Investing in Energy Efficiency

Removing the Barriers

Energy Charter Secretariat

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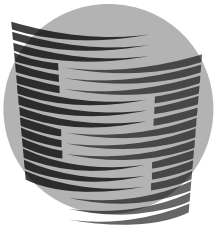

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PREFACE

Investing in improving energy efficiency has the clear advantages of reducing energy costs, improving security of supply and mitigating the environmental impacts of energy use. And still, many viable opportunities for higher energy efficiency are not tapped because of the existence of numerous barriers to such investments. These lost opportunities imply costs to the individual energy consumers and to the society as a whole and they are particularly important in economies in transition. The reasons for the barriers are complex and have a diversified nature.

Barriers to investing in energy efficiency and means to reduce them have on several occasions been addressed in the Energy Charter's Working Group on Energy Efficiency and Related Environmental Aspects (PEEREA). The present report is a follow-up on the Group's activities in this area directed at enhancing energy efficiency policies and implementation in the Charter's member countries. It identifies various types of barriers for making energy efficiency investments, be they of legal, administrative, institutional or financial nature, mainly in buildings, district heating and efficient lighting. The role of various bodies and organisations for the facilitation of energy efficiency investments is analysed, from public authorities and regulators to banks and international financing institutions.

This report was prepared with the support of the PEEREA delegates who participated in discussions and contributed with their comments and suggestions to the shaping of the report. Main author was Mr Bernard Jamet, acting as consultant to the ECS. Tudor Constantinescu from the Secretariat ensured the overall coordination of the work. Erik Sørensen supervised the project.

The study is made publicly available under my authority as Secretary General of the Energy Charter.

Dr. Ria Kemper

EXECUTIVE SUMMARY

Energy efficiency (EE) improvements in buildings, district heating networks refurbishment and modernization of lighting systems through the introduction of modern technology are well known investments that have a substantial and positive impact on the level of energy consumption and excellent pay-back. Yet, the investment must be financed. This report looks into how to remove the barriers to securing the necessary finance. Particular emphasis is put on three categories of investments: (1) energy efficiency improvements in existing private and public buildings (such as insulation), (2) modernization of district heating (DH) systems and (3) introducing efficient lighting.

For each of the three categories of energy efficiency projects covered in this report four different features are examined: (a) permits, authorisations, enablers, (b) financial aspects such as tax incentives and grants, (c) banking, and (d) third party financing (TPF), foreign investors and joint implementation (JI). The analysis is enhanced by examples from both Eastern and Western Europe and the report concludes by suggesting possible improvements to financing investments in energy efficiency.

In order to achieve significant energy efficiency improvements, governments need to include energy efficiency in their policy orientations and effectively implement measures and policies, mostly based on regulations and tax incentives or disincentives, in a clear and structured action plan. District heating legislation and policy in most transition economies need to be improved in order to create a better investment environment. One feature of special importance is to introduce commercial principles for district heating systems, which as a minimum entail payments based on metered consumption. Subsidies, cross-subsidies and tax distortions must be abolished since they give wrong price signals to the consumers. Also, a stronger commercial orientation encourages the involvement of private financial institutions.

Private sector financing alternatives are often hampered by phenomenon like a low awareness level, lack of understanding for project oriented loans, small-scale projects etc. There also seems to be a missing link between financial institutions and project owners and high potential projects do not receive adequate funding in spite of a seemingly win-win situation.

There is a need for new actions and mechanisms in order to create a better environment for the financing of investments in energy efficiency. Three main focus areas are identified: raising awareness and training bankers in financial institutions, establishing a network of energy efficiency financing specialists and developing innovative mechanisms.

However, facilitating the operation of private sector financial mechanisms is not sufficient. The investor should be motivated through an investment friendly environment. To this end, energy efficiency should be an integrated part of legislation related to housing and district heating networks. Construction permits, environmental permits, concession permits, licenses for heat and power generation, as well as government supervision should include requirements on energy efficiency performance.

Result-based and self-regulatory measures such as performance standards and energy labelling should be used as complements to traditional minimum standards, as they are in the new EU building directive. However, whether standards are performance-oriented or not, it is imperative that they are revised on a regular basis, since outdated standards set targets too low and fail to promote new technology.

Furthermore, improved energy efficiency should be rewarded, not penalized. This may seem obvious, but as a matter of fact that there are numerous examples of counter-productive taxes, subsidies and regulations. Combining and coordinating regulatory measures is a critical success factor.

A part of the problem of energy efficiency investment is often that nobody owns the problem. In the building sector, there are many parties involved in building a house. In addition, the lifetime of a house is longer than that of the original investor, making it difficult to oversee the full impact of energy efficiency measures. There are also the different interests of landlords and tenants, where energy efficiency issues tend to fall between the two. Legislation should clearly define and designate responsible parties for energy efficiency.

Assigning the administrative responsibility for energy efficiency is also vital. The national bodies dealing with energy efficiency should serve as a link between the government, international bodies, local bodies, companies and the general public. They should be the coordinating party, communicating needs for assistance on grass root level to the politicians and communicating government policy to the grass root level. Likewise, national agencies have an important role as partners in twinning projects in an East-West context.

Cogeneration should be encouraged. A new EU directive supports cogeneration, which is relevant especially for the accession countries because of the widespread presence of district heating.

The importance of education and information must not be underestimated. Legislation, self-regulation and evaluation will have no impact if there is no understanding of these measures and what they imply. Particularly in Central and Eastern European countries, lack of training on energy efficiency leads to poor management and building maintenance.

Grants can be used to accelerate the introduction of new technology. Grants usually only cover a percentage of total project cost, obliging the investor to finance the investment mostly by his own means. However, loans and other methods, where market actors are involved and forced to commit themselves, are the preferable solutions. Success factors include the use of existing structures. State loan facilities can be administered through banks. There are numerous examples of this in Eastern Europe, but the concept could also be used in Western Europe. It contributes to increase awareness in the banking sector, which in turn may lead to more recruitment of staff with EE knowledge, education of existing staff and, as a result, the bank may eventually develop its own EE loans.

State subsidies and activities should be aimed at enhancing market-based measures. Ultimately the government should have no central role. There is always the risk that grants steal business from private sector financial institutions. Different methods have been developed that refine the grant tool, such as voluntary agreements and technology procurement programmes, which have been successful in for example the Netherlands and Sweden.

Taxes are a powerful regulatory measure that can be used to affect energy consumption and investments in energy efficiency. They can be applied in two ways, through energy taxes to increase energy prices, thereby encouraging energy saving measures, and secondly through tax exemptions and accelerated depreciation, whereby investments in energy efficiency improvements are encouraged. Energy taxes are important communicators of a government policy aiming at energy savings. Taxes can also be used to raise funds for energy efficiency projects. Tax exemption is an uncomplicated form of grant, which uses already existing structures and communication means to reach the target, reducing administrative costs.

Governments also possess indirect tools like public procurement rules. Public procurement rules should be complemented with specific guidelines on energy efficient procurement. It is important for the public sector to serve as a good example by showing the benefits of energy efficiency measures. Also, public procurement represents a large demand, and can affect market penetration and technology development.

Market-related financial mechanisms are important for investments in energy efficiency, and government policy can facilitate the development of such mechanisms, such as Energy Service Companies (ESCOs), revolving loan funds, leasing, joint ventures and venture capital, by providing the adequate legal structure and tax incentives.

ESCOs provide a global service. They offer multiple energy efficiency services to consumers including project finance, engineering, project management, equipment maintenance, monitoring and evaluation. They use Energy Performance Contracts (EPC), where the consumer repays the loan with money saved through

the reduced energy consumption, which was an effect of the energy efficiency investment itself. However, there is a lack of sponsors or investors with the required level of creditworthiness and the necessary technical skills. Sometimes, legal constraints may also affect the operation of ESCOs.

Bundling small projects into larger projects could bring down transaction costs. Revolving loan funds offer facility owners loans that they could repay with energy savings. A successful fund structure for small-scale demand-side projects should target low-risk, simple energy efficiency improvements that are easy to quantify, and use local organizations for the technical evaluation and the financial creditworthiness assessment.

Another important funding source for Central and Eastern Europe is foreign investors. For foreign investors, local financial intermediaries are good counterparts for energy efficiency investments. Foreign investment should generate such self-sustaining effects, such as IFC guarantee funds enhancing local banks. There is a need to strengthen local organizations, which could continue to promote investment in energy efficiency after the project is finished.

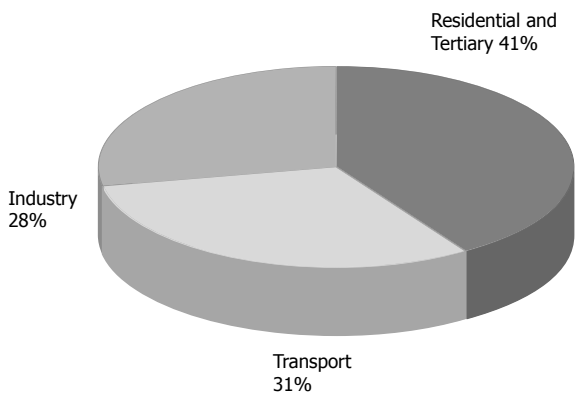
Joint Implementation (JI) projects provide a setting for Western and Eastern European countries to collaborate on energy efficiency projects and raise funds. So far, the largest number of projects is related to the renewable energy and energy efficiency, but the largest projects concern forest preservation, reforestation or restoration. The JI market is strictly regulated leaving little or no room for self-regulating market forces and making it complicated to venture into a project. Moreover, there are too few demand-side projects.

1. INTRODUCTION

The aim of this report is to identify barriers to financing energy efficiency investments for different types of projects in various European countries and to identify and learn from best practices. Although the analysis may concern a wide range of energy efficiency projects, a particular emphasis is on three categories of investments: (1) energy efficiency improvements in existing private and public buildings (such as insulation), (2) modernization of district heating (DH) systems and (3) introducing efficient lighting.

In Western Europe, about one third of primary energy is consumed in non-industrial buildings for space heating and cooling, lighting and electric appliances. In terms of total energy end use, this consumption is higher than that used in the entire transport sector, see Figure 1 below. Inadequate insulation and air leakage are primary causes of energy waste in most houses. Insulating roofs and walls and replacing single-glazing by double-glazing in windows save large amounts of energy. Hence, it is important that energy efficiency measures are implemented in this sector. A prerequisite for implementation is finding finance for the investments.

Figure 1 Energy Demand in 2000

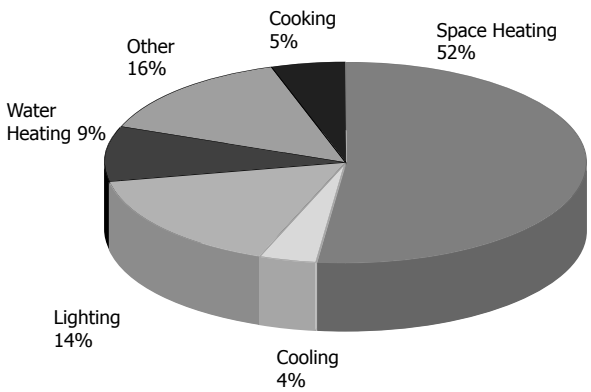


Source: European Commission slide show April 2001. DG for Energy and Transport. http://www.europa.eu.int/comm/energy/library/en_bat_sl_en.pdf

Space heating represents by far the largest part of energy consumption in EU tertiary and residential buildings, see Figures 2 and 3 below. It is therefore important to choose environmentally sound energy sources for heating and to use them in an efficient way. CHP/district heating is a cost-effective, environmentally sound source of heat and power for cities and a critical energy source for countries in transition, currently covering 60% of heating and warm water needs. However,

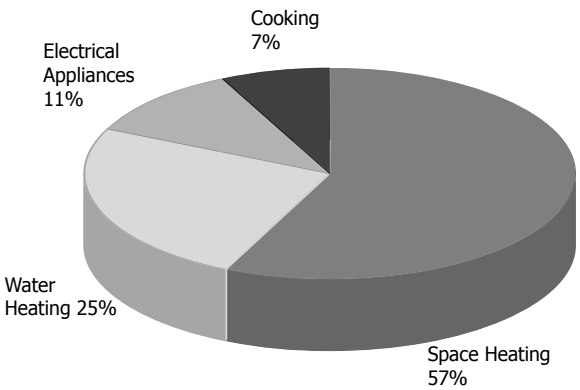
numerous district heating systems in transition economies face serious financial and technical problems because of the policy framework for these systems.

Figure 2 Energy Consumption by End Use in EU Tertiary Buildings



Source: European Commission slide show April 2001. DG for Energy and Transport. http://www.europa.eu.int/comm/energy/library/en_bat_sl_en.pdf

Figure 3 Energy Consumption by End Use in EU Residential Buildings



Source: European Commission slide show April 2001. DG for Energy and Transport. http://www.europa.eu.int/comm/energy/library/en_bat_sl_en.pdf

Subsidies could contribute to promote district heating and facilitate modernization of the networks, but must not be used to subsidize heating as such and thereby discourage reduced consumption. Modernization work normally concerns the production, transport and distribution and includes for example increased use of combined heat and power generation (CHP), reconstruction of the heat generator, reducing thermal losses, and developing the metering and control systems of the heat centre.

District heating networks are well developed in Eastern European countries, although some EU countries earlier developed policies aimed at encouraging the development of such networks (Denmark, Netherlands etc.). In France, for example, there are less than 70 district heating networks, while there are more than 800 in Poland and 200 in Hungary. Most networks in Western Europe are relatively new, use modern technologies and usually are well operated and maintained, while in economies in transition the networks are outdated, using obsolete technologies, lack maintenance and, therefore, are in an urgent need of refurbishment.

Installing efficient lighting systems is also an efficient method to reduce energy consumption that can be applied everywhere: houses, office buildings, enterprises, streets etc. The technology is well known, simple (replacement of old bulbs by new efficient ones such as the CFLs with their adapted fixtures), reliable and available in most of the countries in Europe.

For each of the three categories of energy efficiency projects covered in this report (improving energy efficiency in buildings, modernizing DH, introducing high efficient lighting) the following issues are examined:

- permits, authorisations, enablers
- financial aspects such as tax incentives and grants
- banking
- financing techniques: third party financing (TPF), foreign investors and joint implementation (JI)

The report concludes by suggesting possible improvements to the financing of investments in energy efficiency.

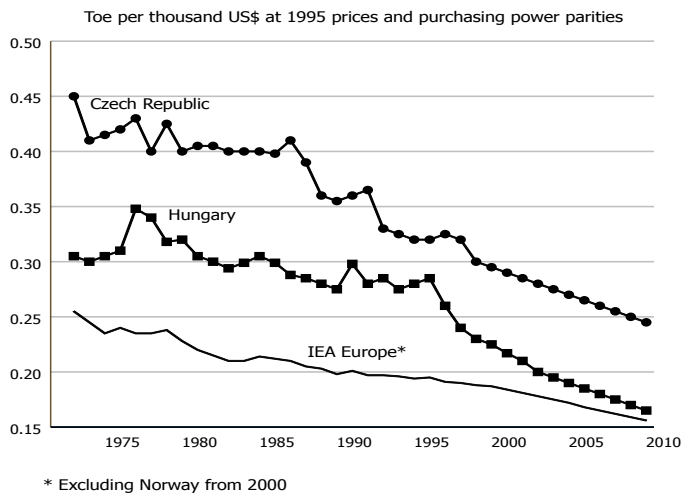
2. SOURCES

Existing studies and reports have primarily been used as sources. They include, among others, national energy efficiency plans, such as the Hungarian Széchenyi Plan from 1999, International Energy Agency (IEA) publications, such as IEA Energy Efficiency updates, and Energy Charter publications, such as the PEEREA country reviews.

Direct contact has also been made with several government authorities, NGOs and companies in order to obtain more accurate and recent information than is available in the reports. Examples of organizations that have been contacted are the IEA, the Hungarian Energy Centre, the Energy Centre in Bratislava, the Dutch Ministry of Economic Affairs (Minez), the Dutch Energy Agency (Novem), the Swedish Energy Agency (STEM), the Silesian University of Technology, Department of heating, ventilation and dust removal technology in Poland and the Czech Energy Efficiency Centre, SEVEn.

The intention has not been to produce a comparative study of all issues in all countries in Europe, but rather to illustrate identified barriers to investing in energy efficiency with examples and present success stories in how to overcome the barriers.

Figure 4 Energy Intensity in the Czech Republic and in Other Selected IEA Countries, 1973 to 2010



Source: Energy Policies of IEA countries Czech Republic 2001 review figure 7. http://www.iea.org/public/reviews/czech7.pdf Energy intensity for a whole country is energy consumption divided by total GDP. It is usually expressed as Mtoe/billion USD.

3. PERMITS, AUTHORISATIONS AND ENABLERS

This chapter focuses on barriers from an administrative point of view in terms of mandatory permits or authorisations for three types of energy efficiency investments (improving energy efficiency in buildings, modernizing district heating networks, introducing high efficient lighting). It examines legal requirements with impact on energy efficiency, result-based regulatory measures and self-regulation, institutions and education.

Energy efficiency projects are subject to the general regulations established in all countries for investments and for dealing with construction of buildings, environmental impact, aesthetic issues, etc. Energy efficiency issues also have to be given some impetus through regulatory measures such as certification, standardization and labelling.

Beside the laws affecting the energy efficiency measure as such, there are laws related to the work of financial institutions and ESCOs. Such laws should support, rather than restrain, the work of financial institutions in their attempts to finance energy efficiency projects.

All legal requirements, taxes and incentives which concern energy efficiency in some way could be combined into one Energy Efficiency Law, which is the case in for example Romania, where such a law was adopted in 1999 and Poland (the Energy Law of 1997). This may highlight the issue, but there is also a risk that it is set aside as a separate topic. By integrating energy efficiency into existing requirements and structures, it becomes a natural part of all construction and modernization work.

3.1. LEGAL REQUIREMENTS WITH ENERGY EFFICIENCY IMPACT

There are not any permits or authorisations specific to investments in insulation. However, there are numerous regulations that are relevant when making an insulation investment, modernizing a district heating network or introducing more efficient lighting. Building permits, building notifications, environmental permits and building standards are some important features, as well as import permits and aesthetic rules.

These permits and notifications are mandatory for every end-user who wishes to undertake a major construction project. It does not matter how it is financed, or whether the end-user is a private household, a municipality or a company. The permit requirement is linked to construction.

District heating is considered one of the most cost efficient and environmentally sound energy sources and the modernization of district heating systems should be stimulated. This should be reflected in relevant rules and regulations, such as requirements on construction permits, building standards, corporate environmental permits and regular government supervision, as well as licenses for heat and power generation and concession permits.

Many district heating projects require corporate environmental permits and compliance with regular government supervision. District heating legislation and policy in most transition economies need to be improved in order to create a better investment environment. One feature of special importance is to introduce commercial principles for district heating systems, which would entail prices based on metered consumption. Subsidies, cross-subsidies and tax distortions should be abolished. Stronger business practices might encourage more involvement of private financial institutions.

A new EU directive strongly supports cogeneration, which is relevant for accession countries where district heating is widespread.

Where permits are required for energy efficiency measures it complicates investment decisions. Application forms must be obtained and decision-making could take long, which may discourage the investor. Efforts should be made to streamline procedures. Eliminating permit requirements for energy efficiency measures altogether is not recommendable, since it is important to coordinate different societal interests.

3.1.1. CONSTRUCTION PERMITS

Construction is controlled in two ways: through construction permits and construction announcements. Energy efficiency could be included as one of the requirements needed for granting a construction permit, thereby encouraging such investment.

Usually it is the municipal housing unit of the municipal councils that does the evaluation of the proposed construction and issues the permit. The party that wishes to undertake a construction project must complete a special form provided by the housing unit of the municipal council where the building is located.

The circumstances where a construction permit is needed depends on the individual case and on the impact of the measure. A building permit is needed when building a new house, equipping a new apartment and changing the use of a building or a part of it. The building permit process implies an evaluation of the proposed measure in relation to the plans for the area and suitability. Stricter rules apply to high-density areas. For example changing a facade requires a construction permit in a high-density area, but not in the countryside. Hence, if insulating a wall or

installing double glazed windows entails a change of the facade, it requires a construction permit in cities, but not in less populated areas.

3.1.2. CONSTRUCTION NOTIFICATION

A construction notification is usually needed for small construction projects and installation of minor equipment. The process could imply that the applicant in consultation with a quality controller at the municipality and a control plan, shows that the changes will meet the requirements. The construction notification process does not include a decision from the municipal authority. Just like construction permit procedures, construction notification procedures should be fast, simple, reliable and encourage energy efficiency.

3.1.3. BUILDING STANDARDS

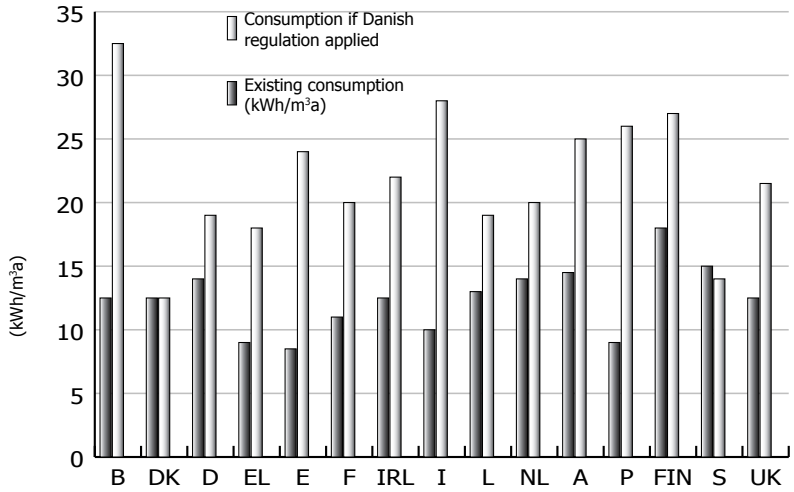
Building standards set minimum levels for, among many other things, insulation standards. Many countries use building standards to ensure that new buildings meet certain criteria, thereby limiting the options for builders and affecting the use of for example energy efficient technology. Evaluations show that the building standards do indeed have the desired effect of contributing to an optimal reduction of energy consumption. For example in France, mandatory heat insulation standards were introduced in 1974, resulting in a 50% drop in average energy consumption in buildings constructed from 1975 onwards (see examples below). However, the standards requires continuous review, since it otherwise jeopardizes innovation and market competition by setting standards too low. The standards can also be further refined. There is a trend towards performance standards, which are examined under 3.2.

The marginal cost for adding energy efficient materials, equipment and technology when building a new house is relatively low, compared to the price of taking such measures in existing buildings. Therefore, it makes sense to impose new standards on new buildings, or renovations of old buildings. Normally retroactive requirements on old buildings, where no renovations are planned, should be avoided. At the same time it is important to keep in mind that buildings tend to last long, and if measures are taken only in new buildings, changes will take centuries to implement. 90% of the residences that will be used by 2020 in Sweden have already been built. Half of today's residences were built before 1965.

The importance of cost-effective insulation is not questionable. If for example Danish standards were applied in every EU member state, energy consumption per building volume would decrease by almost 50%. The most dramatic results would occur in Portugal, Italy, Belgium and Ireland (see Figure below reflecting the situation in 2001). Interestingly, there would be a slight increase in consumption

in Sweden when applying the Danish regulations, suggesting that Sweden has the strictest insulation standards in Europe.

Figure 5 Comparison of Consumption Applying the Model Building Regulation in Denmark in each Member State (Climate-Corrected)



Source: European Commission slide show April 2001. DG for Energy and Transport. http://www.europa.eu.int/comm/energy/library/en_bat_sl_en.pdf

Examples of Insulation Standards

The Czech Republic

In the Czech Republic, voluntary (mandatory only if state money is invested) insulation standards for buildings have been in effect since 1994. The enforcement and monitoring of building codes are insufficient. Estimates show that the standards result in a 30% reduction in energy consumption and that 15 000 apartments are built and retrofitted yearly, producing an annual decrease of CO_2 emissions of about 40 000 tonnes. Similar estimates for commercial and administrative buildings do not exist and there is no retrofitting programme for individually owned houses. However, it can be stated that the current low cost effectiveness of thermal insulation measures reduce willingness to invest in the renovation of buildings.

Denmark

A new code for new buildings entered into force in 1996 (large buildings) and 1998 (small buildings), which cuts an additional 25% off net heating demand, reducing it to about 70 kWh per sqm per year. In addition, the code defines limits on electricity consumption for ventilation and enforces low temperature heating systems to increase efficiency of different heat supply systems, such as district heating systems, condensing boilers, solar energy and heat pumps.

France

In 1974, France took the initiative to introduce mandatory heat insulation for new buildings, leading to a 50% reduction in average energy consumption for residences built after 1975. The regulations have been enhanced gradually over the years, but compliance is lagging behind.

There is 85% compliance in collective buildings, but only 30% in industrial buildings due to lack of control. Thermal regulation of buildings has been enhanced gradually since 2000, in order to allow professionals to comply with higher energy efficiency standards and preventing augmentations in prices for materials. Controls and penalties for non-compliance will accompany the reinforcements.

Germany

Since 1 February 2002, Germany has a new Energy Conservation Ordinance with the purpose of diminishing energy consumed in heating, climate control and hot water in new buildings by 25-30%. Previously, thermal insulation and heating were treated separately, but the new ordinance is an attempt to combine efforts and optimising energy efficiency measures. It does not only cover new buildings, but puts higher demands on modernization and retrofitting measures of old buildings than did the former legislation in the field. To some extent it even requires retroactive improvement of insulation of floors, ceilings and piping.

The country's legislation on energy conservation in combination with government assistance has had a positive effect on Germany's building stock. Thermal insulation ordinances since 1977 have resulted in the following average heat energy consumption ceilings in new buildings in Western Germany:

- First Thermal Insulation Ordinance 1977-1984: below 200 kWh/sqm/year
- Second Thermal Insulation Ordinance 1984-1995: 150 kWh/sqm/year
- Third Thermal Insulation Ordinance 1995-2002: 100 kWh/sqm/year Energy Conservation Ordinance from 2002 (combining thermal insulation ordinance and heating ordinance): 70 kWh/sqm/year

The German unification implied that the Eastern German Länder had to follow the same rules for thermal insulation as the Western German Länder, and from 1991 the Western standards applied to all new buildings in the Eastern Länder. Present (2003) average space heat energy consumption in all types of existing buildings equals 265 kWh/sqm/year.

New standards applied to the administrative buildings that were constructed during relocation of parts of the federal government to Berlin in 1999. Consequently, the Federal Chancellery uses 44% less energy than is required by the Thermal Insulation Ordinance from 1995, the Federal Ministry of Economics uses 34% less, and the Office of the Federal President uses 29% less.

Hungary

50% of buildings in Hungary were built before 1945, so the building stock is rather old. However, the oldest buildings are not the least energy efficient. 550 000 of the about 4 million dwellings in the country were constructed 30 years ago, with prefabricated panels presenting poor energy efficiency performance. Usually, low-income people live in these apartments, lacking resources for improving insulation and air exchange.

Thermal insulation regulation for new residential buildings was introduced for the first time in the seventies. In 1991, a standard in line with average European regulation was adopted. It is based on heat loss per cubic meter.

In 1994, the government made the standards voluntary, only requiring a statement from the architect that the building meets energy efficiency criteria. Requirements on construction materials, in line with EU Directive (89/106/EEC), were introduced in 1997.

Sweden

Since 1960, Swedish building standards have included requirements on thermal insulation. The standards have been revised 1975, 1980, 1988 and 1998, and seem to produce the desired result: energy consumption for heating of residences has not increased since the 70's in Sweden, in spite of the fact that the area of heated residences has increased by almost 50%, reflecting an increase in efficiency by factor two in 20 years.

3.1.4. ENVIRONMENTAL PERMIT

Evidently, when installing a heat pump or similar measures, a permit or announcement to the municipal environmental protection unit is required. The investor must fill out a special form, which will be treated by the municipality or by the local environmental protection agency.

3.1.5. IMPORT PERMITS

Import permits are needed when purchasing certain energy efficiency equipment from abroad. If this is difficult to obtain, and it is associated with complicated administrative steps and high import taxes, end-users are discouraged from making an investment. According to a report published in 2002 by the Energy Centre Bratislava and KWI Architects Engineers Consultants, this has been the case in the Slovak Republic, where particularly for certain boilers import permit procedures and additional tax discourage buyers[1]. Other countries do the opposite and exempt energy efficient equipment from import duty.

1 *National Energy Efficiency Study in Slovakia July 2002. Final report. Prepared for the World Bank and the Ministry of Economy of the Slovak Republic. KWI Architects Engineers Consultants with Ökoplan, Wild & Partner, and Oberösterreichischer Energiesparverband and Energy Centre Bratislava with Profing, EGU and VVUPS NOVA. p. 41.*

3.1.6. AESTHETIC RULES AND CULTURAL HERITAGE

Changing lighting systems, improving insulation in residential houses or other types of buildings does not require any permits, unless it is bulky and on a facade in an area with fairly high building and population density, or if the building is marked as a cultural heritage.

3.1.7. REGULATIONS ON ESCOS

There are several measures governments can take to promote the work of energy service companies (ESCOs), for example improving the legal basis for energy performance contracts. Legislation can affect perceived risk for such contracts, which in turn may lead to an increased number of contracts signed. In the Czech Republic, the law supports the right of ESCOs to collect payment related to their customers' energy savings, but there is not any legislation specifically targeting the rights and obligations of ESCOs or the exact terms of energy performance contracts.

In Ukraine and Russia, payment based on future performance is not fully covered by the legal and accounting systems. In the former Soviet Union, ESCOs are uncertain whether their contracts will be considered valid in a court and customers are afraid of being fined for deducting costs for inappropriate contracts. Even though these problems could be overcome, a change in legislation would make the work of ESCOs easier, and also indicate that they are supported by the government. In Bulgaria, the existing legal framework does not allow municipalities to retain the savings derived from the implementation of energy efficiency measures. This is a major barrier for municipal energy efficiency projects as well as for energy performance contracting by ESCOs.

3.1.8. CORPORATE ENVIRONMENTAL PERMITS AND SECURITY REGULATIONS

All district heating renovation work requires corporate environmental permits and compliance with regular government supervision, as for any other construction project, related or not to energy efficiency. Modernization works that target sub-stations inside the residential buildings are subject to security regulations.

Environmental legislation puts high demands on companies with substantial environmental impact, as for example for district heating networks. They must apply for permits for their activities and must consult government authorities before changing production processes. Companies are subject to continuous surveillance by public authorities and they pay fees for this surveillance. Depending on the amount of environmental impact, different authorities should be consulted. Local authorities deal with less hazardous impacts, central authorities deal with

companies with very hazardous impacts. If the handling of applications for new measures is long and complicated, implying too many administrative steps, companies could be discouraged from making for example energy efficiency investments. Hence, it is important that the surveillance procedures are smooth and simple.

Good energy efficiency performance should even be encouraged in the permit and surveillance procedures, and companies should be rewarded for improving their energy efficiency performance, for example by a reduction in environmental surveillance tariffs.

3.1.9. LAWS/REGULATIONS ON HEAT AND POWER GENERATION

District heating companies are subject to laws on concession and they need a license for heat and power generation. Rules generally concern tariffs, security, quality and details of the contract with the consumer. Such laws should also include conditions on energy efficiency.

3.1.10. DISTRICT HEATING LEGISLATION AND POLICY IN EITS

District heating legislation and policy need improvements in most transition economies. The current regulations do not meet the economic challenges and do not reflect the synergy between district heating and the rest of the energy sector. Dedicated district heating laws or well-developed rules as a part of a broader energy legislation are needed. Such laws should include a requirement to conduct least-cost energy planning for district heating systems on a regular basis. Similar planning and an evaluation of environmental costs and benefits of different options (an environmental impact analysis) should also be made prior to making a major investment. These were the conclusions at an IEA roundtable discussion in 2003 on district heating legislation and policy in EITs.

Furthermore, it is necessary to apply commercial principles for district heating systems including payments based on metered consumption (see discussion below). Private sector involvement in district heating should be encouraged and housing associations should be given a strengthened role for improved customer relations, in order to develop energy efficiency projects. A national energy policy should outline the role of district heating and its implementation at the local, regional and national levels of the energy system.

Phasing out district heating subsidies, cross-subsidies and tax distortions is necessary. They create distortions, resulting in inefficient energy use and financial problems for district heating systems and the cities supporting them. It is important to note that reductions in district heating subsidies must be

coordinated with reductions in energy subsidies for other sectors (such as gas) in order to avoid creating new distortions to the detriment of district heating. Also, support systems for the poor could be needed to compensate for reductions in district heating subsidies, in order to prevent social problems.

Another critical factor is to introduce stronger business practices in the district heating sector. There must be a cultural shift from a production oriented model to a customer-focused model, which entails quality service, better match between supply and demand and maybe also increased financing from commercial banks and other financial institutions.

Moreover, the regulatory process must be adjusted. There are cases where municipal or regional governments own and regulate district heating assets at the same time, which hardly ensures objectivity. Competing regulatory agencies should coordinate their actions when developing tariff policies and governments should consider conditions for depreciation, bad debt and other costs of operating a sustainable business, including a reasonable rate of return[2].

3.1.11. METERING

Metering of energy consumption is an important way to stimulate energy efficiency. It is an essential part of creating market-based pricing and enables a system of billing based on metered consumption, which in turn gives incentives to consumers to reduce their consumption. Systems that are not based on metered consumption are barriers to financing energy efficiency investments, because an investment in energy efficiency will not affect energy costs. For example, in the Czech Republic 50% of households have individual meters and flow regulation, which enables a consumption-based tariff. The rest pays according to the size of apartment or the number of people living there and the same price will be paid no matter how much energy is used, which hardly gives any incentives to reduce energy consumption (see examples below). This section is not intended to be a full review of metering but only to identify its importance for consumption-based payments, which in turn has an effect on energy efficiency investment

2 http://www.iea.org/workshop/2003/dhr/outcomes/pdf

Examples of Metering

The Czech Republic

District heating is an important part of the energy system in the Czech Republic as 30% of the 10 million households are connected to a local district heating network and space heating is the main energy use of households. District heating systems are organised locally and operate in about 50 cities. Individual heating companies are also power producers. The sector was fully privatised in 1992-1994 through a voucher privatisation, with the exception of a few units belonging to the army, schools, state hospitals and other health care facilities, which remain in state ownership. Furthermore, there have been significant foreign acquisitions of companies.

In the Czech Republic, 50% of households have individual meters and flow regulation, enabling a consumption-based tariff. The other 50% have tariffs based on the size of the apartment and/or the number of people living in the apartment. Heat subsidies were abolished in 1996 but the VAT rate remained at 5%. Landlords using heat from a central source are obliged to measure heat consumption. They must not exceed the determined standards for consumption of energy for heating. If house occupiers do overheat, they run the risk of financial sanctions by the State Energy Inspection. Special energy audits must be carried out in order to receive state funding, so that the energy saving potential can be determined.

Denmark

In Denmark, individual metering of the use of electricity, district heating, gas and water in buildings has been mandatory in new buildings since 1996 and in existing buildings since 1997 (according to the IEA energy efficiency update for Denmark April 2003).

France

In France, the law on air and rational energy use from 1996 requires standardized calculations of annual energy costs of dwellings and commercial units for sale or lease. Since 2000 there is a decree specifying the rules on how to make such an estimate for new buildings. A similar decree for existing buildings is also planned. Building owners will be encouraged to pursue energy efficiency work and they are allowed to increase rents in order to finance these undertakings.

Germany

In Germany there is a general requirement for metering in the "old" Länder since 1981 and in the "new" Länder since 1996. Individual metering by flat is required, except in some special cases of district heating.

Hungary

Modernization of the district heating system has high priority, which is reflected in the Action Plan of October 1999. The objective is to save 10 PJ of energy per year until 2010. Metering is mandatory in Hungary starting 2003, and even earlier in some areas,

depending on the regulations of local governments. This is in line with government intentions to create a competitive district heating market through outlining relations between producers, suppliers and consumers of district heating, system owners as well as authorities. The Hungarian view is that regulation must encourage competition through pricing, tariffs and taxes.

The Netherlands

In the Netherlands, there is no national legislation for individual metering, but the energy distribution companies promote individual metering through financial incentives.

3.1.12. EU COGENERATION DIRECTIVE

The increase in cogeneration is an important aspect of increased energy efficiency and it is important that the new EU directive efficiently supports capacity expansion of cogeneration that optimises efficiency and emission reductions.

The intention behind the directive on cogeneration adopted early 2004 is to promote cogeneration through a systematic identification and gradual realization of the national potential for high efficiency cogeneration by creating a common definition and removing barriers.

To overcome current barriers to cogeneration, Member States must:

- guarantee that electricity from cogeneration will be transmitted and distributed on the basis of objective, transparent and non-discriminatory criteria;
- facilitate access to the grid for electricity produced from cogeneration units that use renewable energy sources and from units with a capacity inferior to one MW(e);
- ensure that guarantees of origin of electricity from cogeneration can be issued on request by one or more competent bodies;
- analyse the national potentials for high-efficiency cogeneration.

One way of promoting cogeneration is through national support schemes, but this is not mandatory. However, if support schemes are implied, they must not be used to subsidize heating.

The directive divides cogeneration facilities into three categories:

- Industrial applications, that usually require steam or hot water above 140º C;

- Central Heating applications that require warm water between 40ºC and 140ºC and;
- Agricultural applications.

The directive does not include any national targets for cogeneration and does not require the countries to support cogeneration, but encourages such support. It is hoped that the directive will promote the use and development of cogeneration in the new EU countries, where the widespread use of district heating is a good basis for cogeneration. The cogeneration directive and the renewables directive should be implemented parallel to the electricity directive, so that market introduction occurs in line with objectives on sustainable development. The directive stems from the Commission's cogeneration strategy from 1997, which targeted an increase in cogeneration in total EU electricity production from 9% in 1994 to 18% by 2010.

3.2. RESULT-BASED REGULATORY MEASURES AND SELF-REGULATION

There is a multitude of research projects, trials and experiences that can form the base for good energy efficiency performance of residential dwellings, but the implementation of the results is slow. One way of addressing this problem is to create voluntary schemes for implementation, and impose legislation only if these schemes fail.

There is a trend towards result-based regulatory measures in the form of performance standards, where the house owner is free to choose means to achieve a minimum energy efficiency performance of the whole building. Some European countries have experience with such standards, and the new EU building directive will secure that they are introduced in all EU countries. There are also entirely self-regulatory schemes, such as different sorts of labelling. The EU already has a long history of appliance energy efficiency labelling. In the new building directive these are expanded to energy efficiency labelling of entire houses.

3.2.1. PERFORMANCE STANDARDS

Specific building standards are gradually being replaced by result-based regulatory measures like performance standards. In performance standards, insulation measures for example are part of the total improved performance, but it is up to the house owner to decide how to achieve the performance standard. Performance standards serve the purpose of setting a minimum level for energy efficiency without jeopardizing competition and innovation in the market place. Ideally, the standards setting process involves all parties concerned, increasing awareness and understanding of the importance of energy efficiency.

Soon all EU countries will have to introduce performance standards, since there is a new EU directive on the energy performance of buildings (for details see below), including minimum standards for energy performance, certification systems for new and existing buildings (a kind of energy labelling of buildings) and assessment of heating and cooling equipment. The directive must be implemented in the Member States by the end of 2005.

The EU Building Directive

The directive on the energy performance of buildings, includes in summary:

- Application and regular updating of minimum standards for energy performance of buildings. They are based on a common methodology for 1) all new buildings and 2) for existing buildings of more than 1000 square meters that are renovated. The performance criteria will include energy use for heating, ventilation, lighting, and the opportunity of heat recovery and local renewable energy supply used in cost-effective ways.
- Common methodology for the preparation of minimum integrated energy performance standards, which Member States have to adopt for each type of building. This methodology will take differences in climate into account and include factors relating to insulation, heating, ventilation, lighting, building orientation, heat recovery, and the use of renewable energy sources.
- Certification systems for new and existing buildings: Energy performance certificates no more than ten years old, containing advice on how to improve energy performance, must be available for all buildings when built, sold or leased. These energy performance certificates, along with information on recommended and actual indoor temperatures, will be displayed in public buildings and in other types of buildings frequented by the public.
- Assessment of heating and cooling equipment by experts. Member States must make necessary arrangements for regular inspection of boilers of a rated output between 20 and 100 kW. Boilers above this threshold must be inspected every two years (gas boilers every four years).

The provisions of the directive shall be implemented in national legislation by the end of 2005 as deadline except for some requirements that can be postponed until 2008. In June 2003, the EU Commission, DG TREN started a committee with national representatives and a few stakeholder representatives to discuss implementation of the directive.

Examples from France, the Netherlands and Sweden, where energy performance standards have been in place since 2001, 1995 and 1988 respectively, are given below. France set minimum reference standards for different energy uses and the Netherlands has a ceiling for total energy consumption in a building.

Examples of Performance Standards

France

A change in energy regulation was made in France through RT 2000 (Réglementation Thermique 2000), which came into effect on 2 June 2001, implying that all construction permits that are submitted after that date must comply with a new standard. It includes a general objective for the energy performance of a building, delegating the decision on how to achieve the target to the construction company.

It maintains some minimum requirements, namely that energy consumption must be lower than a reference consumption (for example 16 W per sqm for lighting in office buildings), temperature during summer must be inferior to a reference temperature and minimum performances are required for insulation, ventilation, heating system etc. From 2 June 2001, energy consumption in new, and new parts of, residential buildings should be 20% lower compared to the 1989 regulations. Many buildings already have better insulation than the previous legislation demanded, therefore the increase is not so high in practice. In the tertiary sector, previous legislation was not very demanding, and RT 2000 increases performance requirements by 40%. RT 2000 will be revised in 2005.

Evaluation tools, that will be used to measure the results, have been developed by the Scientific and Technical Centre for Buildings (Th-C, for calculation of energy consumption in a building, Th-E for calculation of comfort temperature in summertime). They are distributed as free software among practitioners. For single-family houses and typical administrative buildings, there is a simplified version of the thermal regulation, where no evaluation is required.

The Netherlands

Energy Performance Standards for new buildings and non-residential buildings came into effect in the Netherlands in 1995 as part of the Housing Act. They promote non-conventional energy sources, such as solar and residual energy, and are intended to achieve savings of between 15 and 20% in energy consumption compared to previous requirements.

The requirements of the Energy Performance Standard (EPN) for new residential properties is 1.0 (since 1 Jan 2000), i.e. buildings must be designed for a maximum of 1000 cubic meters natural gas consumption annually for heating, hot water and cooking.

Sweden

In Sweden performance standards for buildings were introduced in 1988. The Swedish standards have contributed to increased awareness and knowledge among constructors, entrepreneurs etc. The standards have also guided product development and led to improved insulation levels.

3.2.2. ENERGY LABELLING OF ENTIRE BUILDINGS

There is a trend towards further integration of self-regulatory measures through energy labelling of entire buildings. Energy labelling can be viewed as a form of energy performance standard, but of a more encouraging than restrictive character. It allows for market forces to promote technology development and gives economic incentives. Building labelling has been introduced in some countries, and is gradually becoming the rule in the EU being part of the new EU building directive, see 3.1. Energy labelling of houses affects the owner/user primarily when transferring the ownership. A system for mandatory energy labelling of buildings requires creation of regulations and certification systems for accredited controllers. Denmark has extensive experience of this kind of energy labelling (see example below).

Energy labelling raises awareness. Energy efficiency measures are not imposed, and the parties themselves can directly affect the process. In addition, it makes it possible for the owner to be compensated for receive payback on energy efficiency investments made, by increasing the price when selling the house.

It is important that investors in energy efficiency get credit for their efforts. It should be possible to link mandatory energy labels and verifications of the building's energy use to construction permits and building regulations. Another possibility is to reduce property tax for buildings ranking highest on the performance scale. The voluntary Dutch EPA (see example below) is a good example of this.

Examples of Energy Labelling

Mandatory energy labelling when selling a property was introduced in Denmark already in 1997. Small properties (less than 1500 sqm) must be energy-labelled when transferred to a new owner, and larger properties (more than 1500 sqm) must be energy-labelled once every year. The energy labelling has to be performed by a certified energy consultant, and normal heating, electricity and water consumption are rated according to a standard calculation in relation to the number of people in the seller's household and their behaviour, laying the base for an energy plan.

Energy consumption per sqm, environmental impact (presented as CO_2 emissions) per sqm and the total environmental burden for an average family are described. The energy plan includes the most cost-effective energy and water-saving measures that can be taken in the specific property, as a piece of information to the buyer. The outcome of the audit is an energy label that indicates the level of energy efficiency performance of the building on a scale from A1 to C5 (A1 being the best result).

The present scheme was evaluated in 2000 and the overall conclusion was that there is a major energy saving potential in existing buildings. Important to note is that in spite of the fact that the scheme is mandatory, only 50% of the houses that changed owners went through the certification process. Heat saving measures were taken in 45% of the

labelled houses, hence almost 25 % of the houses that were transferred. 40 000 to 50 000 buildings are labelled each year and most of them are single family residences.

For larger buildings, they number about 25 000, an audit is made once a year. The audit is the basis of an energy label, indicating heat, electricity and water consumption on a scale from A to M (M is inferior) and an energy plan similar to the one for small houses. In addition, consumption of heat, electricity and water is registered every month, except for industrial buildings and buildings with particularly low energy consumption.

The forerunner of the energy labelling scheme was an energy consultant programme for statutory heat inspection (the VKO scheme) that was introduced in 1981. That scheme presented problems like lack of participation (half of the participants still do not comply with the requirements), which is believed to be caused by lacking awareness of the programme. Yet, the 50% that did comply do indeed have better energy savings, as well as more focused investments.

Germany

Germany has a new Energy Conservation Ordinance since 1 February 2002. It includes a new requirement on energy profile-certificates for new buildings that show information on their energy demand.

France

France is planning on introducing a similar system, which will be mandatory for every transaction, buying, selling and renting property, and already has an interactive tool for calculations.

Hungary

Hungary is planning to ntroduce a building certification system, based on a data sheet survey on energy consumption, heat supply, heating, hot water production, gas and electricity supply.

The Netherlands

In the Netherlands a house-owner can choose to hire a certified consultant to assess the performance characteristics of the house and prepare an Energy Performance Advice (EPA). The EPA contains a list of necessary energy conservation and rehabilitation measures. The house-owner pays a fee to the consultant, but if the owner implements all the proposed measures, he or she will be compensated by the state.

3.2.3. ENERGY LABELLING OF APPLIANCES

A self-regulatory tool with a longer history is energy labelling of appliances. All EU countries have introduced energy efficiency labelling during the 1990's, following the 1992 Energy Labelling Framework Directive (92/75/EEC) and consecutive directives from 2002 on energy efficiency labelling of electric ovens and household air conditioners.

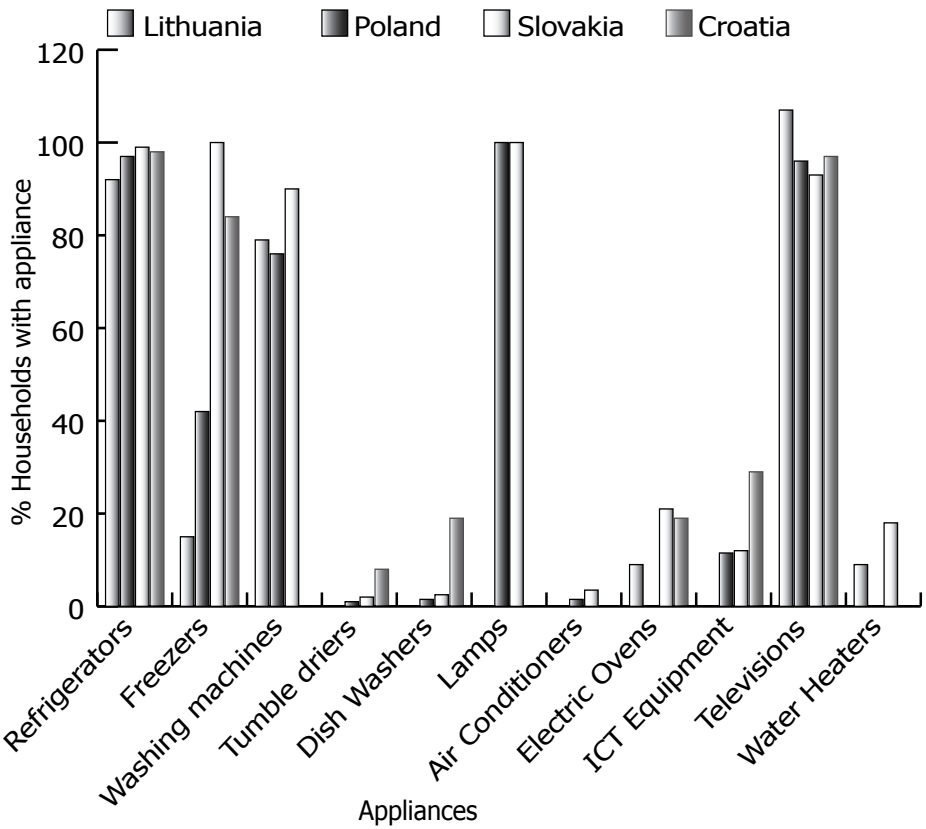
In the West European countries, the labelling schemes are comparatively easy to implement, since there are already procedures for certification and an awareness of labelling schemes and the advantages of energy efficient products. One problem is that if there are too many labels, consumers have a hard time distinguishing between them.

In Eastern Europe, problems encountered are of a somewhat different nature. In Hungary voluntary labelling schemes are considered an option to create incentives, but there is a lack of funds to finance related research and qualification activities and to maintain accredited laboratories.

According to a study made by CTI, the Climate Technology Initiative, in the summer of 2002, the most often reported barrier to the success of energy efficiency labelling of household appliances in Eastern Europe is the low consumer purchasing power. Low consumer and market awareness of appliance energy efficiency is another constraining factor, as well as inadequate public institutional set-up, insufficient consumer information, lack of verification and enforcement and lack of incentives for the use of efficient appliances. The vast number of organizations involved and overlaps in their responsibilities risk jeopardizing the implementation process. Retailer and consumer interest in energy efficient appliances remains low.

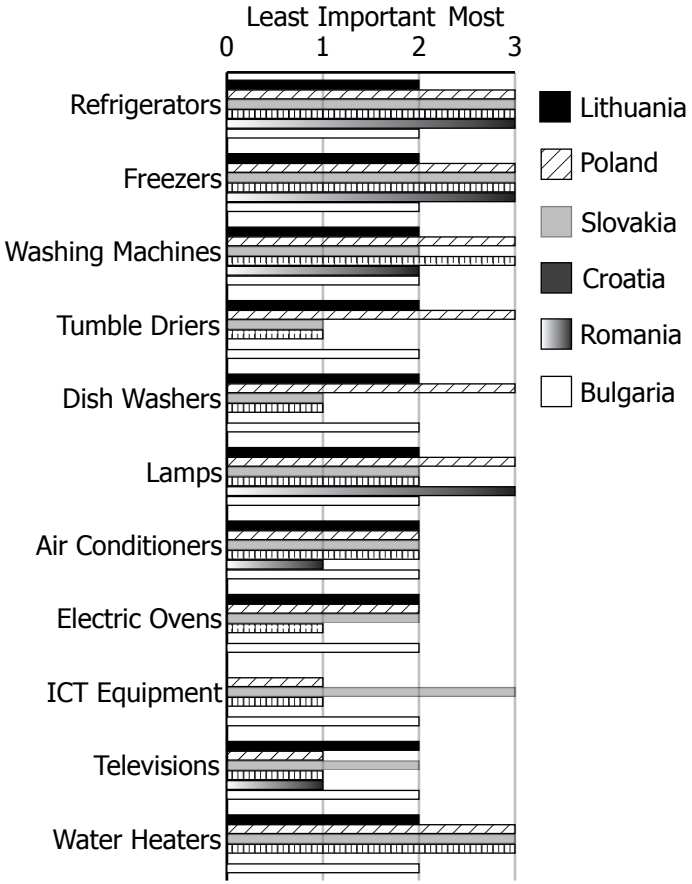
It is interesting to note that some countries have decided not to transpose the directives for appliances that have a low penetration level or for which there is no clear information about the penetration level (compare Figures 6 and 7 below) in order to save scarce government and agency resources. However, a labelling policy is most effective if it is introduced before the market has fully developed and a large number of inefficient appliances have been sold.

Figure 6 Appliance Stock in CEE Countries



Source: CTI, Energy Efficient Appliances Early Adoption Project (2002), p. 16.

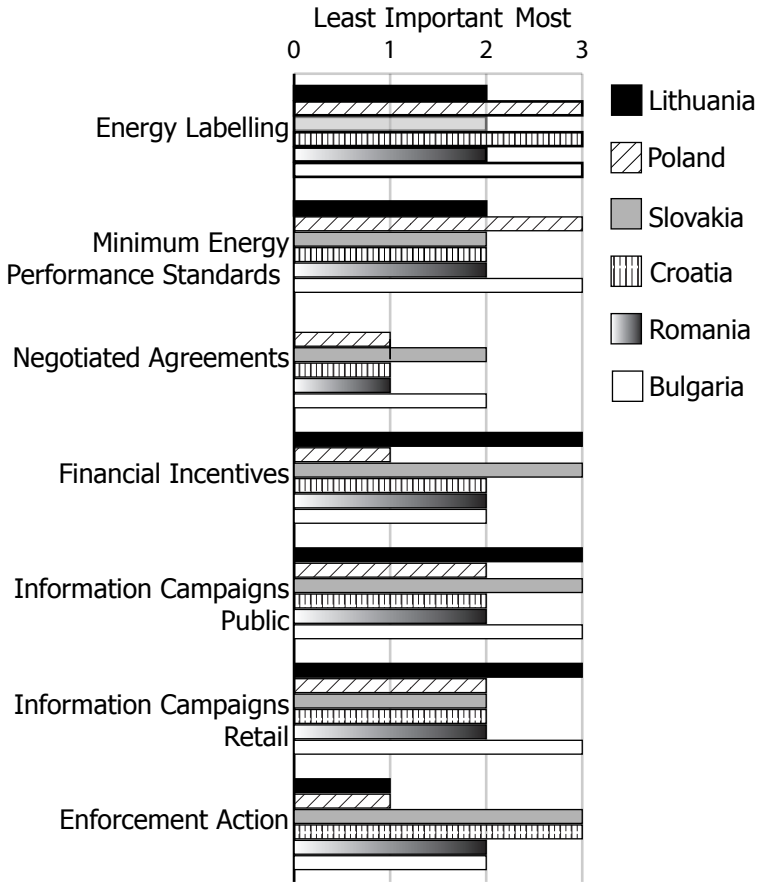
Figure 7 Priority Appliances for Energy Efficiency Policy



Source: CTI, Energy Efficient Appliances Early Adoption Project (2002), p.17.

Generally, public information campaigns and energy labelling are considered the most important instrument for promoting appliance energy efficiency (see Figure 8 below). Negotiated agreements and enforcement actions are considered the least important, which reflects a self-regulatory trend also in Central and Eastern Europe.

Figure 8 Priority Instruments for Appliance Energy Efficiency



Source: CTI, Energy Efficient Appliances Early Adoption Project (2002), p.19.

To overcome the barriers to energy efficiency by labelling of appliances in Central and Eastern Europe, three distinct groups of issues need to be targeted, according to the CTI report:

- Legal issues: transposing EU Acquis, implementing national policy frameworks, and assigning responsibilities to organizations
- Market issues: providing retailer and market party information, as well as consumer information and education activities
- Policy issues: An EU policy should be developed preceded by market and product analyses, and followed by the development of a national policy

A programme could consist of multilateral workshops, training and capacity building, a knowledge network and ad-hoc bilateral support.

Along these lines, the IEA launched the Energy Efficient Appliances Early Adoption Project in 2002, with the aim to assist accession countries to effectively implement the EU directives on labelling and standards. The IEA and the Dutch energy agency Novem continued these activities during 2003 with several Central and Eastern European countries.

3.3. INSTITUTIONS

Government institutions play an important role in implementing policy and legislation, evaluating activities and disseminating targeted information. The organisation of government agencies dealing with energy issues varies between countries. In some cases energy issues have an agency of their own, they may be combined with environmental issues and in other cases with industrial matters.

National agencies need support from regional and local entities in order to effectively implement government policy. One successful project in Eastern Europe is the establishment of energy efficiency centres. Originally they received foreign aid, but now they are self-sustaining and generating impressive energy efficiency improvements.

Accurate monitoring is vital in estimating energy efficiency progress, and there is a coordinated European approach for energy efficiency indicators, through the ODYSSEE project, which is mentioned under 3.3.3.

3.3.1. ENERGY EFFICIENCY AGENCIES

European government agencies with responsibility for energy efficiency differ in many ways (see examples below). Governments designate different tasks to their energy agencies, some combine energy efficiency with various other issues and the legal status of the bodies responsible for energy efficiency different.

The national bodies dealing with energy efficiency should serve as a link between the government, international bodies, local bodies, companies and the general public. They should be the bridging party, communicating needs for assistance on local level to the politicians and communicating government policy to the local level. Activities generally comprise implementing government policies, including evaluation and monitoring, policy advice to government, technical advice to companies and general public, awareness raising, encouraging research and technical innovation, supporting market introduction of new technologies. They can also participate in twinning programmes for knowledge transfer within an East-West context.

Combining energy efficiency with environmental protection underlines the environmental aspects of energy efficiency (for example the French Ademe and

the Dutch Novem), whereas the combination with industrial affairs (Sweden until 1998) may result in stricter financial criteria being enforced upon the energy efficiency policies. Combining energy efficiency with other government priority areas has the positive effects of synergy, for example energy efficiency could be dealt with as a part of environmental management systems. The drawback is that energy efficiency issues may not receive enough attention. Putting them in a separate energy agency (Bulgaria and Hungary for example) avoids this problem.

Moreover, the agencies have different legal status, which affects their work. They may have more impact when they are government authorities. On the other hand, a non-for-profit joint stock company (Poland) or a sort of consulting company (as previously was the case in the Netherlands) allows for greater flexibility and faster decision-making.

The Dutch Novem was previously a government owned company, where 80% of the activities were implementing government policy and 20% consisted in performing tasks for private entities. In 2002, Novem changed legal status and is now a government agency, only implementing government policy. One reason for the change was to avoid potential distortion of competition, a government body should not be involved in business activities. Also loyalty problems must be avoided, it is difficult to be the government representative and company consultant at the same time.

Governments in Eastern Europe generally do not yet treat energy efficiency as a priority in practice. Although there is an energy efficiency potential of at least 30-40% of current consumption, the resources allocated remain limited.

Western energy agencies could work with twinning programmes and assist their counterparts in the East. One example of close co-operation is between Romania and France, where the French Ademe helped establish the first national energy conservation agency (ARCE) in the region, see examples below.

Examples of Organization and Focus of Government Energy Agencies

Bulgaria

In Bulgaria, the State Energy and Energy Resources Agency (SEERA) is responsible for energy policy formulation, preparation of sector legislation and indicative planning. It is the State Energy Efficiency Agency (SEEA) that is in charge of the state energy efficiency policy, including formulating, implementing and proposing energy efficiency programmes and legislation. Price and tariff regulation are central tasks of the State Energy Regulatory Commission (SERC).

France

French Ademe, l'Agence de l'environnement et de la maîtrise de l'énergie (the Agency for environment and energy control) works for sustainable development in the fields of waste, energy efficiency, renewable energy sources, air and transport, and noise. Activities comprise environmental management, encouraging research and technical innovation, advice, spreading knowledge about good examples and information. In 2003 the budget is 337 million Euros.

The agency was formed in 1992 by a regrouping of three agencies, namely L'Agence Française pour la maîtrise de L'énergie, AFME (the Energy Efficiency Agency), L'Agence Nationale pour la récupération des déchets, ANRED (the Waste Agency) and L'Agence pour la qualité de l'air, AQA (The Air Quality Agency).

In 1992, Ademe had 510 employees, but the number has increased to 842 on 31 Dec 2001, following two major increases in 1998, when there was a political emphasis on energy control, and 2001, within the framework of a national programme for improved energy efficiency.

Hungary

The Ministry of Economic Affairs is the primary government authority concerned with energy issues. There is no agency under the ministry that deals with implementation. Instead it is the Energy Centre that is responsible for this. The Energy Centre is a combination of the former Hungarian-EU Energy Centre and the Energy Information Agency and was established by a government resolution in 2000. It is jointly owned by the Ministry of Economic Affairs, the Ministry of Environment and the Hungarian Energy Office (the regulatory agency). The same government resolution created the Energy Saving Interministerial Committee, whose main task is to take decisions on applications for funding under the Energy Saving and Energy Efficiency Action Programme.

The role of the Energy Centre is to manage energy efficiency programmes and perform reporting tasks, as well as to advice government on energy efficiency policies and instruments. The Centre is currently in a transition process from a rather small organization, focusing on technical advice, awareness raising, coalition building and general promotion of energy efficiency and renewable energy, to an executing agency for the implementation of government policy. Major challenges facing the Centre are assuming leadership, and maintaining and improving co-operation among market actors, NGOs, professional organizations, consumers and the civil society. At the same time it has to establish a firm institutional and financial base.

The Netherlands

Novem is the Dutch Agency for Energy and the Environment. It used to be a company, but in July 2002 its legal status was changed to a government agency exclusively implementing government policy. Integrating Novem as an independent agency within the Ministry of Economic Affairs, has entailed that its employees are now civil servants and activities and/or contracts that were previously open for the private market have ceased to exist.

Novem has 450 employees working with four themes: Sustainable Construction, Sustainable Energy Provision, Sustainable Production and Sustainable Mobility. Novem supports the government by managing energy and environmental programmes that contribute to the achievement of national policy goals with regard to sustainability. Industry provides Novem with technical expertise and knowledge of the market, thus helping to create new market opportunities and providing practical insight into the outcome of government regulations.

In summary, Novem:

- manages and coordinates energy and environment-related programmes and studies
- advises the government on sustainable development
- promotes knowledge transfer
- supports the market introduction of new technologies
- evaluates and monitors the effects of government policies

Novem mainly works for the Dutch government (Ministry of Economic Affairs (EZ); Housing, Spatial Planning and the Environment (VROM); Transport, Public Works and Water Management (V&W) and Agriculture, Nature Management and Fisheries (LNV)), but also carries out a variety of international tasks for clients such as the International Energy Agency, the European Union, United Nations and the World Bank.

Poland

The Ministry of Economy has the main responsibility for energy policy, including energy efficiency policy. The governmental institution responsible for the implementation of energy efficiency policies is the Polish National Energy Conservation Agency (KAPE), a joint stock company established in 1994 owned by the National Economy Bank, the Industrial Development Agency, the Ministry of Treasury and the National Fund for Environmental Protection and Water Management. Other important actors in the field are the National Energy Conservation Agency (NAPE), the Foundation for Energy Effective Utilization (FEWE) and various Regional Energy Conservation Agencies (RAPE).

In spite of its legal status as stock company, KAPE is a non-profit organization of public service character with the aim of improving social welfare over the long term through striking a balance between: energy security, social needs, environmental protection and competitiveness.

The mission of KAPE is to support the achievement of sustainable energy policies in Poland. European standards serve as reference and KAPE develops policy in co-operation with both Polish and foreign partners. KAPE carries out activities aimed at rationalization of energy management with respect to environmental protection.

Romania

Since 1990 when a scientific exchange programme concerning energy efficiency was agreed upon, Romania has been a pilot country for action taken by French Ademe and

its partners in Central and Eastern Europe. In 1991, Romania was the first country in the region to establish a national energy conservation agency (ARCE) with assistance from Ademe. The exchange covers among other things, decentralized support programmes between local authorities/regions in France and recipients, city-to-city exchange and pilot projects on district heating and upgrading of buildings.

In 1990-96 the collaboration focused on energy efficiency. One of the important achievements is the establishment of several partner networks: universities, institutions and companies. ARCE was established as a part of the Ministry of Industry and Resources. The staff has been reduced from 80 to 35 in the period 1996-1999 and the number of territorial branches has been reduced from 16 to eight.

Over time, ARCE's role has expanded from exclusively implementation and monitoring to a more proactive one. Since 2000 it is responsible for elaborating the national energy efficiency policy. As of 2003, ARCE is a public institution under the Romanian Ministry of Economy and Commerce, acting as legal person and having organizational, financial, and administrative autonomy. ARCE's financial resources come from the State budget and own revenues. ARCE's staff increased to 45 and the number of territorial branches to 10 (the staff is expected to increase to 84 and the number of branches to 15 by the end of 2005). In 2003 ARCE participated to the elaboration of the National Strategy for Energy Efficiency and its corresponding Action Plan (approved by the Romanian Government January 22nd, 2004), as well as to the Strategy for Renewable Energy Sources Capitalization.

Sweden

In Sweden there is a special authority for energy related issues: STEM, which works for a long-term ecologically and economically sustainable energy system. It has 183 employees and is under the authority of the Ministry for Industry and Trade.

Prior to 1991, there was a special energy authority, STEV. In 1991 STEV was combined with the industrial authority SIND and STU, an agency dealing with technological development, to form NUTEK, a government authority for technical and industrial development. In 1998, the government decided to separate the authorities again.

3.3.2. ENERGY EFFICIENCY CENTRES

Government authorities need support from private sector and NGO partners and organizations with a local connection. In the beginning of the 1990's, US foreign assistance was used to create energy efficiency centres, one of the purposes being to facilitate financing of energy efficiency measures, in part by connecting investors and financial institutions. The centres, which are staffed with local experts to promote the use of energy efficiency products, techniques, and services, have been created in Poland, the Czech Republic, and Bulgaria. These centres have helped stimulate private-sector business volume in energy efficiency technology transfer corresponding to 20 times the total start-up cost of the centres themselves.

Energy Efficiency Centres in Europe
The Polish Foundation for Energy Efficiency (FEWE) - started in December 1990 and has offices in Warsaw, Katowice, and Krakow. The Czech Republic Centre for Energy Efficiency (SEVEn) - was also created in December 1990 and is headquartered in Prague with a branch office in Ceske Budejovice. The Bulgarian Centre for Energy Efficiency (EnEffect) - opened in Sofia in November 1992.

The centres received start-up funding from the U.S. Environmental Protection Agency (EPA), the U.S. Department of Energy (DOE), the U.S. Agency for International Development (USAID), the World Wildlife Fund, the Charles Stewart Mott Foundation, and the John D. and Catherine T. MacArthur Foundation. The Advanced International Studies Unit (AISU) of Pacific Northwest National Laboratory (PNNL) helped establish the centres.

Energy Efficiency Centre Objectives and Mechanisms for Providing Assistance

Energy Efficiency Assistance Objective	Programme Assistance Mechanism
Support the transition of post-planned economies to democracy and market systems	Provide assistance in policy reform and market mechanisms, joint venture development, demonstration projects, and public information
Assist industry in expanding business opportunities for energy efficiency and renewable-energy technologies and services	Help companies develop ventures with local firms by conducting market assessments for given technologies and offering assistance in doing business in the region
Enhance economic recovery in the region by cutting energy-related capital and operating costs	Assist local governments in meeting energy and social needs through policy reform and technical project development
Promote East-West co-operation in science and technology, sharing experiences and gaining insight to the wealth of scientific expertise in these countries	Create information networks and databases on energy efficiency technologies, services, and potential projects and partners
Reduce the regional and global human and environmental health risks from energy-related air and water emissions	Implement practical energy technology and planning measures that reduce the negative environmental effects of energy production and use and simultaneously promote economic growth

Source: AISU. Energy Efficiency Centres in Six Countries: A Review. November 1999.

3.3.3. ENERGY EFFICIENCY INDICATORS

Accurate monitoring and comparisons of energy efficiency progress in Europe need specific indicators developed through a coordinated approach. The SAVE-project ODYSSEE has elaborated harmonized energy efficiency indicators, as well as a database covering energy efficiency policies in Europe. The project is coordinated by the French Agency for Environment and Energy Management (Ademe).

Since 1992, energy efficiency indicators have been created for different sectors with a detailed breakdown by usage: heating, cooking, domestic hot water, household appliances etc. Eventually, there will be a permanent technical structure to monitor annual sectoral progress in energy efficiency and CO_2 emissions both nationally and Europe-wide.

All the "old" fifteen EU Member States participate in the project, but countries in Central and Eastern Europe wish to join too, since it is imperative for them to be able to show compliance with EU energy efficiency levels. A 2003 SAVE project expanded the use of indicators to all accession countries.

3.4. EDUCATION AND INFORMATION

Information and education, such as campaigns, brochures, conferences, exhibitions, and advisory services, can speed up market introduction of new technologies. Information campaigns contribute to a higher awareness level and increase in sales of energy efficient products. The importance of education and information must not be underestimated. Legislation and self-regulation can be successful only if people are informed and understand the purpose behind them.

Education and information are the solutions to several problems. For example, many energy users are unaware of energy efficiency opportunities and need objective information. There is often better information on capital costs of investments than on their running costs, with the result of fewer sales of efficient goods. Dissemination of information, certification systems, standard contracts, and measurement and verification protocols etc. can also contribute to reducing transaction costs.

However, the construction sector presents special problems, since it has few big and many small players. The small companies, along with a vast number of hobby builders, constitute an important part of the market and are difficult to reach and influence. For examples of education and information initiatives, such as the Dutch recommendation of the most cost-efficient energy savings in houses, see below.

Examples of Educational and Information Initiatives

The Czech Republic

In the Czech Republic there are energy consulting and information centres, financed by the government, handbooks on energy efficiency and support for workshops and exhibitions.

France

In France, professionals are encouraged to design more energy efficient buildings than the current regulations require, through sectoral guides provided by Ademe and the Association of Air-Conditioning, Ventilation and Cold Engineers. Eight guides (hotel, office, health, educational, retail, leisure, industry and agricultural sectors) were published between 1992 and 1997. Since 2001, there are Local Information Centres throughout France with the purpose of informing local people and small companies about energy efficiency. A national public information campaign, using TV and radio among other strategies, was carried out in 2001.

Hungary

In Hungary, the low awareness level on energy efficiency is an obstacle to investments. An Action Programme was started in 1999 with the aim to increase awareness on energy conservation, focusing on the educational system, supporting advisory networks and consumer offices, and encouraging labeling and campaigns. The objective is to save up to 10 PJ energy per year until 2010. About 95 640 Euro of grants in 2000, and about 191 260 Euro in 2001 were allocated to reach the target. Many NGOs, universities and others responded, resulting in 11 different projects.

The Netherlands

In the Netherlands there is free advice on which household investments are the most effective in reducing energy consumption. About 91 million Euro per year is available for the scheme and financial support for investments. The country also prepares Energy Performance Advice (EPA) for already existing residential properties. There will be recommendations on the most efficient measures, the energy savings that will result and the costs. The EPA and the results achieved will be evaluated in 2003. The project is expected to give information on the energy situation in existing buildings in the Netherlands.

Poland

The Polish National Agency Conservation Agency, KAPE, started a countrywide training Programme for energy auditors in 1995 with funding and support from Denmark. As a starting point, twelve Polish energy experts were selected for training in Denmark. They in turn produced a training manual in Polish and established an energy consultant secretariat at KAPE. As a result, 2700 architects, HVAC and civil engineers were trained during 1995-99, leading to raised awareness levels, greater interest among professionals for energy related issues and a trend towards more staff in energy consultancy. The

secretariat registers all the energy consultants who have completed the energy auditing training, it issues certificates and authorizes consultants. The certified consultants are listed on the KAPE website.

Romania

The Romanian Energy Cities Network, OER, has published a "teach-yourself and self-evaluation" manual for the staff of Romanian municipalities within the framework of a support Programme from French Ademe running from 2002-2003. The aim is to contribute to an improvement in energy efficiency and assist Romania in preparing for EU membership.

3.5. CONCLUSIONS

Governments need to give a high priority to energy efficiency, develop policy and effectively implement measures and policies in a clear and structured action manner. Permits and standards are necessary for reconciling various interests and to set minimum levels on energy efficiency performance. As an example, energy efficiency considerations should be included in the requirements for issuing construction permits.

Enforcement problems reduce the success of energy efficiency regulations. Enforcement is poor, especially in Central and Eastern Europe, partly due to uncertainty about which government bodies has the responsibility to enforce, partly due to lack of knowledge among civil servants and lack of resources.

In addition, if too many permits are required for a given measure, people will be discouraged from taking the measure altogether. Application procedures must be smooth, efficient, and fast with low application fees. Energy efficiency measures should be given high priority, for example when ordering energy efficiency equipment from abroad and needing an import permit. Combining heating and insulation in standards became a new trend in the beginning of the 1990's and offers advantageous synergy effects.

As a complement to, and further development of, traditional legal building requirements, there is a trend towards more result-based standards and self-regulation, where the requirements relate to total energy performance rather than specific measures. This is reflected in the new EU building directive that will shift the focus from specific solutions determined by the government and will welcome new technological development. There is always a danger that requirements to implement specific energy efficiency solutions limit the scope for research and technical development, and discourage innovation and competition. Whether standards are performance-oriented or not, it is imperative that they are revised on a regular basis. Outdated standards set targets too low and fail to promote new technology.

Taking self-regulation one step further leads to evaluating energy performance of a whole building, and performing energy labelling of entire houses. A certification scheme is part of the new EU building directive. Experiences from Denmark show that high awareness of the labelling scheme is vital for its success. Enforcement is also a crucial part of the scheme. In Denmark an evaluation from 2000 shows that only half of the new buildings are labelled, even though the scheme is mandatory, and only half of the labelling leads to actual investments in energy efficiency measures.

Rules on public procurement put strict demands on public authorities when making purchases not to distort competition, this can, but should not, prevent public authorities from putting high demands on energy efficiency.

The bodies implementing government policy on energy efficiency in the European countries look very different. In some countries energy efficiency is combined with other energy-related matters, in others with environmental issues and yet others with industrial matters. How they are organised affects probably to some extent the perception of energy efficiency. Combining energy efficiency with environmental issues will put emphasis on environmental impact and maybe less on costs and living standards. Combining energy efficiency with energy issues in general gives a clearer focus, but may diminish synergy with other sectors that could be achieved through a cross-sectoral approach. Combining energy efficiency with industrial affairs could make it easier to reach industry, but there is a risk that the environmental impact receives too little attention and also that there is too much focus on the supply-side to the detriment of the demand side.

The national bodies dealing with energy efficiency should serve as a link between the government, international bodies, local bodies, companies and the general public. They should be the coordinating party, communicating needs for assistance on local level to the politicians and communicating government policy to the local level.

National agencies need to cooperate with local organizations, such as the energy efficiency centres, established under a 1990's US Aid Programme. Initial start-up money has generated self-sustaining centres with great impact on energy efficiency improvements. In fact they have helped stimulate private-sector business volume in energy efficiency technology transfer corresponding to 20 times the total start-up cost of the centres themselves. They can contribute to creating a political lobby for energy efficiency.

Continuous monitoring and evaluation is necessary to determine the success of a specific measure and to compare energy performance in different countries. Innovative policy measures may require the development of new evaluation methods, including not only estimated savings, but also criteria for technology development, market development and changes in the behaviour of various players.

Furthermore, the importance of education and information must not be underestimated. Legislation, self-regulation and evaluation will have no impact if they remain unknown. Increasing awareness and understanding of energy efficiency, and what can be done to increase energy efficiency, is crucial. Particularly in Central and Eastern European countries, lack of training on energy efficiency leads to poor management and building maintenance and insufficient awareness among market actors concerning economic and environmental aspects of energy efficiency. There is also lack of information concerning R&D Programmes on energy efficiency in buildings and little involvement of technical and building branch organizations, housing associations and cooperatives in regard to energy efficiency.

Barriers in Central and Eastern Europe could be addressed through introducing monitoring systems to determine energy saving effects in buildings, implementing energy labelling schemes, creating an energy performance database, producing guidelines for energy management schemes in buildings, conducting demonstration projects and making changes in academic educational programmes.

In most transition economies, commercial principles for district heating systems must be introduced in order to create a better investment environment. This would include cost reflective pricing, free from the effects of subsidies, cross-subsidies and tax distortions and payments based on metered consumption. Stronger business practices may have the positive side-effect of encouraging more involvement of private financial institutions.

Cogeneration should be encouraged to a larger extent especially from the perspective that district heating is widespread in the accession countries. There is a new EU directive that strongly supports cogeneration.

4. FINANCIAL ASPECTS

Naturally, reduction of energy consumption entails cost reductions. These cost reductions are proportional to the level of energy prices. Therefore, energy pricing is the first tool to attract investments in energy efficiency. However, investors still need financing for their initial energy efficiency investment. This is true particularly for the building sector, where technical investments in big scale system solutions tend to last too long. It takes a vast amount of time to phase out outdated technology and it is not always possible to introduce new technology gradually. There is also the confusion about who is the problem owner when a property is rented. Neither the tenant nor the landlord feels immediate motivation to invest in energy efficiency.

Furthermore, there are many parties involved in building a house. Construction, use, financing, maintenance, administration, insurance conditions, standards and construction rules must be coordinated to reach the energy efficiency objectives. The problem is that there is not one single party that controls the energy efficiency performance of a house. The ways of financing, renting and taxing buildings and the way the costs for investments are spread over the time of use can constitute obstacles to necessary energy efficiency investments, since they are paid-off on a long-term basis. More attention should be given to investment calculations that include the economic conditions of the time of use, and an Loss cost assessment perspective, when building a new house but also when renovating or maintaining an already existing building.

One way of addressing these problems is to provide up-front funding, so that the initial barrier is overcome. The experience of government and bilateral grant schemes and soft loans to fund energy efficiency measures play an important role and these instruments are examined in this chapter.

Some governments use special methods to further enhance the grant and incentives tools in order to involve the market players more directly. Technology procurements and long-term agreements, LTA, will be examined below. Public procurement can also be used to change market mechanisms. Since the public sector is a large purchaser, it can affect prices and market share of different products through bulk purchases.

Taxes are another powerful financial tool that governments use to change the course of development, compensating for market imperfections and the apparent zero-cost on contributing to the green house effect. Taxes have great influence on energy efficiency investments, by raising energy costs or subsidizing investments through exemptions.

Energy efficiency investments everywhere, but particularly in economies in transition, must be seen in a macro-economic context. Stability in the economy,

including sound economic policies, opening of markets, low inflation, stable exchange rates, along with energy price reform and elimination of cross subsidies, are necessary conditions for attracting energy efficiency investments.

4.1. PRICING

Price is an essential motivation factor for investing in energy efficiency, and is therefore briefly discussed here. This section is, however, not intended to give an exhausting analysis of the whole range of impacts that pricing may have on energy consumption.

Experience in IEA countries suggests that energy prices do have an important impact on energy use for space and water heating. Relative prices have affected the choice of fuel, and the share of electricity used for applications for which other fuels can be readily substituted (e.g. space and water heating). However, the end-use price of electricity has generally been less variable than that of other fuels in IEA countries. Electricity prices have also affected the intensity of uses which are not conducive to fuel substitution, i.e. lighting and appliances.

Prices are affected by a large number of factors, one being the deregulation of markets. The increasing competition between energy suppliers on a deregulated market and the changing role of governments leave more room for market players. Consumers' freedom to choose energy supplier is an important step towards increased economic efficiency and better service in the energy sector. Even customers that do not change supplier or renegotiate their contract seem to benefit, since there is a general price reduction due to competition in Western Europe.

In the CIS countries, energy prices still remain below cost-recovery levels, reducing incentives for energy efficiency, but also creating additional demand. Hence, energy companies presumably invest in capacity that could have been avoided.

Thus, in Eastern Europe, market liberalization increases energy prices, since government subsidies and price control systems are abolished. Hungarian experiences are that tariffs based on actual costs would significantly improve the payback conditions of energy efficiency investments, both in manufacturing industry and households. The country has over 60 years of district heating experience and district heating companies were subsidized by the central government until 1991, to the tune of 30-40% of end-user prices. Even though prices have increased, they still do not reflect full costs, which in turn impede investments in energy efficiency. In fact, district heating companies that operate under the authority of municipalities, must purchase heat at high prices, but sell to consumers at low prices due to social reasons and competitive pressure from natural gas suppliers.

With a general increase in energy price, margins would increase, allowing the financing of modernization in the distribution system. Of course, a prerequisite for this is that energy users actually can afford to pay the higher prices and continue to use energy. There is a risk that elevated prices may cause new social problems for the municipalities.

Another possible development, emanating from the lack of responsibility for profitable direct distribution of gas and electricity, could be that the municipal companies adopt a business spirit and that they venture into new business areas such as energy services. So far, the municipalities do not have any organizations responsible for advice and energy management. Rationalization of municipal energy companies should lead to larger unities, which may be more adapted to profit from market opportunities.

The deregulation of markets in the West has not been entirely uncomplicated either. There is always a risk that deregulation does not result in increased competition, but rather a possibility for the largest companies to further strengthen their positions on the market.

4.2. GRANTS AND OTHER FINANCING INSTRUMENTS

There are several ways for a government to provide financial support to promote investment in energy efficiency measures, such as thermal insulation. A public support programme serves the purpose of providing finance to essential projects that do not receive sufficient private sector funding. The ultimate long-term goal is to develop a well-functioning market for the projects at stake.

Direct support programmes and special state interest guarantee loans contribute to technology investment and experience that lead to further technology development, increased knowledge and potential market expansion. Technology procurement programmes contribute to lowering the price of new technology and government procurement is used to reduce costs for energy efficiency equipment through bulk purchase.

Grants can be efficient means to promote introduction and dissemination of new energy efficient technology. However, it is always uncertain whether the product would survive without a grant. Moreover, there is the problem of so-called "free-riders", i.e. people who would have invested in the technology even without a grant.

4.2.1. DIRECT SUPPORT PROGRAMMES

Through direct support programmes, a certain share normally up to a maximum ceiling, of a total energy efficiency investment is paid by the government. The

investor has to apply for such grants and to comply with certain requirements. For investments in residential energy efficiency measures, it is normally requirements that the investment should be in the investor's permanent residence, the household income must not exceed a certain level, and the investment must not exceed or be below a certain level.

Grants are motivated by the fact that energy efficiency investments can contribute to important public policy objectives, such as less dependency on energy imports or improved competitiveness of domestic industry. In many countries the financial sector is not yet well developed, and commercial funding is simply not available for these investments. Government and international grant schemes should not be permanent, but serve as incentives to self-sustaining activities.

The examples below show how insulation grant schemes work in France, Hungary, Netherlands, Poland, Romania and Sweden. The Netherlands and Romania use increased energy taxes and tariffs to raise funds for the provision of grants to improve energy efficiency, thereby combining stimulating and restrictive regulatory measures.

Examples of Domestic Direct Support Programmes

France

All property owners can apply for energy efficiency renovation grants for permanent homes (i.e. the owner has to spend at least eight months per year there) if the owner's income does not exceed a certain ceiling, depending on family situation and geographical location. The grant normally corresponds to 20% of the investment made, and cannot exceed 2 000 euros.

Another grant is also valid for energy efficiency improvements, such as insulation – the ANAH grant for property that is rented. It generally amounts to 25% of the cost. The cost has to total at least 1 000 euros. In 1997 and 1998, thermal diagnosis was rarely financed with government money. However, since 1999 the French national energy authority, Ademe, finances energy diagnosis (at 50% of the total cost), pre-diagnosis and orientation advice for a commune's patrimony.

Hungary

In 1999, Hungary adopted its Energy Saving and Energy Efficiency Action Programme. The programme sets out energy saving and other targets until 2010 and includes a number of specific actions. It is expected to create 200 billion HUF (750 million euros) of investments, by providing 50 billion HUF (187 million euros) of support during ten years. Support is given through preferential credit or non-reimbursable grants. For 2000-2001, an initial funding of 6 billion HUF (22.5 million euros) was provided by the state. Long-term financing will be derived from an environmental emission fee. Yet, it remains to be seen whether the fee is successfully introduced and the action programme sufficiently financed.

Furthermore there is a non-reimbursable grant for making energy efficiency investments in private homes. The grant is 30% of investments to a maximum of Ft 200 00065 Euro) per household. The Hungarian Energy Centre received over 500 applications in 2000 concerning heating reconstruction, thermal insulation and replacement of windows and doors. This involved almost 4 000 households and resulted in an energy saving of 37.5 TJ/year. The maximum amount per household has been increased to Ft 500 000 (about 1912 Euro).

Thermal insulation in buildings has been promoted through a 1996 pilot panel programme (support programme started in 1997) including 5000 apartment blocks. Low-interest funding is available for insulation and modernization of heating system in buildings constructed with pre-fabricated panels. Ft 60 000 (about 230 Euro) is offered to each individual dwelling, the average payback time of the investment being less than ten years. The interest rate is set below 10%. The pilot programme was managed by the Hungarian Foundation of Enterprise's Development with the aid of the association of producers and sales representatives of insulation materials and technologies. It was taken over by the Central Environmental Protection Fund.

The government has designed financial support to enhance energy efficiency in industry by soft loans or through support systems based on the German Coal Aid Revolving Fund, the Central Environmental Protection Fund and the Phare Energy Efficiency Credit Fund. Originally, the German Coal Aid Fund granted 30 million DM.

The Netherlands

The Dutch government stimulates low-income households to take energy efficiency measures through the grant scheme TELI. Low-income people often live in old and badly insulated homes. They have difficulties affording insulation measures and energy efficient appliances, even though they could benefit from it economically. The last application period was from 1 March to 1 May 2003.

An increase in the regulatory energy tax (see Tax incentives under 4.3.) raised funds for the Energy Premium Scheme (EPR), which is redistributed to households through a rebate on energy efficient appliances, building facilities and sustainable energy production. The EPR was introduced in the Netherlands in 2000 and has successfully changed the market for household appliances. Sales of A-labelled appliances went up to about 70% in 2001 and even higher in 2002 (except for dryers). The EPR used 65 million Euro of the state budget in 2000 and 135 million Euro in 2001. It saved about 210 million kg CO_2 in 2002.

Poland

From 1994 to 1997, the Polish Ministry of Spatial Planning and Construction ran a project to eliminate technological defects in building panels. Through the project, 773 000 housing units (that is 24% of the total cooperative housing stock and 10% of total urban housing), underwent external wall thermo-renovation.

However, the project gave poor results. Due to lack of technological expertise the energy efficiency improvement achieved through the project was marginal. For example no more than five cm of insulation was added. Furthermore, the project covered only

housing cooperatives, not private or municipal buildings. Therefore, KAPE started a new thermo-modernization scheme in an attempt to correct earlier mistakes. In 1998 the thermo-modernization fund was established within the frame of the state budget and is operational since July 1999.

The objectives are to

- reduce consumption of energy for heating and domestic hot water in residential houses and houses used by municipal entities for public service;
- reduce energy losses in local distribution networks and supplying local heat sources, with maximum capacity of 11.6 MW thermal power, if measures to reduce energy use in buildings as mentioned above have been undertaken;
- total or partial replacement of conventional energy sources with non-conventional ones, including renewable.

Investors can receive a grant of 25% of the loan for eligible projects. Eligibility is determined by technical criteria through minimum energy savings and financial criteria through positive net present value payment in less than seven years. The loan must not cover more than 80% of the value of the project. Loan agreements are made between the investor and a commercial bank, which hands on the project over to the National Economy Bank (Bank Gospodarstwa Krajowego), which is responsible for the Thermo-modernization fund, for approval of the premium. An energy audit has to be made prior to applying for support from the Fund.

Allocated state budget to the Thermo-modernization Fund

Year	1999	2000	2001	2002	2003
Allocated State budget (million Euro, approximate numbers)	1.1	6.8	13.7	19.3	25

In spite of a good budget, the number of applications has been rather modest. During the first year of its existence, only 200 applications qualified, the majority was in single-family houses. Contributing factors may be relatively complicated application procedures, lack of assistance in the beginning of the project, problematic decision making in housing co-operatives and communities and probably difficulties providing the required collaterals. The Bank of National Economy is promoting the scheme through a free info-line, poster and press campaigns. Regulatory changes will be made in order to improve the results.

Romania

Co-financing from the Special Fund for the Development of the Energy System from 1994 is provided for the following types of projects: (i) projects related to the production of electricity and heat, (ii) reduction of losses in transport and distribution of electricity and heat, (iii) improving energy efficiency at end-users, and (iv) implementation of renewable energy and fuel substitution. The Special Fund is financed by a share of the Romanian energy development tax, which is a part of tariffs paid by energy producers

for electricity (10%) and thermal energy (2%). The tax is applied to all consumers, except households.

Sweden

Investment grants for more efficient energy consumption in buildings 1977-2000:

Year	No of yrs	Grant	Comment
1977-1979	2	35%	Grant calculated on verified cost, at maximum 3000 SEK/ apartment (about 330 euros). Loans at 100% of verified cost with deduction of the grant. Interest rate grant for loan for the rest of the cost.
1979-1980	1	35%	Grant for verified cost, at maximum 3000 (about 330 euros) SEK/apartment. Loans at 100% of verified cost with deduction of the grant. Interest grant loan for the rest of the cost, but not for individually owned houses.
1980-1981	1	35%	Grant for verified cost, at maximum 3000 SEK/apartment (about 330 euros). Loans at 30% of verified cost with deduction of the grant. Interest rate grant for loan for 30% of the cost for energy efficiency related measures.
1981-1983	2	0%	No pure grant, but interest rate grant for 30% of verified cost for energy efficiency related measures.
1983-1984	1	0-15%	Interest rate grant for 30% of verified cost for energy efficiency related measures. 15% grant for insulation measures.
1984-1985	1	15-30%	Grants for various kinds of measures.
1985-1986	1	10%	Grants to insulation measures. Interest rate grant according to regulation, calculated on an average of verified cost (different for different measures).
1986-1987	1	10%	Grants for different insulation measures. Interest rate grant according to new regulation, depending on whether the energy measure was made separately or as part of a renovation.
1987-1993	7	30%	Interest rate grant at 30% of verified cost for energy efficiency measures.
1995-1997	3	30%	Grant for maintenance measures including energy efficiency measures.
1998-2000	3	30%	Tax reduction for, among other things, energy measures, at maximum 12 000 SEK (about 1300 euros) per apartment.

Source: Egil Öfverholm & Lena Neij: Teknikens bidrag till effektivare energianvändning, p. 40f.

4.2.2. SOFT FINANCE

Interest free loans and grants covering interest and guarantees, provided by the government, are alternative forms of government financial support. In some cases they are managed by a government authority, in other the government delegates the administration to a bank. The requirements to the investor are more important than is the case with direct support programmes, since there is a loan that has to be repaid, even though the terms are more attractive than with commercial loans.

The advantage of these systems compared to direct support programmes is that the investor may be more interested in the investment, since he has to sign a loan contract, which is a larger commitment than just making an investment and receiving a rebate.

A disadvantage, particularly in EITs, is that people with the lowest income may have difficulties in obtaining the loans. For them, a direct subsidy may be more adequate. On the other hand, if the loan can be repaid with energy cost savings, it should be a possible option for anyone.

Examples

Czech Republic

The Ministry of Regional Development (MRE) provides support for the repair, reconstruction and modernization of apartment buildings constructed with concrete panel technology, covering more than one million apartments. Financial subsidies are provided to cover interest and guarantees for activities related to repairs and reconstruction of concrete panel apartment buildings.

Economically strained areas and areas with severe environmental problems are given priority. Support is also provided for insulating buildings, improving heating systems, installing modern distribution pipes and sources of heat and hot tap water, and use of renewable energy sources in buildings, which could have a favourable effect on energy efficiency, and thus on GHG emissions. The budget of the programme for reconstruction of concrete panel buildings was about Kcs 300 million (about 9,4 million euros) in 2001 and support was expected for reconstruction of about 20 000 apartments and for 50 000 apartments annually after 2001.

Hungary

Preferential interest borrowing facilities for energy efficiency measures in blocks of apartments were introduced in 1996. The state support helps pay the interest on loans provided by financial institutions.

The Netherlands

The Green Investment Scheme, or Green Funds, providing low interest loans for

for environmentally desirable projects, had a budget of about 5,7 million euros in 1996 and about 6,8 million Euro in 1997. Green funds are managed by banks and enable banks to give reduced-interest loans for green projects. The rate is usually about 2% less than commercial interest rates. Dividends and interest are exempt from income tax. By the end of 1997 the public had invested more than Dfl. 2 billion (0.9 billion euros) in Green Funds. About 500 projects were designated "green", of which 7 in the field of biomass energy. Total green investment in these latter projects amount to Dfl. 58 million (26.4 million euros).

4.2.3. EXPERIENCE OF DISTRICT HEATING GRANTS IN HUNGARY AND DENMARK

Grants have proved to be successful tools in order to promote conversion to district heating and use of CHP. Experience from Hungary shows that grants for modernization of district heating networks result in larger energy savings than do grants for demand-side oriented projects. Among the modernization projects, CHP investments are the most cost-efficient. 60-70% of the energy saving derives from supply side projects concerning modernization of district heating systems, which require only about 30-35% of subsidy resources

In Denmark, district heat produced from CHP plants increased from 40-80% of all district heat in 1980-1999 and district heating covers almost 50% of energy demand for space heating compared with 30% in 1972. These increases have been encouraged by state subsidies to CHP and conversion of buildings to district heating through installation of central heating systems. Since 1992, companies can obtain state grants of up to 30% of investment costs in energy efficiency, including CHP, resulting in an increase of the number of industrial auto-producers to more than 100 by 1997. The details of these subsidies are explained below.

Hungary

Renewal of district heating systems making district heat supply competitive is a central part of the 1999 Széchenyi Plan. The objective is that the Energy Saving Action Programme will mobilize some 200 billion HUF (750 million Euro) of investments, by providing 50 billion HUF (187 million Euro) of support over a ten-year period. Support is provided either by preferential credit (subsidized interest rate) or as non-reimbursable grants.

The aim of the subsidy is modernization of the district heating supply systems and the reduction of district heating supply costs. Applications can be made for subsidies to increased combined heat and power generation (CHP), for

reconstruction of the supply side's heat generator, heat distributor systems, and for improving the heat centre's metering.

An evaluation of the Széchenyi Plan's Energy Efficiency support scheme for the year 2001 shows that over 80% of the projects are demand-side oriented, but that these projects only represent 10% of total energy savings. 60-70% of the energy saving derive from supply side projects concerning modernization of district heating systems, which require only about 30-35% of subsidy resources[3].

The larger part of the applications has been financed with the state budget for 2001. The six CHP type investments represent about 30% of total investment costs. For these investments, the total investment cost is relatively higher and the ratio of the state subsidy is lower. In spite of the lower state grant, the CHP result in remarkably larger energy cost savings than other reconstruction work in the district heating sector. Considering that 60% of the energy cost savings achieved by the Széchenyi Plan deriving from the district heating supply side's modernization, the importance of the CHP is outstanding for the whole Széchenyi Plan.

Applications supported from the budget of year 2001

Types of Investments	Number of applications	Total investment costs (Million HUF)	Subsidy approved by the TB (Million HUF)	Energy Savings	Energy cost savings (Million HUF/year)
Modernisation	28	2 267.10	657.18	516.17	472.80
Combined heat and power generation	5	1 322.84	231.71	392.11	521.98
TOTAL	33	3 589.94	888.89	909.25	994.78

Source: Széchenyi Plan, Quick analysis on the results of the Energy Efficiency Plan of 2001. Prepared by the Energy Centre Non-profit Co. Mr. Géza Mészáros , Ms. Klára Haidegger , Budapest, April, 2002.

Denmark

In Denmark, district heat is supplied by about 400 district heating companies and covers about 50% of the heat demand, compared to 30% in 1980. Most of the companies are both producers and suppliers, but some purchase heat from "central" power plants. The district heating network provides heat to large consumers, apartment blocks, institutions and single-family houses. District heating companies are owned by municipalities, or by local consumer co-operatives or foundations. In 1999, almost 80% of all district heat was produced

3 *Széchenyi Plan, Quick analysis on the results of the Energy Efficiency Plan of 2001. Prepared by the Energy Centre Non-profit Co. Mr. Géza Meszáros, Ms. Klára Haidegger, Budapest, April, 2002.*

from CHP plants, which is a significant increase from almost 40% in 1980. In 1999, almost 50% of electricity generation was derived from CHP, compared to just under 20% in 1980.

Beside the large-scale CHP and district heating units, there are a large number of small-scale CHP plants, i.e. CHP plants outside the centrally supplied areas. Most of the small-scale plants range between capacities of 0.5 to 10 MW and supply heat to small communities and institutional buildings. Small-scale CHP plants cover at least 90% of the local heat demand. The main fuels used in small-scale CHP are natural gas, waste and to some extent biogas and other biomass.

The widespread use of small-scale CHP is partly due to obligations on the power utilities introduced through a 1986 Parliamentary decision to establish 450 MWe of small-scale CHP using indigenous fuels (natural gas, waste, biogas or biomass). The Energy 2000 plan of 1990 presented an even more ambitious programme for small-scale CHP. A state subsidy was introduced in 1992 for power production from waste incineration, natural gas and renewables used in small CHP plants. The subsidy was first 10 øre (about 0.013 Euro) per kWh but has been reduced to 7 øre (about 0.009 Euro) per kWh, except for plants smaller than 3 MW. The development of small-scale CHP was the most intense in 1994/95. About 80% of the installed capacity (< 25 MW) uses natural gas boilers, 16.5% have gas turbines and 3.5% have biogas-fired boilers. The gas turbine units have higher electric capacity, ranging from 4 to 25 MWe, compared to the gas boilers that range from 0.5 to 4 MWe.

There are more than 60 CHP plants using biogas-fuel. They supply heat to the local district heating network or to a single farm. The support measures have resulted in a local CHP capacity increase by 3.4 between 1993 and 2000, but "central" power capacity remained stable during that period.

The Government wishes to encourage further conversion to district heating, which requires significant investments in buildings for the installation of a central heating system. Subsidies are provided to encourage such investments. Houses that were built before 1950 and are situated in district heating areas are eligible for subsidies for installation of central heating and hot water, the purpose being to use excess heat at the central CHP plants efficiently. In 1997, about 50% of qualifying houses had been converted and the subsidy scheme ended in 2002. Total funds for subsidies were DKK 1.3 billion (about 172 million Euro).

According to the IEA Energy Efficiency update for Denmark in April 2003, the Danish Electricity Saving Trust has made an agreement with more than 200 district heating companies using CHP and biomass to transform electrically heated dwellings to collective district heating systems. The aim is that 50 000 dwellings should be converted by 2007 (the potential being 90 000), resulting in a 555 000 tons reduction of CO_2.

4.2.4. TECHNOLOGY PROCUREMENT

Technology procurement is a measure that can contribute to the introduction of new technology into the market place and lowering the price for this new technology. Reducing cost of new efficient technology through technology procurement and facilitating market introduction for new technology, have been high priority areas for the Swedish government for many years.

Technology procurement is used to stimulate development and distribution of products with higher performance (energy efficiency, technical level, improved functionality) than those that are already available on the market. This process involves buyers and producers, where the buyers define the requirements to the product and constitute an initial market. In the beginning of the 90's, technology procurement support for energy efficiency was introduced in Sweden, and it has been managed by the Swedish National Energy Agency. So far, more than 30 procurements have been made for refrigerators/freezers, washing machines, drying machines, windows, etc. (see example on windows below).

The procurements have been combined with other measures such as demonstration and information programmes, labelling, guidebooks, financial support etc. The efforts have indeed had effects: improved technology, increased awareness and knowledge as well as market introduction of new products. In some cases the procurements have led to price reductions and spin-off effects, i.e. they have given inspiration to develop other new technologies and products.

Procurement projects must be buyer driven, i.e. the interests of buyers, their issues and concerns, market perspectives, and their willingness to buy should influence the product specification. The buyers must actively participate in the process. Yet, it can be difficult to commit the buyers to an initial purchase, especially if the time of purchase is years ahead. In such a situation it is necessary to involve the government or some other organization that can operate with long-term commitments, to facilitate market introduction. The technology aspects of the procurement project should not be allowed to overshadow market and cost aspects. Sufficient funding is indeed a success factor.

At present, possibly the most interesting and powerful technology procurement programmes are the ones developed in international co-operation. These programmes have the advantage of enhancing the impact of technology procurement programmes and broadening the markets for new technologies. Many products have an international market and the most efficient way to create a large demand is to bring together buyer power on a multi-national basis. Moreover, Europe-wide procurements contribute to harmonized European markets, and facilitate the introduction of common European standards and labelling schemes.

Technology Procurement of Windows in Sweden

The first technology procurement programme for windows was undertaken in 1992. The requirement for the windows was a U-value (thermal transmittance) below 0.9 W/Ksqm. The average U-value of the replaced windows was 2-3W/Ksqm. Apart from energy efficiency, this requirement would lead to noise reductions and flexibility in the placement of radiators. Two winners with U-values of 0.73 and 0.88 W/Ksqm were declared. These windows required four glass panes. Many architects complained that the winning windows were heavy and aesthetically unattractive.

A new technology programme was launched in order to improve the aesthetic aspects of the windows. This time, the requirements were 1.0 W/Ksqm, which could be met by triple-glazed windows. STEM/NUTEK sponsored the manufacturers with free consultation by some of the best architects in Sweden. As a result of the new procurement programme, four additional producers met the requirements.

Energy efficient windows (<1.0 W/Ksqm) achieved only about 2% of the total sales of windows each year. One reason for this was attributed to the recession in the construction industry. Producers had old windows in stock, and energy efficient windows had to be ordered. However, a measurement of the attitude towards energy efficient windows indicated that 45% of architects and building contractors were interested in energy efficient windows. Now, STEM follows up the technology-procurement process of energy efficient windows with additional market activities. These activities are broader than the procurement and include energy efficient windows with U-values of up to 1.3 W/Ksqm.

Being voluntary agreements, procurement processes have an advantage over mandatory instruments, since it is usually easier to gain acceptance for voluntary action. For example, it takes a long time to agree on and introduce a mandatory EU-wide minimum efficiency standard, but procurement processes can be implemented more promptly.

Technology procurement programmes should be complemented by market programmes in order to promote commercialization and market penetration. Such programmes should be designed to achieve a dynamic market penetration and a permanent shift of the market towards more energy efficient products and services. The programme design processes should focus on technical evaluations, behavioural surveys, market surveys, and estimates of energy saving potential.

4.2.5. ENERGY EFFICIENCY CRITERIA IN PUBLIC PROCUREMENT

In the public sector, purchases for energy efficiency purposes need to comply with public procurement rules and guidelines, just like any other purchase. For EU Member States national rules must follow the directives in the area, which in turn include WTO guidelines (see below). The general requirement is that all public procurement above a certain threshold must be subject to competition.

EU Directives on Public Procurement

National rules must follow EU-directives in the area:

- 93/36/EEC (supplies),
- 93/37/EEC (public works),
- 92/50/EEC (services),
- 93/38/EEC (supplies, public works and services within the public supply sectors water, energy, transport and telecommunications),
- 97/52/EC (amendments to 93/38/EEC, 93/37/EEC and 92/50/EEC), 98/4/EC (amendments to 93/38/EEC), 89/665/EEC and 92/13/EEC (directives on remedies).

The fundamental principles of European Community law with regard to public procurement are the principles of non-discrimination, equal treatment, transparency (openness and predictability), proportionality and mutual recognition.

The principle of non-discrimination prohibits all discrimination based on nationality. No contracting entity may, for example, give preference to a local company simply because it is located in the municipality.

According to the principle of equal treatment all suppliers must be treated equally. All suppliers involved in a procurement procedure must, for example, be given the same information at the same time.

According to the principle of transparency the procurement process must be characterized by predictability and openness. In order to ensure equal conditions for tenders the contract document has to be clear and unambiguous and contain all the requirements made of the items to be procured.

The principle of proportionality states that qualification requirements and requirements regarding the subject matter of the contract must have a natural relation to the supplies, services or works which are being procured and not be disproportionate.

The principle of mutual recognition means among other things that documents and certificates issued by the appropriate authorities in a Member State must be accepted in the other Member States.

The WTO Government Procurement Agreement (GPA)

The Government Procurement Agreement (GPA) is the World Trade Organization's agreement on public procurement. The GPA rules are integrated into EU's procurement directives. The paramount feature of the rules in the agreement is non-discrimination, ensuring that foreign suppliers or suppliers with foreign background get the same treatment as domestic suppliers.

According to the WTO, it is estimated that government procurement typically represents 10-15% of GDP. Hence, public procurement rules have great impact on the market, and could affect the trade with energy efficiency products and services.

Government procurement guidelines can be complemented with requirements on energy efficiency performance, thereby creating large volume purchases of energy efficient products by government institutions. This in turn contributes to lower prices on energy efficiency equipment. Moreover, energy efficiency criteria in public procurement make government agencies serve as good examples. It is easier to encourage the private sector and consumers to improve their energy efficiency performance, if the public sector can show that it is concerned with energy efficiency itself and can demonstrate the cost-effectiveness of the investments made.

A motivating factor could be to enable the public authorities to retain a share of the cost savings for other uses, but it is probably enough to just change procurement guidelines. In many countries it is not only a problem of lack of awareness and routines that energy efficiency criteria are not considered in public procurement. For example in the Czech Republic, the law prevented public authorities from including energy performance contracting in their tenders until 2000.

The money saved on investments in energy efficiency could also be used for other energy efficiency purposes within the authority or for example allocated to a fund for helping low-income people to finance investments in energy efficiency.

Examples

Czech Republic

Regional initiatives have been implemented, where each region has to draw up model energy concepts within five years to create appropriate conditions for efficient energy use in public buildings. The Ministry of Environment provides guidelines for the work. The Dutch Energy Agency, Novem, has assisted SEVEn in preparing a financial manual for cities and smaller municipalities concerning the development of municipal buildings energy projects, including suggestions to sources of financing. The project included proposing a model procedure for applying energy performance contracting to the public sector. The work involves drawing up a proposal and reviewing it with representatives of the relevant government institutions (i.e. the Ministry of Finance, the Czech Energy Agency and the Economic Chamber of the Czech Republic). The outcome of the work is expected to support the installation of energy efficient equipment in public sector buildings administered by the civil service, educational and health care institutions, defense and security institutions, cultural bodies etc.

France

In France, government buildings consume 2.25 million toe and spend 0.5 billion Euro on energy annually. Since 1991, the ministries have been requested to implement energy-

efficiency programmes in their own buildings, to serve as good examples. Other public buildings are also examined, and services for energy management, energy audits, and budgetary allocations to promote energy efficiency work are being introduced. In June 2001 Ademe signed a contract with the Ministries for Environment, Energy and Research for the period 2000-2006, setting quantitative objectives in terms of results (toe saved) to 2006. Each year Ademe reports to the Ministries on the results in relation to the objectives.

Sweden

In several market areas, central, regional and local governments represent 30 to 50% of the total market. Each year, the government purchases products consuming about 2 TWh. This number could be reduced to 0.7 TWh through energy efficient purchase, if energy efficient products were applied and products with the best short-term potential are heat pumps, windows, lighting and ventilation.

4.2.6. VOLUNTARY AGREEMENTS BETWEEN PUBLIC AND PRIVATE SECTORS

Voluntary agreement programmes between the public and private sector (represented by a company or association of companies) have been developed in several countries in the 90's. The aim is usually to achieve a negotiated target concerning energy efficiency, emission reduction or technology development. In return for its efforts, the company may receive tax benefits, technical support, energy surveys, or some other form of compensation. In most countries, these programmes are an alternative measure to regulation and taxation.

The Netherlands has a long history of voluntary agreements, so called Long Term Agreements, LTAs, which are used as a tool to combine voluntary and mandatory approaches. The agreements are usually made between the government (Ministry of Economic Affairs) and representatives from economic sectors. There are six LTAs in the commercial, education and health care sectors targeting 25-30% energy savings and covering some 30% of total energy consumption. The greenhouse horticulture LTA covers 80% of total energy consumption in the agricultural sector, and there was a 42% energy efficiency improvement between 1980-1997. Two new LTAs were agreed upon in 1998 in the agricultural sector, bulbs and mushrooms. The energy savings targets are 22 and 20% respectively in the period 1995-2005. In 1996 a covenant was agreed upon with the associations of social housing organizations. Presently there are plans to promote energy conservation in existing dwellings and office buildings through LTAs with rental agencies in the social housing sector and with relevant organizations for renting and maintaining office buildings.

The LTAs are supported by conditions in the environmental permits required for large installations. When a company participating in a long-term agreement applies

for an environmental permit, it must submit, along with other application material, the corporate energy plan drawn up under the terms of the agreement. If the corporate energy plan demonstrates that the company is fulfilling its obligations as laid down in the agreement, the authorities evaluating the application simply includes a provision in the permit requiring the company to report on the implementation of its corporate energy plan and any other measures set out in the agreement.

If a company does not fulfil its obligations under the long-term agreement, or if it does not participate at all in an agreement, the permitting authorities may include requirements relating to energy conservation in the permit. Hence, the companies participating actively in LTAs are rewarded through easier application procedures for environmental permits and consecutive surveillance.

LTAs are a good alternative in the sense that they highlight energy efficiency for a specific sector at a given point in time. This will create attention to the issues.

Facts on Dutch LTA

The following steps precede the signature of an LTA:

Step 1: NOVEM, the government energy agency, approaches a selected industrial sector (or an individual company) for a Long-Term Agreement.

Step 2: The sector confirms its willingness to undertake energy conservation in a declaration of intent with the Minister of Economic Affairs.

Step 3: The sector's energy conservation potential is estimated with the help of expert guidance.

Step 4: The results of the estimates are translated by Novem and the sector concerned into a multi-year plan which forms part of the Long-Term Agreement.

Step 5: The Long-Term Agreement is signed by the sectoral association, the individual firms, the Minister of Economic Affairs and Novem and often the Association of the Provinces of the Netherlands.

The deal is that the government agrees not to introduce other regulations on energy efficiency in industry, and the industry voluntarily agrees to reduce its energy intensity to a target level.

The first LTAs were signed in 1992 and as of mid-1998 there were 30 LTAs with industry associations. About 1200 industrial companies participate in LTAs covering over 90% of industrial primary energy consumption. There are 11 LTAs with groups of users in services sectors.

The Minister of Economic Affairs provides support to the programme including:

- Financial instruments aimed at industry: tax reductions can be granted for investments in clean technologies. This scheme, however, applies to all companies, whether they are signatories to an LTA or not.
- Financial assistance within the framework of the LTA, including various subsidy schemes.
- Increase of the above financial assistance if the programme is more promising than expected.
- Support in the form of a detailed audit of the industries' facilities.
- Co-ordination of regulatory measures aimed at energy efficiency in industry, including requirements to obtain permits and energy taxes.

The agreement includes a yearly monitoring system based on an annual report of individual members of the sector. The aggregated reports are submitted to Novem as operating agent, and quantified through an energy efficiency index for the sector. After a few years the parties will evaluate the results and review the effectiveness of the agreement.

Evaluations show that Dutch industry had improved its energy efficiency by 14.5% from 1989 to 1997. In 2000, annual savings of about 0.7 billion Euro were anticipated for Dutch industry. Industry is positive to the LTA approach and no sector has dropped out of an agreement.

New LTAs after 2000 include some new characteristics:

- A more individual approach.
- In 2001 a standardized monitoring system at an improved quality level was introduced.
- Reasonable measures will be taken, with an internal rate of return of at least 15%.
- This corresponds to a recovery period of five years or less for investments.
- They will focus mainly on the larger energy consumers.

New voluntary agreements have been reached, targeted at medium-sized industries – the large energy-intensive enterprises take part in the benchmark covenant. Partners include individual companies, approximately 20 industrial associations, associations of municipalities and three Ministries: Economic Affairs, Environment and Agriculture. These LTAs run until 2012. The rate of increase in energy efficiency of large energy-intensive enterprises might be lower in the next few years because the energy conservation potential seems to be lower.

4.3. TAX INCENTIVES

The fiscal regime applicable to energy efficiency investments in the residential sector is complex. However, six important fiscal aspects with particularly high relevance can be distinguished: specific energy taxes, tax exemptions, capital gain tax, property tax, VAT and accelerated or free depreciation. Taxation is certainly a powerful tool to stimulate and giving incentives to invest in energy efficiency and contributing to financing such investments through tax exemptions, or by imposing energy tax and VAT.

Several European countries apply the concept of "tax shift", i.e. imposing higher taxes on natural resources and environmental pollution, primarily energy consumption, and using the revenues to reduce income tax. The general idea is to impose taxes on energy in order to make it more expensive, thereby creating incentives to reduce consumption. Energy efficiency measures can be further encouraged, not only by the mere fact that reduced consumption will decrease energy cost, but through tax exemptions. In the Netherlands, there is a tax with the single purpose of encouraging energy efficiency.

4.3.1. ENERGY TAXES

Energy taxes, VAT and taxes that are linked to a specific energy source, are used to increase energy prices, creating a situation where an energy efficiency investment more easily pays off. An energy tax can also provide state revenues to be used for assisting in financing energy efficiency measures, thus working two ways. The revenue gained from increased energy tax or VAT can be directly allocated to tax exemptions or grants for energy efficiency measures, see for example the regulatory energy tax in the Netherlands among the examples below.

The energy price normally does not cover environmental, security and other external costs associated with energy use, energy taxes can compensate for that. Furthermore, these external costs, i.e. climate change, risks associated with nuclear power and health effects of fossil fuels etc., can be rather complicated to estimate. At the same time it is important to keep in mind that a decision not to consider them automatically sets their value to zero.

Several European countries apply the concept of "tax shift" (for examples see below) i.e. imposing higher taxes on natural resources and environmental pollution, primarily energy consumption, and using the revenues to reduce income tax. In that way, environmental concerns and employment objectives are handled simultaneously. It is argued that it is not sustainable to finance reductions of other taxes by increasing environmental taxes, since the objective of the environmental taxes is to solve the environmental problems and when that is achieved, there will be no more revenues of environmental taxes.

This is true for sulphur dioxide tax, nitrogen oxide tax and taxes on waste. Such emissions can be reduced using cheap technical solutions. A higher price on emission due to increased tax will motivate investment in such technology. The revenues will decrease fairly rapidly, and the tax will have contributed to improved performance. However, increases in CO_2 taxes and energy taxes in general will not have the same effect, because the reduction in CO_2 emission and energy consumption is relatively low when increasing the taxes. They can both contribute to increased state revenue and reduce environmental impact.

This is due to the fact that gas, diesel, electricity and heat are inelastic consumption goods. This implies that the percentage consumption reduction of the product, for example due to increased tax, will never be bigger than the percentage increase in price. Hence, if the price of electricity is raised by 10%, consumption of electricity will diminish by less than 10%, probably only about 2-3%. Yet, from a long-term perspective, these taxes contribute to improved energy efficiency performance, since they stimulate the development and market introduction of new, energy efficient technology.

Experience in IEA countries suggests that relative prices have affected the choice of fuel, and the share of electricity used for applications for which other fuels can be readily substituted (e.g. space and water heating). However, the end-use price of electricity has generally been less variable than that of other fuels. Electricity prices have also less effect on uses which are not conducive to substitution, i.e. lighting and appliances.

Some negative side effects have to be taken into consideration as well. Increased energy taxes on households tend to affect mostly low- and medium income people. Moreover, increased energy taxes can entail negative regional effects and negative effects on competitive sectors. In addition, the basis for the environmental and energy taxes is much smaller that the bases for tax on labour. Therefore, tax shifts must be implemented gradually.

The EU reached an agreement on minimum energy taxes in March 2003. This was the result of five years of discussion and the outcome is a compromise, which does not raise tax levels dramatically, for further details see below.

EU Minimum Energy Tax

The EU Commission proposed a directive for minimum levels of fossil fuel taxation already in 1997, but the Member States did only agree on this in 2003. The directive determines the minimum tax levels on fossil fuels for the next 10 years, starting in 2004, but many countries have specific exemptions for up to 5 years. The directive extends the scope of minimum energy-tax rates to cover coal, gas and electricity. However, the effect is modest, since most Member States already have higher rates than the minimum requirements. The table below gives an overview of the new minimum tax levels.

New EU minimum taxes Rate, 2004	€-Cent/kWh	Increase from 1992 directive
Diesel & petrol* for transport	3.0-4.0	25%
Natural gas & LPG for transport	0.94-0.98	25%
Natural gas & coal for heating**	0.11 (0.055)	New
Fuel oil-heating oil	0.13-0.21	14%
LPG & Kerosene for heating	0	-
Electricity**	0.1 (0.05)	New

**Unleaded petrol; leaded petrol is 17% higher.*

*** Rate in brackets are for business purposes; for natural gas, the low business-rate only applies for heating.*

Examples of Tax Shifts

Netherlands

In the Netherlands, the government levies a number of taxes on energy, which apart from producing revenue have an environmental purpose. The regulatory energy tax came into effect in 1996, with the purpose to provide financial incentives for energy conservation and the reduction of CO_2 emissions. This is in line with a general environmental tax reform with the aim to transfer the tax burden away from direct taxes, e.g. on labour, towards indirect taxes, especially on environmentally harmful goods and services.

The regulatory energy tax does not contribute to the general budget; instead, revenues are recycled to taxpayers. In 1998 energy taxes were doubled and the tax burden of this increase is to be shared proportionally between households and industries: 68% for households and 32% for industries. The focus on small-scale household energy consumption rather than large industrial energy consumption is an attempt to avoid the economic risks associated with competition from countries where a similar tax is not in

force. In addition, long-term agreements are already proving effective in controlling the energy consumption of large energy consumers.

About 85% of the increased revenue will contribute to lowering direct taxes paid by households and industries. The remaining 15% will be used to promote energy efficiency.

Sweden

Taxes are regulatory measures that have been used in Sweden since the 1950's to tax electricity, energy, CO_2, sulphur and nitrogen oxide. In 1989, a general energy tax was introduced on electricity and fuels, except biofuels and peat. For all fuels except biofuels and peat and fuels used for electricity generation there is also a CO_2 tax. For heavy fuel oil, coal and peat there is a sulphur tax. Furthermore, there is a nitrogen oxide tax, a nuclear power tax, and a special estate tax on hydro-power and value-added tax.

The Swedish tax reform of 1991 was the start of a more environmentally oriented tax system, even though taxes on energy and environment had been used before. The term "tax shift" was not used at the time, but in practice this is what occurred. Increased environmental taxes financed reduced tax on labor. It has had a positive effect. While taxes increased, energy consumption and CO_2 emissions have been more or less constant. Energy efficiency, expressed as total energy consumption in relation to BNP, has improved.

In 2001 the Swedish government presented a long-term strategy for a continued green tax shift for the period 2001-2010 of totally about 30 billion SEK (about 3.3 billion Euro). During 2003 the tax shift will comprise 2,6 billion SEK (about 290 million Euro).

4.3.2. TAX EXEMPTIONS

Tax exemptions are used for instance in the case of income tax deductions for investments in insulation. They basically serve as a direct grant, but they are easier to access and administer, since the investor does not have to make a special application, getting a special form to fill in etc. He or she can receive it merely by including the investment in the income tax declaration. In addition, it is easier to reach investors with information about this opportunity than special direct support programmes, since the latter would require separate campaigns. Tax exemptions can be included in the information that has to be sent out anyway at times of income tax declarations. Of course, for this system to be efficient the investor must have enough income to deduct the cost from, otherwise a direct support system is more appropriate.

From a government perspective this system is advantageous also because it does not require a separate administration, but can be handled by the already existing tax authorities, which reduces administrative costs.

In France, income tax exemptions are used to assist in financing energy efficiency investments. In other countries there are exemptions from import duty on energy

efficiency equipment and goods used in the production of energy saving lamps. Experience from the Slovak Republic shows that exemptions should not be too strict, and information about them must be easily available.

Examples of Tax Exemption Systems

Bulgaria

In Bulgaria there are exemptions from import duty on certain environmentally friendly goods, such as installations and equipment for energy production from renewables and materials and elements for the production of energy saving lamps.

The Czech Republic

In the Czech Republic there is income tax relief for energy efficiency and recycling installations. Tax payers can deduct 10% of the purchase price from the tax base for installations like thermal pumps, electric generator aggregates for CHP up to 2.5 MWe and other electric equipment.

France

In France one can obtain an income tax reduction of 15% of total cost for energy efficiency measures to a maximum of 8 000 Euro. The exemption covers purchases for permanent residence of large equipments for renewable energy use, replacement of boilers, thermal insulation material for basement floors, roofs, walls, windows (double glazing for example), shutters and entrance doors. Purchases of equipment for heating regulation, such as systems allowing time programming, adjustment according to exterior temperature or central regulation, also qualifies for tax reduction. It does not matter if the person owns the permanent residence or if he is a tenant.

The Netherlands

The Energy Investment Relief Scheme (EIA) offers tax relief on investments in energy conservation technologies and renewable energy technologies. Provided the equipment appears on a qualifying list, the Energy-list, up to 52% of the investment costs may be offset against taxable profits. Some items are listed on both the VAMIL list (see 4.2.6. on accelerated depreciation) and the Energy-list, in such cases both schemes can be applied.

Romania

In Romania it is possible to benefit of exemptions from annual income tax, no-interest loans from the State budget and subsidised interest for commercial loans, for investments in energy efficiency (dwelling thermal rehabilitation). There is also exemption from custom taxes for imported energy efficiency and renewable energy equipment.

Slovakia

In the Slovak Republic, income tax exemptions can be made for energy efficiency investments, i.e. for energy efficient and renewable energy equipment. However, they are not widely used because they are too restrictive and there is a lack of information on the offers.

4.3.3. PROPERTY TAX

Property tax varies to a large extent between countries, and the encouragement of energy efficiency varies greatly. The property tax in Sweden is directly related to the standard and comfort of the property, and increases if for example investments in insulation are realized or windows with better energy efficiency performance are installed. Hence, energy efficiency improvements are not encouraged in property tax terms, in fact they are even discouraged (see below for details). However, if a company owns property, tax reductions can be made for certain improvements of the property, but very different rules apply for very specific situations.

Energy Aspects of the Swedish Property Taxation

The Swedish calculations of property tax are partly based on the standard of the house, where a higher standard motivates higher property tax (other factors that are taken into consideration are for example geographical location). The standard is determined through five categories of items: exterior (material on façade, roof etc.), sanity (hot and cold tap water, toilet, shower, sauna etc.), kitchen (quality of stove and oven, length of work bench, quality of cabinet doors etc.), other interior (fireplace and basement that can be used as living area). A fireplace, which contributes to reducing energy consumption, motivates higher property tax. The fifth category is energy specifically, and the better the energy efficiency performance, the higher the standard, resulting in higher property tax. Aspects that are taken into consideration for higher tax are:

- Winter insulation
- Windows with insulating glass, or double or triple glazing without insulation glass
- Heating through primarily a heat pump system (even if it is combined with other heating source)
- The electricity system has been changed 1990 or later

In France, the property tax is calculated on the potential revenue in case the property had been rented, which may affect energy efficiency, but not as clear-cut as in Sweden. In the Czech Republic, on the other hand, there is a real estate

tax relief for five years for house owners who reconstruct their heating system from solid fuels to heating through natural gas, electricity or any renewable energy source.

4.3.4. VAT

VAT can work as an energy tax if it is used to affect prices on energy and related equipment. It works the same way as taxes on fuels. Using a lower VAT rate for environmentally desirable energy and for energy efficiency equipment gives an incentive for consumers to choose the least expensive option.

In addition, the state revenue gained can be used for energy efficiency promotion, see the Czech Republic and Hungary below. In the Slovak Republic differences in VAT do not necessarily reflect an energy efficiency strategy and will not particularly encourage energy efficiency investments[4]. Higher VAT rates for energy efficiency erformance contracting than energy supply are also misleading and should be removed.

Examples of Differentiated VAT

The Czech Republic

In the Czech Republic there are lower VAT rates (5% instead of the higher 22% rate) for environmentally sound products and goods related to energy savings, such as thermostatic controls, meters for measuring the amount of heat consumption, thermal insulation measures and energy saving light bulbs. Hence, the VAT is used to help finance investments in energy efficiency.

Hungary

Hungary has lower VAT rates (12%) for natural gas and electricity use than the regular VAT rate of 25% for vehicle fuels and alike. Energy saving equipment and energy efficiency services do not enjoy the same reduction. There are plans to introduce an environmental emission fee on air, water and soil, which would be levied on emissions. The energy sector would be the pilot with an air emission fee on SO2, NOx and CO_2, particles and other toxic emissions. The Environmental Emission Fee is expected to finance the government's energy saving and energy efficiency action programme.

Slovakia

Slovakia has differentiated VAT rates by type of energy and type of equipment. The differences do not encourage energy efficiency. For electricity, district heating, light and heavy oil, VAT is 10%, whereas for liquid fuels it is 23%.

4 *National Energy Efficiency Study in Slovakia July 2002. Final Report. Prepared for the World bank and the Ministry of Economy of the Slovak Republic. KWI Architects Engineers Consultants with Ökoplan, Wild & Partner, and Oberösterreichischer Energiesparverband and Energy Centre Bratislava with Profing, EGU and VVUPS NOVA. p. 44.*

4.3.5. ACCELERATED OR FREE DEPRECIATION

Companies investing in energy-savings and using renewable energies are often able to benefit from a corporate tax advantage, where the purchased energy efficiency equipment is depreciated faster than other equipment, entailing lower corporate tax.

In the Netherlands, there is a scheme for free depreciation on environmental investments, the Vamil scheme. It grants entrepreneurs a financial advantage because accelerated depreciation is permitted on designated equipment placed on the green fiscal list (VAMIL list), thus keeping company profit and tax payments in the early years of the investment down, and improving the cash flow. Vamil was closed already in September for the year of 2002, because the budget limit was exceeded. During 2003 the budget will be carefully supervised.

In order to follow the European rules on stimulation measures, investments larger than 25 million Euro will not be approved, unless there is consent from the EU Commission. If a potential investor wishes to try that option, a written application must be submitted to the VROM-minister (Ministry of Health and Land Planning). The minister will then present the application to the EU Commission. Furthermore, for applications of more than one million Euro, a copy of the purchase contract and service agreement should be provided.

4.3.6. TAXES SPECIFIC TO DISTRICT HEATING

It is vital that taxes do not discourage energy efficiency and environmentally sound energy sources, and it is essential that the tax system be analysed as a whole. For example, the Dutch regulatory energy tax, which was introduced in 1995, increases prices on heat and electricity, which is expected to encourage consumers to reduce consumption. At the same time, it is designed so as to encourage the choice of environmentally sound energy sources. In order to prevent double taxation, natural gas used in the generation of electricity is exempted. There is also an exemption from the tax for heat supplied via district heating, which improves the competitive position of district heating relative to individual central heating. In Sweden there is an exemption from energy tax on fuels used for heat generation in CHP-plants.

It is interesting to note the results of the BIO-COST project, which was funded by the European Commission's THERMIE Type B Programme in 1998-99. The objective was to analyse the effect of national biomass policies on the investment costs of biomass district heating plants. Denmark and Sweden have mainly high energy taxes as a driving force, while Austria and France rely mainly on subsidy systems. The results of BIO-COST show that governmental policies can have a big effect particularly on grid and buildings costs, which in turn have a large impact on the overall costs of the plant. The results do not indicate an obvious

advantage of either energy taxes or subsidies: the French subsidy approach leads to fairly low cost levels compared to the Danish tax approach, while the Swedish tax approach features the lowest cost level. Apparently, the Austrian subsidy approach increases investment costs.

4.4. CONCLUSIONS

Measures to promote energy efficiency can be categorized as "stimulating" (information, financial support) and "restrictive" (prohibitions, fees). A combination of these would probably be optimal, since stimulating measures legitimate a policy, while restrictive measures execute a policy. Affecting the price of energy, or the price of an energy efficiency measure, naturally affects the amount of investments in energy efficiency. One example of stimulating measures are direct support programmes, soft finance and tax incentives, which are important financial measures that a government can use to influence investments in energy efficiency. Direct support programmes and state interest guarantee loans contribute to technology investment and important experience that can lead to further technology development, increased knowledge and potential market expansion. However, they entail substantial costs and should only be used to promote introduction and dissemination of new energy efficient technology to raise awareness and create a market, but grants should not be made permanent. The drawbacks of grants are that there is always an uncertainty of whether the product would survive without a grant. Moreover, there is the problem of so-called "free-riders", that is people who would have invested in the technology even without a grant.

Different methods have been developed that refine the grant tool, such as voluntary agreements and technology procurement programmes. The intention is to involve the parties more and making the connection between the grant and market structure more immediate. Such methods have been successful. The Dutch LTA-programmes are also well coordinated with regulation on environmental permits, rewarding participating companies by facilitating the application procedure. Such carrots are essential.

Taxes are another powerful tool to affect energy consumption and investments in energy efficiency. Tax exemptions are a more efficient tool than direct support programmes in the sense that it uses an already existing structure. That is, people have to make their income tax declarations anyway, the forms are sent out and information on energy efficiency tax exemptions can be included in the same information material as for the rest of the income tax declaration, no special campaign is needed. Moreover, the existing apparatus for tax payment is used and no special public organization must be established to administer the scheme.

It is important that the tax system follows a logic structure, where high-energy consumption is penalized and improved energy efficiency is rewarded. This may

seem obvious, but for example in Slovakia, in Sweden good insulation, heat pumps, energy efficient windows etc. motivate higher property tax rates. Investments in improved energy efficiency entail increased taxation and reduced profit.

The green tax shift is becoming increasingly common around Europe, where revenue from increased environmental taxes, primarily energy taxes, is allocated to reduce income taxes. There are also examples where revenue from increased energy taxes and fees are used to help finance energy efficiency investments (the Dutch regulatory energy tax). In fact, this is a very efficient method to combine stimulating and restrictive measures, addressing energy efficiency consumption in two ways simultaneously.

Public procurement rules should be complemented with guidelines on energy efficient procurement. This would have at least three positive effects. Firstly, cost-effective energy efficiency procurement saves money, which could be allocated to help financing investments in energy efficiency elsewhere. Secondly, it is important for the public sector to serve as a good example, to show the benefits of energy efficiency measures, and thirdly public procurement represents a large demand, and can drive the use of new technologies.

5. BANKING

Ever since the first oil crisis of 1973, the burning question has been how to finance investments aimed at reducing energy consumption or how to promote renewable sources of energy, as a substitute for fossil fuels. As previously mentioned, many western countries have attempted to resolve this question by putting in place specific measures for financing, using tax incentive mechanisms, subsidies, or, also, other measures such as guarantee funds or bond issues. This approach has implied the acknowledgement that current financing mechanisms and methods to be found on the market, were ill adapted or, at the very least, ineffective.

It is important to recognize that the problem of financing energy savings projects and/or projects using renewable energy remains largely unresolved. This is particularly evident at a time when the issue is taking on a new dimension in the context of climate change policies, bearing in mind, on the one hand, the direct link between the conditions of production, use and consumption of energy and greenhouse gas emissions and, on the other hand, the options offered by the flexible mechanisms provided for in the Kyoto Protocol.

There are two main reasons for the difficulties encountered in the financing of energy efficiency projects. On the one hand, it derives from the culture of financial institutions and their internal procedures and, on the other hand, from the particular characteristics of these projects.

5.1. THE CULTURE AND PROCEDURES OF THE FINANCIAL INSTITUTIONS

Under this heading, five inter-linked factors could be mentioned, which all play some part in making it difficult for a commercial financial establishment or even a multi-lateral financial institution to give consideration to an energy savings or renewable energy project. It has to be pointed out that these features are general and apply to most of financial institutions, whatever their country of residence.

5.1.1. INSUFFICIENT AWARENESS OF THE IMPORTANCE OF THE SUBJECT

Both public and private financial institutions operate according to a quasi-standard set of rules. It is not necessarily part of their mission to be interested in social problems and, out of concern risk, management concerns concentrating on any particular sector is not a priority. This naturally leads to them adopting a neutral stance with regard to proposals submitted to them. These are assessed solely on economic, financial and risk criteria, regardless of the importance of the project to the greater good. This explains why, for years, a very senior executive of a

large regional development bank could venture to say that "his" bank had no business intervening in the field of energy savings since this was the domain of NGOs and State agencies.

5.1.2. LACK OF IN-HOUSE EE EXPERTISE WITHIN FINANCIAL INSTITUTIONS

This problem is related to the previous one. Clearly, failure to take into account a problem affecting the greater good means that resources – particularly manpower and technical resources – are not earmarked for dealing with this problem. As a result, in most financial institutions there are often competent teams working on the energy sector projects, but solely on the supply side and never on the demand side. Furthermore, there is often lack expertise in the field of renewable energy.

Therefore, when a demand-side type or renewable energy project is submitted for appraisal, it is not taken as seriously or handled as efficiently as a project proposal for a power generation plant using fossil fuels. This leads in particular to bank demands providing guarantee and other security requirements (corporate guarantees, collaterals, pledges on assets) instead of using project finance mechanisms based on the expected cash flow generated by the investment.

5.1.3. SMALL PROJECT SIZE

Often, energy savings projects are small in terms of financing requirements. For a financial institution, however, project preparation and management costs are practically the same, whatever the size of the project: it costs just as much to process a 100 000 Euro operation as it costs to process a 100 million Euro operation. It is no surprise that a financial establishment's preference would be for these more profitable operations and, at this size, it would generally be a supply side operation. The small size of projects is a totally prohibitive factor for many banks and financial institutions; it can only be overcome by putting into place mechanisms, which allow for the grouping of projects through ESCOs or Investment Funds schemes.

5.1.4. THE INFLUENCE OF LARGE GROUPS

Investments in the energy savings or renewable energy sector are brought to the financial institutions by a variety of players and therefore, very often, energy is not the main thrust except, sometimes, for the promotion of renewable sources of energy. Clearly, financial institutions are much more tempted and it is more in their interest, in terms of risk management, to work with the few but more focused players, whose core business is energy and, who are always firmly rooted

in traditional energy production (major plant equipment suppliers, production companies, energy distribution companies etc.) Faced with production lobbies, which encourage consumption, isolated energy consumers have little means of attracting the interest of the financial sector.

5.1.5. LOW STAFF MOTIVATION

Here we are dealing more with a consequence of the points mentioned earlier. Professional staffs in financial institutions are given little or no incentive to handle energy savings or renewable energy proposals when these are submitted: the operations are too small, with low profit prospects for the financial institution, difficult to process due to lack of skills required and not likely to get support from the hierarchy. There is nothing to motivate a banker to dedicate time and to risk credibility within the institution in order to promote an energy efficiency project. In this way, many potentially interesting projects are denied the opportunity of being appraised and financed.

5.2 THE APPROACH OF COMMERCIAL BANKS

As a consequence of what has been previously said, it is easy to understand that in general banks will not offer specific conditions for energy efficiency projects, unless they are backed by governmental support or bilateral or international initiatives. Instead, an applicant needing a loan to finance an energy efficiency project will have to apply for a regular loan. In fact, interest rates on loans to residential or municipal energy investments may even be particularly high, depending on how the client's creditworthiness is assessed by the bank. This is due to the fact that there are high risk factors associated with small loans to households or municipalities, and they entail relatively high administrative costs.

5.2.1. DOMESTIC BANKS

A viable domestic banking sector is crucial for local investors to receive long-term financing. It is particularly important for energy efficiency measures which are usually smaller than supply-side projects. Energy efficiency projects may also have longer pay-back times than other projects which compete for capital.

International Financial Institutions (IFIs) can provide local intermediary banks with credit lines for energy efficiency investment to address the lack of local capital and the problems of the local banking sector. Local banks must be persuaded to develop their technical expertise and to handle projects that are more difficult and riskier than average. It should be underlined, however, that there are numerous no-cost energy savings possibilities.

The same rules generally apply for loans that will be used for energy efficiency investments as for any other purpose. A bank normally requires creditworthiness in the applicant's personal economy and a security in the form of a mortgage deed in real estate and/or a personal guarantee from a third party, to approve a loan.

The general requirements on companies are usually the same, but it is the creditworthiness of the company that is evaluated, since it is an entity separate from the people who run it. Relevant information could include a business plan, balance sheets, economic history, tradition of paying bills, board members etc.

5.2.2. A BANK SPECIALIZING IN ECO-LOANS

There are, however, banks that do not consider that eco-loans are less profitable. One such exception is the Dutch Triodos Bank, which has been a leading innovator in sustainable banking since it was established in 1980. It only finances companies which add social, environmental and cultural value. Fair trade and microcredit organizations in developing countries are financed with the support of depositors and investors who wish to contribute to social justice in a sustainable economy. The bank has offices in Zeist, the Netherlands, in Bristol, UK and in Brussels, Belgium. Next year it will open an office in Spain.

Since 1990, Triodos Bank has become an active fund manager, both for funds set up by itself and for third parties. Third parties are for example charities, donor organizations and government. Energy efficiency is one of the target sectors of the Triodos Venture Capital Fund, which is a private equity fund that invests in companies during their expansion phase. Other target sectors for that fund are organic food, renewable energy and environmental products and services.

Triodos even has its own CO_2 market, the Triodos Climate Clearing House. It is an independent registry and trading platform for CO_2 credits resulting from CO_2 reduction and sequestration projects. Relevant projects pertain to afforestation, renewable energy and energy efficiency. The CO_2 credits are deposited on and transacted through CO_2 accounts and there is a guarantee that CO_2 credits which have been used to compensate for the buyer's CO_2 emissions cannot be on-traded.

The bank presented good growth in 2002, the balance sheet rose by more than 9% to 829 million Euro. Net profit rose by 12% to 2.6 million Euro and the total level of funds entrusted to Triodos grew by 14% to 1.3 billion Euro by year-end.

5.2.3. BANKS ADMINISTERING GOVERNMENT ENERGY EFFICIENCY LOANS

The most common arrangement to involve banks in energy efficiency loans is through administration of government funding. Running advantageous state loans through regular banks has several positive effects. It increases awareness in the banking sector of the importance of energy efficiency and about energy efficiency projects. It forces the banks to recruit appropriate staff and/or educating staff about energy efficiency and how to evaluate energy efficiency projects. A spin-off could be that the banks actually are inspired to develop their own loans for energy efficiency projects, defining profitable models that do not require government funding.

By using already established financial institutions, the government profits from existing routines and knowledge about handling loans. A disadvantage is that one or some banks may receive inappropriate privileges over others. It is important that the selection of the bank to manage the government-funded loans is well prepared.

Examples of banks managing government energy efficiency funds are the Czechoslovak Trade Bank (CSOB) which manages the PHARE Energy Savings Fund (ESF), the Hungarian Credit Bank (now ABN AMRO Bank), which manages the Energy Efficiency Credit Fund, EECF (based on the energy saving programme the German Coal Aid Fund), and the Polish Environmental Protection Bank administering the EcoFund. Success factors include broad eligibility criteria and transparency.

The EECF has contributed to creating an interest among Hungarian banks for energy efficiency project financing, directly as well as through ESCOs. The Czech fund has a similar experience. Generally, commercial banks were not interested in energy efficiency lending before these funds were established, but they have become involved in this type of lending through co-financing (on commercial terms), and eventually in their own lending operations.

Examples of Banks Managing Government Energy Efficiency Funds

The Czech Republic

In 1997, the Ministry of Industry and Trade contracted the Czechoslovak Trade Bank (CSOB) to operate and manage the PHARE Energy Savings Fund (ESF) to provide preferential loans for small and medium-sized energy efficiency projects. The European Commission, through PHARE and the bank set aside 4.5 million Euro each for the project. Projects involve improvements of heating systems, double-glazing of windows, reduction of heat losses through walls and roofs, improvements of lighting etc. and loan amount is generally 60,000 - 1.4 million Euro.

The bank will manage the ESF funds for a period of 10 years (i.e. 1997-2007) and during that time it will capitalize the interest on the deposit and loan repayments and invest them in more projects, making the ESF a revolving fund. When the contract ends, the bank will transfer the administered funds to the Czech government (Ministry of Industry and Trade). The CSOB submits quarterly reports on the management of the fund and on loans under consideration to the Ministry of Industry and Trade and the ESF supervisory committee. The committee includes the local Delegation of the European Commission, the Ministry, CSOB, and the PHARE Energy Programme Management Unit at the Ministry.

Applications are sent directly to CSOB branches and the evaluation of the applicant's creditworthiness follows general procedure at CSOB. Hence, standard banking criteria will be applied to these loans for evaluating the viability of projects, as well as the creditworthiness of the loan applicant. The most important criterion is however a special one: at least 40% of the overall cost savings must be a result of reduced energy consumption. The loan applicant will be required to invest in the project and finance up to 40% of its costs. There are exceptions from this rule, for schools, hospitals, etc. The interest rate is established at half of the CSOB prime rate plus 3.5% and payback periods are longer than for regular loans. If serious differences are discovered between the information in the project report and reality after implementation, the client will be charged the usual commercial rate as punishment.

The selection of projects and decisions on credit are the responsibility of the bank, assuming that the project and its credit entirely meet the conditions set forth in the contract between the bank and the Ministry of Industry and Trade. The bank exclusively carries all risks associated with the selection of clients and projects, and charges an administration fee of 0.95% of the total loan amount.

However, the quality of projects is judged not only by the bank, but also by firms specializing in technical and economic evaluations. They help with the technical evaluations of the quality of the projects. Any solvent and creditworthy project developer from the state or private sector may apply for financing from the ESF. Eligible projects are those that bring significant energy savings and require investments between about 62 000 and 1.6 million Euro. The payback term is 4 years minimum and 5 years and 6 months maximum.

The share of an ESF loan in total project cost is typically 80-100%. 39 projects had been approved as of October 2001, amounting to about 10 million USD. The types of projects funded are reconstruction of heating systems and energy systems, insulation of houses, regulation of heating and insulation in schools. Usually the borrowers are Industrial Enterprises, Municipalities, Hospitals, Building Co-Operatives, and District Heating companies.

Hungary

The Energy Efficiency Credit Fund (EECF) was established on 1 August 1991 by the Ministry of Economic Affairs (MoEA) and based on the energy saving programme the German Coal Aid Fund with funds of 18 million USD. It is administered by the Hungarian Credit Bank (now ABN AMRO Bank) and is integrated into the bank's lending operations.

It does not have an end-date. The German Coal Aid originates in a DM 30 million German aid package offered to Hungary in 1991.

The main objective is to improve energy efficiency in energy production, transformation, transport, and end-use. The governing board consisting of seven persons, which is selected by MoEA but independent, makes all loan decisions (the Bank has veto rights). The decisions are based on a credit-worthiness review made by ABN Amro and a technical-economic review by the Energy Information Agency (EIA), a not-for-profit government subsidiary. EIA receives 0.5% of the loan amount, but does not bear any technical risk. The Bank establishes the criteria for creditworthiness and receives 3% of the loan amount for the review and for handling repayment. The Bank also carries the risk of any defaults, but the risk factor seems low, since 1991, more than 500 loans have been approved, and only 10 borrowers defaulted.

It is a revolving fund and interest rates are about 50% of prevailing basic interest rate published by the Hungarian National Bank. Loans can be approved for up to 80% of project cost, but no more than about 303 000 Euro. The expenditures envisaged for the development project are repaid within an average of two to three years. The average loan is 80 000 USD (the maximum is 0.3 million USD) with 50 loans per year volume. Typical borrowers are industrial firms, municipalities, and district heating companies. Projects need to achieve minimum energy savings to be eligible (>100GJ per million HUF (3 800 Euro) annually and 50% of all savings must be energy cost savings). Borrowers, which are usually industrial firms, municipalities, and district heating companies, need to provide usual securities to the bank. Only about 2% of the approved projects have failed, usually because of bankruptcy .

From the start of the programme in 1991 until the end of 2002, the investments approved for financing amount to a total of HUF 19.5 million (about 75 000 euros), of which HUF 11.9 (about 45 000 euros) is made up of preferential credits.

The EECF has been successful, allowing an annual energy saving of 8.16 PJ up to 2002 which corresponds to an annual saving of HUF 7.091 billion (about 27 million Euro). About 83% of approved projects have been completed and monitored and they have presented even better results than expected. The value of energy savings is 8% higher than the target figures mentioned in the bank contracts.

The following table shows total investments, the share of preferential credits and energy saving potential per year in SMEs.

Year	Prefential credit	Total Investment	Energy Saving potential per year
2000	Ft 1 billion (about 3.8 million Euros)	HUF 1.6 billion (about 6.1 million Euros)	325 TJ
2001	Ft 0.89 billion (about 3.4 million Euros)	HUF 1.41 billion (about 5.4 million Euros)	220 TJ
2002	Ft 1.51 billion (about 5.8 million Euros)	HUF 3.53 billion (about 13.5 million Euros)	1040 TJ

The success is partly due to broad eligibility criteria and transparency. The Hungarian EECF has contributed to creating an interest in the various Hungarian banks for energy efficiency project financing, directly as well as through ESCOs. The Czech fund has a similar experience. While commercial banks were generally not interested in energy efficiency lending before these funds were established, they have become involved in this type of lending through co-financing (at commercial terms) and eventually in stand-alone lending operations, e.g., in Hungary. The existence of a fund with soft terms does not discourage commercial financial institutions from becoming involved in energy efficiency loans. In fact, in Hungary the EECF has been helpful in the evolution toward commercial financing of energy efficiency.

Poland

The Polish Environmental Protection Bank supplies commercial credits. In 1996, the Bank introduced new credit lines with support from the EcoFund:

- replacement of existing street lighting systems in particular with energy saving installations;
- energy saving solutions in central heating and hot water supply systems;
- reduction of exhaust emissions through adapting internal combustion engines (both gasoline and diesel) for gas fuel.

Projects related to conversion of coal-fired boilers into gas fired, where ecological effects are easy to measure, have high priority. However, projects based on reduction of energy consumption through an improvement of the energy management system or the technological process are not likely to receive funding from this source.

5.2.4. EXTERNAL LINK BETWEEN THE BORROWER AND THE BANK

One problem in getting banks interested in energy efficiency projects is the missing link between the project owner and the bank, where the project owner

is incapable of presenting its project in an attractive and comprehensible way, and the bank lacks the expertise to fully appreciate the benefits of an energy efficiency project. The solution could be to use a third party to present the project to the bank, which knows how to market the project. That party should be able to analyse the project and provide the bank with relevant information, including key facts and figures. An example from Bulgaria shows how the energy centre, EnEffect, was hired to produce a business plan, which made several banks interested in an energy efficiency project.

The idea to construct a district heating power plant in Stamboliyski, Bulgaria, emerged in 2001, when the new management of the Tselhart Joint Stock Company had ceased to supply heat to the heat transportation network of the city. The company TEGE-21 Ltd. was created, involving private companies and the Municipality of Stamboliyski, which would be responsible for the plant. The construction works started in the summer of 2001. The Municipal Council granted a building permit for construction of the district heating power plant and the right to freely use the existing heat transportation network. The construction of the building was funded by one of the private investors.

However, there was a need for more funding for installations and connection of the power plant to the gas supply and heat transportation networks, and this would be covered by a bank loan. A business plan had to be attached to the application for a bank loan and in 2002, TEGE-21 Ltd. assigned the Centre for Energy Efficiency, EnEffect, to work out a business plan for the project.

The plan was designed on the basis of data provided by the investor regarding the heat transportation network, the type of end-users connected to it, and the characteristics of the envisaged energy equipment. The team from EnEffect made technical and economic calculations of the losses in heat transportation, the operation and maintenance costs as well as the revenue from heat and electricity sales. The financial aspects of the project were very good and the payback period on investments was estimated to less than five years.

The business plan was submitted to three banks and gained their interest. Eventually, the loan was granted by the First Eastern International Bank under very favourable terms and conditions. In December 2002, the State Energy Regulation Commission granted the company a license for heat and power generation and heat transportation on the area of the city of Stamboliyski.

5.3. CONCLUSIONS

The barriers to banks financing energy efficiency are two-fold: there is a lack of awareness and in-house expertise about energy efficiency and there is the problem of project size. Energy efficiency projects are usually small in terms of financing requirements whereas administrative costs for the bank remain the

same. Banks prefer to work with a few but more focused players such as major plant equipment suppliers and with corporate rather than project-based financing. Staff motivation is low as far as energy efficiency projects are concerned.

There are usually no specific loans for energy efficiency investments, but such loans are treated like any other loan in the bank. In fact, they may be treated in a negative way because risk the is perceived as relatively high, entailing higher interest rate. There are exceptions to the rule that banks do not in general prioritize energy efficiency projects (the Dutch Triodos bank has sustainable banking as its mission).

One way of addressing the problems described above is to run advantageous state loans through regular banks. Such a system increases awareness in the banking sector of the importance of energy efficiency and about energy efficiency projects. It forces the banks to recruit appropriate staff and/or educating present staff about energy efficiency and how to evaluate energy efficiency projects. A spin-off effect is that the banks actually are inspired to develop their own loans for energy efficiency projects, where they find profitable models that do not require government funding (this is the experience in Hungary and the Czech Republic). Another spin-off effect is that other local banks may co-finance the bank administering the state subsidies, thereby gaining interest in energy efficiency projects.

By using already established financial institutions, the government profits from already existing administrative routines and knowledge about handling loans and does not need to create its own organizations for this. Establishing a separate organization entails great costs. A disadvantage is of course, that one or some banks may receive inappropriate privileges over others.

There also seems to be a missing link between financial institutions and project owners. High potential projects do not receive adequate funding in spite of a seemingly win-win situation. Information about the project has to be presented to the financial institution in an attractive and comprehensible way, including key facts and figures that appeal to the bank. Using a third party to present the project to the bank, which knows how to market the project, could solve this.

6. THIRD PARTY FINANCING, FOREIGN INVESTORS AND JOINT IMPLEMENTATION

There are various contract forms of Third Party Financing (TPF) that are relevant for energy efficiency measures; such as ESCOs using performance contracting, revolving funds, leasing, instalment payment, joint ventures (JI), venture capital and municipal bonds. These possibilities are examined in this chapter. ESCOs are perhaps the most efficient mechanism for financing energy efficiency projects. They provide more than just funds by also adding technical expertise. However, they have not become as widely used as expected. An alternative, or complement, to ESCOs is revolving loan funds, which offer loans that can be repaid with energy savings. The repaid loans are used to finance new projects. There is vast experience of running revolving funds. This chapter includes fund practitioners' recommendations.

Foreign investment in energy efficiency is a valuable opportunity not the least for East-European countries. For smaller projects, like thermal insulation in private homes, it is hardly feasible for foreign large investors to finance investments directly. Instead the foreign investments are channelled to institutions which in turn finance the smaller projects. The main conclusion seems to be that foreign investment should generate self-sustaining effects, as for example the IFC guarantee funds enhancing local banks. Such projects create or strengthen local organizations, which continue to promote investment in energy efficiency even after the project is finished.

Joint Implementation (JI) projects provide a tool for West- and East-European countries to collaborate on energy efficiency projects and raise funds. So far, the largest number of projects is related to renewable energy and energy efficiency, but the largest projects concern forest preservation, reforestation or restoration. The scheme has encountered some problems, inter alia because the JI market is strictly regulated, leaving little or no room for self-regulating market forces. Companies complain that governments are not showing enough interest in green projects. This is party due to the fact that accession countries have been preoccupied with EU membership.

The pilot phase of JI, the so called Activities Implemented Jointly (AIJs), show that most energy sector projects are supply oriented rather than demand oriented and most of the AIJ demand-side energy projects that do exist are in buildings. Governments should encourage demand-side projects. Moreover, government revenue from emission trading could be more effectively invested in carbon mitigation through loan guarantee funds rather than direct subsidies, since the former creates a chain of effects. Furthermore, a loan guarantee fund may produce lower risk and thereby inspire private commercial banks to get involved.

6.1. THIRD PARTY FINANCING

Market-related financial mechanisms are highly important for investments in energy efficiency, and government policy can influence the use of market-based financial mechanisms by providing the adequate legal structure and tax incentives, as well as supporting the institutional framework, etc. The mechanisms that are treated here are: Energy Service Companies (ESCOs), Revolving Loan Funds, leasing, instalment payment, joint ventures (JV), venture capital and municipal bonds.

The ESCOs provide multiple energy efficiency services to consumers including project finance, engineering, project management, equipment maintenance, monitoring and evaluation. They use Energy Performance Contracts (EPC), whereby the consumer repays the loan with money saved through the reduced energy consumption obtained through the energy efficiency investment itself. This is probably the paramount mechanism for financing energy efficiency projects, but it has encountered some problems and has not yet become as widely used as expected. ESCOs could be the coordinators of revolving loan funds. Such funds use repaid loans to finance new loans for the same purpose. Initial funding could be provided by the state or IFIs.

Leasing is a form of renting in combination with the option to obtain legal ownership at the end of the rental period. This method is used by banks as well as special leasing companies. There are two main types of leasing: capital and operational lease. The difference between the two depends on which party bears the economic risk. Instalment payment is another possibility for the purchase of energy efficient goods. Joint ventures (JV) could be a suitable option for local companies to share risk and receive knowledge transfer, and for a foreign company to get access to local networks and finance. A JV between a utility and an industry could be used to stimulate cogeneration. Venture capital may be relevant for energy efficiency investments when starting a new business.

6.1.1. ESCOS

The mechanism which has proved most efficient is the development of "third party financing" companies. These companies offer a threefold service: engineering and technical expertise; total investment financing; and energy savings guarantee.

By taking full responsibility for designing, setting up and implementing an energy efficiency project, these companies bear the entire risk. They are only remunerated through the proceeds of the savings.

Although such initiatives have been very successful and are still working today, it has to be recognized that the concept has not expanded as much as one could have expected. It has proved difficult to find sponsors or investors with

the required level of creditworthiness, the necessary technical skills and enough appetite to take this kind of risks, even though it can be demonstrated through a number of examples, that the financial returns that can be obtained are much higher than in other service businesses. This problem has been the main difficulty to overcome for the EBRD when promoting the concept in the countries in transition, although it finally succeeded to set up around 15 of such companies in various countries, under the name of ESCO. They were developed with only four different sponsors.

In fact these sponsors developed the concept with EBRD's support, not only for the sake of earning on saving energy but also, and sometimes mostly, in order to sell equipment or other services. Only a handful of very small companies, particularly in Poland and Hungary to which it is important to add the recently created Hungarian ESCO EETEK (set up by the EBRD Energy Efficiency and Emission Reduction Fund) should really deserve the designation of third party financing company.

The basic role of the ESCOs is to provide energy efficiency services to consumers, such as project finance, engineering, project management, equipment maintenance, monitoring and evaluation, usually through EPCs, whereby energy savings repay a loan. ESCOs can consider projects implying high risk (and high returns), since they can diversify the risk over several projects.

Hungary seems to be the most mature market in Central Europe for ESCOs. This is due to budgetary and legal autonomy of cities, allowing for smooth regulation on ESCO work, increases in fuel oil prices, gas sector privatization, differences in VAT rates and liberalization of energy markets. However, the potential of ESCOs is not fully exploited in Central Europe. The need to change the regulatory framework in order to address this problem was discussed at an IEA and CTI workshop on TPF in Budapest in November 2001.

Eliminating the price control on heat is one important step. The price of heat should be liberalized subject to an established ceiling (price cap per square meter or GJ). Changing the procurement rules for the choice of ESCOs and equipment is another important step, as well as correcting misleading differences in VAT rates between ESCO services and energy supply. Energy delivered to the consumers by an ESCO should be subject to the same VAT rate as in the case of a standard energy delivery. A possible way of promoting performance contracting could be to create an association of ESCOs in Central Europe. Such an association could communicate company information to prospective customers.

Governments may grant incentives and national administrations could be forerunners by using the TPF scheme for their own buildings, thereby enhancing both demand- and supply side energy efficiency.

However, organizational factors affecting the success of ESCOs should also be considered. ESCOs with the optimal mix of expertise, i.e. finance, engineering, project management, market sense and customer relations are the most successful. Traditional engineering companies that wish to venture into ESCO business should seek partners in order to be able to offer the full range of services. Customer training is a critical component, where customers are informed of the specific mechanisms and benefits of energy performance contracting.

Governments and public financing institutions have three important tools for the support of ESCOs:

- Strong legal basis for energy performance contracting;
- Training for engineering companies, banks, government officials and energy; consumers and;
- Seed financing (including guarantees) to stimulate the market initially.

Seed financing can be an important factor in promoting energy performance contracting. The EBRD, for example, has established a number of multi-project financing facilities (MPF) with ESCOs. The result has been that the ESCOs have been able to undertake more projects, and facilitated the use of performance contracts rather than requiring traditional payment for their services. The Czech Energy Agency's grants for energy efficiency projects have also stimulated ESCO projects.

The ESCO industry in Ukraine is rather new and most energy efficiency companies there do not use performance contracting, nor do they provide any other financing for projects, with the exception of the Ukrainian Energy Services Company, UkrEsco. This is a state-owned energy service company with access to about 36 million USD in loan and grant financing from the EBRD and the European Union's technical assistance programme, TACIS.

Such grants or subsidies can motivate customers to consider this unfamiliar mechanism. Energy performance contracting has great potential in economies in transition. It can help consumers reduce their energy costs without forcing them to spend their limited cash resources for the initial investment[5].

Examples of EPC and ESCO Work

The Czech Republic

One example of energy performance contracting is the Czech Association of Environmental Technology, SEVEn, who has developed a model procedure for applying the Energy Performance contracting (EPC) to the public sector. The aim was to support the installation of energy efficient equipment in public sector buildings. ESCOs have been developed for upgrading heating and hot water systems in hospitals and schools.

In the Bulovka Teaching Hospital, four energy conservation measures were taken in September 1995: switching the existing central heating system to district heating, implementing a new energy management system, installing a new air handler recovery system and converting and upgrading to a new high energy efficiency natural gas boiler. Total costs of these measures amounted to about 2.7 million USD, producing annual energy savings of about 700 000 USD, corresponding to a four-year simple payback.

UNEP's EMPRESS (Energy Management and Performance Related Energy Savings Scheme) project will support energy efficiency efforts in Eastern and Central Europe. The project will help establish specialized energy service companies (ESCOs) that provide Monitoring and Targeting (M&T) energy services to industrial and commercial clients. A conventional ESCO focuses on the installation of equipment.

After installation the ESCO only maintains the equipment and monitors the savings. An M&T ESCO will primarily take case of management issues for the client company. The equipment installed (meters, data collection instruments, and low cost sensors and controls) are only considered as tools in the process to set up a management reporting system and work with the client's staff to change operating methods (through training, mentoring and motivation).

Hungary

Hungary seems to be the most mature market for municipal ESCO in the region. The reasons have been identified as (www.munee.org):

- Cities enjoy important budgetary and legal autonomy and can set policies that, for example, allow ESCOs to enter into performance contracts directly with hospitals not requiring numerous local government approvals. Banks have a long tradition of lending to the municipal sector. The OTP Bank, which keeps the bank accounts of more than 80% of the cities, ran the German Coal Fund, which offered cities loans specifically for energy efficiency and is one of the relative success stories with revolving funds.
- A new law requires co-generated electricity to be purchased by the grid at a fixed price, creating a new market for investments in CHP facilities. This law makes cogeneration a much more secure activity.

- Large and quick increases in the fuel oil prices and gas-sector privatisation, led to the significant expansion of the country's natural gas network in the early 1990's. This improved the cost efficiency for local governments of fuel switching in old district heating boilers.
- The market for ESCOs operating municipal facilities expanded in the 1990s. This was partly due to a difference in the VAT rate between the procurement of goods (25%) and energy (12%), which encouraged cities to outsource and buy energy at a lower tax rate than they would pay if buying equipment. Combined with the pressure to reduce expenses, and to avoid cutting staff, outsourcing became an attractive option, creating a market for ESCOs that operated district heating systems, hospitals and schools.
- As a result of recent liberalization of energy markets, utility-based ESCOs are emerging in Hungary. Electricity companies wish to expand their traditional services. The desire to keep existing customers and gain new ones trigger such ESCOs to cover a broader range of projects and accept additional risk.

6.1.2. REVOLVING LOAN FUNDS

An alternative, or complement, to ESCOs is revolving loan funds, which offer loans that can be repaid with energy savings. The repaid loans are used to finance new energy efficiency projects. The funds allow for bundling a number of small projects together into larger projects, which brings down transaction costs and reduces risk.

Different types of energy efficiency funds have been established in a range of countries to promote energy efficiency investments, see below for examples. However, many funds have not found customers, because fund managers did not market the fund sufficiently, they were not familiar with the energy efficiency business, the application procedures were too cumbersome, potential borrowers had difficulties developing "bankable" projects, etc. Other funds have been more successful, presenting a large number of implemented projects.

Examples of Revolving Funds

Hungarian Public Sector Energy Efficiency Programme

This programme started in June 2000 and will last until May 2005. The Ministry of Economics is the executing agency, but monitoring and supervision of project implementation will be conducted by a steering committee. The committee consists of the Ministry of Economics, the Ministry of Environment, UNDP, NGOs with energy expertise and other relevant agencies. The purpose of the programme is to remove barriers for a sustained market of energy efficiency services and to promote implementation of energy efficiency projects. GEF provides 4.2 million USD and UNDP 400 000 USD, the government 2.8 million USD, private and public investors 9-13 million USD. Support

takes the form of grants and interest free credits and targets municipalities, hospitals and other public institutions.

Projects that can qualify are building and district heating, water heating, public lighting, fuel switching, boiler and control systems as well as waste water treatment. The programme has three parts: 1) Support for EE Policy, awareness, and co-ordination which includes establishing a National Energy Agency (in addition to the energy centre), 2) Support for project identification, development, and financing, and 3) training.

Direct support will be provided in the form of cost-sharing for at least 100 audits to leverage investment in the municipal sector and provide funding contingent grants for cost-sharing feasibility studies. Audits and feasibility studies are the critical link to financing that municipalities lack and are expected to shift support to projects that have significant, cost-effective energy savings. GEF could also cover the incremental risk to be repaid when a project has been implemented.

Lithuanian Energy Efficiency Housing Pilot Project EEHPP

The EEHPP ran between 1996-2001, but the Lithuanian government transformed the repaid loans into a revolving fund, which became operational in January 2001. The aim is to facilitate energy efficiency improvements in the residential and public sectors. Funding comes from the Lithuanian government, the World Bank, the Danish Ministry of Housing and Urban Affairs and the Dutch Ministry of Economics. A 10 million USD loan was obtained from the World Bank of which 5.2 million USD were allocated to homeowners to implement energy efficiency in the residential sector and 4.7 million USD to municipalities to invest in energy efficiency measures and renovations of public schools. The Lithuanian government agreed to provide 30% matching funds for the project.

As of April 2001, 12 municipalities had received 4.7 million USD and residential projects 10 million USD, including 54 public schools and kindergartens, 227 homeowners associations and 26 single-family households. Energy efficiency measures were implemented in more than 200 multi or single-family buildings. The Danish Ministry of Housing and Urban Affairs and Dutch Ministry of Economics perform technical evaluation. Projects concern new heat substations, window replacement, roof insulation, and wall insulation. The objectives are to: 1) develop maintenance of housing infrastructure by stimulating private initiative; 2) achieve greater energy efficiency through demand side activities; 3) develop private sector; 4) introduce long-term affordable financing schemes.

Lithuania Municipal Infrastructure Development Programme

The programme lasts from 2000-2004 with money from the Lithuanian Ministry of Finance and the Lithuania Housing and Urban Development Foundation. Borrowers are local authorities, home owners associations, and owners of detached houses. Projects relate to environmental protection, energy savings and insulation of residential and public facilities, heat supply, water supply, waste treatment, waste handling, and transportation. The objectives of the fund are to: 1) develop a project financing scheme for habitat and urban development under market economy conditions; 2)

promote energy conservation and private initiative while introducing projects of energy conservation and habitat refurbishment; 3) develop institutional infrastructure to provide services on preparation and implementation of habitat and urban development investment projects.

Lithuania Public Sector Energy Management Programme

This programme started in 2001 without an end date. Sponsors are the Lithuanian government, the Lithuanian Housing and Urban Development Foundation and EBRD. The purpose is to finance energy efficiency measures at buildings owned or operated by different ministries, regional and local authorities and other public institutions. EBRD had provided 20 million euros as of 12 April 2001.

Romania GEF Energy Efficiency Financing Facility Project (FREE)

The project was launched in November 2001 and has no end date. The World Bank and GEF are sponsors. A GEF contingent grant of USD 9 million will supply seed capital. In addition to commercial co-financing, there is also GEF Technical Assistance of 1 million USD and donor funds for capacity building. The purpose is to establish an Energy Efficiency Fund in order to improve energy efficiency, to reduce GHG emissions, to utilize self-sustaining market based mechanisms, and to enable capacity building.

The Fund will take a part of current perceived risks and transaction costs to allow lending at regular commercial rates. The share of the loan in project cost can be up to 70-80% - the remainder is to be covered by borrowers. Borrowers are restructured/ privatised industries – cement, pulp & paper, oil, chemicals, machine building, glass, wood, processing, food. Advantages of the Fund are: 1) flexibility with the capacity to respond quickly and to adapt to new needs, 2) no contributions from the State budget, 3) self-sustaining and open to commercial co-financing, 3) combining financial services and EE expertise, 4) potential catalytic role in the Romanian Energy Sector. The Fund is an institution of public interest with its own legal status. It is independent and financially autonomous and will initially operate as a revolving investment fund.

Source: Alliance to save energy: Fund for energy efficiency projects April 23, 2002.

Energy efficiency funds are critical at an early stage in creating an energy efficiency industry in developing countries and transition economies. Such funds have been established and operated successfully. At a World Bank workshop for energy efficiency fund practitioners in April 2000 experiences of revolving funds were discussed and resulted in several interesting conclusions.

The most important factor for increasing awareness of and interest in energy efficiency investments is market-based energy prices. In addition, government commitment to energy efficiency is essential to the success of the fund and it must be part of a comprehensive energy efficiency policy. Government incentives for energy efficiency (e.g., tariffs, tax credits, depreciation, and mandated audit) improve a fund's market.

Energy Efficiency Funds must have lower interest rates than average market rates to attract clients and/or some other incentives for potential customers, such as project development support. This in turn requires considerable effort and time for fund managers, especially when establishing the fund. The typical barrier is a lack of energy efficiency technical capacity as well as a lack of financial knowledge and resources by potential parties who could evaluate and develop energy efficiency projects. The necessary integration of the technical and financial expertise often does not occur.

Energy efficiency funds have been established both within government agencies, as semi-government organizations, and as entirely independent organizations. Commercial financial institutions have been used to manage funds, to evaluate credit worthiness and manage credit risk. The technical-economic evaluations have been performed either by fund staff or outsourced to non --profit institutions or consulting firms.

Marketing is an essential part of the success of a Fund, particularly marketing to senior business management. Small projects have high transaction costs. They need to be packaged by partners such as ESCOs. Another possibility is to create very simple mechanisms that avoid costly audits and feasibility studies, such as a list of standard energy efficiency measures. Full collection of interest and principal repayment is not a big problem. It is carried out either by banks or, e.g., by utilities through the energy bill. Fund practitioners in EITs give several recommendations as outlined below:

Fund Practitioners' Recommendations

Public-Private Structure of the Fund

- A clear objective is necessary to guide the fund's organization and operation.
- The fund should be established and run as a business, implying that it should not be a technology deployment system, but rather profit-making should be the focus of the Fund.
- Transparency of procedures should be maximized and government interference in financing decisions minimized.
- The government should establish clear objectives and rules, then delegate the fund operation to professionals.
- Governments should use supportive public policies to create a good environment for the fund.
- Complex procedures and structure should be avoided.
- The loan approval board should consist of independent members, and each potential borrower should have the same rights before the board.

Fund Operations

- Use existing market players (i.e., banks) for functions where possible, as one way of assuring that financial and technical-economic assessments are of high quality. Due diligence must be performed by professional staff with incentives for good performance.
- Assess the energy efficiency market; identify a target group. The establishment of the fund should be accompanied by a strong educational campaign, securing that all players are aware of the Fund, its objectives and criteria. Continue marketing the fund, especially to the target group, and cooperate with state/ provincial energy agencies and industrial associations and use other partnerships and alliances to this end.
- Technical assistance to borrowers may be required to develop feasible, bankable projects
- Use third parties such as ESCOs to market and develop projects for the fund; avoid high transaction costs.

Projects and Clients

- Focus on proven technologies, avoid demonstrating new technologies.
- Focus on short term loans for projects with high rates of return.
- Avoid placing funds in a few large loans, spread the risk through many small projects.
- Fund financing should cover only a portion of the project costs: the borrower must have equity in the project.
- Loans should be approved only to credit-worthy clients; establish high credit-worthiness criteria, which are to be rigorously enforced.
- Secure loan repayment through collateral requirements.
- Monitor carefully the design, implementation, and operation of projects.

Source: Energy Efficiency Fund Practitioners' workshop, workshop summary. Held at the World bank in Washington D.C. April 13-14 2000.

Revolving funds offer loans that are repaid with energy savings. Linking them to investment funds which would buy the carbon credit a project generates at a fair market rate is another proactive measure. Partnerships between investors seeking carbon credits, commercial banks, energy consumers, and local utilities could make such investment arrangements possible. However, they may need a coordinator, such as a local energy efficiency centre or an ESCO.

A successful fund structure for small-scale demand-side projects should target low-risk, simple energy efficiency improvements that are easy to quantify, and use local organizations for assessment of financial creditworthiness and technical evaluation, see the fund proposal below (Secrest, 2002).

Proposal on an Energy Efficiency Financing Fund

Traditionally, energy efficiency projects take over two years to implement and costs often exceed USD 200 000. Financial institutions are accustomed to these larger projects and smaller and shorter projects are considered uneconomic. One way of addressing this problem has been to combine several small projects in order to create a larger package for financial institutions, amounting to at least USD 10 million. However, this involves additional organizational work which increases cost for administration.

An alternative to this traditional market based financing could be to develop streamlined methods to work with smaller projects. Projects with low financial risk have good cash flow and the sponsor demonstrates the ability and commitment to repay the investment. A source of loan funds at interest rates attractive to private and municipal borrowers would be established.

Figure 9 Flow of Information (dotted lines) and Funds (solid lines) for Small Scale Projects

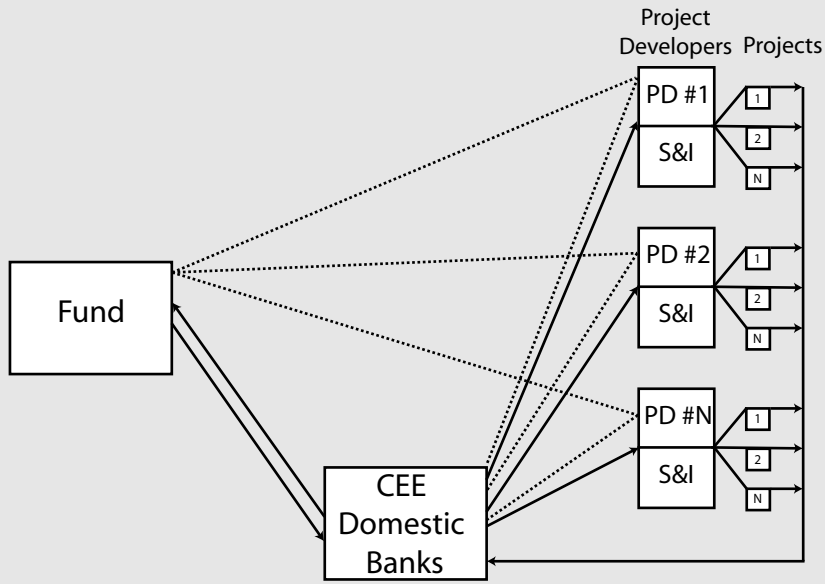


Figure 9 shows the flow of information and funds for small-scale projects. The steps in the process are:

1. The project developer (a local organization with engineering, financial, and policy capability) identifies and develops a project(s) and communicates this to the fund and domestic bank. Development includes a contract with the project owner.
2. The Fund reviews the project materials and, upon approval, disburses payment to a prequalified domestic bank.

3. The pre-selected supplier and installer (S&I) provides and installs the equipment.
4. Upon communication from the project developer that the installation is satisfactory, the domestic bank disburses initial payment to the supplier and installer.
5. The domestic bank collects payment from the project owner in the agreed time period.
6. The project developer evaluates the project and communicates the results to the domestic bank and the fund.
7. The domestic bank sends repayment to the Fund, completion payment to the S&I, and preparation/evaluation payment to the project developer.

The key to this structure lies with the capability of the in-country project developers to evaluate the technical, financial, and implementation aspects of each project to guarantee minimal risk. This would be accomplished by implementing measures for which the efficiency improvement is easy to quantify and the creditworthiness of clients is well secured, i.e. projects having low technical, financial, and implementation risks.

Source: Secrest, 2002, p. 4.

6.1.3. LEASING

Leasing is a successful way of overcoming problems of finding financing. A familiar example is the common practice of leasing office copy machines. In energy efficiency leasing arrangements, the monthly payments for the customer should be lower than the expected energy savings. Leasing is offered as a financial tool by special leasing companies and regular banks. (Performance contracts follow the same principle, although ownership is transferred.) A contractor finances and installs energy efficiency equipment in a consumer's location and assumes all the risks. The contractor receives compensation out of the energy savings.

Leasing is a financing possibility that is becoming increasingly popular in Eastern Europe. It has already been tried in the West, for example in France through Sofergie. The objective of Sofergie, as strictly defined by the law, is to finance installations or purchase equipment with the purpose of reducing energy consumption. This mechanism was introduced in France following the oil crisis in the 70's. It worked best in the 80's when it benefited from government grants and tax exemptions. Since then these privileges have been abolished and Sofergie has lost its popularity. Another disadvantage is that Sofergie, just like any other traditional financial institution, does not add any technical expertise to the client, unlike ESCOs.

There are two main types of leasing: capital and operational lease, the difference depending on which party bears the economic risk. In case of capital lease,

the lessee makes regular lease payments during a certain period, which often represents the economic lifetime of the equipment. At the end of the lease period, the lessee becomes the owner of the equipment. The contract is irreversible and it is the lessee who bears the economic risk, for example that the value of the equipment may diminish as a result of use, technological development, new market developments, etc.

For operational lease, the lease term cannot exceed 75% of the economic lifetime of the equipment and it is the leasing company/owner of the equipment that bears the economic risk. This type of lease can be excluded from the corporate balance sheet and thereby improves the creditworthiness of the lessee. The advantage for the lessee is that minimal or no down payment is required. Also, lease eligibility is based primarily on future cash flows rather than balance sheets.

6.1.4. JOINT VENTURE

A joint venture (JV) is a common project between legally and commercially independent companies or institutions in which the parties jointly bear the responsibility for management and financial risk. However, a joint venture involves many issues which may impede their development, such as long negotiations, loss of project control and transfer of technology between partners.

The JV construction can be relevant for energy efficiency and renewable energy investments in many ways. Particularly relevant are the cases of JV between a local and a foreign company, where the local company can benefit from for instance foreign expertise in energy efficiency technology and the foreign company gets quick access to the local market, and JV between an energy utility and an industrial company, where the JV can provide additional resources and skills necessary to develop for example a successful cogeneration project.

6.1.5. VENTURE CAPITAL

A venture capital fund invests in new companies and provides equity funds at an early stage of a company's development, with the expectation of investment returns when market entrance has successfully been achieved. Since there are high risks involved, venture capitalists usually conditions the investment by demanding influence on the management of the company

Venture capital may be an option for energy efficiency and renewable energy investments in cases where they involve starting a new business. It is of particular interest for large-scale projects that are a separate legal entity in relation to the core business, for example cogeneration projects, wind farms, district heating, and manufacturing of energy efficient equipment.

6.1.6. MUNICIPAL BONDS FOR FINANCING INFRASTRUCTURE PROJECTS

In the fall of 2002, the Municipality of Varna in Bulgaria emitted municipal bonds for financing a package of infrastructure projects. One of the priority projects is an energy efficiency upgrading of the street lighting system in the city. The project covers 100% of the street lighting fixtures and full conversion to two-tariff metering of electricity consumption. It also includes establishment of a system for control of the duty cycle of street lighting, to create semi-night dimming of the luminaries along the high-speed city main roads and distribution roads.

The Energy Efficiency Centre, EnEffect, made a technical and economic feasibility study of the project with an assessment of the estimated energy savings, assessment of the costs of equipment and required construction and assembly works, calculation of the project cash-flow, risk and sensitivity analysis as well as identification of the environmental and other accompanying benefits from project implementation.

This is the first municipal energy efficiency project in Bulgaria to be financed by a municipal bonds loan. This approach offers two major advantages: first, the cost of the collected funds is at least 3% lower compared to the best current interest rate levels, and second, the need to submit collateral has been avoided.

6.2. THE CASE OF FOREIGN INVESTMENTS

Foreign investment in energy efficiency is a valuable opportunity not the least for Eastern European countries to receive funding for projects. For smaller projects, like thermal insulation in private homes, it is hardly feasible for foreign large investors to finance investments directly. Instead the foreign investments finance local institutions which in turn finance the smaller projects. Even though many energy efficiency projects, especially insulation, have proved to be economically attractive, most financial intermediaries, especially in emerging markets, are reluctant to finance these transactions. Foreign investment can have an influence on those local financial intermediaries.

Hence, the main lesson to be learned is that foreign investment should generate self-sustaining effects, such as IFC guarantee funds enhancing local banks in Hungary through the Energy Conservation Co-financing Programme. Such projects create or strengthen local organizations, which continue to promote investment in energy efficiency even after the project is finished.

Foreign investors show great interest in the district heating sector in Central and Eastern Europe, especially if financing is secured by International Financial Institutions. The World Bank and EBRD have recently approved several projects with the objective to modernize district heating plants and networks. These

projects concern demand-side issues such as consumption-based billing by installing metering equipment and supply-side issues like customer relations, training on management information systems, marketing, outreach and market analysis, as well as reducing energy losses in the system.

6.2.1. EU PROGRAMMES

EU funding can be achieved both through the EU framework programme, "Intelligent Energy for Europe" including SAVE, ALTENER and two new funding programmes, as well as the PHARE programme with the aim to assist the applicant countries of central Europe in their preparations for joining the European Union.

A New EU Framework Programme for Energy

Intelligent Energy for Europe is a new EU programme, with the aim to create a new direction and focus for energy policy in Europe for the next four years (2003-2006). The previous energy programme ended in December 2002. The old ETAP, SYNERGY, SURE, CARNOT, ALTENER, and SAVE are condensed to four: SAVE, which promotes energy efficiency and ALTENER, which promotes renewable energy, but it will also comprise two new programmes: COOPENER, for international co-operation on energy efficiency and renewable energy, and STEER for transport.

Through these programmes the DG TREN (in charge of energy and transport) intends to address transportation and energy demand, and renewable energy and energy supply. An overall budget of 200 million Euro has been agreed upon (the previous energy programme spent only 175 million Euro), with the following breakdown: 69.9 million Euro for SAVE, 80 million for ALTENER, 17.6 million for international co-operation, and 32.6 million for energy aspects of transport. There are possibilities for an increase after 2004. It is expected that the programme is officially approved in July and that the first deadline for proposals will be in November 2003.

Moreover, a new executive agency will be created to manage this and future energy programmes. The agency will be responsible for creating yearly guidelines and priorities for spending, rules for participation and timetables for implementation. It will also be in charge of administering funds and do evaluation of projects funded. The European Parliament has proposed a larger, strategic "European Intelligent Energy Agency". The original Commission proposal was designed for more small-scale projects to be funded. Like the old programme, the new programme requires that most projects receive funding with no more than 50% by the EU, requiring third party funding on most projects.

Some previous problems are addressed, for example that small projects have not been allowed to apply for support. The minimum limit is proposed to be changed

from 250 000 Euro to 50 000 Euro. It should also be possible to receive more than 50% financing from the Commission in some cases, since for network activities among non-profit organizations, for SMEs and for many entities from accession countries, it is difficult to raise 50% or more from other sources. Others that may have difficulties are project partners who provide experience from their own countries to other countries with less experience on energy efficient development. These partners may face difficulties in obtaining national co-funding since the results of the projects will be most important for other countries.

Phare Assisting Applicant Countries of Central Europe

The Phare programme is one of three schemes assisting EU applicant countries in adjusting to EU membership, addressing economic restructuring and political change. It was created in 1989 to assist Poland and Hungary, but now includes ten candidate countries in Central and Eastern Europe, namely Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, Slovenia and Romania[5]. The EU enlargement process caused a more focused approach by Phare in 1997, orienting the programme entirely to the pre-accession priorities outlined in each country's accession partnership. In addition, Phare's management has been integrated into applicant country government structures. There is a national fund and a small number of implementing agencies.

Phare had been criticized by the Court of Auditors and the European Parliament for lack of impact and sustainability, so the 1997 reform aimed at preparing for implementation structures required after accession. For example "twinning" is now operational with 200 Member States' civil servants, advising their counterparts in applicant countries' administrations on priority acquis matters. Setting up new implementation structures took about twelve to eighteen months, so the changes were applied around 1999. During the period 2000-2006, Phare provides about 11 billion Euro of co-financing for institution building support.

The effect of the 1997 reforms has had a positive effect on Phare contracting rates. According to the Commission's assessment, the number of Phare programmes rated as satisfactory or above has increased, but still needs improvement. By using the governments' own structures there is much less use of programme management units. Budgetary coordination has also improved due to the fact that Phare funds are administered by the countries' own public financial authority. By increasing government responsibility in this way, it is expected that Phare fund administration will contribute to improved financial control in the national budgetary systems.

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5 Until 2000 the countries of the Western Balkans (Albania, Bosnia & Herzegovina and The Former Yugoslav Republic of Macedonia) also participated in Phare, but since 2001 the CARDS Programme (Community Assistance to Reconstruction, Development and Stability in the Balkans provides financial support to the Western Balkans)

Still the strengthening of applicant countries' institutions and complying with the acquis are far from complete. Existing Member States must also help applicant countries prepare structures to be able to use structural funds efficiently and effectively when they become members. While the needs in the candidate countries are immense, the number of well prepared investment and institution building projects is low. At regional level, authorities must administer resources through newly created structures. This problem threatens to restrict the absorption capacity of the candidate countries and the impact of the Phare programme.

Yet, there are quite a few good examples, perhaps most importantly the Phare Energy Efficiency Co-financing Scheme, EEFS, in Hungary, which provides interest free loans from a revolving fund, see examples below. The Phare funds usually collaborate with local banks, and thereby contribute to strengthening the local financial institutions by awareness raising and the development of procedures to handle EE loans. Also the funds provide loans primarily and not grants, which allows them to reuse the money for yet new projects. In addition, investors are forced to commit themselves even more to the project.

Examples of Phare Financed Projects

The Phare Energy Efficiency Co-financing Scheme in Hungary

The Energy Efficiency Co-financing Scheme, which is established under the PHARE Programme, started in 1998 and will run until 2008. It provides an interest-free credit from the Revolving Fund, which has a budget of 5 million Euro for energy efficiency purposes, plus an interest bearing loan granted by commercial banks at the actual inter-bank rate of interest in Hungary. 10% of total project cost must be submitted by the investor herself. The payback term is eight years. The size of the loan must not exceed 107 000 Euro.

Beneficiaries are normally municipalities, private and municipality owned companies and in 10% of the cases beneficiaries are third party financing agents. The loans are mainly used for efficient street lighting, small-scale combined heat and power systems, improvements of production processes, rational heat supply, building envelope upgrade and, to some extent, projects involving renewable energies. Total savings are estimated at 1.613 TJ/year of primary energy, corresponding to a reduction of CO_2 emissions of about 110 kt/year.

As of 2001, 57 projects had been supported at a total amount of 21 million Euro of which 5.6 million Euro had come from the interest free Phare component. The technical and economic evaluation is made by the Hungary energy centre, and the financial creditworthiness is assessed by the Financial Bank (EIB) and Hungarian bank. Loan approval is made by the bank.

The Phare grant provides the interest subsidy of the loans because it is lent to borrowers interest free. The Phare component of any loan must be between 20 000 and 400 000 Euro.

The Latvia Energy Efficiency Fund I

This fund runs from 1998-2008 and sponsors are the EU Commission through Phare, the Latvian Ministry of Economics and the Latvian Development Agency. The purpose of the fund is to provide low interest loans for small and medium sized energy efficiency projects. One million Euro is provided by Phare and by October 2001 15 projects, including six private companies and nine municipalities, had been approved. They receive 80% of the loan from Phare and 20% from a commercial bank at interest rates of 7.25-8.75% Minimum loan size is 30 000 Euro and maximum is 400 000 Euro. Borrowers are municipalities and private companies and project types are in food industry technology as well as reconstruction of district heating systems.

Latvia Energy Efficiency Fund II

This fund started in 1999 and has no end-date. Sponsors are the EU Commission through Phare and the Latvian Ministry of Economics. One million Euro is available for municipalities and 1.6 million for private enterprises. Loan approval is made by Parex Banka and Aizkraukles Banka. Loans for municipalities are given only with State Treasury participation and co-funding. Loans for private enterprises are approved through commercial banks and co-funding. Interest rates are lower than fund I, but stricter conditions for eligibility are applied.

The Slovakia Energy Saving Scheme

The scheme is presently idle, but normally should run from 1997-2007 with money from the EU through Phare (3.8 million Euro) and EBRD (7.6 million Euro). The purpose is to provide attractive loans for small and medium scale energy saving investment projects to reduce energy intensity, energy imports, environmental impacts and increase competitiveness of the Slovak industry. Previously it was the Priemyselna Banka Košice, PBK, that administered the fund and evaluated creditworthiness, but now it is Slovenská Sporitelna, SLSP. It also approves loans with the consent of the supervisory board.

Interest rates are one fourth of commercial rates. Simple payback of the project must not exceed four years and project size is between 50 000 Euro and 800 000 Euro. The share of loan in total project cost can be up to 60% the other 40% to be covered by other sources. 40% of the financial return must be the result of a reduction in energy consumption. Industry can apply for the loans.

In October 1998 the EBRD Credit Line to PBK was blocked and it was announced by PBK that not enough funds were available for co-financing of all the energy saving projects under Phare allocation. PBK finally declared bankruptcy. Currently, the Ministry of Economy has money for additional EE projects, but there has been no decision yet as to the future of the fund.

The Slovenia Energy Saving Fund

The fund has a lifetime of ten years, 1998-2008. The Slovene Ministry of Finance, Ministry of Economic Affairs, and the European Commission provide resources. The objective is to enhance the use of, and the investment in, energy efficiency equipment

and to assist local banks in developing a new business field and to help develop more diversified financing schemes for energy efficiency.

Total budget is 13.7 million Euro, and the government contributes 1,7 million Euroas a grant to reduce the interest rate, Phare contributes 2 million Euro at 0% interest rate, and Bank Austria Creditanstalt 10 million Euro at commercial rates. Euro. The Slovene commercial bank and Austria bank (Fund Manager) assess creditworthiness, approves loans and monitors the projects. The Agency for Efficient Energy Use (Monitoring Unit) performs technical evaluation, audit and feasibility studies.

Interest rates are 40% lower than commercial rates and the payback term is eight years with a maximum grace period of two years for the start of principal repayment. Projects range from 50 000 to 500 000 Euro. Collateral is provided in accordance with an agreement between the borrower and the bank (mortgage on the real estate or business property or production premises, pledge over the equipment, bill of exchange). The loan share in project cost should be less than 50%.

Projects must result in identifiable and measurable energy savings (projected to provide at least half the return on the investment share financed by the loan). The borrowers must be Slovene legal entities, the loan must be in Slovenia, and projects must fulfil the Bank Austria Creditanstalt standard credit eligibility. Industrial, buildings, and service sectors can borrow money for cogeneration, compressed air systems, energy efficient boilers and heat recuperation.

The fund manager Bank Austria Creditanstalt was selected in a public tender, inviting all qualifying financial institutions in Slovenia to apply. The organization and operation of the fund has three parts: 1) The fund manager provides administrative, logistical, and operational support, and is responsible for financial appraisal and final decision on loan application, controls loan disbursement, and monitors and verifies energy savings, 2) There is monitoring of the energy efficiency aspects of the projects and for technical assessment of loan applications, 3) The supervisory board (three members from EC, Ministry of Economic Affairs, Ministry of Finance) monitors the technical, financial, and operational implementation of the Fund and ensures that the operation of the Fund Manager is in accordance with the contract. The board can change the blending ratio, the effective interest rate, lending conditions, the efficiency criteria, and target sectors and approves all reports submitted by the Fund Manager.

Source: Among others, Alliance to save energy: Fund for energy efficiency projects April 23, 2002

6.2.2. USAID EFFICIENT LIGHTING PROJECT IN BULGARIA

In Bulgaria, bank loans through the Bulgarian Municipal Energy Efficiency Programme (MEEP) are available for energy efficiency projects. The programme will run from 1999-2006, the purpose being to establish sustainable commercial financing for energy efficiency projects in Bulgaria. It is financed by USAID through its Development Credit Authority (DCA) and managed by the United Bank of Bulgaria (UBB), which makes financial assessment. Electrotek Concepts, Inc. does technical evaluation. The programme includes five energy efficiency projects, four

of them are in the municipal sector. 6.25 million USD are available and approved by UBB with a 50% principal guarantee backed by the US Treasury.

By October 2001, 10 loans had been approved totalling 1.6 million USD. UBB is responsible for loan approval and collection. Depending on the transaction, a one-time loan origination or commitment fee will be charged on loans and loan guarantees in the range of 0.5% and 1.5%. The Development Credit Authority (DCA) levies interest rates established by UBB (commercial rates for Bulgaria). The payback term is established by UBB on a project-by-project basis (currently 3-5 years) and loans are 150 000 to one million USD. Normally the share of the loan is 70% of the project cost. Municipalities and industry are the borrowers and projects include energy efficiency or greenhouse gas emissions reduction.

Two projects are in the Bulgarian cities of Silistra and Popovo. The total cost of the Silistra project is about 300 000 USD and the DCA loan covers 70% of this. The total cost of the Popovo project is about 65 USD, and the DCA loan covers 64% of this amount. It is Electrotek that undertakes analyses of business plans, cash flow and risk. These analyses can serve as models for other municipal projects prepared for financing under the DCA guarantee mechanism.

The project succeeds in involving both a commercial bank and a municipality, by presenting terms that appeal to both parties. The fact that a local bank is used will give long term positive effects, since the project contributes to raising the awareness level about energy efficiency projects within the bank, and encourages development of similar loan programmes. The projects include investments in every part of the municipal infrastructure, such as street lighting, municipal building heating, water and gas supply, urban solid waste treatment and renewable energy.

Examples of USAID Efficient Lighting Projects in Bulgaria

The Pernik Municipal Street Lighting and Building Energy Efficiency Project

This project was funded in November 2000 and includes street lighting improvement, whereby old fixtures with inefficient mercury lamps are replaced by high-pressure sodium lamps and flexible control systems are installed. Hereby, electricity consumption is reduced 3.1 times and, at the same time, illumination is improved. The project also includes improvement in heating systems in municipal buildings. Controls have been introduced in heating systems of eleven municipally owned buildings with the result that heat consumption is reduced and comfort level is improved.

The Pazardjik Municipal Street Lighting Project

This project was funded in March 2001 and deals with street lighting improvement, similar to the Pernik project. In addition to replacement of fixtures and lamps, new electronic controls and metering devices are installed.

The Silistra Municipal Street Lighting, Building Energy Efficiency and Solar Project

This project was funded in June 2001 and covers improvement of the efficiency of space heating in three municipally owned buildings: a school, an administrative building and a retirement house, including the installation of a solar hot water system. The project also includes elements of street lighting improvements similar to the Pernik and Pazardjik projects.

Source: http://www.munee.org/go.idecs?i=45

6.2.3. EFFICIENT LIGHTING INITIATIVE (ELI)

The Efficient Lighting Initiative (ELI) is a programme funded by the Global Environment Facility (GEF) and implemented by the International Finance Corporation (IFC) and by local counterparts in each participating country. The aim is to reduce greenhouse gas emissions by introducing energy efficient lighting technologies in emerging markets. It will lower market barriers to efficient lighting technologies in six developing countries and countries in transition, among them the Czech Republic, Hungary and Latvia.

Implementation began in the spring of 2000 and the project is expected to catalyse the installation of energy efficient lighting, primarily in the public sector, with special emphasis on street lighting. It should also to enhance the capabilities of lighting businesses, particularly in the area of project financing. Furthermore, it is hoped that ELI will promote compact fluorescent lamps (CFLs) for the residential sector. The initiative has been running for three years (2000-2003) and the programmes in the Czech Republic, Hungary and Latvia were completed in the fall of 2003, but this is not the end.

ELI has brought together lighting manufacturers, electric utilities, the public sector, NGOs and educational institutions. The idea was to have a sustainable, long-term impact, and it seems like this will be the case. ELI will continue as a mark, on demand from manufacturers, large consumers and others. IFC is working with international partners to create a self-sustaining lighting product quality certification programme, using the ELI logo. In fact, over 150 products are already carrying the ELI mark. For examples of ELI project results in Europe, see Appendix I.

6.2.4. IFC GUARANTEE FUNDS AND PARTNERSHIPS WITH LOCAL FINANCIAL INSTITUTIONS

The International Finance Corporation, IFC, guarantee funds are a successful tool of overcoming barriers to energy efficiency project financing. By supporting local financial institutions, the programme seeks to address credit risk barriers,

the difference between perceived risk and actual risk, as well as lack of properly structured projects. Success factors include the collaboration with local FIs and only partial guarantee support, requiring the FIs to commit themselves and use their own resources to fund projects.

IFC has developed this programme in co-operation with the Global Environment Facility (GEF) to support the financing of energy efficiency projects in Central European countries under the name Commercializing Energy Efficiency Financing (CEEF). The target of the programme are investments in projects and equipments aimed at improving efficiency of energy use in buildings, industrial processes and other energy end-use applications. IFC has already finalized a successful pilot EE finance guarantee programme under this scheme in Hungary, see below, the result being excellent payment performance and greatly expanded lending for energy efficiency projects by Hungarian banks. This pilot is now expanding into the Czech Republic, Estonia, Latvia, Lithuania and Slovakia.

The specific barriers identified and how they have been addressed are presented below.

Barriers addressed by the IFC project:

Barrier	Project Response
Lack of debt financing: experience and capacity deficit in host country financial sector.	Provision of FI lending. Support to FIs to develop understanding of market opportunity; facilitate introduction of ESCOs; technical support for developing credit analysis skills and financial products.
High perceived risk for SME borrowers and EE projects by FIs.	Support to develop credit analysis skills for evaluating EE project risk; provision of partial guarantee to mitigate actual risk to FI.
Lack of collateral value associated with EE projects/equipment.	Provision of partial guarantee to mitigate FI risk; TA support to FIs to develop project finance capabilities and appreciate the positive security features of EE projects: cost savings that improves free cash flow of end-user.
Excessive collateral requirements imposed by FIs.	Provision of partial guarantee to mitigate actual risk to FI.
Extraordinarily risk adverse financial markets based on experience with poor credit procedures.	Provision of partial guarantee to mitigate actual risk to FI. Selection of priority markets, e.g., SMEs, where project finance techniques can be applied, viability of borrowers demonstrated and competition between FIs can result in new lending.
Lack of well-prepared projects	Selection of markets where fundamental economics of EE projects are attractive; TA support to ESCOs to assist in project structuring and presentation to FIs.

Source: Sturm, Szalkai and MacLean (2002): IFC's CEEF project: Mobilizing commercial debt for EE investment.

Hungary IFC Guarantee Funds

The Hungarian Energy Efficiency Co-financing Programme (HEECP) was launched in 1997 facilitating the establishment and maintaining stable economic conditions of ESCOs. It does not have an end-date. It was launched by the International Finance Corporation (IFC) Environmental Projects Unit with a total of 5 million USD budget from the Global Environmental Facility (GEF). Out of this amount, 4.25 million USD are allocated to guarantee reserves, USD 300 000 to technical assistance and USD 450 000 to programme administration over a four year period.

After successful termination of the pilot phase, the guarantee facility has been increased to 16 million USD. Participating local financing institutions sign Guarantee Facility Agreements with the IFC, which implies that HEECP provides partial guarantee support to credits approved by the financial institutions for energy efficiency projects (50% in the pilot phase and 35% under HEECP-2). Hence, the GEF funds are used for the provision of partial guarantees to the FIs, which in turn provide credits in the form of commercial loans and financial leases for qualified energy efficiency projects.

The objective is to overcome barriers to energy efficiency project finance which are due to 1) credit risk barriers, such as weak or uncertain end-user credit, 2) the difference between perceived and actual credit risk created by capital market inexperience with energy efficiency investments and 3) lack of properly structured and creditworthy projects applying for financing, as well as the relatively high transaction costs and risks associated with energy efficiency project development.

There is also technical assistance providing technical advice and small grants for: 1) marketing services by participating financing institutions, 2) project identification, development and investment preparation, 3) general energy efficiency market promotion activities, 4) and programme evaluation activities.

The financial institutions involved are the Raiffeissen Lizing/Raiffessen Bank (RL/RB) and OTP Bank. No defaults have occurred and no guarantee claim payments have been made to date. Borrowers are industrial, municipal, institutional, multi/single family housing, and projects include efficient lighting, building and district heating, industrial motors, boiler and control systems.

6.2.5. EBRD MULTI-PROJECT FACILITIES

The EBRD has Multi-Project Facilities (MPFs) agreements with sponsors in the West, for example the German municipal utility MVV Energie Aktiengesellschaft, Compagnie Générale de Chauffe (CGC) of France, Landis & Gyr of Switzerland, and the USA's Honeywell Incorporated, with the purpose of financing ESCOs in Eastern European countries.

The ESCOs in turn apply performance contracting, allowing energy cost savings to serve as a guarantee for repayment of loans for energy efficiency projects. The CGC- Prometheus in Hungary and CGC-Termotech in the Slovak Republic are examples of sub-project signatories. In 1998, the Bank had participated in the

establishment of eight private sector ESCOs under the MPF agreements and one with a non-MPF sponsor.

Results of Loan to Prometheus ESCO in Hungary

- The Bank's first loan to Prometheus (USD 5 million) was initiated in 1995 and has been fully disbursed.
- Nearly 20% average reduction in clients' energy consumption has been achieved.
- About 48 000 MWh (more than 4 000 toe) has been saved annually, based on the current portfolio of energy performance contracts.
- Approximately 200 Energy Performance Contracts (EPCs) have been signed since 1993, including: 8 hospitals, 12 industrial and commercial buildings, 50 administrative buildings and 100 schools.
- HUF 1 200 million (6 million Euro) had been invested by mid-1997, bringing HUF 500 million (2.5 million Euro) in annual savings.

Source: http://www.ebrd.org/country/index.htm

6.2.6. DEBT-FOR-ENERGY EFFICIENCY INVESTMENT SWAP

An innovative way of providing foreign investment is the debt-for-energy efficiency investment swap. In 1991, a national fund for Environmental Protection and Water Management was established in Poland. The Fund was to manage parts of environmental pollution penalties and fees paid by businesses and reallocate these funds to environmental projects. In 1992 an independent, non-for-profit organization, EcoFund, was established by the Polish Minister of Finance to handle financial recourses made available from debt-for-environment swap. In1991, the debt to USA, Switzerland and France was of 467 million USD And in general, 10% of the debt can be turned into ecological investment in Poland through advantageous loans or grants.

Among the projects that are supported are:

- Energy savings
- Promotion of renewable sources of energy
- Elimination of methane emissions
- CFCs phase-out from industrial processes.

6.2.7. FOREIGN INVESTMENT IN DISTRICT HEATING

International financial organizations such as the World Bank and EBRD have granted loans to many projects related to modernization of district heating plants and networks. Foreign grants for district heating are typically oriented to:

- On the demand side, measures to enable market-based billing and reducing heat losses, installation of energy efficiency equipment in residential buildings, meters etc., and insulation, new windows and temperature control.
- On the supply-side measures to improve customer relations, training on management information systems, marketing, outreach and market analysis.
- Reducing energy losses in the system by installing modern pre-insulated piping, variable speed pumps, heat exchangers and automation systems.

The international financial institutions often work with energy companies and municipalities directly, where the exact details of the projects are determined, see examples in Appendix III on the Vilnius and Sofia district heating systems. However, there are also examples of the creation of funds, which are set up to finance projects within a certain framework, see examples below on the Dexia-Fondelec Energy Efficiency and Climate Change Fund for Eastern Europe and the Polska Energy Efficiency Loan Facility. The fund-approach probably has a greater impact on local financing mechanisms.

These programmes can help raise the awareness level and knowledge about energy efficiency among staff of financial institutions, and hopefully generate a different investment environment. Providing loans directly to municipalities and companies, without using an intermediary could be faster and more efficient in terms of immediate results in energy efficiency. In addition, it makes it easier for the international institutions to control the projects.

One example of the fund approach was the launching in 2000 of the Dexia-Fondelec Energy Efficiency and Climate Change Fund for Eastern Europe that has already invested more than 40 million Euro in district heating modernization, setting up of ESCOs and street lighting refurbishment.

Dexia-Fondelec Energy Effciency and Emissions Reduction Fund

This fund started in 2000 and will run until 2010. It is funded by Dexia Public Finance International Bank, FondElec Group, and EBRD.

The purpose of the project is to invest directly in energy-efficiency driven companies and projects, primarily in Central and Eastern Europe. The Bank will initially invest 20 million Euro in the Fund. An additional 10 million Euro will be available and may either

be invested in the Fund if subscriptions exceed 100 million Euro or may be used by the Bank to co-invest with the Fund. FondElec Group Inc is the fund manager. Type of projects which are considered are aimed at improving energy efficiency in existing plants and equipment, e.g., plant retrofits and fuel conversions, heat recovery systems, electric transmission grids, gas and district heating system improvements, illumination, and industrial energy efficiency enhancements.

The Fund will contribute to economic transition by: 1) developing the energy efficiency sector with macro- and micro-economic benefits for all consumers of energy; and 2) increasing the participation of the private sector in the renewal of infrastructure. By raising the efficiency and decreasing emissions to meet EU standards, the Fund will assist the accession countries in joining the EU. Reduced energy consumption improves municipal creditworthiness as well as the competitiveness of industry.

The Fund's financing of ESCOs will provide a commercial means to improve energy infrastructure without additional debt burden. The Fund will supplement the Bank's financing capability in the sector and will encourage the creation of co-operation between the public and private sectors. The project also includes the establishment of the first commercial investment vehicle that facilitates the distribution of carbon credits to shareholders through investment in energy-saving projects.

FE Polska Energy Efficiency Loan Facility

This fund started in 2001 and there is no end-date. Funding comes from EBRD and EU through Phare. The objective is to finance the modernization of small district heating systems. The cost of modernization is financed by energy performance contracting, in order to avoid significant increases in tariffs. EBRD provides 15 million Euro and the BRE Bank of Warsaw provides 10 million Euro. The projects will cover district heating rehabilitation and end-user improvements (pipelines, boiler houses retrofitting, metering and control etc.), ESCOs and energy efficiency improvements in industry. The EBRD and its local co-lender BRE Bank intend to create a long-term loan facility available to finance the restructuring of small district heating companies in Poland and the Slovak Republic.

6.3. USE OF THE JI MECHANISM FOR ENERGY EFFICIENCY PROJECTS

Joint Implementation, (JI) mechanisms are one category of the three flexible mechanisms of the Kyoto Protocol[6], whereby emission credits or allowances are transferred. JI projects generate emission reduction units (ERUs) that are deducted from the emission target of one country and added to the target of another. A JI project could involve, for example, replacing a coal-fired power plant with a more efficient combined heat and power plant or reforesting land.

6 *The other two are the clean development mechanism (CDM), whereby Annex 1 parties implement projects that reduce emissions in non-annex I parties, in return for certified emission reductions, and emissions trading, whereby annex 1 parties acquire units from other annex 1 parties.*

In practice, JI projects are most likely to be undertaken in Annex I Parties in collaboration with economies in transition, where there is more scope for cost-efficient emission reductions.

By March 2002, the UNFCCC Secretariat had been informed of over 150 AIJ projects, involving about one quarter of parties to the Convention as investors or as hosts. The AIJ pilot phase has gained increased attention demonstrated by an almost 50% increase in the number of projects since 1997. Non-annex I countries represent 70% of Host Parties, and EITs still host the majority of AIJ projects, although developing countries are increasing their share. The largest number of projects are related to renewable energy and energy efficiency, but the largest projects concern forest preservation, reforestation or restoration.

The JI market is strictly regulated, leaving little or no room for self-regulating market forces. There are not enough motivating factors for private industry. Companies also complain that there is too little interest for green projects. This is partly due to the fact that accession countries are preoccupied with EU membership, and the accession procedures are perceived to stress stringent economic issues. This results in a lack of clear climate policies, and if such policies exist, lack of a clear strategy for JI. Often there are no selection criteria for JI projects and no capacity to identify suitable projects.

Furthermore, public awareness is low, and as a result there is little environmental lobbying of governments, insufficient information about success stories, lack of good model examples to follow, low involvement of experts from the CEE region in JI projects and poor co-operation between host and donor countries. Moreover, there is a lack of practice in combining small projects into bankable packages, lack of clear rules and models for baseline assessment and too few financial institutions and financial mechanisms for JI.

The AIJs show that most energy sector projects are supply oriented rather than demand oriented, and most of the AIJ demand-side energy projects that do exist are in buildings. AIJs in district heating, particularly fuel-switching, represent a large number of the AIJ projects, but they are generally not the most energy saving projects.

Governments could encourage utilities to collaborate on demand-side management projects, through regulation or through more flexible means, such as allowing the utilities to venture into international emission reduction trading. Housing cooperatives and other groups of energy consumers could also be engaged in emission trading. Establishing average emission rates could simplify the setting of baselines for demand-side mitigation projects. A major problem in involving the private sector in emission trading is the need to establish a reliable monitoring and reporting system.

6.3.1. ADMINISTRATIVE STEPS TO BE TAKEN FOR JI PROJECTS

Joint implementation projects must be approved by all Parties involved and must lead to emission reductions or removals that would not have occurred without the project. Annex I Parties must not use ERUs generated from nuclear energy to meet their targets. Projects starting from the year 2000 and meet the above rules can be listed as JI projects. However, ERUs may only be issued from 2008. JIs must follow very specific procedures, see below.

Procedures for JIs

There are two possible procedures for undertaking a joint implementation project.

The first procedure, the so called track one, is relevant when the host Party fully meets all the eligibility requirements related to the Protocol's methodological and reporting Preliminary version obligations. In this situation, the host Party may apply its own procedures to projects, issue ERUs and transfer them to the investing Party.

The second procedure, the so-called track two, applies if the host Party does not meet all the eligibility requirements. Then the amount of ERUs generated by a project must be verified under a procedure supervised by the 10-member Article 6 supervisory committee. This allows joint implementation projects to begin operation before the host Party meets all the eligibility requirements. However, the host Party must meet numerous requirements before it may issue and transfer ERUs (for example, it must have established its assigned amount and have submitted its most recent required emission inventory).

Under track two, project participants must elaborate a project design document for a proposed JI project. This document will be examined by an independent organization, an independent entity that has been accredited to perform this work by the Article 6 supervisory committee. The evaluation serves the purpose of ensuring that the project has an appropriate project-specific, transparent and conservative baseline (the starting point for measuring emission reductions or removals), along with a monitoring plan to guarantee that emissions and removals can be accurately estimated. The baseline and monitoring plan must meet standard criteria, and the project design document should also feature an evaluation of the project's environmental impacts. The independent entity will decide whether the project should proceed. Unless a project participant or at least three supervisory committee members require a review of the project, it can start after 45 days.

Once a project is underway, project participants are to submit a report to the independent entity indicating estimated emission reductions or removals generated by the project. The independent entity will in turn determine the emission reductions or removals that may be issued as ERUs by the host Party, which in the absence of protests will be deemed valid after 15 days. The host Party may then issue the ERUs and transfer them to the investing Party.

There are specific criteria for the acceptance of an AIJ project (5/CP.1), and these should be implemented in national procedures for administering AIJ projects. In Appendix II there are examples of how Sweden and the Netherlands have interpreted these criteria. AIJs must be compatible with and support national environment and development priorities and strategies. They must be approved by the participating parties and each country should prepare a structure to handle such approval.

Furthermore, the project must result in environmental benefits that would not have occurred if the project had not been undertaken, as well as cost benefits. Earmarked resources must be allocated to AIJ projects, in addition to the financial obligations of OECD countries in relation to the Global Environment Facility (GEF) and to current official development assistance flows (ODA). The criteria ensure that AIJs are entirely voluntary tools, that they do not simply become a part of already existing support schemes, but raise new funds, and have clear results in the environment and cost savings.

The Netherlands stress the importance of clear benefits for the local environment, beside a positive impact on global climate. In addition, the Dutch are concerned that each project should offer a training component to local authorities and/ or companies in the host country, as a way of further involving local partners. Swedish experience suggests that precisely a local involvement is difficult to achieve. Local investment funds are not available at reasonable costs and the local application of the Swedish EAES-programme[7] is weak.

Countries organise their work with AIJ differently, but clearly, it is necessary to designate responsible parties and preferably even creating a separate body for AIJ projects, as shown by the Dutch example below.

Organisation of the Netherlands' AIJ Programme

The Netherlands' AIJ programme is a collaboration between the three ministries represented in the Management Group JI: the Ministry of Housing, Spatial Planning and the Environment, the Ministry of Foreign Affairs and the Ministry of Economic Affairs. The environment ministry is responsible for producing annual reports on the progress of the Dutch AIJ programme. These reports are submitted to parliament and the UNFCCC Secretariat. The ministry is also responsible for initiating further research projects and communication together with the other two ministries. Companies, governmental organisations and NGOs can all participate in AIJ projects.

The Ministry of Foreign Affairs covers assistance programmes for developing countries, while the Ministry of Economic Affairs is primarily in charge of the Netherlands bilateral support programmes for Central and Eastern European countries. Their main tasks within the AIJ programme are to identify, select, finance and monitor AIJ projects in

7 *The Programme for an Environmentally Adapted Energy System in the Baltic region and Eastern Europe*

developing countries and Central and Eastern European countries. The Ministry of Economic Affairs delegated the task to its implementing agency SENTER. An external agency –the Joint Implementation Registration Centre (JIRC) – was established to register, verify and certify the emission reduction or sequestration achieved. It was operational between 1996 and 1999 as a registration and certification centre. JIRC registered and certified the Dutch AIJ projects, and verified the emission reductions achieved. As per 1 January 2000, JIRC was dismantled since the Dutch AIJ programme had come to an end.

One example of Dutch AIJs is a series of AIJ projects in Hungary with the aim to promote AIJ as a feasible concept. One of the projects deals with energy conservation in local municipalities. Different energy efficiency projects initiated by local governments are analyzed through the project. The local governments have to finance measures themselves, either with their own budgets or by attracting external funding, such as the German Coal Aid Revolving Fund.

6.3.2. STATISTICS ON AIJS

The largest number of individual AIJ projects are related to energy efficiency, about 43% according to a study made in 2000. More than half of the energy efficiency projects dealt with more efficient provision of municipal services, primarily district heating and hot water supply or heat for residential/governmental buildings. One third of the energy efficiency projects concerned demand-side management techniques with the aim to reduce energy costs and supply for features like indoor lighting or air conditioning. 22% of the projects involved fuel switching, many of them converted boilers in district heating or industrial plants fuelled by coal or heavy-oil to natural gas or biomass. Even though fuel switching projects are large in number, they only produce about 1% of total CO_2 offsets of all the AIJ projects examined.

By 2000, the key investor countries in the AIJ pilot phase were the United States, Sweden, Netherlands, Australia, and Norway. Switzerland and Germany were to report on a number of projects under development; and are likely be key investors in the future. Sweden represented 32% of total investments, most of them being relatively small-scale energy efficiency and fuel-switching projects (conversion of heat production plants to the use of biofuels, reduction of heat losses in district heating systems and energy efficiency in buildings) in municipal services and district heating in Latvia, Lithuania, and Estonia. The Netherlands had pursued at least 17 AIJ projects, with several others in the pipeline. It invests primarily in Eastern Europe and the Baltic states. The Netherlands was the largest investor in energy efficiency projects concerning commercial-industrial applications.

The investor countries have different objectives for their involvement. The Netherlands seeks to test the AIJ mechanism and invests in very different projects and in different countries, however with some concentration in Europe. Sweden focuses on its neighbouring countries Estonia, Latvia and Lithuania, which have

the highest impact on the Swedish environment from a geographical point of view, and primarily on small-scale fuel-switching projects.

6.3.3. JOINT IMPLEMENTATION IN EASTERN AND CENTRAL EUROPE

JIs have confronted the following problems:

- Lack of public awareness, and as a result a lack of "green pressure" on governments, especially in the CEE region.
- Insufficient dissemination of information about "success stories."
- Lack of models that provide examples to follow.
- Low involvement of experts from the CEE region in JI projects.
- Poor co-operation between host and donor countries.

These were some of the problems related to JIs in CEE identified at a workshop of experts on JI in Hungary in 2001. The primary driving force for an enterprise from a host country to enter the JI market is its desire to present an "environmentally-friendly" image and the probability of receiving ERUs in the first commitment period. Since there is not yet any market for ERUs, the prices are artificially determined through bilateral government agreements. Donor countries tend to choose the cheapest projects, threatening the host country's own compliance. An independent broker may be the solution to avoid cheating and corruption. There is also competition from the other flexible mechanisms. The Clean Development Mechanisms (CDMs) offer an "early crediting mode" to investors. Allowing the application of such early crediting in JI may make it more attractive. In addition emission trading presents lower transaction costs.

Current high transaction costs and risks are caused by:

- Lack of practice in combining small projects into bankable packages (except EBRD).
- Lack of clear rules and models for baseline assessment.
- Lack of clear additionality rules.
- Lack of a legal framework for JI.
- Lack of financial institutions and financial mechanisms for JI.

Public action is needed to lobby for climate change issues, however, public awareness of climate change is low and information and education campaigns are necessary.

The majority of the countries in CEE do not have clear and separate JI national strategies. If such strategies do exist they are often part of a broader national policy to abate climate change that usually have low priority in the region.

Climate policies lay the base for setting clear selection criteria for JI projects and such criteria should reflect a country's priorities. However, there are often no selection criteria and the capacity to identify suitable projects for JI is poor. Moreover, the "positive" JI list database is often out-of-date and the responsibilities are not clearly divided between institutions. There is a need for more transparency and a more pro-active industry to produce bankable project proposals. Business people from the CEE region, on the other hand, refer to lack of government interest in green projects. The existing legal framework is, in some cases, counteractive.

The Dutch SCORE Programme

The Dutch SCORE Programme (Supporting the Cooperative Organisation of Rational Energy Use) is a good example of how foreign investments can contribute to self-sustaining programmes. SCORE focused on institutional setting, know-how transfer and capacity building, supported by demonstration projects in energy efficiency in end-use sectors in the CEE. A pilot phase of the programme was conducted in Hungary, Latvia and Poland in 1997-2000, and since the results were very promising, a consecutive programme was conducted in 2000. Bulgaria, Romania and Croatia had expressed interest in participating in a new SCORE programme.

The SCORE Programme enabled a knowledge transfer from Dutch organizations and programmes on energy efficiency to Central and Eastern European countries. The objective was to create "a self-sustaining structure of capable actors in Central European countries", with capability to identify, develop and implement all initiatives necessary to continuously improve the efficiency of energy end-use. The support continued for four years, and during this time the basic institutional setting was put in place and made operational, assisting in providing the necessary institutional structure for organizing for example JI projects.

The Dutch SCORE programme, see details below, was aimed at preparing Central and Eastern European countries for running JI projects. It helped create an institutional framework for energy efficiency projects.

6.3.4. NEED FOR MORE DEMAND-SIDE ORIENTED JIS

The Activities implemented jointly, AIJ, are a pilot version of the real JI, the difference being that AIJs do not entail crediting between countries, but they do give lots of valuable experience. For example, the AIJs show that most energy sector projects are supply oriented rather than demand oriented, (see table), and most of the AIJ demand-side energy projects that do exist are in buildings.

Summary of Energy Sector AIJ Projects in Countries in Transition

Project Type	Number	Total Cost in USD	Emission Reductions (tCO_2)
Demand-Side Energy	10	96.9 million	230 000
Demand-Side Energy without Cement Project	8	4.3 million	213 000
Mixed Demand and Supply-Side Energy	2	1.2 million	55 000
Supply-Side Energy	53	147.0 million	16 000 000
Total	65	245.1 million	16 285 000

Source: Evans, 2001. Demand-side energy efficiency and the Kyoto mechanisms: Foring the link in countries in transition., p.1.

Few joint implementation projects treat demand-side energy efficiency, despite their cost effectiveness. Three major reasons for the difficulties of getting a demand-side energy efficiency project accepted are that:

1. end-use energy efficiency projects are usually small and dispersed, implying higher transaction costs.
2. considering energy savings alone, demand-side projects are usually profitable, but if energy savings are not considered, they may seem to have comparatively high costs per ton of carbon.
3. energy consumers are most often only indirect greenhouse gas emitters, particularly when heat and electricity are centrally produced. The majority of demand-side energy projects under AIJ are in buildings, since they typically offer many highly cost-effective opportunities to save energy.

These issues have to be taken into consideration in order to stimulate the creation of demand-side energy efficiency JIs, which has great importance not the least in Central and Eastern Europe.

6.4. CONCLUSIONS

Market-related financial mechanisms are highly important for investments in energy efficiency, and government policy can influence the use of such mechanisms by providing the adequate legal structure and tax incentives, as well as supporting the institutional framework, etc. The mechanisms that were addressed under this chapter are: ESCOs, revolving loan funds, leasing, joint venture, venture capital and municipal bonds.

The only efficient mechanism which has proved capable of directly addressing the barriers in traditional banking is the development of "third party financing" companies: ESCOs. They can provide engineering and technical expertise, total investment financing as well as an energy saving guarantee. They use Energy Performance Contracts whereby the consumer repays the loan with money saved through the reduced energy consumption resulting from the the energy efficiency investment.

However, the role of ESCOs has not increased as much as expected. This is due to lack of sponsors or investors with the required level of creditworthiness, the necessary technical skills and readiness for risk exposure, even though it can easily be demonstrated that the financial returns that can be obtained are much higher than in other service businesses.

One big problem in financing energy efficiency projects is that there are many small-scale demand-side projects. The solution is to bundle numerous small projects together into larger projects, which could bring down transaction costs. Revolving loan funds offer facility owners loans that they could repay with energy savings. Linking them to investment funds which would buy the carbon credit a project generates is another proactive measure.

A successful fund structure for small-scale demand-side projects should target low-risk, simple energy efficiency improvements that are easy to quantify, and use local organizations for assessment of financial creditworthiness and the technical evaluation. They need to be packaged by partners such as ESCOs.

Commercial financial institutions do not have experience in energy efficiency projects nor do they have an interest in gaining such experience because they are focusing on other opportunities. The most important factor for increasing awareness of and interest for energy efficiency investments is market-based energy prices. In addition, government commitment to energy efficiency is essential to the success of the fund and it must be part of a comprehensive energy efficiency policy. Government incentives for energy efficiency (e.g., tariffs, tax credits, depreciation, and mandatory audit) can contribute to improving a fund's market. Marketing is also an essential part of the success of a fund, particularly marketing to senior business management.

Foreign investment has an influence on local financial intermediaries who are reluctant to energy efficiency projects due to low awareness and perceived high risk. For foreign investors, local financial intermediaries are good counterparts. In that way they contribute to improving knowledge about energy efficiency financing issues among local financial institutions, and the latter may develop commercially based loan structures once they have the appropriate evaluation models in place.

The main lesson is that institutional financing should generate self-sustaining effects, such as the IFC guarantee funds enhancing local banks in Hungary through the Energy Conservation Co-financing Programme. Such projects create or strengthen local organizations, which continue to promote investment in energy efficiency even after the project is finished.

Another tool for foreign investment is the Joint Implementation, mechanisms, which is one of three "Flexible mechanisms" under the Kyoto Protocol, whereby emission credits or allowances are transferred. Few joint implementation projects treat demand-side energy efficiency, despite its cost effectiveness. Possible explanations are that end-use energy efficiency projects are usually small and dispersed, implying high transaction costs. Furthermore, energy consumers are most often only indirect greenhouse gas emitters, particularly when heat and electricity are centrally produced. The majority of demand-side energy projects under AIJ are in buildings, since they typically offer many highly cost-effective opportunities to save energy. These issues have to be taken into consideration in order to stimulate the creation of demand-side energy efficiency JIs, which has great importance not the least in Central and Eastern Europe.

In addition, Central and European countries need to create structures to handle the JI projects. Furthermore, a loan guarantee fund may produce lower risk and thereby inspire private commercial banks to get involved.

Governments could also encourage utilities to collaborate on demand-side management projects. It should be the role of host governments to encourage demand-side energy projects.

Foreign investors show great interest in the district heating sector in Central and Eastern Europe. The World Bank and EBRD have recently approved several projects with the objective to modernize district heating plants and networks. AIJs in district heating, particularly fuel-switching, represent a large number of the AIJ projects, but they are generally not the most energy saving projects.

7. CONCLUSIONS

General economic, legal and commercial conditions that facilitate the financing of investments in energy efficiency

Energy efficiency improvements in buildings or residential houses, district heating networks refurbishment and modernization of lighting systems through the introduction of modern technology, are well known investments that have a substantial and positive impact on the level of energy consumption and excellent payback. Yet, the initial investment must be financed. Many countries provide grants and tax incentives for energy efficiency measures. It is also a top priority for foreign financing, whereas private financial institutions are not keen on getting involved in energy efficiency projects.

Governments need to give a high priority to energy efficiency and include it in their policy orientations and effectively implement measures and policies, mostly based on regulation and tax incentives or disincentives, in a clear and structured action plan. District heating legislation and policy in most transition economies need to be improved in order to create a better investment environment. One feature of special importance is to introduce commercial principles for district heating systems, which entail prices based on metered consumption. Subsidies, cross-subsidies and tax distortions, must be abolished. Stronger business practices encourage more involvement of private financial institutions.

A part of the problem of energy efficiency investment is the issue of the problem owner. Particularly in the building sector there are many parties involved in building a house and the lifetime of a house is longer than that of the investor, making it difficult to oversee the full impact of energy efficiency. There is also the issue of landlords and tenants, where energy efficiency tends to fall between the two. Governments should determine responsibility for energy efficiency through clear legislation, such as the energy labelling scheme of buildings.

Energy efficiency should be an integrated part of legislation related to housing and district heating networks. Construction permits, environmental permits, concession permits, licenses for heat and power generation, as well as government supervision are all relevant elements for energy efficiency investments and should include requirements on energy efficiency performance. Result-based and self-regulatory measures such as performance standards and energy labelling should be used as complements to minimum requirements, as they are in the new EU building directive. It is imperative that standards are revised on a regular basis.

Furthermore, energy efficiency measures should be rewarded and not penalized. This may seem obvious, but there are numerous examples of counter-productive taxes, subsidies and regulations. In most transition economies, commercial principles for district heating systems must be introduced in order to create a

better investment environment. This would include accurate pricing, i.e. prices based on metered consumption, free from the effects of subsidies, cross-subsidies and tax distortions. Stronger business practices may have the positive side effect of encouraging more involvement of private financial institutions.

Cogeneration should be encouraged to a larger extent. A new EU directive strongly supports cogeneration, and this is relevant especially from the perspective that district heating is widespread in the accession countries.

The government should appoint responsible ministries and agencies for energy efficiency. The national bodies dealing with energy efficiency should serve as a link between the government, international bodies, local bodies, companies and the general public.

National agencies need support from local organizations and energy efficiency centres often have a central role in applying government policy. They are a successful result of a 1990's US aid programme. Initial start-up money has generated self-sustaining centres with great impact on energy efficiency improvements.

Continuous monitoring and evaluation is necessary to determine the success of a specific measure and to compare energy performance in different countries. It may require the development of new evaluation methods.

Enablers

The importance of education and information must not be underestimated. Legislation, self-regulation and evaluation will have no impact if no one knows about these measures. Increasing awareness and understanding of energy efficiency, and what can be done to increase energy efficiency, is crucial. Particularly in Central and Eastern European countries, lack of training on energy efficiency leads to poor management and building maintenance and lack of sufficient awareness among market actors concerning economic and environmental aspects of energy efficiency.

Grants can be used to introduce new technology on the market faster, they are especially successful concerning the time requisite, usually good technology will eventually reach the market without a grant, but it may take longer. However, grants should primarily be used to promote introduction and dissemination of new energy efficient technology to raise awareness and create a market, and they should not be made permanent, there is the issue of free-riders, who would have made the investment even without a grant, and finally the technologies promoted by the grants should be sustainable in the market.

Loans and other methods, where market actors are involved and forced to commit themselves are the best alternatives to grants. Success factors include the use

of existing structures. State loans can be administered through banks. There are already numerous examples of this in cases of foreign investment in Eastern Europe, but the concept could also be used in Western Europe. This contributes to awareness raising in the banking sector and an administrative saving.

State subsidies should be aimed at enhancing market-based measures in an attempt to create a situation where ultimately the government will have no central role. Different methods have been developed that refine the grant tool, such as voluntary agreements and technology procurement programmes, which have been successful in for example the Netherlands and Sweden. The intention is to involve the parties more and making the connection between the grant and market structure more immediate.

Market-based financing mechanisms

There are usually no specific loans for energy efficiency investments, but these loans are treated like any other loan in the bank. In fact, they may be treated differently in a negative way because risk is perceived as higher, entailing higher interest rate.

Private sector financing of energy efficiency projects present problems like low awareness level, lack of understanding for project oriented loans, small-scale projects etc. Information about the project has to be presented to the FI in an attractive and comprehensible way. This type of problems could be solved by using a third party to present the project to the bank.

There is a need for new actions and mechanisms in the financing sphere in order to create a better environment for financing investments in energy efficiency. Three main focus areas can be distinguished:

1. Raising awareness and training bankers in financial institutions

   Banks are primarily interested in corporate financing and need to develop project financing schemes in the energy efficiency field as opposed to the corporate financing procedures.

2. A network of energy efficiency financing specialists

   There is a need to create a network of skills related to these questions within financial institutions by the setting up of dedicated teams, specifically assigned to dealing with energy savings and renewable energy proposals. The EBRD took the initiative in 1994 and remains today the only financial institution with such a dedicated team. Furthermore, the creation of a network of information and contacts, allowing for the exchange of experiences and data between, would represent a further step towards the development of the skills and expertise required to handle these issues effectively from a financial perspective.

3. Development of innovative mechanisms

   A large number of energy efficiency projects, particularly in the field of district heating modernization or the change of lighting systems, are cost-effective. However, they generate returns that are not at the high level commonly expected by traditional investors. Also, these investors as well as financial institutions are accustomed to large projects, while small ones that entail relatively large transaction costs are considered uneconomic. One way of addressing this problem is to combine a number of small projects. Such funds could be managed by for example ESCOs or banks.

ESCOs provide a global service. They offer multiple energy efficiency services to consumers including project finance, engineering, project management, equipment maintenance, monitoring and evaluation.

Market-related financial mechanisms are highly important for investments in energy efficiency, and government policy can influence the use of market-based financial mechanisms, such as the ESCOs, revolving loan funds, leasing, joint ventures and venture capital. Governments should facilitate the operation of these mechanisms and encourage their involvement in energy efficiency projects by providing the adequate legal structure and tax incentives.

The fiscal regime

Taxes are powerful measures that affect energy consumption and investments in energy efficiency. They can be used in two ways, through energy taxes and VAT to increase energy prices through tax exemptions and accelerated depreciation, whereby energy efficiency improvements are encouraged. Energy taxes are important communicators of a government policy aiming at energy savings.

Tax incentives are simpler to administer than grants. No special campaigns are needed to disseminate information and there is no need for special administrative procedures.

Raising funds

Rules on public procurement put strict demands on public authorities for not distorting competition when making purchases. Legislation on public procurement must be adjusted so as to allow public authorities to include energy efficiency and energy performance contracting in tenders. Public procurement rules should be complemented with specific guidelines on energy efficient procurement.

The green tax shift is becoming increasingly common around Europe, where revenue from increased environmental taxes, primarily energy taxes, is allocated to reduce income taxes. There are also examples where revenue from increased energy taxes and fees are used to help finance energy efficiency investments (the

Dutch regulatory energy tax). In fact, this is a very efficient method to combine stimulating and restrictive measures.

Revolving funds - a winning concept

Recommendations for the management of a revolving fund include strong business practice, clear objectives, transparency of procedures and minimum government interference. Simple procedures and use of existing market players are other success factors. The fund must also be promoted through a large network. Risk should be spread through many small projects, the borrower must contribute to project financing and proven technologies should be prioritized.

Partnerships between investors seeking carbon credits, commercial banks, energy consumers, and local utilities could make such investment arrangements possible. However, they may need a coordinator, such as a local energy efficiency centre or an ESCO.

A successful fund structure for small-scale demand-side projects should target low-risk, simple energy efficiency improvements that are easy to quantify, and use local organizations for assessment of financial creditworthiness and technical evaluation.

IFI support to create an operational local market for financing energy efficiency projects should focus on capacity building

Foreign investors show great interest in the district heating sector in Central and Eastern Europe. The World Bank and EBRD have recently approved several projects with the objective to modernize district heating plants and networks.

Foreign investment may contribute to improving knowledge about energy efficiency financing issues among local financial institutions.

Foreign institutional investment should generate self-sustaining effects, such as the IFC guarantee funds enhancing local banks. Such projects create or strengthen local organizations, which continue to promote investment in energy efficiency even after the project is finished.

Joint implementation projects need more local support and less rules

Joint Implementation (JI) projects provide a tool for Western and Eastern European countries to collaborate on energy efficiency projects and raise funds. So far, the largest number of projects are related to renewable energy and energy efficiency, but the largest projects concern forest preservation, reforestation or restoration. The scheme has encountered some problems. Companies in Central and Eastern Europe complain that governments are not showing enough interest

in green projects. This is a lack of clear climate policies, and if such policies do exist, a clear strategy for JI.

The creation of structures to handle the JI projects could include the designation of a responsible authority for JI projects.

The AIJs show that most energy sector projects are supply oriented rather than demand oriented, in spite of the fact that they are not the most energy saving projects, and most of the AIJ demand-side energy projects that do exist are in buildings. Governments should encourage demand-side projects.

APPENDIX I: EFFICIENCY LIGHTING INITIATIVE (ELI) PROJECTS IN EUROPE

ELI projects in Europe

The Czech Republic

- The CEEF (Commercializing Energy Efficiency Finance) is a four-year, 90 million USD loan guarantee programme, which is funded by the Global Environment Facility (GEF) and the International Finance Corporation (IFC). It supports local financial institutions venturing into energy efficiency projects. Eligible projects are for example streetlighting upgrades and commercial lighting projects and they can be granted a guarantee of up to 50% of their commercial loan or lease.
- PRE (the Prague Electric Distribution Utility) and JCE (the South Bohemia Electric Distribution Utility) run CFLs promotional campaigns, for example distributing information leaflets about CFLs.
- OSRAM, which is an important CFLs manufacturer on the Czech market, have ELI certified CFLs. To them ELI serves as a quality brand and ELI logo stickers are used on CFL boxes as well as in PR activities.
- BEGHELLI-ELPLAST, the Czech-Italian light producer, is planning on establishing an ESCO division together with local electric utilities, with the aim to support energy efficient lighting projects in the public and commercial sectors.
- SEVEn, the Czech Energy Efficiency Center and local ELI partner disseminates information about energy efficiency lighting technologies which can be purchased on the Czech market. This is part of GreenLight, a European voluntary programme promoting private and public organizations commitment to reducing their lighting energy use.

Hungary

- The Hungarian Lighting Society uses ELI developed curriculum and training materials for ESCOs and lighting professionals.
- Local television stations broadcast the ELI-funded information film about the use of CFLs in the residential sector and the ELI CFL advertising spot.
- The local NGOs that participated in the ELI residential campaign use the educational materials developed through that campaign in the continuous education for schoolchildren about efficient lighting. The curriculum is also offered to other NGOs.

Latvia

- Links made through ELI have facilitated the introduction of the EU GreenLight programme in Latvia, which promotes efficient lighting retrofits in public and commercial buildings.
- CEEF (Commercializing Energy Efficiency Finance), a four-year, 90 million USD loan guarantee programme funded by the Global Environment Facility (GEF) and

the International Finance Corporation (IFC), supports local financial institutions that are involved in energy efficiency projects. Eligible projects are streetlighting upgrades and ESCO lighting projects. They can receive a guarantee of up to 50% of their commercial loan or lease.

- SIA Ekodoma, the local ELI partner in Latvia, offers training courses in efficient lighting on a commercial basis for engineers from project design companies and installation companies, as well as for municipality staff. Ekodoma can also make lighting energy audits and prepare business plans or draft calls for tender for ESCO services if municipalities need such assistance.
- The Riga Technical University offers an ELI designed efficient lighting module as part of its electrical engineering curriculum.

Source: http://www.efficientlighting.net

APPENDIX II: AIJ CRITERIA, THE NETHERLANDS AND SWEDEN

Swedish criteria for acceptance of an AIJ nationally	Dutch criteria for acceptance of an AIJ nationally
Activities implemented jointly should be compatible with and supportive of national environment and development priorities and strategies; In the process of selection of projects, appropriate local and national authorities are informed about the planned project in order that they support it	AIJ projects should be compatible with and supportive of the national environmental and development priorities and strategies of the host country. AIJ must be compatible with the sustainable development priorities of the countries concerned (e.g. contribute to the reduction of local air pollution and transfer of technology) and must not introduce any conditionality that may interfere with the national priorities of Parties involved.
Activities implemented jointly under this pilot phase require prior acceptance, approval or endorsement by the Governments of the Parties participating in these activities; The Swedish Goverment has an agreement with a central authority concerning the approval of projects for AIJ and concerning the joint reporting of AIJ-projects	The most important element is that the governments of the countries concerned must have approved the registering of the projects as an AIJ project in a Letter of Intent (LoI). This is in line with the Berlin decision which states that "all activities implemented jointly under the pilot phase require prior acceptance, approval or endorsement by the governments of the Parties participating in these activities". It goes without saying that such activities must be based on the principle of voluntary participation and equity, with full respect for the sovereignty of the host country.

Swedish criteria for acceptance of an AIJ nationally	Dutch criteria for acceptance of an AIJ nationally
Activities implemented jointly should bring about real, measurable and long-term environmental benefits related to the mitigation of climate change that would not have occurred in the absence of such activities; Restraining factors in the host country for the implementation of projects within the EAES-programme have been a. o. - that local investment funds are not available allowing financing at reasonable costs - a weak local tradition to apply the technologies focussed upon in the EAES programme, using wood waste from industry or from forest operations as a fuel, or applying an up to date technology for energy saving. Consequently the local technology for the applications has largely been missing. These factors still restrain local development, notwithstanding the fact that the tehnology development and local tradition have progressed rapidly as a consequence of the EAES-programme. The EAES programme concentrates of investments in the municipal sector with a foreseeable and long-term energy consumption. Activities implemented jointly should contribute to cost effectiveness in achieving global benefits; The projects are financed by loans. The economy of the project shall allow for repayment of the loan and also generate a profit.	IJ projects should result in real emission reductions compared to a baseline situation. Project proposals should include monitoring requirements. Furthermore, Parties should periodically report on progress made. This aspect is also derived from the Berlin decision, which states: "Activities implemented jointly should bring about real, measurable and long-term environmental benefits to the mitigation of climate change, that would not have occurred in the absence of such activities, and contribute to cost effectiveness in achieving global benefits" The environmental benefits claimed for AIJ projects will be screened. Apart from having a positive impact on climate, projects should preferably result in clear benefits for the local environment as well. Each project should, to the extent possible, include a training component for local authorities and/or companies in the host country. Involvement by local partners will therefore be strongly encouraged. AIJ projects should be economically and environmentally sound projects, which would not have been set up, for whatever reason, without AIJ funding. AIJ projects may deal with sources, sinks and reservoirs of all greenhouse gases not dealt with under the Montreal protocol. The Berlin decision refers to "projects that can be conducted in a comprehensive manner covering all relevant sources, sinks and reservoirs of greenhouse gases"
The implementation of the projects also aims at cost efficiency. As an example - procurement is made in open comptetition where local and foreign companies participate.	
The financing of activities implemented jointly shall be additional to the financial obligations of Parties included in Annex II to the Convention within framework of the financial mechanism as well as to current official development assistance (ODA) flows; The Swedish EAES-programme is financed from funds for climate issues allocated by Ministry for Industry and Trade. These funds are separate from development assistance funds.	Following the Berlin decision, the financing of AIJ projects shall be additional to the financial obligations of Annex II Parties (OECD countries) within the framework of the financial mechanism - the Global Environment Facility (GEF) - and to current official development assistance flows (ODA).

APPENDIX III: WORLD BANK AND EBRD DISTRICT HEATING PROJECTS IN EASTERN EUROPE

Improving the Vilnius district heating system, Lithuania

On June 10, 2003 The World Bank approved a USD 6.5 million grant from the Global Environment Facility (GEF) to finance the Vilnius Heat Demand Management Project in Lithuania. This is demand-side oriented project and tha irm of the project is to reduce greenhouse gases emissions from the Vilnius district heating system by implementing financially sustainable and replicable energy efficiency investments in the residential sector of Vilnius City.

Activities included in the project are:

- cofinancing Vilnius Energija's demand management programme, which will demonstrate the benefits of automatic and consumer controlled use of heat in homes and consumption based billing at the apartment level, including limited grant financing for low-income customers.
- creating comeerically sustainable financial facility: Energy Conservation Programme Commercial Fund. This will support implementation of ivnestments targetng reduction of heat losses from the city's housing stock.
- Implementing, monitoring, evaluation and information dissemination activities.

The GEF project complements the programmes pursued by Vilnius Energija and Vilnius city municipality. Specific objectives of the GEF project are to support the installation of energy efficiency equipment in residential buildings of Vilnius and to assist the parties in creating a market for energy efficiency products. Demand-side management measures, such as thermostatically controlled radiator valves, heat meters in Vilnius households and building-envelope improvements to reduce energy losses, are expected to contribute to such a market creation, by enabling apartment-level billing.

By approaching both an energy company and a municipality, the project addresses energy efficiency on both supply and demand sides, enabling important coordination. Investments in energy saving at customer level is particularly poor in Eastern Europe and the former Soviet Union, and this project is addressing that problem.

Reducing the delivery costs of Vilnius district heating system, Lithuania

The World Bank approved a 19 million Euro loan already on 23 August, 2001 for the Vilnius District Heating Project to support the government's energy strategy to supply safe, reliable energy at least cost and encourage energy efficiency, reducing environmental impact. This project is more supply-oriented and relates to the quality of district heating supply and reduction of energy costs are the specific objectives of the project. Previous central control of temperature will be transferred to customers. The private sector is involved through a leasing agreement and this is expected to enhance implementation.

In detail, the project includes:

- Replacing block substations with building level substations in residential buildings;
- Creating an Energy Conservation Programme to support upgrading the existing building level substations to modern consumer controlled technology and household level energy efficiency improvements like insulation, new windows, and temperature controls;
- Rehabilitating Combined Heat and Power (CHP) Plant #3 and the district heating pump in the Combined Heat and Power Plant #2;
- Installing a gas pipe interconnecting CHP Plants #2 and 3;
- Upgrading of 4 of the 5 heat only boilers; and
- Technical assistance, including consultancy assistance on project implementation and on the development of management information systems, financial auditing of VDHC and project accounts, twinning arrangements with Helsinki Energy, technical assistance and training for marketing, outreach, and market analysis.

The loan will be disbursed at the standard rate for LIBOR-based fixed spread loans in Euro, repayable in 14 and a half years.

Improving the DH systems in Sofia and Pernik, Bulgaria

On 17 June, 2003, the World Bank approved the district heating Project in Bulgaria, aiming at improving district heating services in the cities of Sofia and Pernik. A loan of USD 27,2 million is approved for Toplofikacia Sofia, the municipally-owned district heating company serving the city of Sofia, and a loan of USD 7 million for Toplofikacia Pernik. Objectives are demand-driven district heating services and reduced energy and water losses for the two toplofikacias as well as air quality improvement in Pernik. DH is the most economical way to provide heat to provide high density urban areas with heat. In Bulgaria, DH is the largest provider of space heating in major cities.

The District Heating Rehabilitation Project includes the modernization of some 8 000 district heating substations, rehabilitation of the network (replacement of about 70 km pipelines, compensators, thermal insulation of overground pipelines and conversion to variable flow of the Sofia district heating network). Installation of new sub-stations and other institutional and policy measures will allow district heating services to become more demand driven, giving customers the possibility to control their consumption. This is expected to lead to energy savings of around 15% per household. The project will also support critical rehabilitation needs in the two Toplofikacias that will result in reduced energy and water losses, which in turn would strengthen the financial position of the two companies. An air filter that will reduce the particulate emissions will be installed, which will improve the air quality in Pernik.

The estimated project cost is approximately EUR 114 million, which is anticipated to be funded by the EBRD (EUR 30 million), the World Bank (EUR 26 million), local contributions (EUR 26 million), grant from the Kozloduy International Decommissioning Support Fund - KIDSF (EUR 30 million) and EU financing for consultancy (EUR 1.6 million). USAID is supporting the institutional aspects of the project. The World Bank loans have a 17-year maturity, with a 5-year grace period.

Contracts will comprise the delivery, installation, testing and commissioning of the following:

- Individual heating substations units for space heating and domestic hot water, including heat exchangers, circulation pumps, control valves, automation, etc.
- Replacement of elements of the district heating networks with pre-insulated pipe systems;

Tendering for the above contracts is expected to begin in 2003. These components are anticipated to be financed principally by the EBRD and KIDSF grant.

Contracts to be financed by the EBRD will be subject to its Procurement Policies and Rules and will be open to firms from any country. The proceeds of the EBRD's loan will not be used for the purpose of any payment to persons or entities, or for any import of goods, if such payment or import is prohibited by a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations or under a law or official regulation of the purchaser's country.

Contracts to be financed with the KIDSF grant will be administrated by the EBRD in line with the procurement rules of the EBRD and KIDSF. The eligible countries as of 1 January 2003 are: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, Switzerland, United Kingdom, all so-called PHARE countries and the EBRD's countries of operation.

EBRD loan to reducing energy losses in Romanian district heating networks

The EBRD is also financing a project in Romania, through a 45 million USD loan to the Romanian government, to reduce energy losses in the district heating networks in the cities of Buzau, Fagaras, Oltenita, Pascani and Ploiesti. The project also supports the introduction of a market-oriented regulatory framework in the Romanian heating sector. Financing from Swiss donors have complemented the EBRD loan, and there are discussion of an AIJ between the two countries.

The project contains three basic components:

- Demand-side management equipment: modern heat exchangers, heat meters and control valves for non-residential consumers and residential end-users;
- Transmission and distribution equipment: modern pre-insulated piping, variable speed pumps, heat exchangers, metering, transmission control and automation systems and valves;
- Heat production equipment: new highly efficient multi-fuel burners, automation systems, control and metering equipment.

GLOSSARY

AIJ	Activities Implemented Jointly (pilot phase of the JI under the Kyoto Protocol flexible mechanisms)
CDM	Clean Development Mechanism; a mechanism defined in the Kyoto Protocol to enable developed and developing countries to cooperate on emission reduction projects where the emission credits for such projects would be transferred to the developed country.
CEE	Central and Eastern Europe
CIS	Commonwealth of Independent States (former Soviet Union)
CFL	Compact Fluorescent Lamps
CHP	Combined Heat and Power
CTI	Climate Technology Initiative
DH	District Heating
DSM	Demand Side Management
EBRD	European Bank for Reconstruction and Development
EE	Energy Efficiency
EIT	Economies in Transition
ELI	Efficient Lighting Initiative
EPC	Energy Performance Contracting
ERU	Emission Reduction Units
ESCO	Energy Service Company
FI	Financial Institution
GEF	Global Environment Facility
GCARF	German Coal Aid Revolving Fund
GHG	GreenHouseGas emissions
ICT	Information and Communication Technology

IEA	International Energy Agency
IFC	International Finance Corporation (of the World Bank Group)
IFI	International Financial Institution
JI	Joint Implementation (projects under the Kyoto Protocol flexible mechanisms)
JV	Joint Venture
LTA	Long Term Agreement (voluntary agreement between the public and private sector in the Netherlands)
NGO	Non Governmental Organization
PEEREA	The Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects
TPF	Third Party Financing
UNEP	United Nations Environmental Programme
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change

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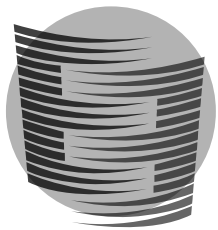

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