Prospects for Using Non-Traditional Methods to Finance Energy Efficiency Projects in the Czech Republic

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The paper presents the prerequisites for using non-traditional methods to finance energy efficiency projects in the Czech Republic. It identifies the obstacles to implementing energy efficiency projects and analyzes the fundamental barrier—a lack of financial resources—in greater detail. The report further describes the revolving fund as a first specialized source of financing for energy efficiency projects in the Czech Republic. The last section presents the first Czech applications of Energy Performance Contracting.

Introduction

Without a doubt, the division of Czechoslovakia into two independent states—the Czech Republic and Slovakia—meant that the Czech Lands drew closer to the mature economies of West European countries. Economic reform was successfully initiated, and the Czech Republic, from the standpoint of the speed and quality of the economic transformation, is considered one of the most successful countries in the former Communist bloc. Yet one of the most stubborn questions remains the acquisition and use of energy resources that will have a decisive role in the ongoing environmental devastation.

Energy Consumption and the Potential for Energy Savings

The current value of energy consumption in the Czech Republic is about 221 billion Kc (equivalent to 7.4 billion USD).[1] The Czech Republic leads almost all European countries with per capita energy consumption of 180 GJ, while its economic performance is below average. Energy intensity is not decreasing; in recent years, in fact, its growth has been noted as a result of a decrease in economic activity.[1] (See Figure 1.)

On the other hand, there is technology available on the market that can reduce energy consumption considerably. The cost-effective energy savings potential is estimated to be about 20% of energy consumption (258 PJ), which at current energy prices represents approximately 45 billion Kc (1.5 billion USD). (See Table 1.)

Under these circumstances, one question arises: why is energy efficiency still not broadly practiced in the Czech Republic, and why has it not become a natural part of the economy?

Main Obstacles to Energy Efficiency in the Czech Republic

There are many reasons that the energy savings potential is insufficiently utilized. The primary reason that the technical potential for savings (estimated at 50-60% of current energy consumption) is not usable to a greater extent than the above-mentioned economically returnable 20% is energy pricing. Energy prices have increased in recent years; those that are still regulated and subsidized (especially for heat), however, do not stimulate consumers to invest in costlier measures for savings.

Yet even the savings potential that is cost effective for the energy consumer remains practically unutilized. It appears that the argument of financial return is not sufficient-a number of factors act against it. Imperfect competition leads manufacturers to simply pass their higher energy costs into their production costs. If the energy costs constitute only a small part of the company's total costs, the motivation for more efficient energy use is generally very small.

A fundamental obstacle to energy efficiency, however, for the time being remains a *lack of financial resources*, or

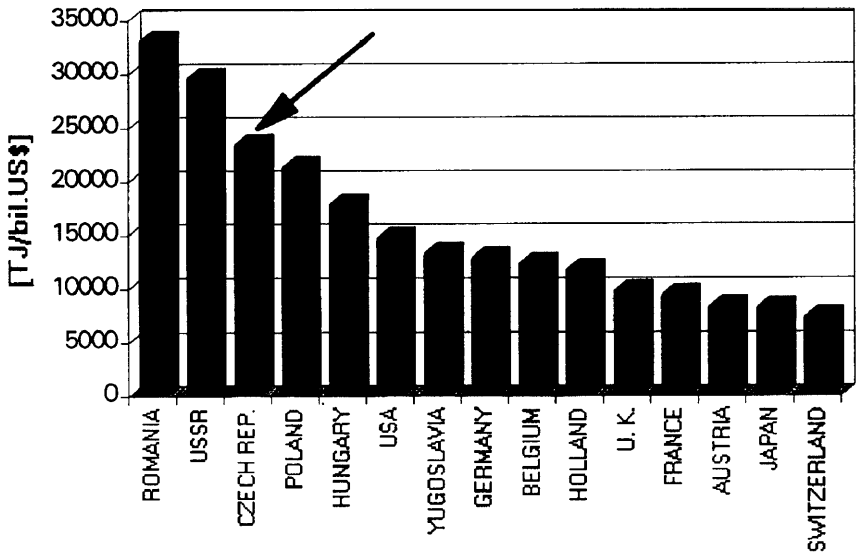

Figure 1. Primary Energy Consumption per Unit of GDP in 1990

Table 1. Energy Consumption (1990) and the Cost-Effective Energy Savings Potential in the Czech Republic

	End-Use Consumption	End-Use Consumption		Energy Savings Potential	Energy Savings Potential	
	[PJ]	[bl. Kč]	[bl. USD]	[%]	[bl. Kč]	[bl. USD]
Solid Fuels	310	15	0.5	20	3	0.1
Liquid Fuels	189	62	2.1	10	6.2	0.2
Gaseous Fuels	265	27	0.9	15	4.1	0.1
Heat	305	56	1.9	35	19.6	0.7
Electricity	153	62	2.1	20	12.4	0.4
Total	**1,222**	**222**	**7.4**	**20.4**	**45.2**	**1.5**

more precisely the often insurmountable problems in obtaining financing. In the commercial sector, energy consumers usually do not have enough of their own capital. If investment resources are available, they go first to projects such as renewing or expanding production. Investments in reducing costs, and therefore also in reducing energy consumption, are not yet a management priority. Non-commercial buildings (schools, hospitals, state administration, and similar buildings) have significant budget constraints that make it impossible for them to have higher investment costs.

Standard commercial loans are the most frequently used source of financing investments in the Czech Republic today; energy efficiency projects, however, cannot at the present time be financed using these loans. The Czech banking sector finances only top-notch projects with a short payback period (up to 4 years). There are several reasons for this: the high demand for loans, the lack of long-term financial resources, the higher risk of doing business in this period of economic transformation, and the restrictive policy of the Czech National Bank. Energy efficiency projects (especially those which address all aspects of energy consumption) have a simple payback period of 5-10 years and so are not in banks' realm of interest. Moreover, banks maintain interest rates at a high level (currently 16-20%).[2] High loan interest rates burden the project's cash-flow and so make its financial parameters considerably less attractive.

If the energy efficiency project meets bank criteria and the bank is willing to provide a loan, difficulties arise in providing guarantees. Until recently almost the only acceptable form of guaranteeing a loan was property that was attractive on the market or the guarantee of another bank. Not every client, however, owns attractive buildings, and the guarantee of another bank, whose cost hovers around 8%, would significantly increase the cost of the acquired financial resources. Although the opportunities for guaranteeing loans in Czech banks are gradually growing, guarantees in the form of future assets acquired during the course of the project and future project cash flow is still not acceptable for most banks.

Equity financing of energy efficiency projects as a counterbalance to debt financing is not yet common in the Czech Republic. Issuing securities is certainly a promising source for financing, especially of municipal energy efficiency projects. Taxation is currently the greatest obstacle to issuing municipal bonds. Profit from municipal bonds is not exempt from profit tax as is common in the West. In fact, it is taxed-as are securities of other legal entities—at a rate of 25%.[3] Bonds must therefore have a higher coupon interest rate to make them sufficiently attractive to investors. This situation presently prevents their widespread use as well as their use for financing energy efficiency projects.

The capital market is not yet entirely developed, and thus for the near future it is impossible to count on being able to acquire sufficient funds in this way.

The Revolving Fund—A Source for Financing Energy Efficiency Projects Using Non-Traditional Methods

Into this situation, however, has come the first offer from abroad of financial resources designated solely for investment in energy efficiency. Some years ago an energy system development study was developed for a Czech city in cooperation with the European Union. This study included proposals for energy efficiency measures. After the study was completed, it became clear that a lack of funding would make it impossible to implement the project. Foreign experts, therefore, expanded the study by adding a proposal for a new financing plan-a revolving fund. Even after this step, however, no domestic investors were found to establish the fund. The European Union, therefore, has decided to give the Czech Republic 5 million ECU (5.7 million USD). These funds should be used to test the less traditional methods of financing based on paying back the investment from savings achieved—primarily Energy Performance Contracting.

The European Union funds are a gift to the Czech Republic. Within the framework of the PHARE Program, these funds will form a Revolving Fund that will grant *loans* for energy efficiency projects. Loan payments will then be reinvested into the same types of projects. This type of fund-if it is large enough—can secure financing for energy efficiency projects for a relatively long time. The size of this revolving fund is limited; however, 5 million ECU will enable the financing 10-15 projects in the first phase. If this proposed concept proves to be viable, the Revolving Fund could acquire resources from additional investors in the future.

For the energy consumer who is considering investment in energy efficiency, the Revolving Fund and the mechanism for using it bring a variety of advantages. The term of the loan can be as long as 10 years. The loan interest rates for the first loans will be lower than those for standard commercial loans (roughly 10- 12%).

Here let us pause for a moment. The reader can object that the Revolving Fund cannot be maintained if consumers get less than market rates. The proposed rates are a compromise between the needs for maintaining the Fund, the high sensitivity of energy efficiency projects to high interest rates, and requirements of the bank that is interested in operating the Revolving Fund. After subsidies for energy prices are eliminated and inflation goes down[4] to a level that is standard in developed countries, the Revolving Fund's loan terms should become more like standard commercial terms. At the present time, therefore, the Revolving Fund is simulating economic condition that are expected in the next several years, even at the cost of temporary losses to the Fund.

Given the limited amount of funds, the Revolving Fund does not set as its goal to finance all projects that cannot acquire financing in other ways. The purpose of its existence is to prove the viability of non-traditional financing methods in Czech conditions. If successful, the Revolving Fund will evoke the interest of financial institutions in energy efficiency projects, which are at least an equivalent alternative to other investment opportunities.

The Institutional Structure of the Fund

The Revolving Fund will not be operated as an independent legal entity but will be managed by a Czech bank. This arrangement should ensure the professional management of the Fund (and thus reduce the risk of bad investment) and should reduce to a minimum the costs for operating the Fund. The chief administrative body of the Revolving Fund will be a board of directors including representatives of the European Union, the Czech government, and the financial sector. The role of the bank will be primarily:

- to evaluate submitted project proposals on the basis of basic bank criteria and supplemental criteria;
- to evaluate projects and grant loans for them;
- to manage granted loans;
- to submit regular reports to the European Union and the Czech government about the granted loans and the status of their repayment.

Suitable Projects

The Revolving Fund will finance primarily projects with a focus on *end-use energy efficiency.* Submitted projects must meet the following criteria:

- The project cash flow must reliably cover loan payments;
- The applicant meets basic bank criteria for receiving a loan;
- The facility must undergo an energy audit;
- Project costs must fall between 1-50 million Kc (30,000 USD–1.5 million USD);
- The lifespan of the project must be at least twice as long as the term for repaying the loan.

The basic criterion for accepting a project proposal for financing from the Revolving Fund is the *submission of a detailed energy audit for the facility under consideration.* A detailed energy audit must present an exhaustive analysis of the technical and economic energy savings potential in the facility. The evaluation of *all* measures is required, even those that are not capable of payback at the time the project is developed. This is because a change in initial conditions (prices of energy or efficiency measures or similar conditions) may radically change the payback capabilities of these measures. Because the first projects will serve as demonstration examples for similar enterprises or facilities in the future, a complete list of efficiency measures will facilitate the preparation of future projects.

A detailed energy analysis can also test whether a particular contract does not lead to so-called "cream skimming "-selecting the most economically profitable measures with quick payback. Experience in the Czech Republic for the time being has shown the opposite trend. Energy efficiency project suppliers (regardless of how projects are financed) offer customers projects with very short payback which are not comprehensive. Measures with longer payback period (i.e., building insulation or energy efficient windows) remain unutilized, and the customer has no opportunity to implement them as a separate investment in the future. This situation, unfortunately, occurs with the agreement of both parties. Here it is necessary to persuade the customer to demand comprehensive approach from suppliers and not to agree to simple and seemingly profitable solutions. The concept of the Revolving Fund should help considerably in this effort.

Initial projects will focus on promising industrial enterprises and the non-manufacturing sector (healthcare, state administration, etc.), where there is a low risk that the client goes to bankruptcy. There is no current plan to make use of the Revolving Fund in the residential sector. Subsidized heat prices for the public currently make it difficult to implement projects that would result in a return in this sector. Legislation in the residential sector and rental agreements is still imperfect in the Czech Republic. Drafting energy service contracts with residents would therefore be very complicated, Similarly, financing very small projects would evidently not bring the expected results for energy consumers. Energy Performance Contracting is associated with increased administrative cost, and thus can be cost ineffective for small clients.

Financial Plan

The financial plan for making use of the monies in the Revolving Fund is illustrated in Figure 2. Project financing will be based on cooperation between the energy consumer and the energy service company (ESCo), which will be responsible for the project proposal, implementation, and management for a designated period.

The ESCo will conduct an energy audit, and in conjunction with the client—energy consumer—will submit a project proposal to the Revolving Fund. If the project meets the required criteria, the fund will grant a loan to the project. The achieved cost savings will be used first to cover loan payments, and any remaining amount will be divided between the client and the ESCo in an agreed-upon proportion. If the level of energy savings achieved is not sufficient to cover the loan payments, the ESCo must pay the difference to the customer.

Risk Distribution

It is often written that Energy Performance Contracting is risk-free. This claim, however, is valid only for the customer—energy consumer. Two types of risks can appear in Energy Performance Contracting. They must be clearly defined:

- *technical risk:* The project is unsuccessful, the technical performance is weak, and no energy savings are achieved.

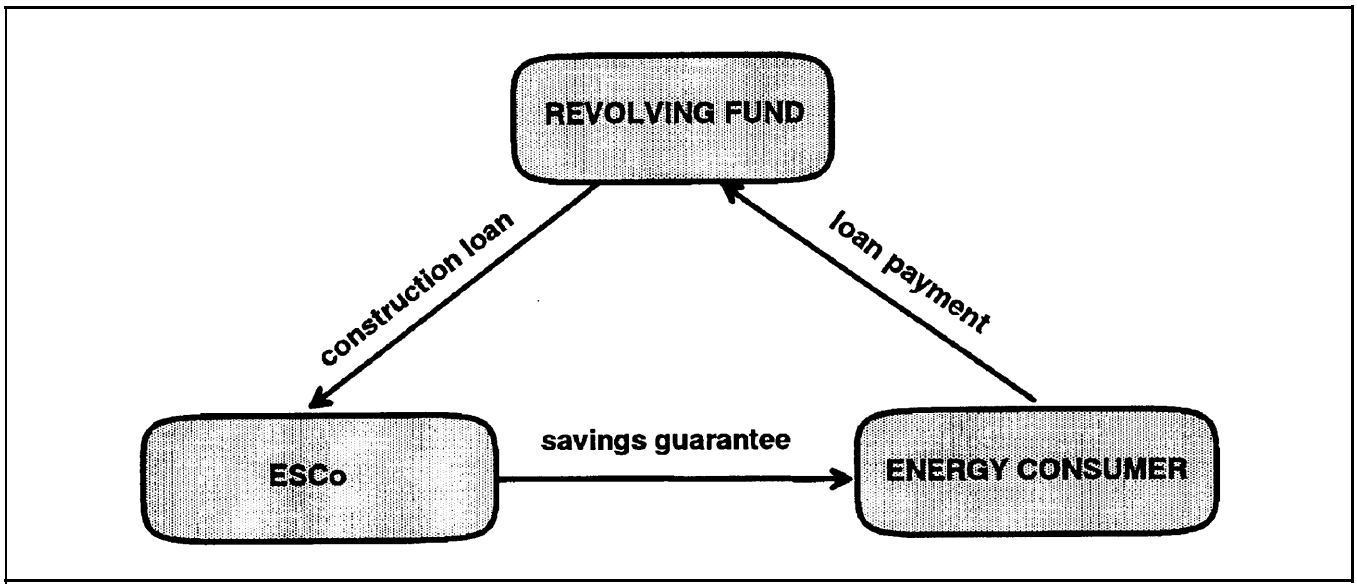

Figure 2. Project Financing from the Revolving Fund

- *financial risk:* The project is technically perfect, but the customer goes into bankruptcy.

In countries where EPC is used, the ESCo alone bears the technical risk. In the case of Revolving Fund, there will be exceptions. The energy-service sector in the Czech Republic is still weak, and companies interested in conducting these activities have minimal experience with non-traditional financing methods. Because a component of the "Revolving Fund" project is also support to new Czech ESCoS, the Fund itself will take on part of the technical risk.

The financial risk will be taken by the bank managing the Revolving Fund. The bank will have the final word on granting loans from the Revolving Fund and so will bear full responsibility for the financial stability of the energy consumers.

The expected date for initiating Revolving Fund activities is January of 1995. According to preliminary response, interest in its funds will apparently be high. The Revolving Fund is also an opportunity for energy service companies that would like to expand their services by including energy efficiency projects and offering non-traditional financing plans.

Applications for Energy Performance Contracting

As one possibility for financing energy efficiency projects, the Revolving Fund is still in its preparation stage. Two energy service companies are already active in the Czech Republic: they offer customers Energy Performance Contracting and, despite the above-mentioned difficulties, they have been able to secure project financing.

One of the first facilities that received an energy service agreement was a large teaching hospital in Prague. The teaching portion of the hospital educates medical doctors with a special focus on treating infections, tropical diseases, and neurological conditions, as well as practicing dermatology and orthopedics. The hospital consists of 19 buildings with a total of approximately 80,000 square meters (approximately 860,000 square feet) and has a capacity of 1,640 beds.

The current annual energy cost and consumption is shown in Table 2.

Table 2. Current Annual Energy Costs

Annual Utility Bill	Kč	US$
Boiler House Operation[(a)]	40,000,000	1,429,000
Electricity	20,000,000	714,000
Water	15,000,000	535,000
Total	**75,000,000**	**2,678,000**

(a) includes operating costs

The recommended energy efficiency measures are described further in a later subsection, and the financial data is compiled in Table 3.

Table 3. Summary of the Savings, Implementation Cost and Payback

ECM Description	Annual Savings kW	kWh	Therm GJ	Water	US $	Implementation Cost US $	Gross Payback Years
Convert Steam to District Heat	0	0	0	95,000	385,185	1,239,000	3.2
Install new EMS	0	0	21,248	0	102,040	598,000	5.9
Install Heat Recovery	-2	-20,050	4,687	0	23,810	186,200	7.8
Convert Central Steam Plant to Natural Gas	0	0	0	0	108,965	406,000	3.7
Total	**-2**	**-20,050**	**25,935**	**95,000**	**620,000**	**2,429,200**	**3.9**

Financial Terms of the Contract

One of two energy service companies that are presently active in the Czech Republic is carrying out this project. Despite the above-mentioned difficulties in obtaining financial resources, the ESCo has been able to secure financing. An equipment supplier arranged a loan from abroad at very attractive interest terms—the loan is for a period of 8 years. Because this loan is in foreign currency, the interest rate is considerably lower than in Czech banks-a mere 7%. How was this financial operation possible despite the above mentioned obstacles? That of course is the company's trade secret.

The ESCo signed a contract with the hospital for 8 years. For the entire period of the contract, 70% of the achieved savings will be used to cover loan payments, and the remaining 30% will be divided equally between the ESCo and the hospital. The ESCo guarantees that the savings achieved will cover at least the loan payments. If the level of energy savings is not high enough, the ESCo will make up the difference.

Proposed Energy Conservation Measures (ECMs)

ECM No. 1: Conversion of Space Heating from the Existing Central Steam Plant to a New District Heating Plant— This ECM will entail shutting down the hospital's central steam plant and connecting it to the district heating plant. Costs will be controlled through heat metering and individual department bills. This ECM will basically reduce costs by reducing losses and providing easier control of hot water consumption. The primary benefit is rate savings which result in reduced utility costs because the steam is produced at the outside DHS. Water consumption will be cut by decreasing boiler plants.

ECM No. 2: New Energy Management System— As part of the conversion to district heating, a new energy management system (EMS) will be installed to allow close control of both domestic water temperatures in each building and space heating hot water temperature controls as mentioned in ECM No. 1 above. Energy systems will be monitored to ensure the optimal use of energy and maximum user comfort. The new EMS will allow direct monitoring, meaning maximum energy savings. Coupled with a preventive maintenance program, energy systems will be kept in top condition.

ECM No. 3: Air Handler Heat Recovery— Two of the buildings have air treatment systems that run 24 hours per day because of the special climate requirements of the areas served. As a result, most use 100% outside air, and result in high utility cost. Installing this ECM will reduce the needs for heating and air conditioning and thus the utility costs.

ECM No. 4: Central Steam Plant Conversion from Light Fuel Oil to Natural Gas— The existing steam plant has high fuel costs, high pollution fines to the government and ongoing maintenance problems that are costly to remedy. Implementing this ECM is easy to do and results in economy of scale during construction to hold down construction costs.

Conclusions

The primary benefit of EPC, which currently attracts a lot of interest among energy consumers, is access to external sources of financing. Yet even after the financial and capital market in the Czech Republic becomes fully developed, EPC will still be applicable. Other benefits that Czech energy consumers for the time being consider of secondary importance will emerge to the forefront:

ongoing professional advice, long-term project monitoring leading to permanently achieved savings, and trained and motivated staff.

Non-traditional financing methods, especially Energy Performance Contracting, are of course not a cure-all. Individual projects require different approaches. However, there remains a sufficient potential in the Czech Republic for using non-traditional financing methods. Using these methods would lead to development of the energy service sector, the growth of demand for energy efficiency technology, and an end to further devastation of the environment.

Endnotes

1, The growth of the Czech economy's energy intensity is caused by two major factors. In the decrease of production, the share of the fixed part of energy consumption increases, which then increases the total energy intensity. The second factor is a shift in the industrial structure. The largest decrease in production occurred in less energy-intensive branches of industries, while the fuel and energy industries, metallurgy, and the production of construction materials practically stagnated.

2. Czech bank margins are around 7%.

3. Income from bank deposits is taxed at a rate of 15%.

4. In 1993 the inflation in the Czech Republic reached roughly 20%, and 1994 expects a rate of 10%. The inflation rate is expected to gradually decline in the next few years to a level standard in developed countries.

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