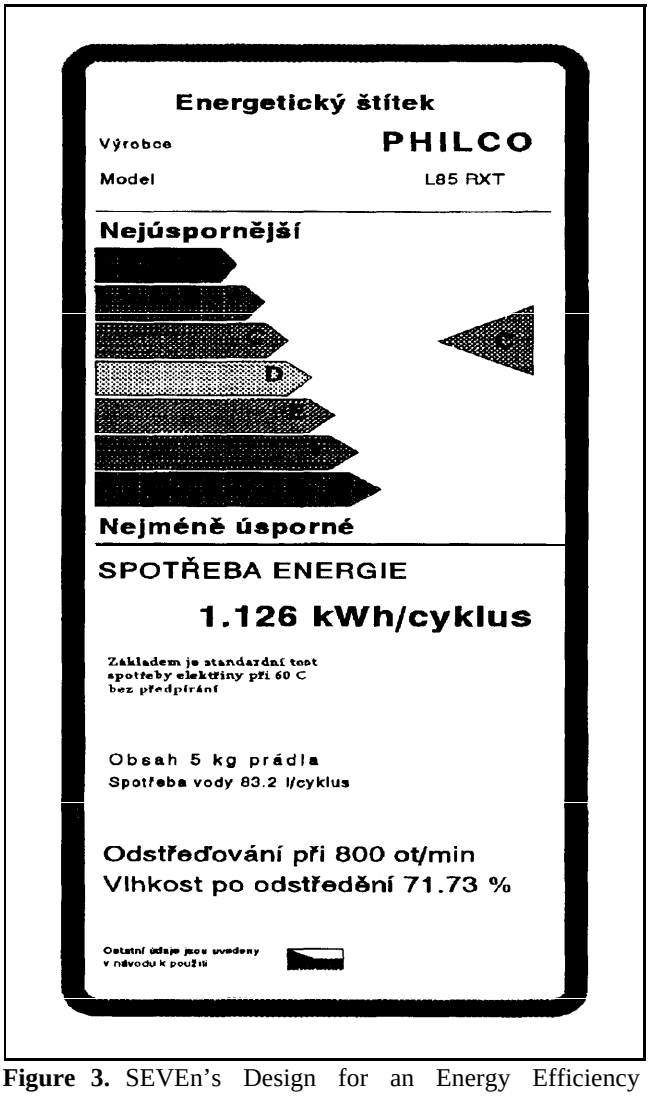

Figure 3. SEVEn's Design for an Energy Efficiency Label

Provide Information

In 1991, within the framework of the program "Principles for State Participation in the Reduction of Fuel and Energy Consumption in Residential Buildings, " a system of about 50 EKIS was established. Some of these centers were selected as generators of information for the rest of the system. Generators received state support. The system has not yet proven effective enough to gain a positive evaluation. On the positive side, is that a network exists through which information can be disseminated. The problem, however, is selecting and preparing information that center visitors really need.

Demonstration Projects

The state program mentioned above made contributions to demonstration projects possible. Foreign aid enabled the implementation of several additional projects. In the Czech Republic it is necessary to demonstrate the technical feasibility of a project, but first and foremost the economic parameters. Such evaluations have not yet been conducted.

Discussion and Conclusions

Energy Efficiency and Sustainable Development

Three years ago, SEVEn published its first study, which included the four main elements of the strategy I have presented here. We expected the primary impetus for its application to be economic with a gradual orientation toward sustainable development. We would be hard pressed to find another strategy that is in such harmony with sustainable development as energy efficiency. In reality, interest in sustainable development is almost invisible, even at the Ministry of the Environment.

This stance is often defended by the need for economic prosperity and stability. (You may notice that stability is also the first point of our strategy.) For many people the concern about sustainable development is taken as a dangerous distraction from today's burning economic questions. It is possible to agree with them only to the point where it really is unreasonable to expose the success of economic reforms to any threats. Yet our EES is constructed in such a way that economic development cannot endanger it, but rather support it.

The reduced interest in environmental issues in Eastern Europe surprised us, yet it has its own logic. We have to realize that past interest in environmental problems was not caused by a high level of ecological knowledge or education. People supported the environmental movement primarily because of the role environmental problems played in the political struggle against the Communist regime.

Today people in Central Europe are faced with many problems that they did not have to deal with in a centrally planned economy: growing unemployment, changing jobs, improved job performance, inflation exceeding wage growth, among others. This change in the attitudes of citizens is also reflected in the change in politicians' attitudes. Taking care of the environment appears to be an irreconcilable problem for many new democracies. About a year ago, when a new constitution of the Czech Republic was being prepared, a representative of the leading coalition in the Czech Parliament even declared the right to a clean environment to be utter nonsense.

The only impulse for thinking about sustainable development in the Czech Republic is provided by international negotiations such as the Earth Summit and its follow-up

activities. Preliminary studies (Tichý 1993) can easily demonstrate the influence of energy efficiency measures on the reduction of CO_2. Although this process has proven to be quite inexpensive, we do not expect energy efficiency implementation, because the Czech Republic is able to achieve reduction in other ways: CO_2 emissions can be reduced more easily because of the decrease in production that takes place during an economic transition and the share of coal in primary energy sources is decreasing due to other factors.

Conclusions

The experiences of the past three years have substantively changed our view on the content and implementation possibilities of EES in economies in transition. Our primary observations are:

- It is impossible to expect that EES implementation will be rapid, despite the fact that many laws and measures are approved relatively easily and quickly. A long-term, concentrated effort is absolutely necessary.

- It is still impossible to depend on interest in a clean environment as a primary motivation for interest in energy efficiency.

- The EES must not be merely an ideal construct based on the best experiences and the most sophisticated ideas. It must correspond with gradual economic transformation and its possibilities.

Economic profit can become a very strong argument, especially if it can be transferred to market mechanisms without state intervention. Today the most promising arguments in the Czech Republic seem to be economic.

Partial success has been achieved. Despite the existing difficulties, the long-term view of energy efficiency in the Czech Republic is optimistic. Any one of the goals is still achievable, and a certain delay does not always have to be detrimental. A later implementation of a measure can set its effects in a better-prepared economy and increase the efficiency and trustworthiness of the accepted measures. The short term is not important, the long-term objectives are of primary importance.

The EES should be based primarily on the capabilities and advantages that exist in this country. There is a qualified technical work force in the Czech Republic, and its cost is and will be for a long time below the European average. The industrial base is also relatively extensive, although many enterprises need technological innovation. There is still a certain excitement over new things, and the business sector does not have its definitive form and is still evolving. If energy efficiency business is to bring a real profit, it has no less likelihood of being selected than any other field.

Our goal was to develop a proposal for the Czech Republic, but we invite discussion of this proposal for other countries in Central and Eastern Europe. As economies in transition must solve unprecedented problems, we see this situation as an unique opportunity to bring a new contribution to the knowledge about the common effort in this region: environmental protection through energy efficiency.

Abbreviations Used in the Text

ČEZ	Czech Power Utility
DHS	district heating system
DSM	Demand-Side Management
EES	energy efficiency strategy
EKIS	energy consulting and information centers
ESCo	energy-service company
IRP	Integrated Resource Planning
Kč	Czech crowns
PPP	Power Purchasing Parity

References

Bull, Mike. 1993. "The Role of Integrated Resource Planning and Demand-Side Management in a National Energy Policy Framework for the Czech Republic." Bonneville Power Administration. SEVEn, Prague.

Maroušek, Jaroslav. 1991. "Energy Policy without Destruction of the Environment." SEVEn, Prague.

Regulation 186/1991 Sb. "Dealing with Heat Energy and DHS Control." Collection of Laws, Prague.

Act No. 309/1991 "Act on Protecting the Air Against Pollution." CSFR Law, Prague.

Procházka, Vladimir. 1993. "Nuclear Energy and Savings": "Electricity Savings in the Former Czechoslovakia—The Theoretical Potential." SEVEn, Prague.

Tichý, Miloš. 1993. "Reducing Carbon Dioxide Emissions in the Energy Field Through Energy Efficiency." SEVEn, Prague.