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MUNICIPAL HEATING REFORM PROJECT IN UKRAINE

CEE Countries' Experience in Financing Energy Efficiency in District Heating and Buildings

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ALLIANCE TO SAVE ENERGY
Creating an Energy-Efficient World

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Background and Introduction

The countries of Central and Eastern Europe rank among those in which district heating is in relatively widespread use. In conjunction with cogeneration of electricity and heat, district-heating systems make it possible to efficiently use primary energy sources, keep environmental damage to an acceptable level, and offer services at competitive prices. However, these benefits represent only potential advantages of district heating and cogeneration. This does not automatically mean that every district-heating system functions in a cost-effective and energy-efficient manner. Nor does it guarantee meeting government emission levels, nor does it necessarily prevent excessive heat losses in heated facilities. It would be possible to name more than one example where customers of a district-heating company were dissatisfied with services provided and their price, and gave preference to other forms of heating, for example, with electricity or gas, over district heating.

Doing business in the municipal energy field is connected to risks – just like doing business in any other area. Moreover, heat supply is a sector with a high proportion of long-term investments. Fixed costs represent a relatively large part of total costs, they can even be more than half. Moreover, the possibility to sell produced heat is limited only to those customers located within the geographic vicinity of the district-heating system. An implemented project and an already-built infrastructure is thus relatively inflexible in the case of a later change. For example, if the assumptions on the size of sales significantly differ from reality later on, it is only with difficulty that adjustments can be made to the new conditions. As a consequence of this, there may be a rise in heat costs and consequent loss of customers.

Therefore, good project preparation before implementation may be of critical importance for the success of a heat-supply or similar municipal project. This refers not only to the technical side of a project – for the most part, engineering organisations have a good deal of experience in this. Preparation of the technical side of a project, though demanding, can be managed well and should not cause any special problems.

Something that is new and not always done well enough is preparation of a heat supply project as a business opportunity. Though it may sound cliché, this formulation has a concrete meaning: in preparing a municipal energy project, it always pays to proceed in the same way that successful business people go about preparing projects in other competitive sectors. Above all, this means analyzing market and demand, that is, whether and in what amount customers want a given product or service and what price they are willing – and able – to pay for it. This also means establishing technically suitable variants with which it would be possible to cover project demand and realistically assessing and estimating risks from an economic and technical perspective. On the basis of such project analyses, it is possible to select the optimal variant and the best method of financing. It is also possible to prepare credible background information for financial institutions that are to provide financing for the project.

In the majority of economic sectors, successful business people take customer concerns as the point of departure in preparing their business plans: they estimate future demand and how much of a given product customers will be willing to buy and at what price. Heat supply and other services associated with energy efficiency are often considered basic social ~~–n~~eeds" and services that must be ensured for the population in every case and ~~–a~~t any price." This opinion is reflected by the way in which these projects are prepared: often they are done in the opposite direction, customer demand in relation to quantity and quality of provided services and the willingness to pay for them is not examined, and the point of departure becomes selecting equipment and technology based on historical consumption patterns. In an environment of limited competition,

expenses for supplying heat are often added up and, allowing for a certain profit margin, they are then divided up among individual customers according to amount of energy consumed or services provided. Using such an approach, it can turn out later that the resulting price for services and products offered is higher than the price that customers are willing to pay for the given amount and quality.[1]

Finance and Investment: Paying for Improvements in District Heating

Many governments and district heating enterprises claim that lack of financing is one of the major problems in the heating sector, and there are many reasons why financing for district heating investments is not readily available. Three basic problems constraining investment are lack of equity, lack of customer finance, and lack of access to capital markets. Access to finance depends on the credit worthiness of the borrower, the financial parameters of the project, and any mechanisms for credit enhancement (such as collateral and loan guarantees).

One way to look at the financial prospects for district energy systems in the region is to look at the price level—necessary to motivate improvements—and hard budget constraints—necessary to make prices meaningful and investments worthwhile. The presence of these conditions explains the interest of the investors in district energy systems of the Baltics, Poland and Hungary.

Credit enhancement can be undertaken to some degree for systems which have not inspired investor confidence. This otherwise normal practice, however, is made difficult when confusing legal and political structures make it unclear how lenders could recover unpaid loans. Would they be permitted to attach bank accounts or seize assets? Nations can no longer realistically provide sovereign guarantees to back loans and investments in district energy and customer energy savings systems because of the huge transactions costs imposed on governments to undertake them—primarily in the form of time for busy leaders. Moreover, the multi-lateral development banks can finance only a tiny fraction of the region‘s needs.

The majority of the financing needs of the district energy sector of the region must be provided by the private sector, if it is to be had. But vendors usually are unwilling to finance customers' purchases, and lenders usually are unwilling to finance transactions without a guarantee of repayment. These problems are compounded by the –small project" problem, which is to say that because productivity projects such as efficiency investments tend to be much smaller than the mega-deals in the oil and power industries, transactions costs can overwhelm the deals. Management costs for loans are relatively fixed as are due diligence requirements. Therefore, the cost of developing a $5 million municipal district heating project or a $15 million industrial cogeneration project may be financially attractive, but the up-front costs are likely to be the same as for a $100 million power plant or $1 billion gas or oil deal. The risk-to-reward ratio tends to be high enough to send financiers looking elsewhere for investments.

Local banks increasingly are making loans to help their customers, including municipalities, remain solvent. These banks have the knowledge necessary to determine whether the loan is likely to get repaid, and provided that the financial assessment is favorable, loans or loan guarantees for municipalities are good business. There are also numerous possibilities for co-financing and pooling the financial resources from the state and municipal funds with the bank loans, IFI resources and residents.

[1] Financial Manual for Municipalities in Central and Eastern Europe: How to Develop Municipal Energy Projects. SEVEN. 2004.

A number of organizations active in the region, including the International Energy Agency (IEA), the World Bank, and EBRD, have all concluded that a number of basic policy measures are needed in each country that fit the countries transition strategy. The IEA recently succinctly stated these policy needs,[2] including establishing or providing:

- Comprehensive energy policy based on either market competition or regulation independent of short-term political goals, with full cost recovery, and least-cost planning principles.
- Tariff structures which reward efficiency and quality of service, not higher costs, in energy transformation, delivery, and use.
- Unbiased, fair, and unsubsidized competition,
- Independent and separate social safety-net support programs.
- Programs to promote demand-side energy efficiency, with metering, control, and weatherization, and with billing for actual consumption.
- Mechanisms to enforce payment discipline.
- Transparency in formulating and administering laws, regulations, tariffs, energy plans, and heating services.

These recommendations are geared toward ensuring that consumers have fair and equitable access to heating services and that service providers have a means of making reasonable profits. These goals can conflict in the most stable economies, and regional transition strategies and political developments can exacerbate the difficulties.

We thus reiterate what many others have found earlier. Tariffs on all fuels as well as district energy must eliminate subsidies and cross subsidies. There must be metered as opposed to estimated heat consumption. Payment discipline must be imposed. Ownership of assets can be public (national, regional, or local), private, or mixed, but hard budget constraints, price rationalization, and provision of market-like incentives must prevail or privatization and competition cannot soon be expected to function. These factors are changing all the time and yet they influence and interact with one another. Subsidies and cross subsidies on gas or electricity can influence the method used to calculate the tariff for district heat.

Paying for Energy Efficiency in Residential Buildings

Based on the reviewed energy efficiency financial schemes and case studies the main key players for establishing and operating different types of financial schemes for implementing energy efficiency measures in the residential buildings including refurbishment of the buildings are the following:

- Donor programs, funds and organizations;
- Government, local governmental bodies;
- Home-owners associations, including condominiums and other building management bodies;
- Financial institutions/banks;
- Private sector, consulting companies, energy services providing companies (ESCOs);
- Non-governmental organizations (NGOs).

The most common financial schemes for the countries with transition economies are established with the financial means of donor organizations and programs as well as local governmental support. This is very important for creating necessary basis for continues operation of different

[2] Coming in from the cold. M.Evans and E.Douraeva. IEA/OESC. 2004.

financial schemes. This helps to initialize and conduct awareness raising activities among the residents, implement pilot projects, the results of which are usually very important for demonstrating benefits of proper operation and maintenance of the buildings including the energy efficiency improvement measures implementation. Demonstrated benefits together with awareness raising activities insure the replication of similar project (best practices) in other buildings as well as improvement and continuous operation of existing financial mechanisms.

The key features of the reviewed main financial schemes developed and/or implemented in different countries are summarized in the **Table 1** below. As it is obvious from the Table 1, only two of the reviewed programs and funds do not support the low-income families via energy efficiency improvement but provide direct subsidies:

1) *Social Energy Fund in Hungary,* which helps low-income families to deal with rapid increases in residential gas and electricity tariffs through providing cash for gas heating, direct payments to district heating suppliers, or in-kind wood/coal benefits (see table in Annex I), and

2) *Keep the Heat program in Canada,* which offers cash rebate of $100-250 depending on heating fuel, for families with net annual incomes under $25,000 and for single people with net annual incomes under $15,000 (see table in Annex I).

The rest of the reviewed mechanisms provide support via EE improvement; 10 of which have also special focus on helping the low-income families with EE enhancement.

Common measures financed: The reviewed financial schemes, which support the EE improvements in residential buildings and in some cases help low-income families, have primarily supported the following common measures:

1. replacement of windows (Bulgaria, Czech Republic);
2. replacement of doors (Bulgaria);
3. insulation of doors (Czech Republic);
4. weather-stripping (Bulgaria);
5. insulation of floors, ceilings and walls (Bulgaria);
6. thermal insulation of the building envelope (Bulgaria);
7. replacement of some internal piping networks for heat, hot, and cold water as needed (Bulgaria);
8. improvement of the façade (Bulgaria);
9. reconstruction and expansion of the attics (Bulgaria);
10. replacement of the roof (Bulgaria, Czech Republic);

At the same time, some of the programs had low-income support components in forms of grants or subsidized energy efficiency assistance. Some of the specific measures included the following:

1. grants to vulnerable households for mandatory installation of heat cost allocation devices (Bulgaria);
2. donation of low-income families with high-efficient light bulbs (Bulgaria);
3. low-interest loans to finance weatherization (Bulgaria);
4. loans of around $500-600 with no interest rate and a 6-month repayment period (Armenia);
5. grants from municipalities covering the costs of low-income households implementing the EE measures in the common spaces (Armenia);
6. free weather-stripping supplies (Serbia);
7. warm front grants of £2,700 - 4,000 (UK), which cover loft insulation, draught proofing, cavity wall insulation, hot water tank insulation, gas room heaters with thermostat controls, converting a solid fuel open fire to a modern glass fronted fire, timer controls

for electric space and water heaters, energy advice and low energy-consumption light bulbs. The audit, advice and installation are at the government's expense;

8 installation of EE equipment, implementation of small-scale EE projects (Canada);

9 brochures on simple energy-saving measures developed for households (Bulgaria);

10 technical support and grants - awareness raising on EE, implementation of EE measures, free energy audit (USA, Canada).

It is important to highlight that for most of the cases it is very important to use the funds received for EE improvement purposes on the most prioritized improvements, especially this refers to the cases when no professional energy auditing is conducted with proper economic analysis. The first prioritized measures can be the once with shorter pay-back periods and relatively simple, such as replacement, renovation and installation of the doors and windows in the entrances, heat supply systems upgrade and metering, etc.

However, the HOA and residents should decide which measures are the most prioritized for their building, for some of the buildings the renovation of basement might be the most urgent, while for the others- the insulation of building envelop can be the case.

Example: In Olaine, Latvia the building which has participated in the Housing Agency Program and implemented the residential EE project in, received energy audit with the following classification of EE measures:

Priority A *– for implementation in 1 year, e.g. substation upgrades, metering and heat cost allocation.*

Priority B *– for implementation in 3-5 years, e.g. improvements of building engineering systems related to heat energy consumption.*

Priority C *– for implementation in 5-10 years, e.g. building envelope improvements including new windows, improvements of building systems related to electric energy consumption, improvements in common areas.*

And though the most common approach in implementing these suggestions is to start with A and B, the residents of Zemgales building decided to implement measures under Priority C first. Because the residents had no access to prior experiences with EE, they selected the measures which they thought could generate the largest financial savings - insulation of the building walls and balancing the heating system. However, the monitored results were very much in line with the energy audit predictions.

Table 1. Summary of Reviewed Experiences of EE Financing in Heating and Buildings

#	Program	Years	Program Overview	Overview of Financial Mechanism
1	Let‘s renovate dwelling-renovate City (Renew the House – Renew the City) Lithuania, Vilnius; *Example: mūnai Energy Efficiency Pilot Project*	2004	A Vilnius City Council program with the Vilnius City Heating JSC (VCH) as the program coordinator. Aimed to renovate and modernize residential housing. The first municipality-driven program.	Revolving Fund which provides loan through the FI/bank, and being coordinated by the heating company. Municipality provides support.
2	Building Energy Efficiency Revolving Fund Program in Gumri, Vanadzor and Maralik cities, Armenia	2005	The Fund and accompanying technical assistance was provided within the USAID-funded Municipal Network for Energy Efficiency Program in Armenia within its support to HOAs.	The EE Revolving Funds provide small, interest-free loans to condominiums with a 6-month repayment period for EE upgrades in multi-apartment buildings, with support from municipality to cover low-income households investment

#	Program	Years	Program Overview	Overview of Financial Mechanism
3	Modernization and rationalization (M&R) of the thermal economy in Michalovce, Slovakian Republic	1993	Programme of State Support of Housing Stock Rehabilitation,with loan guarantees provided by the state-owned Guarantees and Development Bank. Launched by Government Resolution to revitalize rehabilitation of the housing stock, reduce energy intensity, and to involving banking resources. Eligible beneficiaries are those with insufficient collateral, including condominium and contracted housing managers.	10 year bank guarantees for up to 100% of the loan principal, not to exceed exceeding SKK 300,000 per unit. Eligible projects include those to reduce the energy intensity of apartment houses by at least 20%. The long-term loans provided by State Fund of Housing Development (FRB), and grants for rehabilitation that eliminate system faults.
4	Reconstruction of the residential building by credits, Kuldiga, Latvia	2001	A pilot study for developing the first-ever energy-efficiency credit line of the Latvian state-owned Mortgage and Land Bank to rehabilitate housing, while the Bank develops banking business in the residential sector and to prove scheme of credits for reconstruction and energy-efficiency measures for home owner associations (HOA).	First ever loan was extended to an HOA from a bank. Implementing a pilot project for opening a credit line.
5	Demand Side Management (DSM) in Valmiera, Latvia	2002	Implemented during 2002-04, involved training for municipal energy managers and hands-on auditing of residential buildings. The audits showed that residents could save energy and money on heat bills through appropriate and available energy-efficiency measures in their buildings.	Demand side management program for three buildings
6	Zaharna Fabrika (ZF) Foundation/ Refurbishment of a Multi-Family Building, Sofia, Bulgaria	2004	Refurbishment of a multifamily building in Sofia, Bulgaria to demonstrate how homeowners associations can finance and implement building renovation and maintenance projects that result in energy-efficient heat consumption and lower bills for residents	Bulgarian Housing Association and two Dutch housing associations established the ZF Foundation, which acts as an intermediary between the HOA in Block 10 and the creditor DIGH, and coordinates the project implementation.
7	Energy Efficiency Retrofits in Concrete Panel Building, Rumburk and Brno-Liskovec, Czech Republic	1997	Municipality of Rumburk resources coupled with a grant from the Czech Energy Agency in a ratio of about 1:2 to provide subsidies to apartment buildings and schools to increase the use EE measures.	The grant program is administered by the Czech Energy Agency on behalf of the Ministry of Trade and Industry to provide subsidies to apartment buildings and schools to increase the use of renewable energy, or for measures that save energy such as thermal insulation, sealing or replacing window and automated temperature controls.
8	Energy Efficiency Retrofits in Concrete Panel Building, Brno-Liskovec, Czech Republic	1997	Municipality of Brno–Novy Liskovec resources and a grant from the State Housing Development Fund (SFRB) subsidized loans for PANEL building improvements, including EE. The selected concrete panel social housing building supplied by DH.	subsidized interest loans where the subsidy can cover up to 40% of costs, maximum repayment time of 15 years.

#	Program	Years	Program Overview	Overview of Financial Mechanism
9	Housing Agency Program, Residential Energy Efficiency, Olaine, Latvia	2003	Latvian Housing Agency offered to pay for half the cost of energy audits in 100 of the most qualified buildings in Olaine in order to promote energy-efficiency. To qualify, residents filled in questionnaires and provided written joint consent of all apartment owners to EE measures.	Commercial bank, provided a loan to HOA of Zemgales building for EE project (including audit at a 50% discount price).
10	Polish government‘s program supporting EE renovation measures, 68-unit apartment building owned by a cooperative at 115 Czerniakowska Street, Warsaw, Poland	2003	The process and results of the complex EE renovation by modernizing the building‘s heating system and installing heat cost allocation devices (HCAs) and thermostatic radiator valves (lRVs), some water-saving technologies, and thermal insulation of walls and the roof, households saved over 17 percent on their utility bills.	The co-operative board initiated a major renovation of the building. The project was financed: 50% - co-operative‘s own resources (collected money in renovation fund); 50% - loan, 25% of which was subsidized by the state‘s Thermal Renovation Fund.
11	Municipally Owned and Managed Fund for Residential Refurbishments, Bytów, Poland	n/a	A unique method of channeling part of the municipal budget to support refurbishment measures in HOA buildings –using the revenue from sales of municipal apartments, the City Council created the foundation called ―Our Condominium" (―Nasza Wspólnota") with initial capital in the amount of US$370,000. To qualify, the HOA members agreed to pay monthly charges to their refurbishment funds in the amount of a minimum of one zloty (~ USD 0.35) per m2 per month, which was a double of the previous rate, still quite low and affordable.	City Council decided to create the foundation using the revenue from sales of municipal apartments with initial capital of around $370,000. The foundation‘s objective is to guarantee loans and to cover the interest payments on loans given to HOAs by selected banks for financing all necessary refurbishment measures, including EE measures. A loan from the bank can cover up to 90% percent of the total investment cost, for a maximum of 5 years.
12	Program for Thermal Rehabilitation of the Multi-Level Residential Buildings in Romania	2002	The Government Urgency Ordinance was adopted regarding the establishment of special measures for thermal rehabilitation of some multi-level residential building. Measures Implemented: •Insulation of external walls •Heat insulation and hydro insulation of the roof •Heat insulation of the basement	The funds for the carrying out of thermal rehabilitation work are shared as follows: • 34% from State budget allocations. These allocations are approved on a yearly basis, and funds are provided out of the budget of the Ministry of Development, Public Works and Housing. • 33% from funds approved for this use on a yearly basis by local authorities. • 33% from maintenance funds of the owner associations

#	Program	Years	Program Overview	Overview of Financial Mechanism
13	Thermomodernization Fund in Poland	2005	Thermomodernisation fund implemented projects in the following process: 1. Elaboration of energy audit 2. Loan application 3. Obtaining the loan letter and thermomodernisation bonus 4. Designing 5. Construction permit 6. Implementation 7. Confirmation conformity with the audit and design	The state budget writes money to the Thermomodernisation Fund – 27,5 million Euros for 2005, the commercial banks are spending the Fund's money as the 25% bonus to the loans given to the investors, and the investor's obligation is to present the energy audit which confirms savings required by conditions set by law.
14	Case Study: Refurbishment project of a typical multifamily social house, Poland	2003	Comprehensive refurbishment program was implemented during one construction season. Replacement of central heating installation, insulation of walls, insulation of roof, insulation of windows above the staircases	The loan was borrowed by the home owner association was fully paid by December 2005. Commercial loan: 28%: Bonus from the state: 72% + loan interest SPBP: 9.88 years
15	Third Party Financing, Latvia	n/a	General meeting of the apartment owners authorizes a building management company to take all necessary actions related to energy efficiency measures in the building including tendering and contracting for energy audits, development of technical project documentation, construction works, or accepting financial offers such as commercial loans or state and / or municipal co-financing.	Authorized building manager acts as an intermediary, not as a borrower. Loan payment for energy efficiency works is included in the monthly costs for building management. if the general meeting of the apartment owners decides to change the building manager since the apartment owners are the borrowers themselves
16	Armenia Renewable Resources and Energy Efficiency (R2E2) Fund - WB Financed Urban Heating Project, Armenia	2005	R2E2 channeled through a World Bank Loan for Urban Heating, which first implemented pilot loan funded projects for $1M amount, and after successful completion, launched an on-lending scheme with selected qualifying banks.	The total amount of the line of credit shall be $4,2 mln, with total allocations to a single project not exceeding $0.5. The lending was done at 18-24% and was largely absorbed by individual heating systems.
17	Croatia District Heating Project	2005-2010	Main beneficiaries were district heating customers in Zagreb and Osijek. Two main components: 1) Infrastructure rehabilitation - network rehab and pipe replacement in Zagreb and Osijek. Rehab of 25 heating sub-stations in Osijek. 2) Consultancy services to develop DSM program and conduct two surveys Promote efficient operations by HEP T: - reduce energy and water losses by rehab-ing network and closing non-economic boilers in Osijek - increase profitability of HEP T using cost recovery tariffs - increase customer satisfaction - implement voluntary DSM program in Zagreb and Osijek	World Bank (WB) Loan. Hrvatska Elektroprivreda (HEP) borrower

#	Program	Years	Program Overview	Overview of Financial Mechanism
18	Bulgaria District Heating Project	2003-2008	Rehabilitate Sofia Toplofikacia (TS) and Pernik Toplofikacia (TP) networks, substations, general plant and provide technical assistance. Goals: 1) improve quality of services - increase connection rates. 2) improve financial viability - improve working ratio and increase bill collection rate. 3) increase environmentally friendly operations through energy conservation and pollution reduction measures - reduce network heat losses and energy consumption	World Bank (WB)and European Bank for Reconstruciton and Development (EBRD) loans. Grant from Kozloduy Int'l Decommissioning Support Fund (KIDSF) and EU Phare. TS and TP contributed a portion of funds.
19	Russian Federation Municipal Heating Project	2002-2008	Eight participating cities. Main components: 1) system rehabilitation - replace and upgrade sections of district heating (DH) systems. 2) Technical assistance - procurement, engineering, supervision - support Central Project Implementation Unit (CPIU). 3) CPIU - supervises the project implementation on behalf of Gosstroi. Includes financial audit and maintain project accounts 4) Institutional Support - research focused on options and actions to improve pricing and regulation, and assessment of restruction options for the sector, financial structures and mechanisms, and energy cost-related issues of social protection for low-income families	World Bank (WB) loan
20	Kyiv District Heating Improvement Project	1999 - 2007	Main components: 1) heat production capacity improvement - replace and construct new boilers. 2) DH Rehabilitation - rehab transmission and distribution pipeline, water treatment and rehab substations. 3) institutional support - review options to restructure Kyiv DH cos., design project processes including auditing, and train staff. Promote cost recvoery policies and assess structure for eventual privatization.	World Bank (WB) loan

#	Program	Years	Program Overview	Overview of Financial Mechanism
21	Estonia District Heating Rehabilitation Project	1994 - 1999	Worked in cities of Tallinn, Tartu and Parnu to do small boiler conversions and replacements in small publicly owned boilers, district heating (DH) rehab, and improve existing combined-heat-and-power plant at Iru/Tallinn and provide institutional support for project agencies. Goals: 1) Reduce fuel costs and import requirements. 2) EE Rehab in DH systems 3) Facilitate restructuring and privatization of DH institutions.	World Bank (WB) loan; European Investment Bank, Governments of Sweden, Finland and Denmark also provided loans

Key Players in Developing and Administering Financing Schemes

The reviewed sample of implemented energy efficiency projects has a diverse set of financing schemes, moreover – the successful implementation of these projects required multi-stakeholder participation, especially in the management and administration of these financing mechanisms. The initiative and implementation has been mainly carried out with participation of the following key players:

- International Programs/ Donors/IFIs
- National/state lending/grant Funds
- Government agencies (ministry/ cabinet/prime minister)
- Local Administration/ Municipality
- Apartment Owners/ Home-owners Associations (HOA)
- Priv. Sector/ Heating Company
- NGO/Foundation

The various combinations of partnerships in development, management and administration of the reviewed financing schemes are summarized in Table 2 below.

Table 2. Various Key Players Participating in Management of Financing Schemes

#	Program	Key Management Players					
		International Prog./ Organization/ Fund	Govt (ministry/ cabinet/prime minister)	Local Administration/ Municipality	Owners/ HOA	Priv. Sector/ Heating Company	NGO/Foundation
1	Let‘s renovate dwelling- renovate City (Renew the House – Renew the City) Lithuania, Vilnius	n/a	n/a	**X**	n/a	Vilnius City Municipality; "Vilnius City Heating Company" as coordinator.	n/a
2	Building EE Revolving Fund Program in Yerevan, Gumri, Vanadzor and Maralik cities, Armenia	ASE supervision under USAID-funded MUNEE Project	n/a	Vanadzor Municipality, Maralik Municiplity	n/a	n/a	National Association of Condominium Owners (NACO) provided project oversight, on-site NGOs for day-to-day coordination.

#	Program	Key Management Players					
		International Prog./ Organization/ Fund	**Govt (ministry/ cabinet/prime minister)**	**Local Administration/ Municipality**	**Owners/ HOA**	**Priv. Sector/ Heating Company**	**NGO/Foundation**
3	Modernization and rationalization (M&R) of the thermal economy in Michalovce, Slovakian Republic	n/a	The license is regulated by the Law on thermal energy, controlled by Regulation Board and by Ministries of Economy and Finance	n/a	n/a	The enterprise uses the income, incurred from sale of thermal energy, to finance M&R of the thermal economy.	n/a
4	Reconstruction of the residential building by credits, Kuldiga, Latvia	n/a	n/a	n/a	Cooperative took a credit.	Cooperative consulted with consulting company Ekodoma who has developed computer model for audit, and took a credit.	n/a
5	Demand Side Management (DSM) in Valmiera, Latvia	USAID-ASE/MUNEE	n/a	Valmiera council	n/a	Communal company Valmieras Namsaimniekes and consulting company Ekodoma, Ltd conducted energy audit.	ASE support
6	Zaharna Fabrika (ZF) Foundation/ Refurbishment of a Multi-Family Building, Sofia, Bulgaria	Dutch Housing Guarantee Fund (DIGH)	n/a		X		ZF Foundation, acts as an intermediary between the HOA and the creditor DIGH, and coordinates the maintenance and management of a small group of residential buildings.
7	Energy Efficiency Retrofits in Concrete Panel Building, Rumburk and Brno-Liskovec, Czech Republic	n/a	Administered by the Czech Energy Agency on behalf of the Ministry of Trade and Industry	Municipality of Rumburk	**n/a**	Agency used its network of consulting & information centers to provide technical advice on reducing energy use.	n/a

#	Program	Key Management Players					
		International Prog./ Organization/ Fund	**Govt (ministry/ cabinet/prime minister)**	**Local Administration/ Municipality**	**Owners/ HOA**	**Priv. Sector/ Heating Company**	**NGO/Foundation**
8	Energy Efficiency Retrofits in Concrete Panel Building, Brno-Liskovec, Czech Republic	n/a	State Housing Development Fund PANEL program	Municipality of Brno-Novy Liskovec	**n/a**	n/a	n/a
9	Housing Agency Program, Residential Energy Efficiency, Olaine, Latvia	n/a	n/a	**X**	**X**	n/a	n/a
10	Polish government‘s program supporting EE renovation measures, building on 115 Czerniakowska Street, Warsaw, Poland	n/a	n/a	n/a	HOA hired professional en. Auditor	n/a	n/a
11	Municipally Owned and Managed Fund for Residential Refurbishments, Bytów, Poland	n/a	n/a	n/a	X	n/a	n/a
12	Program for Thermal Rehabilitation of the Multi-Level Residential Buildings in Romania	n/a	Ministry of Development, Public Works and Housing selects the buildings for the Program, based on municipalities‘ proposals and legal criteria	Mayors oversee implementation	n/a	n/a	n/a
13	Thermomodernization Fund in Poland	n/a	n/a	n/a	**X**	n/a	n/a
14	Case Study: Refurbishment project of a typical multifamily social house, Poland	n/a	Ministry of Construction doing M&V	n/a	HOA switched to profess-sional maintenance Co.	n/a	n/a
15	Third Party Financing, Latvia	n/a	n/a	X	The building manager has authority to sign documents for all.	X	n/a

#	Program	Key Management Players					
		International Prog./ Organization/ Fund	**Govt (ministry/ cabinet/prime minister)**	**Local Administration/ Municipality**	**Owners/ HOA**	**Priv. Sector/ Heating Company**	**NGO/Foundation**
16	Armenia Renewable Resources and Energy Efficiency (R2E2) Fund - WB Financed Urban Heating Project, Armenia	WB provides overall supervision	Key Stakeholder ministries, chaired by the Ministry of Energy or Prime Minister	n/a	n/a	n/a	R2E2 Fund coordinates and manages the Project
17	Croatia District Heating Project	WB provided overall supervision and help Croatia define a DH strategy that will help it in EU accession	Gov't prepared a District Heating Strategy			HEP (the electric company) subsidiary supplies about 116K households and 6K COs. In Zagreb, Osijek, and Sisak.	
18	Bulgaria District Heating Project	WB provided overall supervision.	Gov't prepared a District Heating Strategy, Energy law amended. Ministry of Economy and Energy involved.			Sofia DH Co. and Pernik District DHC established the project implement unit with consultant Poyry Energy Oy, a Finnish co.	
19	Russian Federation Municipal Heating Project	WB provided supervision.	Gosstroi, federal agency responsible. National Foundation for Housing Reform implemented				
20	Kyiv District Heating Improvement Project	WB provided supervision.	Number of reforms were introduced by government regarding heat tariff structure in billing and collection to improve Kyivenergo's financial performance.	KyivEnergo and Kyiv City.		Kyivenergo. Kyiv Municipal DH Co. merged with Kyivenergo. Among the 10 largest electric power producers and largest heat producer in Ukraine.	
21	Estonia District Heating Rehabilitation Project	WB provided supervision.	Ministry of Economy	Tallinn, Tartu, and Parnu mu-nicipalities		Eesti Energia	

Commonly Used Financing Mechanisms

Before launching into a discussion of financing mechanisms, it is necessary to mention that for municipal EE projects covering the DH systems or large-scale thermo-modernization of buildings it is crucial for the municipality to work on project design, conduct energy audits, set energy savings targets, prepare a feasibility study, draft a project proposal and estimate cost and resource savings prior to seeking financing. Often a municipality will secure the services of a private sector firm to assist with this, such as an ESCO or other energy efficiency service provider. It is advisable to seek co-financing from several sources. For example, the municipal budget spending can be used for project preparation, energy audits, feasibility studies, interest payments and project management, while borrowed equity or grants can be used for project implementation.

For residential projects, there is a large list of variables which predefine the necessary administrative structure necessary. Specifically, depending on the capacity of the home-owner associations (HOAs) to handle finances and the length and solidity of their financial performance history, the municipalities, government and banks can work directly with the HOAs. However, when an HOA capacity is week, working with the utility as the last circuit prior to the end

In addition, the municipality should also assess for itself the value of ―deep tissue" projects which will require larger investments, will have longer pay-back periods, but will generate higher long-term savings. Sometimes projects which boast a faster pay-back might seem more favorable at first, but not be worth the transaction costs associated with implementing a project, nor the time investments. This decision will depend on the size of the municipality and its strategic goals.

As suggested in a report prepared by the Alliance to Save Energy and the Pacific Northwest National Laboratory in 2002[3], the common steps for financial sourcing can be expressed as the ―3Cs" of finance: character, cash flow, and collateral:

- **Character** is a determination of the applicants' credit history and credit worthiness – past loans, repayment timeliness, and current ability to pay. Establishing character is difficult in cases where the applicant has not had the opportunity to earn credit.
- **Cash Flow** essentially involves establishing technical and financial baselines, and the savings that will result from the project in order to evaluate feasibility and the existence of a positive cash flow. This can be difficult when metering is insufficient to measure both production and consumption of energy, nonpayment is common, and accounting systems are not transparent.
- **Collateral** is established by the security of the asset, where the loan is typically less than the value of the asset that is pledged to the lending institution in the event of default. In general, energy efficiency projects tend to be more distributed, thereby more difficult to collateralize. In addition, a difficulty in transitioning economies is determining the true value of a commodity or property, and whether the legal and political systems will allow the lender to seize assets in order to recover an unpaid loan. This often results in vendors unwilling to finance investments and lenders requiring a guarantee.

The 3Cs are not unique to investments in energy efficiency, but in the case of municipalities in transitioning economies, the problems above are exacerbated due to the historically subordinated position of municipalities to national and/or regional institutions (i.e. a lack of autonomy). This

[3] Regional Energy Sector Investment Strategy for Eastern Europe and the Former Soviet Union. This report, prepared by the Pacific Northwest National Laboratories (PNNL) and the Alliance to Save Energy, is intended to provide a strategy for the development and implementation of energy efficiency projects in the municipal sector of Eastern Europe and the Former Soviet Union. Available at http://www.munee.org/files/NewStrategy.zip

subordination often limits the ability of municipalities to exercise discretion within their budget and/or enter into contracts with terms greater than one or two years (ASE 2002).

Energy efficiency projects can be financed through various mechanisms and by various institutions, and often a combination of mechanisms and tools is used for a project. For example, a municipality seeking to retrofit its district heating system might use a combination of a soft loan from the state or a designated special purpose fund (with donor contributions); a portion of its own budget to finance a percentage of the project cost up-front; and financing from the equipment provider to pay for any new equipment using the energy cost savings from the project to repay the loans and the vendor. Table 1 below presents an overview of the existing mechanisms that can be used for financing municipal energy efficiency. A more detailed discussion of the special purpose and third party financing mechanisms follows in Annex I, based on earlier research conducted by the Alliance to Save Energy for the REEEP.

Table 3. Available Financing Mechanisms and Financial Institutions

Financial Mechanism	How Used	How to Access	Advantages	Limitations
Municipal/ State General Budgetary Funds	All types of municipal projects.	Municipal/state government	Independent decision-making power	Limited funds availability; may not be not available for large scale projects
Soft loans	Uses below-market interest rates to lower cost of borrowing money.	From municipalities, state, banks (sometimes as part of a program with IFIs), loan funds supported by international organizations and multilaterals.	• Interest holidays • Long repayment periods	Municipalities are unfamiliar with specific procedures and requirements of institutions
Commercial bank loans	Issued by banks, credit unions, finance companies to municipalities at market interest rates	Local and foreign commercial banks	Can be faster than financing tied to government or donor programs.	If municipality lacks credit-worthiness, loans need credit guarantees
Grants	Provided by IFIs, usually through local and international implementing NGOs, international development agencies	Government (state and municipal); donors (usually tied to specific development assistance programs); state banks (to encourage commercial financing and open market for EE finance).	No repayment necessary. Lowers barriers to projects.	Might delay commercialization of EE finance.
Partial Loan Guarantees	Secure a loan in case the borrower defaults.	Special guarantee facilities. Sovereign guarantees offered by the state	Qualify for a loan from a financial institution that for which otherwise unqualified	Cumbersome financial paperwork
Performance	For projects that	Contract signed between	Eliminates the need for	Savings from the project

Contracting	generate sufficient energy-cost savings to pay project costs.	municipality and an energy service provider such as an energy service company (ESCO), EU Energy Center, NGO, or consulting firm. Financing can be provided through municipality, service provider or third party.	the municipality to have the upfront capitol to fund the project.	must be shared with the service provider. Requires sufficient metering to establish a baseline and monitor savings against it.
Leasing	Allows firms to lease assets instead of borrowing and then buy them out later	Private companies wanting to lease DH assets. Equipment manufacturers and distributors wanting to enter a market.	3-20 year maturity; use the equipment now and with the option of paying for it later, making cash available for other use.	In addition to paying to use the equipment, pay additional charges on the lease as well.
Vendor Credit	When purchasing equipment, municipalities pays for it over short-term	Equipment Vendors	Helps build credit history if a municipality is not creditworthy; easier to obtain than loans; widely offered by vendors; no interest	
Municipal Bonds	Raise internal equity for municipality by issuing a bond	Contact investment specialist	Interest rate is likely to be exempt from taxes	Requires lengthy and expensive preparatory work. Incur large debt and risk of default
Revolving Fund	Accumulates savings from EE projects for self-perpetuating investments in more EE projects	NGOs, governments, international donors, municipalities	Self-sustaining after first capitalization;	Requires large upfront investment. Can be cumbersome and expensive to administer. Legislative and institutional barriers may prevent municipalities from accruing savings.

Financing Experiences in CEE

The previous section illustrated the variety of financing schemes and tools available in the CEE and CIS region. However, some of the presented schemes are more common than others, and there is a general trend in the frequency of application of various financing schemes related to the state of the economic development, maturity of financial markets and degree of energy sector restructuring. This is particularly reflected in the availability of the Government contribution to the investments, market readiness to assume the risk of lending to municipalities and/or HOAs, availability of general sectoral strategies, expressing the Government stance on the sector and its investment needs, as well as the necessary legal framework favorable for energy auditing, project financing and repayment, etc.

As Annex II illustrates, there is a wealth of international financing institutions (IFIs) willing to invest in energy efficiency. The IFIs and donors have mutual understanding that energy efficiency is an attractive investment niche, including the multi-apartment residential sector, with some creativity required; as well as the public buildings sector, which has direct impact on the state budget expense categories. As the fuel prices hike and the municipalities progress in their restructuring in other priority capital investment areas (road construction, street lighting, hospitals, education, garbage removal, etc.) local governments become willing to invest their resources in energy efficiency as well. However, these are almost never sufficient to cover the full cost of major energy efficiency upgrades due to lack of means on municipal budget accounts. Hence, municipalities have often partnered with national funds, IFIs, banks, credit guarantee programs, etc. In residential projects at least 10 percent co-financing from the households is feasible and recommended to cultivate the sense of ownership over the project.

The below table summarizes the mix of financiers involved in the sample of projects studied for the present assignment.

Table 4. The Key Financiers involved in the reviewed energy efficiency financing schemes

#	Program	Key Financiers					
		International Prog./Organization/ Fund	**Govt (ministry/ cabinet/prime minister)**	**Local Administration/ Municipality**	**Owners/ HOA**	**FI/Banks**	**Priv. Sector/ Heating Company**
1	Let‘s renovate dwelling-renovate City (Renew the House – Renew the City) Lithuania, Vilnius; *Example: mūnai Energy Efficiency Pilot Project*	Global Fund for Environmental Protection dedicated 6,5 million USD loan (3 million USD is intended for building renovation).	Government support for renovation of dwelling houses may comprise up to 30% of total investments.	1) Finances the energy audits, investments projects preparation, and technical documentation preparation; 2) up to 15% of total investments for dwelling houses renovation. *Example: the municipality funded the modernization of surroundings.*	Owners - 10% or more from the investment amount. *Example: Obliged to reimburse 50% of renovation costs during 15 years period.*	―Hansabankas” have signed a cooperation agreement with Vilnius city heating company and able to lend up to 90% of the funds required by the associations for renovation of buildings.	n/a

#	Program	Key Financiers					
		International Prog./Organization/ Fund	**Govt (ministry/ cabinet/prime minister)**	**Local Administration/ Municipality**	**Owners/ HOA**	**FI/Banks**	**Priv. Sector/ Heating Company**
2	Building Energy Efficiency Revolving Fund Program in Gumri, Vanadzor and Maralik cities, Armenia	Fund's starting amount was provided by USAID - Alliance to Save Energy-MUNEE program.	n/a	The Municipalities of Vanadzor and Maralik provided assistance to low income households for participating HOA	In form of labor, material or financing equivalent to 10% of total investment	n/a	n/a
3	Modernization and rationalization (M&R) of the thermal economy in Michalovce, Slovakian Republic	n/a	n/a	City council becomes owner of the investment improvements.	n/a	n/a	The enterprise finances M&R of the thermal economy.
4	Reconstruction of the residential building by credits, Kuldiga, Latvia	n/a	n/a	n/a	Cooperative took a credit.	Mortgage bank provided credit.	n/a
5	Demand Side Management (DSM) in Valmiera, Latvia	Funding (7, 300 EUR) from USAID-ASE/MUNEE.	n/a	Valmiera council will provide loans of around 8, 500 EUR/building.	Building managers could take loan.	n/a	n/a
6	Zaharna Fabrika (ZF) Foundation/ Refurbishment of a Multi-Family Building, Sofia, Bulgaria	A subsidized loan of $69,422 provided by the Dutch Housing Guarantee Fund (DIGH) to the ZF Foundation.	n/a	n/a	The households borrowed loan.	n/a	n/a
7	Energy Efficiency Retrofits in Concrete Panel Building, Rumburk and Brno-Liskovec, Czech Republic	n/a	Grant from the Czech Energy Agency	Municipality of Rumburk also participated in financing	Owners also participated in financing	n/a	n/a
8	Energy Efficiency Retrofits in Concrete Panel Building, Brno-Liskovec, Czech Republic	n/a	Grant & Subsidized Loan from State Housing Devt Fund	Grant from Municipality of Brno	n/a	n/a	n/a

#	Program	Key Financiers					
		International Prog./Organization/ Fund	**Govt (ministry/ cabinet/prime minister)**	**Local Administration/ Municipality**	**Owners/ HOA**	**FI/Banks**	**Priv. Sector/ Heating Company**
9	Housing Agency Program, Residential Energy Efficiency, Olaine, Latvia	n/a	n/a	Latvian Housing Agency offered to pay 50% energy audit costs in 100 of the most qualified buildings in Olaine.	50% of energy audit costs, and the HOA took loan	Hansabanka commercial bank, provided a loan of $102,000 to HOA of Zemgales building	n/a
10	Polish government‘s program supporting EE renovation measures, building on 115 Czerniakowska Street, Warsaw, Poland	n/a	25% of the loan was subsidized by the state‘s Thermal Renovation Fund.	n/a	The co-operative‘s renovation fund financed 50% of the project costs and the repayment. This fund is formed from the monthly payments from each household.	50% of project costs were loan (half of which was subsidized)	n/a
11	Municipally Owned and Managed Fund for Residential Refurbishments, Bytów, Poland	n/a	n/a	1) The City Council formed the Fund ―Our Condominium” using the revenue from sales of municipal apartments. This Fund guarantees the loans and covers the interest payments on loans given to HOAs. 2) The municipality‘s housing allowance covers the contribution to the refurbishment fund for low-income households.	Around 10% of the total investment cost, and loan repayments for a maximum of 5 years.	A loan from the bank can cover up to 90% of the total investment cost, for a maximum of 5 years.	n/a

#	Program	Key Financiers					
		International Prog./Organization/ Fund	**Govt (ministry/ cabinet/prime minister)**	**Local Administration/ Municipality**	**Owners/ HOA**	**FI/Banks**	**Priv. Sector/ Heating Company**
12	Program for Thermal Rehabilitation of the Multi-Level Residential Buildings in Romania	n/a	1) The energy audit, feasibility study and design of the thermal rehabilitation included in the annual program are provided by State budget allocations. 2) 34% of the thermal renovation work costs - from State budget allocations.	33% of the thermal renovation work costs - from funds approved for this use on a yearly basis by local authorities.	33% of the thermal renovation work costs - from maintenance funds of the owner associations.	n/a	n/a
13	Thermomodernization Fund in Poland	n/a	The state budget writes money to the Thermomodernisation Fund – 27,5 mln EUR for 2005	n/a	Building (HOA, cooperative) renovation fund	The commercial banks are spending the Fund's money as the 25% bonus to the loans given to the investors.	n/a
14	Case Study: Refurbishment project of a typical multifamily social house, Poland	n/a	n/a	n/a	HOA took loan	The bank provided the loan, which was secured by proxy to the bank account (no mortgage)	n/a
15	Third Party Financing, Latvia	n/a	X	X	The building manager does not have any financial obligations for loan redemption. Loan payment for energy efficiency works is included in the monthly costs for management.	X	X

#	Program	Key Financiers					
		International Prog./Organization/ Fund	**Govt (ministry/ cabinet/prime minister)**	**Local Administration/ Municipality**	**Owners/ HOA**	**FI/Banks**	**Priv. Sector/ Heating Company**
16	Armenia Renewable Resources and Energy Efficiency (R2E2) Fund - WB Financed Urban Heating Project, Armenia	The International Development Association (through the DCA) provided a credit in the amount of US$ 15.0 million to the Republic of Armenia.	n/a	n/a	lend from PFI	provide loans to HOA and individuals	na
17	Croatia District Heating Project					World Bank loan EURO 24M = US 29.8M (EURO 1 = US 1.2233)	HEP T financed construction of a small fraction of new water pipes using some of their own funds.
18	Bulgaria District Heating Project	WB Prototype Carbon Fund (PCF) purchased carbon emissions reductions and USAID granted around USD 1M for consultants to assist with transaction.	Ministries of Energy and Economy provided the Guarantee Agreement of Operation to assure fair energy tariff setting. Tariff influenced operation costs and savings.			USD 34.2M from WB. WB loan - two separate loans made to TS and TP, guaranteed by Gov't. Co-financier: EUR 30 M from EBRD, and EUR 10.4 M to TP from KIDSF (managed by EBRD).	TS and TP contributed some of their own funds
19	Russian Federation Municipal Heating Project					USD 78M from WB. (1 USD = RUB 26.56)	
20	Kyiv District Heating Improvement Project			Governance set up: Kyiv City was obligated to compensate Kyivenergo for difference between heat cost and heat tariff for households. Kyivenergyo was dependent on the city for its financial resources because household heating tariffs were low.		USD 159.7M from WB. (EBRD was going to co-finance but Kyiv and Kyivenergo did not comply with some lending terms).	JSC Kyivenergo contributed 59.7M.

#	Program	Key Financiers					
		International Prog./Organization/ Fund	Govt (ministry/ cabinet/prime minister)	Local Administration/ Municipality	Owners/ HOA	FI/Banks	Priv. Sector/ Heating Company
21	Estonia District Heating Rehabilitation Project	Danish provided tech assistance in preparing tenders. Procurement in this program was handled by Sida and WB	1, Small Boiler Conversion/replacement program - like credit-line. State Energy Dept. of Ministry of Economy obtained feasibility studies and Ministry of Finance provided loans.			USD 36.32M from WB. USD 5.43M from governments. USD 18.01M from European Investment Bank.	

In Romania, the financing mechanisms were provided as part of the Government reform of the urban heating sector. The Romanian Government has launched the National Building Thermal Rehabilitation Program in 2006, coordinated by the Implementation Unit of the Ministry of Transport, Construction and Tourism. The mayor of Bucharest announced that all 10,000 multi-apartment buildings in the city would be included in this program. The program aimed to involve the households and HOAs in energy efficiency projects, providing the incentive of free energy audits, building certification feasibility studies, design work and project M&E, if the majority of households agree (>50%) to enroll in this program. Each HOA member family, living in a multifamily building, will be requested to pay 33% of the rehabilitation costs (about US$730 – 1,220), which allows them utilizing soft bank loans, offered for 5-8 years.

Concurrently, another National Program for rehabilitation and modernizing the heat and power supply was launched. The Government Decision of phasing out heat subsidies in the residential sector by January 1, 2007 was to be accompanied by improving the efficiency and lowering the operation costs and tariffs of heat and power supply. This ―District Heating 2006–2009: Quality & Efficiency" National Program was meant to ensure both the strategy and the financial means for improving the overall efficiency of DH utilities, bringing its value to the European level. The program offered funds to the municipalities, allowing them to follow the provisions of the National Strategy for DH activities.

It was estimated that by 2010 the Program would have reduced the heat production by 10 million Gcal/year from the current 26.7 million GCal. The total value of this DH orientated program was 3.7 billion Euro (13.4 billion Lei), of which 3.47 billion Euro (12.17 billion Lei) – in bank loans, to be repaid by the Ministry of Public Administration and Internal Affairs (50%), along with the municipalities (50%).[4] The plants and the DH companies are not allowed to privatize or outsource their assets on the activities for a period of five years, from the date of the first operational start. The program was not mandatory for the cities. The Local Councils were also encouraged to participate in public private partnerships (PPPs) or for offering concessions. The program was launched in late November 2006. By mid-2007 60 municipal projects had already registered with this program.

[4] Two provisions of the "DH 2006 – 2009; Quality & Efficiency Programs" make it unfavorable to the privatization process: (i) Only the state owned utilities are eligible to get funds through this program; and. (ii) The administration of the municipal DH systems must be ensured by an operator (company), with 95% statutory capital owned by the local authorities.

Poland's Thermal Modernization Program provided loans and grants to housing associations and public institutions for thermal renovation projects.

The experience of Bulgaria in applying various energy project financing mechanisms – separately or in combination – provides probably the most diverse menu of opportunities the countries can utilize to promote investments in the urban heating sector:

1. State guaranteed credits from IFIs for financing of significant and socially important infrastructure projects, which due to legal, regulatory and other barriers could not be financed with standard bank credits: *Projects for rehabilitation of DHC Sofia and DHC Pernik.*
2. Standard bank credits used for co-financing of large projects and full financing of smaller projects.
3. Contemporary mechanisms for financing of investment projects including financial leasing: *Project for Construction of a cogeneration facility at DHC Varna.*
4. Joint Implementation Projects Mechanism according to the Kyoto Protocol for economically profitable greenhouse gases emission reduction and for attracting foreign investments.[5]
5. Equity. Successfully carried out price reform and implementation of modern methods for price regulation create opportunities for financing of investment projects with equity: *During 2004 the energy sector investments were about 960 million Bulgarian leva, of which 43% is equity.*
6. EU pre-accession funds for financing energy projects:
   - *Rehabilitation of district heating network of DHC Sofia - €30 million;*
   - *A financial memorandum for project for rehabilitation of DHC Pernik for the amount of €4.95 million was signed at the end of 2004;*
7. Privatization opening the heat market for private capital and investments, as described in the Privatization section of this report.
   - *The certified bidders for DHC Ruse had to meet the preliminary qualification requirement for equity amounting to at least €500 million, which provides a financial guarantee for investments in environmental protection and rehabilitation amounting to 1,350 million leva (preliminary estimation);*
   - *Through investment agreements with the purchasers included in the privatization contracts for the sale of energy companies. Investment agreements with purchasers of DHC Burgas, DHC Gabrovo and DHC Veliko Turnovo amounted to 23.55 million leva, necessary for modernization of processes for production and transmission of heat energy.*

The specific arrangements applied in the reviewed sample of programs and projects is summarized in the below table.

Table 5. The terms and conditions of the reviewed financing schemes

#	Program	Financial Features (lending terms, business	Main Conditions/ Requirements	Main Results	Special Emphasis on Low-Income

[5] For example, in Bulgaria projects are underway for rehabilitation of DHC Sofia and Pernik, JI project with Holland for DH Kazanlak, DH Yambol and Polymery JSCo; JI project with Holland for co-generation in DH Plovdiv; JI project for co-generation in DH Bourgas with Denmark; JI project for co-generation in DH Pleven and DH Veliko Tarnovo. In Ukraine, JI projects for DH systems with large numbers of boilers are proposed for Chernihiv oblast, JSC Oblteplokomunenergo; AR Crimea, LE Krymteplokomunenergo; Rivne oblast, DE Teplotransservis; Vinnitsya city, CCE Vinnytsyateplokomunenergo; Donetsk city, LE Donetskmis'kteplomerezha; Dnipropetrovsk city, RCE Dniproteploenergo; Luhansk city, LCCE Teplokomunenergo; and Khmelnytsky city, CCE Khmelnytskteplokomunenergo.

		plan, payback periods, IRR, etc.)			Families
1	Let‘s renovate dwelling-renovate City (Renew the House – Renew the City) Lithuania, Vilnius	n/a	Requirements for HOA: 1) HOA establishment and registration, 2) having as many voices as possible, decision in finance accumulation, basic contribution and plan.	60% heat cost savings were estimated; Improved living conditions; Improved living conditions; Increased real estate price (~ 30 %); Good example for other owners.	n/a
2	Building Energy Efficiency Revolving Fund Program in Gumri, Vanadzor and Maralik cities, Armenia	The condominiums take interest-free loans with a 6-month repayment period.	Small (USD $500-600) interest-free loans with a 6-month repayment period.	Around 2-3°C indoor air temperature increase during the heating period; Most of the households reported around 10-25% electricity and natural gas consumption decrease for heating purposes.	The Municipalities of Vanadzor and Maralik provided grant assistance to the low income households for participating HOAs.
3	Modernization and rationalization (M&R) of the thermal economy in Michalovce, Slovakian Republic	n/a	n/a	Reduction of natural gas consumption for generation of heat and reduction of network losses by 15.2%; Reduction of heat consumption by 20%	n/a
4	Reconstruction of the residential building by credits, Kuldiga, Latvia	Cooperative took a credit for 12 years with the interest rate of 10% per year.	Example: cooperative took a credit ~$100, 000 for 12 years with 10% annual interest.	Heat consumption decrease; The same heat price, but increased maintenance payment; Average indoor temperature increased from 15 to 20oC.	n/a
5	Demand Side Management (DSM) in Valmiera, Latvia	Building managers could take loan with 0% interest and three-year term. Around 1.5-2.5 payback period was calculated.	n/a	Around 120 MWh/year average savings per building.	n/a
6	Zaharna Fabrika (ZF) Foundation/ Refurbishment of a Multi-Family Building, Sofia, Bulgaria	Subsidized loan was provided to ZF Foundation at a low interest rate and repayment period of 20 years.	Monthly payments: $15-25/apartment.	Reduced energy use for heating by more than 60%. As a result, the residents are saving about US $350 per household on annual heating bills.	n/a
7	Energy Efficiency Retrofits in Concrete Panel Building, Rumburk and Brno-Liskovec, Czech Republic	The average subsidy is 15,000-20,000 CZK/flat, The residents' costs decline by a total of EUR10,843/yr, or EUR339 per flat	n/a	The improvements decreased by almost half (47%) the amount of electricity needed to heat a given area.	n/a

#	Program	Financial Features (lending terms, business plan, payback periods, IRR, etc.)	Main Conditions/ Requirements	Main Results	Special Emphasis on Low-Income Families
8	EE Retrofits in Concrete Panel Building, Brno-Liskovec, Czech Republic	Average of CZK16,000 per flat, cost savings of EUR5,500 per year, or EUR172 per flat.			
9	Housing Agency Program, Residential Energy Efficiency, Olaine, Latvia	The loan was given for 17 years at a 6% interest rate. The size of the loan was based on the package of recommended EE measures and estimated investments.	Residents had to complete a questionnaire about the existing conditions of their buildings and to provide a letter of intent stating that the apartment owners jointly agree to undertake EE measures.	Indoor air temperature increased from 17°C to 21°C, and the energy consumption decreased by around 20%.	Pensioners and other low income residents receive subsidies for energy and related O&M. Not possible to get money from the municipality for repayment of a loan.
10	Polish government‘s program supporting EE renovation measures, building at 115 Czerniakowska St., Warsaw, Poland	n/a	n/a	Around 30% actual savings for heating.	n/a
11	Municipally Owned and Managed Fund for Residential Refurbishments, Bytów, Poland	Loan repayments for a maximum of 5 years.	The HOA members should agree to pay twice higher monthly charges to their refurbishment funds.	Average Heat Cost Savings of around 7% for some participated building	Municipal housing allowance covers the contribution to the refurbishment fund for households unable to pay the minimum required in order to qualify for support from the foundation.
12	Program for Thermal Rehabilitation of the Multi-Level Residential Buildings in Romania	A complete return on the investment will be achieved in approx. 6-8 years, depending on the type of work carried out.	n/a	25% energy saving was estimated.	n/a
13	Thermomodernization Fund in Poland	n/a	The investor's obligation is to present the energy audit verifying savings required by by law.	Example: 1) Better comfort, 2) The market value of the flat raised by 10%, 3) The heat cost reduced by 0.45EUR/m^2/month	n/a

#	Program	Financial Features (lending terms, business plan, payback periods, IRR, etc.)	Main Conditions/ Requirements	Main Results	Special Emphasis on Low-Income Families
14	Case Study: Refurbishment project of a typical multifamily social house, Poland	The loan was secured by proxy to the bank account (no mortgage)	n/a	Average energy savings reached 35% and the accuracy of calculations in energy audit is +/- 5%.	n/a
15	Third Party Financing, Latvia	n/a	n/a	Only a few energy-efficiency projects have been implemented in Latvia according to this scheme.	n/a
16	Armenia Renewable Resources and Energy Efficiency (R2E2) Fund - WB Financed Urban Heating Project, Armenia			n/a	Grant to the poor for heating (gasification of apartments, installation of heaters or connection to the heating system of 8,000 households)
17	Croatia District Heating Project	ERR appraised at 17%, Actual 24.4%. Higher due to larger energy savings. Economic energy prices were higher that appraisal. FRR appraised at 13.8%. Actual 25.6%		1) Replaced 20.4 km of pipeline in Zagreb and 9.8 km in Osijek. 2.6 km of new pipelines. 17 new indiret substations in Osijek. 2) Government decided to proceed with voluntary DSM program because it didn't require major legislation change. However, incentives aren't enough because heat tariffs are low and savings are not adequate to pay back investment. 3) Energy losses decrease, water savings increase, increase in domestic connections, decrease in operating ratio 4) customer surveys showed satisfaction with heating service.	

#	Program	Financial Features (lending terms, business plan, payback periods, IRR, etc.)	Main Conditions/ Requirements	Main Results	Special Emphasis on Low-Income Families
18	Bulgaria District Heating Project	WB assisted in helping TS and TP sell carbon emission reductions to Prototype Carbon Fund Incremental costs of project implmenetation unit, financial mangement system and financial audits were financed by TS and TP. USAID grant covered consultancy services for private sector participation. EU Phare and KIDSF grants financed engineering, procurement, and supervision services for design of project, as well as some rehab of network. TS financed the public awareness campaign.	To achieve financial targets, TP took up court cases against debtors, sold debt, and arranged no penalty overdue payment campaigns. They also sold old and unused physical assets.	1) implemented consumption-based billing. Consumers can regulate their consumption. 2) increase in residential customers, due to automated DH substations 3) TS and TP no longer reliant on subsidies 4) improvement in collection ratio 5) reduction in heat and water losses, electricity and carbon emissions.	
19	Russian Federation Municipal Heating Project	payback varied from immediate to more than 20 years		Highest rates on investments came from regions where there was no metering before the project, but heat was purchased from an outside heat source. Investments under this project only covered a portion of DH systems. According to Rosstroi, total investments required to modernize the HCS sector infrastructure could take RUR 347 billion or 12.6 billion.	Focused on better targeting delivery of subsidies to low-income households. Housing allowances were introduced to all project cities.

#	Program	Financial Features (lending terms, business plan, payback periods, IRR, etc.)	Main Conditions/ Requirements	Main Results	Special Emphasis on Low-Income Families
20	Kyiv District Heating Improvement Project	20 yr repayment term, 5 years grace period. Variable interest rate LIBOR+0.5%. Amendment and WB policy in eligible expenditures changed, so Kyivenergo did not need to co-finance local expenditures -		1) Electricy and heat tariffs established. 2) ERR and FRR for some components of project - some new substations were about 10% above capital. 3) Postive impact on poverty alleviation, especially the poor.	
21	Estonia District Heating Rehabilitation Project			1) Larger reduction of fuel costs. 2) EE increases - 36 projects in small boiler conversion/replaceme nt program completed worth USD 7.4M. 3) DH companies restructured - AS Tallinna Soojus (formerly subsidiary of Eesti Energia and municipally owned Linnasoojus), AS Parnu Soojus was in works to be privatized, and in Tartu, DH assets were privatized to become AS Tamme Soojus.	

At this point, further studies could enhance the climate for financing with recommendations on how to move toward a standardized approach for measuring progress and assessing the impacts of different policies. Measurements of progress, such as a scorecard with benchmarks, could be developed with input from a combination of donor, financial institution, and business planning sources. An example is shown in **Table 6.**

Table 6. Scorecard on Heat Sector Investment Climate

Economic		
Level of cost recovery		
Private financing with:		
	Guarantees	
	Liens on assets	
	Soft loans	
Existence of incentive mechanisms for investments		
	tax and fiscal incentives	
Share of heat energy billed		
Share of billed heat energy payments collected		
Private ownership of assets		
Private sector participation forms possible:		

	Lease	
	Concession	
	Partial divestiture	
	Complete divestiture	
	Full privatization	
	Management contract	
	Other	
Environmental		
International agreements in place		
Existence of accounting/tracking framework		
Existence of institutional mechanism		
Number of CO_2 trades to date (i.e. experience)		
Social		
Independent administration of social programs		
Coverage of social safety nets (share of total customers covered)		
Share of utility bills covered by the social safety programs		
Regulatory		
Cross subsidies within fuel		
Subsidies existing across fuel		
Favorable feed-in tariffs for CHP		
Tariffs set nationally, regionally, or locally?		
Approved alternative heating sources available		
Are procurement procedures clear?		
Transparency		
Regulatory fees (tariff approval, licensing)		
Cost-based tariffs allowed (two-tier, cost-plus)		
Possibility to include investments in tariff		
Efficiency and service quality benchmarking		

Source: ASE Urban Heating Review, 2007.

A scorecard is not a new concept, but would provide a new, agreed-upon set of metrics and an approach for updating the metrics. This would enable investors and donor agencies to more transparently coordinate district heating sector activities with one another and with recipient countries, and it would enable recipient countries to more clearly understand the actions needed for their chosen heating strategy to meet international acceptance. The idea is to reduce search cost, and increase agreement and transparency. One alternative is to have a third party, public interest or research organization take on the task of monitoring /update the scorecard, with an annual meeting of the major organization meet annually to review progress and coordinate actions.

Conclusions and Recommendations

The reviewed programs and a large number of case studies documented by various groups provide sufficient evidence that energy efficiency improvements have and can help vulnerable households in Ukraine and neighboring countries, and that energy efficiency is the quickest, cleanest and cheapest way to bring comfort and economic mitigation to these households. Unfortunately, the experience with residential end-use energy-efficiency projects is still very limited, and documentation of that experience scarce, so there is a need to share the available experience to apply the lessons more widely to implement energy efficiency improvements among residential consumers in general with special provisions to ensure the inclusion of

vulnerable households. Most importantly, local institutions at all levels need to be strengthened and coordinated so that policies and programs aiming to protect vulnerable households will take advantage of the plentiful but untapped resource of energy efficiency. Donors, governments, financial institutions, utilities and municipalities could save money and natural resources through residential energy-efficiency programs that ensure the inclusion of vulnerable households.

The reviewed case studies testify that helping the low-income households on a sustainable basis should aim to decrease their consumed energy, rather than help them pay the bill. The appropriate program or financing scheme should target energy efficiency and energy saving, while reducing the bills as well as improving the comfort of the low-income households.

Furthermore, it is recommended that the programs supporting the implementation of EE via soft loans, grants and other customized financing tools solely target the most vulnerable, instead of uniformly including consumers of various income groups.

Several insights emerged from case studies and country-specific research conducted under earlier USAID assistance about residential energy efficiency in SEE/CIS:

- Energy Efficiency Might Not Save Money but Help Achieve Comfort: Most vulnerable households calibrate energy consumption to their affordability, hence end up in sub-optimal comfort conditions. In such cases, energy efficiency may leave the bills unchanged, but bring the indoor air temperature to normal, rather than under-heated. This has significant non-monetary improvements in lifestyle, comfort, health, etc. Such cases have been registered especially when the energy tariffs have escalated during the project monitoring period, and often resulted in zero monetary savings, but improved comfort and reduced energy consumption. In such cases, it is important to report what the bills would have become in the absence of the energy efficiency upgrades.

- Customized Financing Schemes Are Necessary: Some residential energy efficiency measures have short-term paybacks, some – longer. Given the difficult economic conditions in CIS/CEE countries and legal barriers to condominium borrowing, customized financing schemes are necessary for streamlining investments towards residential energy efficiency, where experts show from 30 to 60 percent of energy can be saved. These schemes specifically require substantial ―soft" assistance, such as support for development of the projects and applications, subsidized energy audits, continued assistance during the first few years of operation of the project, if it is technologically intensive.

- The Governmental role, mostly in form of the subsidies, will promote the implementation of residential EE, and will encourage HOA/residents taking the loans. Moreover, since the financial markets prefer to observe a certain risky lending product prior to offering it using their own equity, Government‘s role is instrumental in attracting development credits and facilitating the combination of soft lending and technical assistance, along with the necessary legal and regulatory reform for elimination of investment barriers. For example, the Bulgarian Ministry of Regional Development and Public Works has officially launched the National Program for Renewal of the Building Stock in the Republic of Bulgaria which proposes a 20% subsidy. If this subsidy is effectively coupled with the opportunities offered by other programs (the credit line for energy efficiency offered by the European Bank for Reconstruction and Development, the Bulgarian Energy Efficiency Fund, as well as DIGH) or any future ones it can prove to be a great success in modernizing the building infrastructure in Bulgaria.

- The HOA should be more creative and find solutions for further repayment of the loans. For example, in Sofia, Bulgaria, when the refurbishment (under Zaharna Fabrika Foundation) strategy in multi-apartment building was limited by the homeowners‘ ability to repay the loan on a monthly basis, the HOA planned to generate income by renting out the two newly-created flats in the attic after the refurbishments were completed.

- Good relationships between the HOA, residents, local governmental bodies, private companies and other participants can ensure effective implementation of different financial mechanisms for EE improvement in residential buildings. Furthermore, the HOA‘s participation, which can be monetary as well as labor, in building EE and other refurbishment process is very important for building further maintenance and operation. *Example: In Sofia, Bulgaria, when the refurbishment (under Zaharna Fabrika Foundation) of the building was conducted, the residents of the building helped with the finishing touches such as painting of the staircase and part of the façade. This reduced the total cost of the refurbishment. Moreover, the residents are actively involved in rehabilitating the courtyard space around the block, partially financed by the Sofia Municipality.*

- While the state is interested in reduction of emissions and fuel (especially imported) usage, the municipalities are first and foremost interested in meeting their responsibility to assure at least the minimum acceptable living standards of vulnerable households. These goals could be better accomplished through coordination of state and municipal resources to ensure that energy efficiency refurbishments include buildings with **vulnerable households.**

  In Bytów, Poland, when the refurbishment was conducted with the help of Municipally Owned and Managed Fund, the municipality‘s housing allowance usually covers the contribution to the refurbishment fund for households that cannot pay the minimum required in order to qualify for support from the foundation, formed by the City Council using the revenue from sales of municipal apartments.

  In Armenia, within the Building Energy Efficiency Revolving Fund Program in few cities in Armenia, the Municipalities of Vanadzor and Maralik provided assistance to the low income households for participating condominiums.

- If the energy audit is conducted properly, and/or cost-effective EE measures were implemented the loan repayment is not a difficult burden for HOAs/residents.

  In Bytów, Poland, when the refurbishment was conducted with the help of Municipally Owned and Managed Fund, the repayment of the loan (without interest, which was covered by the foundation) is not very difficult for HOAs‘ members, because the heat cost savings achieved by the households help to cover the monthly payments into the HOAs‘ refurbishment funds, which is the source of loan repayment.

- Grant Financing Should Carefully Target to Those in Need– residential energy-efficiency programs for multifamily buildings should target all households (preferably through loans) but have special provisions (grants) for vulnerable households so that they may participate in the project from the beginning and are not deterred by the costs that households are expected to contribute. Some of the state-sponsored residential energy-efficiency programs have such provisions (e.g. as in Lithuania) and the experience and challenges with implementing them deserve closer study so that barriers can be lowered.

In others (e.g. Armenia) vulnerable households were grant-subsidized by the municipality, while the rest of the HOA members borrowed zero-interest loans.

- Affordable Housing Programs Could Benefit from Energy Efficiency – Several countries have introduced programs to make housing more accessible and affordable to vulnerable populations. Affordable housing needs to be energy-efficient so that bills for heat, electricity, water and wastewater are manageable for those who will be paying them, and so that the occupants of this housing are ensured a satisfactory level of comfort and basic energy and water services. While the energy-efficiency aspect of affordable housing programs may be implicit, it must be explicit and closely monitored to protect the residents and bill-payers of these homes, but also to track the real effects of energy-saving measures and technologies in such buildings.

- Institutional Strengthening is Essential – many residential energy-efficiency programs require that applicants be housing associations, which may exclude many vulnerable households living in rented flats or buildings that have not associated. Energy efficiency programs must reach these households and work more closely with community organizations, housing agencies and municipalities to do so. One of the ways to strengthen housing institutions is to offer an affordable consulting and information through housing advisory agencies (as in Lithuania, Armenia).

- Collaboration is Necessary: One of the most important conclusions is that energy efficiency financing for vulnerable households is a complex and resource intensive undertaking and collaborative effort can be instrumental. Such collaboration is particularly important between the various groups targeting different components of the social issues: welfare and social services, energy and energy efficiency agencies, utility companies, NGOs, state and local governments. For example, municipalities, social welfare services and utilities are those with most capacity to address this issues:

    - **Municipalities** benefit from helping the general population save energy because constraints on energy and water resources are a concern throughout the region and in towns where bills are high, consumers are less able to spend their money in the local economy. If bills exceed affordability thresholds beyond what consumers can pay, nonpayment can cause financial problems for the utilities, some of which are municipally owned, and subsidies are frequently paid by municipalities. Municipalities need more incentives to improve residential energy efficiency in flats where vulnerable households reside (with social assistance from the municipality), and in the general multifamily population. Cost accounting of the status quo compared with net savings (i.e. the difference between costs of residential utility bills before and after a project) from energy-efficiency measures can illustrate how energy efficiency can make utility services more affordable and thus ease the transition to more market-based tariffs. It is also important for municipalities to see the difference between the investment costs for energy efficiency and the sum of net savings over a project‘s lifetime. The investment costs are one-time costs that yield savings over time, while traditional subsidies are paid continuously and do not yield savings.
    - **Utilities** can play a big role: By legal requirements for utilities to support consumer EE improvements and awareness campaigns, district heat, electricity and natural gas utilities could be made accountable for energy efficiency and conservation and encouraged to do so aggressively and cost-effectively. If the utilities support the low-income EE programs, the cost of programs specifically

targeted at low income customers, including related public education and outreach, should be recovered in utility rates. Similarly, the cost of low income programs of the electricity utilities should also be recovered in rates. Utilities should be encouraged to use local community groups that supply services to low income households and non-profit groups with experience in delivering energy efficiency programs as delivery channels for their energy efficiency and conservation programs.

  - **Social assistance / safety net funds** can be tapped for EE financing – The social assistance is often used to pay bills in vulnerable households, hence the social services and policy-makers, if given evidences how EE can reduce the social hurdles in benefit recipient households, may become interested in targeting some of the social assistance to low-income EE financing. The rules for using housing allowances and social benefit money to finance loans are understandably restrictive. The funds can be used most typically for basic housing and utility costs, food, etc. As a way to enable Latvian pensioners (for example in Latvia) and other lower-income households to help pay for energy efficiency investments, the loan repayment structure in housing associations was set up so that households make their contributions through the monthly sum paid to the HOA manager for operations and maintenance (O&M) related to energy, which is an allowable expense for social benefits. All households repay their ~~"e~~nergy-efficiency loans" by paying a higher amount in monthly fixed O&M costs until the loan is repaid.

- Monitoring and Evaluation of Projects Should Include Affordability Impacts – better empirical data are needed about residential energy and water demand, and price elasticity for all income levels so that there is a greater understanding of which households are vulnerable to utility price reforms. When reforms do not produce expected results, the gaps in data are often reasons for discrepancies between expectations and realities. And as the UNDP and Bulgarian Energy Efficiency Center concluded based on their experience with the Gabrovo project – one of the more comprehensive and thoroughly documented residential energy-efficiency projects in CEE/CIS, long-term monitoring is crucial to understanding the benefits and costs of energy efficiency, and monitoring has to start from the beginning of a project. To make well-informed policy decisions, greater rigor is needed in evaluating energy efficiency projects and programs, and harmonization of evaluation techniques within each country and across the region could facilitate more investment in energy efficiency and reduce the cost and administrative burden of evaluation. A well-developed range of evaluation methods and tools exists in western countries and they should be utilized more broadly.

- Integrate End-Use and Supply-Side Efficiency Options – Improvements in energy efficiency need to take place in supply as well as end-use. Better quality services must accompany price reforms. Efficiently supplied energy and water can be offered to consumers at a lower price. Consumers should be billed based on consumption to encourage them to use and pay for only what they need.

- Consumption Based Billing and Thermal Regulation are Fundamental – Metering of energy and water use at the building level needs to be universal. The quality of the meters, and the ability of institutions to enforce metering is very important for affordability. Once they have the knowledge of what they are consuming and a bill based on that consumption, households must have the means to regulate how much they consume.

- Building Energy Performance Standards and Appliance Labeling Are Essential – Although they might not affect today‘s vulnerable households, policies that lead to better building energy performance and efficiency of home appliances and lighting and related equipment (boilers, heat and water distribution systems) will improve affordability of all households for years to come. However, the institutional capacity to enforce these policies is needed.

- Energy-efficiency procurement programs could help increase the uptake of efficient technologies in housing that is still publicly owned, and set an example for residents in privatized housing. Some of the experts contributing to this study feel that energy-efficient appliances could be a very important aspect of social assistance programs targeted at vulnerable households.

Methods for Evaluation Need to Be Quantitative and Qualitative – There is no commonly used standard method of evaluating energy-efficiency work in CEE/CIS, and this lack of a standard evaluation makes it very difficult to compare and contrast the results from projects and programs across the region. While documenting and evaluating energy-efficiency projects, project implementers should take advantage of existing methods for evaluating social and economic impacts to enable better and more accurate comparative analysis, and to assign appropriate weight to benefits that are particularly hard to quantify. Furthermore, social impact analysis can help policymakers, donors and IFIs, and local stakeholders evaluate the impacts of reforms and energy-efficiency programs both quantitatively and qualitatively. For example, the cost of energy-efficiency projects and programs that target vulnerable households may be considerably higher because these households do not contribute with their own scarce resources, and the benefits might be improved comfort at the same cost instead of improved comfort at a reduced expenditure. However, the net benefit is still positive when considering the improvements to quality of life and to society when fewer households suffer from lack of basic needs.

- Public Awareness Campaigns are Necessary to Make the Link Between Affordability and Efficient Energy Use – As energy prices continue to make headlines, media and all institutions trying to address affordability concerns should publicize the results of local energy-efficiency projects and international experience when local examples are not available. Product and service suppliers as well as governmental agencies and NGOs can contribute to the documentation and publicizing of what energy-efficiency measures are available and effective in their respective cities and countries.

- Before designing a large-scale program, a small-scale program can be designed to test, calibrate and adjust all components such as financing terms, administrative support necessary, awareness and other support necessary. These are not only important to achieve success, but also get a clear understanding of true costs.

Annex I. Types of Special Purpose Financing and Funds

Within the USAID-funded MUNEE program, the Alliance to Save Energy has worked to assist the countries of CEE and CIS in creating favorable investment environment for energy efficiency improvements. The MUNEE Program documented case studies, described the investment barriers, developed investment guidelines, etc. With additionally leveraged financing from the REEEP, the Alliance also produced guidelines for financing municipal energy efficiency investments in CIS countries.[6] The below overview presents a discussion of the existing mechanisms that can be used for financing municipal energy efficiency in the CIS, including the special purpose and third party financing mechanisms.

1. Special Purpose Funds

A. Grants

Grants are given on a selective basis to municipalities in the CIS through several grant programs created by Western governments during the last 15 years to finance causes that improve the environment and quality of life, including energy efficiency. Usually, grants require co-financing by the municipality or other external sources, such as local commercial banks. If the municipal energy efficiency project provides large-scale ancillary benefits such as improved health and lower greenhouse gas (GHGs) emissions, and supports the priorities of the national, regional and local governments, the Global Environment Facility (GEF) is a resource that should be considered. The GEF is a facility of the United Nations Framework Convention on Climate Change (UNFCC) with the United Nations Environment Programme (UNEP), United Nations Development Programme (UNDP), and the World Bank serving as implementing agencies. Since all CIS countries are parties to the UNFCCC, they will be eligible for the grants provided that the projects are in line with the facility‘s priorities. Grants are usually provided as a percentage of total project cost and depend on the size and the stage of the project.

B. Revolving Fund

A revolving fund (RF) is usually established to fund a specific activity that is defined by the investors and owners of the fund. Because a RF requires only a one-time initial investment, assuming it is managed properly to accumulate adequate savings to sustain future financing, it does not depend fully on external investors or on the municipality‘s credit rating. The original investment in a RF can come from a variety of sources, such as targeted budget funds, local and international bank loans, international donors, private companies, organizations, and the government. in order to reap the maximum benefits from the savings obtained through investments of the RF, it is necessary to ensure that metering and monitoring of energy savings is accurate and systematic. This requires that all energy-consuming entities be equipped with metering devices, which is a costly and lengthy project in its own right. In addition, a RF functions best where municipalities are able to retain the savings from energy saving projects for future reinvestment.

[6] Available on www.reeep.org.

Administration in Kyrgyz Republic. The Bishkek revolving fund shows that savings from the implemented energy efficiency project are paid back incrementally into the bank account within a fixed time period. RFs with larger initial investments and longer repayment periods are capable of financing more projects because they accumulate more funds. In order for the RF to be effective and successful, functioning metering technologies, monitoring of results and cooperation of local authorities are essential.

A municipality can establish its own energy efficiency RF, or apply to participate in an existing RF that can be owned by a variety of entities such as a private company, a non-profit organization, or by a government. The scale of the RF depends on its aims, but the known funds in Armenia, Russia, and Ukraine have loaned as little as $500 for a single project. The RF is usually created as a bank account under the name of the owner of the fund. It is also common for the RF to have an operating body that manages the project financed by the RF. Annex 3 presents a case study on a RF set up by the Nordic Environment Finance Corporation (NEFCO) in Petrozavodsk, Russia. The RF has been successful because the Petrozavodsk City Council provided special permission to enable the city to retain and reinvest the savings from energy efficiency project.

Fund for Revolving Financing of Projects for Buildings in Lutsk

The Executive Committee of the city of Lutsk, Ukraine, in cooperation with a private residential maintenance organization and funding from USAID, created the Fund for Revolving Financing of Projects for Buildings in Lutsk (Fund) for improvement of energy performance of the public and residential buildings in Lutsk. With assistance from the Alliance to Save Energy, the Fund was created as part of a special project aimed at implementing a complex automated control energy consumption system in four multi-level residential buildings. Regulation of the Fund for Revolving Financing of Projects for Buildings in Lutsk was drafted and approved in November 2006. The implementation of the Fund was just beginning when this report was completed.

It is necessary to highlight that implementation of the Fund would not have been possible if the city of Lutsk did not understand the benefits of creating the Fund, and did not directly facilitate passing of the regulations on functioning of the Fund.

If the municipality is borrowing from a RF established by another entity, the municipality can act as a direct borrower if it is implementing the project on its own, or have a contractor such as an ESCO carry out the borrowing and project implementation. If the municipality has decided to set up its own energy efficiency RF it needs to consider the local laws that regulate establishment of RFs in different banks.

A RF emerges as a self-sustaining financing mechanism after the first capitalization. Many small and medium-sized RFs have been created to fund municipal energy efficiency projects throughout the CIS, though most of the time co-financing from other sources is required to cover all project implementation expenses. However, there are still barriers in many CIS countries for developing revolving funds. For example, when the Alliance to Save Energy provided assistance to the city of Lviv in preparing legislation on the functioning of an RF in the city of Lviv, Ukraine, the local government rejected it due to insufficient funding and human resources.

C. Guarantee Facilities for Commercial Bank Loans

If the municipality is rated by local financial institutions as a reliable partner, and possesses enough cash inflow to service its loans, financing of EE projects by commercial bank loans may be a viable opportunity. The calculation of the economic cost of the project must account for the interest rate costs on the loan and the repayment schedule of a loan. It is also important to consider the possible service and other charges applicable to the loan. Long term loans—of 10 to 15 years—might be hard to obtain, though this dependson country-specific financial markets and banking sector conditions. In considering a project for commercial bank financing, banks assess a municipality's cash flow and financial viability.

Usually, if a municipality's credit rating is unsatisfactory due to lack of previous financing experience, credit guarantees can be obtained from special guarantee facilities established by international donors and international financial institutions (IFIs) to lower barriers to commercial financing. States might also guarantee loans taken by municipalities. The guarantees offered through the aforementioned facilities typically cover up to 50 percent of a loan, while the rest must be guaranteed through collateral or another party so that risk is shared and so that the guarantee facilities can help mobilize commercial financing for more projects. Some notable examples of guarantees for commercial loans are the IFC's facility in Hungary and "Commercializing Energy Efficiency Finance" program in five Central European countries, and the USAID's Development Credit Authority (DCA), described in **Box 2**.

Box 2. Development Credit Authority

The Development Credit Authority (DCA) is a broad funding authority that allows the United States Agency for International Development USAID to issue loan guarantees that promote development in countries where USAID has an active presence. The purpose of DCA is to enhance credit, with true risk sharing on the part of private and public sector partners, by guaranteeing up to 50% of the principle of a loan. Some of the priority areas for DCA are global climate change, small business promotion, and energy and environmental infrastructure.

For example, the DCA program in Bulgaria is a unique financial mechanism to develop sustainable energy efficiency financing. Under the DCA program, USAID/Bulgaria provides guarantees (50% of outstanding principal) on behalf of non-sovereign project sponsors (qualifying borrowers) in favor of the United Bank of Bulgaria (UBB). Within the Municipal Energy Efficiency Program (MEEP), a pipeline of projects was developed as part of a DCA portfolio. Similar DCAs currently exist in Macedonia, Bosnia and Herzegovina, and other countries of the region for lending to municipalities, SMEs and residential sector for EE.

For more information consult http://www.usaid.gov/policy/budget/cbj2007/an/dcaaii.html

Though local financial markets are much more developed than a decade ago, and it is easier to obtain commercial bank funding, interest rates are still very high and municipalities are often limited on how much they are legally allowed to borrow. There are also bank regulations, which make long-term loans too costly for borrowing to be a viable option. However, when municipalities have their loans guaranteed, they become popular customers with banks. A

substantial portion of financing for municipal EE projects in the CIS in the past 15 years has come from IFIs, such as the European Bank for Reconstruction and Development (EBRD), the European Investment Bank (EIB), the World Bank (WB), the International Finance Corporation (IFC), and Nordic Environment Finance Corporation (NEFCO). According to the United Nations Economic Commission for Europe (UNECE) –direct loans to public enterprises have been ruled out by IFIs…though exceptions at a smaller scale are made for different types of rehabilitation projects, where there is a low degree of private sector interest" (UNECE, 2005). Therefore, the loans have to be backed by sovereign government guarantees.

D. Municipal Bonds

Issuing municipal bonds, or debt, in procuring funding for municipal energy efficiency makes the most sense when the size of the municipality is significant enough to attract the attention of investors for financing its ventures. Issuing municipal bonds requires lengthy and expensive preparatory work that consists of analyzing and forecasting the municipality's financial resources, and launching a procedure for obtaining a credit rating from an international credit agency (e.g. Moody's, S&P, Fitch, etc). The municipality also needs to define bond emission parameters and prepare an Investment Memorandum. Bond financing is beneficial when the revenue from bond issuance is eligible for tax breaks or tax exemptions. Interest on bonds is usually paid out semi-annually; short-term bonds pay interest until maturity, and interest on long-term bonds is amortized through annual principal payments. The downside to bond financing for municipal energy efficiency is that benefits from the project accrue over time, usually 5-10 years, while repayment of principal on the bonds has to occur simultaneously at maturity. This can create cash-flow issues for the municipalities if bonds' maturity date is not correlated to the financial savings from the energy efficiency project. Certificates of participation or lease buyback agreements are similar forms of debt issuance though might not be available to many municipalities.

An example of the use of bonds to finance EE is the city of Varna in Bulgaria, which issued municipal bonds to obtain a relatively large volume of low cost financing for an EE project involving retrofit and modernization of the city's street lighting. The bonds raised €3 million, and the simple payback of the project was 2 years and 9 months. The municipality collected relatively high volumes of financing by issuing general obligation bonds at 9 percent interest in comparison to the 12-14 percent that was offered by the banks. Repayment of the bonds was done in three equal portions during a three year period, primarily as revenue bond emission through the savings. Six other cities participated in issuing bonds to raise funding for their projects. According to EnEffect, serious shortages of long-term financing still exist in municipalities in Bulgaria, and though raising bonds is an option, the associated procedural requirements make bonds an option only for the more advanced municipalities.

E. Joint Implementation

A myriad of technical demonstration projects attest to the fact that municipal energy efficiency in the CIS countries has a large energy saving and emission reduction potential. Many of these technical projects can serve as a basis for generating carbon revenue through Joint Implementation (JI) or Clean Development Mechanism (CDM) methods.

Not only can JI provide additional revenue to municipal energy efficiency projects, but it can also:

- Ensure a secure revenue stream that is not affected by fluctuations in fuel costs,

exchange rates, and contract conditions;

- Increase the awareness of and confidence in energy efficiency retrofitting through the use of a monitoring system;
- Establish links to public administrative systems and, thus, get political commitment and support;
- Provide revenue to the housing association that can be used for other common purposes if the crediting period is longer than payback time of loans.

Some of the potential JI and CDM municipal project opportunities include:

- Retrofitting buildings to improve thermal performance;
- Modernizing the DH systems to switch to low carbon intensive fuels, reduce system losses, improve generation efficiency and better demand-side management (DSM);[7]
- Improving efficiency of street lighting; [8]
- Improving efficiency of energy use in municipal water supply and wastewater treatment;
- Reduction of fuel use in municipal transportation.

Other opportunities, which are not solely targeted at efficiency, include capture and utilization of land-filled methane at solid municipal waste disposal sites, as well as on municipal wastewater treatment sites; switching from conventional fuels in municipal energy generation facilities, e.g. switching from coal or gas to local biomass (wood waste).

JI and CDM are regulated by internationally agreed procedures, which state that the project developer must document that the project will result in emission reductions that would not have occurred without the project. In JI projects, emission reduction units (ERUs) are calculated by comparing the baseline emissions level with the level after the project has been implemented. The host and investor countries also have their own regulations to which they must adhere. The methodologies regulating JI and CDM have been primarily designed for CDM, and the existing approved methodologies for end use energy efficiency projects under the CDM can be used for JI energy efficiency projects in the residential sector in Eastern Europe as described below:

(a) Methodologies for baselines and monitoring, including methodologies for small-scale project activities, approved by the CDM Executive Board, may be applied by project participants under joint implementation, as appropriate.[9]

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[7] More in this respect has been done in Central and Eastern Europe (CEE), and replicable experiences are found in Romania, Bulgaria, Hungary and Baltic States. In Ukraine and Russia (for JI) as well as other CIS countries (for CDM) there is still a large potential for introducing metering and regulation on the demand side of district heat supply. Such Demand Side Management (DSM) measures also motivate modernization and efficiency improvements on the supply and distribution side. Moreover, presence of meters at the building level is a precondition for development of JI projects. Energy consumption levels need to be documented in order to claim energy savings. The benefits of installing DSM instruments are well known to the consumers throughout the region, yet the equipment is too expensive and the high upfront capital investments create a barrier to widespread installation.

[8] To date, many of the cities in the CEE and CIS countries rely on outdated lighting systems which are not only extremely energy intensive but also provide low quality of street illumination. Many of these projects are not bankable in the absence of carbon financing due to low baselines.

[9] Decision from COP/MOP to the Kyoto Protocol in Montreal.

(b) The relevant parts of the CDM project design document, and of the project design document for small-scale clean development mechanism project activities, may be applied by project participants under JI, as appropriate.
(c) Under the Marrakesh Accords,[10] small-scale activities were defined as ―Energy efficiency improvement project activities which reduce energy consumption on the supply and/or demand side by up to the equivalent of 15 GWh per year." The small-scale projects also presume that much smaller projects can be bundled within the 15GWh/year size limit. This would be particularly convenient for building-level projects which usually are far below the size limit.

The number of projects that are implemented using these methodologies is, however, very low.[11] In addition to the difficulty and bureaucracy of the CDM/JI approval and verification process there are a number of barriers to the uptake of municipal EE projects and subsequently to using CDM/JI as funding mechanisms. These include low affordability of utility services for end-users, which often results in low collection rates and hampers successful project implementation; and restrictions on end-user funding for DSM-projects. Another barrier is unclear ownership structure in residential housing, where apartments have been almost fully privatized, but the common spaces (roofs, staircases, basements, internal infrastructure) are still owned by municipalities. These, combined with a lack of awareness and willingness to take initiative, have served as barriers to timely implementation of CDM/JI projects in the region.

In CIS countries, the CDM/JI framework has been developing in the last few years – designated national authorities (DNA) were established, the local capacities for processing CDM/JI projects strengthened, and some pioneer projects already entered the pipeline. European donors are pursuing CDM/JI projects, while IFI carbon funds, such as the World Bank Carbon Fund act as clients for potential projects.

Municipalities in the CIS can play an important role in CDM/JI project identification. A potential CDM project can be identified and developed by host country project developers. These may also be private companies, NGOs, governments, municipalities, foundations, international organizations, or international investors.

When a municipality selects a project, it can work closely with project developers, designated operational entities, and the host country government (the designated National Authority, DNA) in preparing the Project Idea Note (PIN) and Project Design Document (PDD). If the PIN is approved and the PDD is developed, the municipality can play an important role in organizing stakeholder consultations, and providing its support for the project, particularly if it includes municipal assets or enterprises. For example, in Armenia—which as a non-Annex B Party to Kyoto Protocol may participate only in CDM projects—two district heating rehabilitation projects in Avan and Davitashen districts of Yerevan are currently undergoing CDM project development for the introduction of combined heat and power.

Moldova, another CDM host country, recently established its DNA and project approval procedures, and as a result the ―Moldova energy conservation and greenhouse gases emission reduction" CDM project was validated. The World Bank's Community Development Carbon Fund (CDCF) is promoting small-scale CDM projects. The project consists of EE improvements and fuel switching measures for a series of public buildings (kindergartens, schools, vocational schools, hospitals, policlinics etc.). The project is based on the heat supply and efficiency improvements component of the World Bank Moldova Energy II Project, which is being implemented in the Republic of Moldova and contains four components:

[10] Outcome of the Conference of Parties (COP) to UNFCCC in Marrakesh (www.unfccc.int).
[11] For more information, see www.cd4cdm.org

electricity system upgrades; heat supply and efficiency improvements; technical assistance and project management. The project is expected to reduce GHG emission by approximately 11,567 tons of CO_2-equivalents (tCO_2e) per year.[12]

Similar projects were designed and are under way in other CIS countries. Box 6 provides details on a district heating project in Crimea, Ukraine the documentation for which recently commenced. Project implementers believe that JI and CDM will attract significant investment into municipal EE, particularly for supply- and demand-side retrofits in municipal heating and building modernization. CDM and JI project design requires close compliance with the modalities of these projects, methodologies, rules and guidance from the UNFCCC.[13]

[12] Full Validation report available at http://cdm.unfccc.int/UserManagement/FileStorage/B9T0BR5JFSQA6SVBUV61XC013CKDQP.

[13] http://cdm.unfccc.int should be consulted regularly for recent methodologies and guidelines.

Box. Joint Implementation Project: Rehabilitation of the District Heating System in Crimea, Ukraine

Energy efficiency of the district heating (DH) systems throughout most of Ukrainian regions is very low. The Ukrainian DH sector is in the midst of two-sided pressure of low tariffs and increasing fuel prices. As a result of depreciated fixed assets, the DH sector in Ukraine has large potential for GHG emission reductions through DH rehabilitation. However, financing for this type of work is largely absent and project implementation rate is extremely slow. Taking advantage of the JI mechanism can help speed up the DH rehabilitation measures and reduce GHG emissions. Since Ukraine is an Annex B country many of the JI projects considered for implementation in the country are in the DH sector.

―Krymteplocomunenergo", a district heating (DH) company that provides heat and hot water supply services, maintenance of boilers, networks and other energy equipment to the Autonomous Republic of Crimea started a Joint Implementation (JI) project in 2004 that aims to rehabilitate and modernize the DH system.

The project is currently under preparation and is planned to commence in 2008 when the Kyoto Protocol is activated. The key features of the project include:

- Rehabilitation of 188 boiler houses;
- Switching from fuel oil to natural gas;
- Replacement of 43km of heat networks with pre-insulated pipes;
- Installation of 6 CHP units (total installed capacity 3 MWe);
- Landfill gas recovery and utilization for energy purposes;
- Substantial fossil fuel saving;
- Increased reliability and energy efficiency of the DH system of Crimea;
- Lower environmental pressure in the region.

Total investment is expected to be US $28 million. The table below presents the economic characteristics of the DH rehabilitation project with and without the utilization of the JI mechanism.

	Without carbon credits sales	**With carbon credits sales**
Net Present Value	-$716,052 USD	$2,183,653 USD
Internal Rate of Return	9.10%	13.10%
Simple Payback Period	7.2 years	5.7 years
Discounted Payback Period	10.9 years	7.9 years

Currently, an expression of interest was delivered to the Austrian JI/CDM program. Consultants from the Institute of Engineering Ecology and SEC ―Biomass" in Ukraine, and STV, Germany worked to develop PIN and PDD. The ―Krymteplocomunenergo" used TÜV SÜD Group as the ―validator" and has agreed to provide a share of investment in the project. The DH company expects to receive a letter of approval from host country DNA by the end of 2007.

The baseline calculations are obtained by measuring CO_2 emissions from boilers and CHP units operated by ―Krymteplocomunenergo"; emissions of CH_4 from Simferopol MSW landfill; and CO_2 emissions from boiler house that consumes landfill gas and CO_2 emissions from emergency flares. During the five years between 2008 and 2012, the project is expected to accumulate 711,344 emission reduction units in tons of CO_2-equivalents (tCO_2e).

Source: Scientific Engineering Centre "Biomass." www.biomass.kiev.ua

2. Third Party Financing

A. Leasing

A lease is essentially an agreement to either enable temporary use of equipment without purchasing, or to acquire equipment by paying for it over time. It is beneficial for small municipalities who are very limited in their financing options due to lack of credit history or are unable to obtain co-financing from grants or bank loans. The payments include both principal and interest and are made over a fixed period of time. Payments are usually made monthly, but can be structured in quarterly payments, or as otherwise agreed upon by all parties. A capital lease requires the transfer of the asset in question to the lessee at the end of the period while an operating lease allows the lessee to merely pay for use of the asset while it is needed. For the most part, lessor will tailor terms according to the municipality's specifications. A municipality might consider leasing its assets for the following reasons:

- Cities face strict borrowing limits (this is typical for many but particularly for EU-accession countries) and leasing may not count as debt – depending upon legislation.
- Leasing permits acquiring equipment when needed, without having to make a lump sum up-front payment. This spreads out the cost over time, making it easier on budgets.
- A lease-to-own agreement allows equity to be built up in the equipment over the term of the contract for future trade-in value.
- Leasing provides a real-time solution to worn out equipment, unanticipated capital equipment needs, and allows a higher level of general needs to be met without having to sacrifice other essential services.
- The lessor can take the responsibility for quality of equipment, its operations, and related energy savings.
- In some countries, leasing companies that receive interest on leases to municipal governments do not pay income tax on that interest. There are other tax benefits that might be available for leasing companies in Eastern Europe and their savings can be passed onto the city governments in terms of lower interest rates; municipal leases can therefore be priced at below market interest rates.
- Municipal lease payments may be paid from general operating revenues.

Currently, some CIS countries such as Ukraine are bound by a limited selection of lessors. If municipality is interested in companies that might provide lease financing, Leaseurope is a society of leasing associations which provides contacts for leasing companies in the region. In addition, many countries in the CIS have leasing trade organizations.

B. Vendor Credit

Vendor credit financing is also known as _point of sale‘ financing. Through an agreement between a vendor and the municipality, the vendor sells equipment to the municipality under a repayable loan. The terms for the loan are agreed upon between the municipality and the vendor and are usually short-term.

Usually in the CIS countries, the vendor credit scheme used by municipalities requires participation by four entities – the lender, the sponsor, the borrower, and the guarantor. The lender is the manufacturer of energy efficient equipment and can either be domestic or foreign. Vendor credit usually provides favorable financing rates and the cost of credit is relatively inexpensive. The sponsor can be a private domestic company that holds equity in the project. The sponsor designs the project, negotiates agreements and contracts, arranges the financing, and carries out other tasks associated with project development. A sponsor may have a collaborative financing arrangement with a vendor and might assist the vender by marketing equipment loans or leases to customers under specific credit terms and conditions that are acceptable to the borrower. The borrower is the municipality which purchases energy efficient equipment. In some cases when the municipality requires a credit guarantee, the fourth party – the guarantor – might be involved. The guarantor, such as the local commercial bank or the city council, is involved upon request by the vendor or the sponsor of the projects to ensure credit.

There are many vendors that offer credit for projects. For example, Danfoss, a supplier of metering and control technologies has done this type of financing in 20 Ukrainian cities. Though vendor credit is a readily available financing tool that enables municipalities to obtain equipment as a low cost, due to the underdeveloped tendering procedures in many CIS countries it can result in ambiguous quality of financing and equipment.

Another problem with this method is that the projects tend to be small. But the projects are highly replicable if the municipality can demonstrate it is a good customer. Thus, in terms of developing an investment strategy, smaller municipalities should go for smaller but more realistic sets of investments. Whereas the City of Rostov-on-Don in Russia might pursue a bank loan from a large commercial bank like Citibank, a small city in Moldova should contact the local office of an equipment supplier to explore vendor-credit options.

C. Performance Contracting

Though still very much a nascent financing tool in the CIS, performance contracting (PC) is applicable when energy-cost savings are an inherent result of a project. A PC is a contract between the municipality and the energy efficiency service provider, be it an energy service company (ESCO), private consultancy, or NGO. In a PC, goods and services associated with the project are paid for with the energy-cost savings accrued from it, allowing the municipality to finance improvements without incurring any upfront costs. PCs are flexible and can be structured to best fit the needs of the parties involved, for example with regard to the repayment schedule and compensation. In order to initiate a dialogue with an ESCO or another type of organization, a municipality must first have an energy audit conducted by a reputable source that lays out the different EE measures possible and the savings expected from them.

ESCO‘s typically provide the following services: investment grade energy audits, calculation of baseline energy consumption, identification of energy saving measures, design of energy saving projects, installation and maintenance of new energy efficient equipment, training of technical personnel in a facility, and monitoring resulting energy savings. However, the role of an ESCO should not be limited to providing technical services needed to optimally design and implement an energy efficiency project. An ESCO should conduct analysis and generate information that financial institutions require in order to evaluate projects‘ financial viability.

Sometimes ESCOs are able to finance the improvements internally, offering a full range of services under one roof. In the CIS, however, it is more common for an ESCO to arrange for a third party financing from a commercial bank or other financial institution. Yet another option is for the municipality to secure the financing, which may be the desired route where government agencies are offering discounted rates and relaxed lending criteria to municipalities. The text box on the following page presents the general ESCO contracting process for implementation of a municipal energy efficiency project.

After the energy audit has been conducted and the target efficiency projects finalized, the municipality can start negotiating the project implementation contract with the ESCO. Performance Contracts are different from traditional contracts with energy engineering and consulting companies because the firm contracted (be it an ESCO or other type of firm) is compensated based on actual energy savings resulting from the project implementation, instead of a fixed contract price.

There are a number of common barriers to the use of performance contracting in developing and transition economies, and the CIS countries are no exception. On the part of municipalities, an understanding of performance contracting mechanisms is often lacking. In some countries, the situation is compounded by an insufficient supply of service providers capable of performance contracting, or the suppliers exist but the industry is so nascent that confidence in them is lacking. This lack of confidence usually translates into an inability of these firms to provide the project financing, since their unproven creditworthiness either denies them access to loans altogether, or the terms are poor. Another factor is that, in some countries, municipal governments do not have a good track record of sound financial management or honoring contracts, making efficiency service providers reluctant to assume the real or perceived risk of contracting with municipalities. Ukraine Energy Services Company (UkrESCO), a Ukrainian ESCO created by TACIS and EBRD, is one of the few ESCOs that does utilize the PC financing mechanism. Russia‘s ESCOs are more inclined to use PC, while ESCOs in the smaller CIS countries are still struggling to offer services in this arena.

i. Types of Performance Contracts

There are two main types of performance contracts: *shared savings* where the financial risk lies with the ESCO and the savings are shared between the ESCO and municipality for a negotiated period of time; and *guaranteed savings* where the financial risk lies with the municipality but the ESCO guarantees a certain percentage of savings. There can also be numerous variations and combinations of these two main types. The essence of a performance contract, common to all types, is that the contract written so that the investment costs are paid from the savings.

Guaranteed Savings

- The municipality takes on the third party financing from a lender, putting the loan on the municipality‘s balance sheet.
- The ESCO guarantees that savings will be sufficient to cover the investment cost, and if they are not the ESCO pays the difference between the realized savings and project payments.
- Excess savings can be shared between the municipality and ESCO.

In this scenario the client takes on no risk even though they have the financing because the guarantee covers the financing cost, a known and quantifiable amount. However, guarantees add more risk onto the ESCO and more risk always trickles through as added cost to the project in the form of a higher percentage of the savings being taken by the ESCO. When a contract includes some form of guarantee, a contractor normally takes out insurance against that guarantee. Such insurance is generally expensive since insurance companies cannot adequately quantify these types of risks unless the contract is for a simple type of project with a long track record, like changing light bulbs, where there are few unknowns in the equation. The cost of the insurance policy is added, with associated mark-ups, to the cost of the contract. In summary, guarantees made by the ESCO cause them to negotiate a higher — often significantly higher — percentage of the savings to ensure an adequate profit margin to cover all the risk they assume.

In many instances in the CIS an ESCO will prefer to bring in a guarantee in order to assure repayment of savings. The guarantee can be obtained at the expense of a portion of accrued savings. For example, other than having the government be an equity partner, two common methods well suited to performance contracting are to establish a separate account into which the municipality deposits savings from the project, or set-up a Trust and Retention Account (TRA) in which the municipality deposits revenue from electricity bills and taxes (and/or water bills if water efficiency is part of the project) into an escrow account in accordance with the payment schedule of the loan. There can be even another safeguard called a reserve fund, which is additional security to the bank in case of default or any short fall in the TRA account. (The definition of default has to be defined and agreed by all parties.) In addition to the municipality making deposits into the TRA account, it also diverts some funds into the reserve account. The escrow agent then makes payments according to the order of preference outlined in the performance contract, which is generally:

- Payment of the interest and principal
- Transfer to the reserve fund
- Payment to ESCO or other the service provider
- Payment to the municipality

The guaranteed savings type of performance contract is less risky for the municipality than the shared savings type due to the lower risk for the municipality combined with lower financing costs that municipalities can sometimes get (for example through their nodal agency or a donor). Sometimes financing institutions are more comfortable lending to a municipality than to an ESCO, assuming the loans are accompanied with a guarantee, because many ESCOs in the CIS are still in the nascent stage with inadequate credit histories and short financial track records.

Shared Savings

- The ESCO takes on the risk of third party financing from a lender, putting the loan on the ESCO‘s balance sheet.

- The savings are shared between the municipality and ESCO with the contract stipulating that the municipality will receive a certain *percentage* of the savings, but it does not guarantee the *magnitude* of those savings.

In this scenario, the ESCO is still carrying the cost of the project but without the additional cost

of the guarantee. Therefore the client (municipality) is not carrying any risk, but then it is also not assured of any savings, although in practice such an outcome is unlikely. The most likely outcome from a shared savings performance contract — should circumstances allow for this type of contract —is that the municipality will accrue significantly greater financial rewards from the project than if a guaranteed savings contract had been used.

ii. Components of Performance Contracts

The performance contract document determines the terms of project operation over the entire contract period. It defines in detail the relationships, roles and responsibilities of each party, and clearly explains the mechanism of project performance and any savings guarantee. The performance contract is a long-term agreement between the municipality and ESCO. Therefore it has to be flexible enough to accommodate both the current and future needs of the facility for the duration of the contract term. The performance contract should contain the basic legal provisions and protections to which each party will conform, as well as specify governing laws and pertinent regulatory requirements (e.g., insurance, code compliance, etc.), liabilities, conditions of default and remedies, and indemnification provisions. It can be customized to accommodate additional terms and conditions as necessary. The main components that need to be included in the contract comprise the following:

Scope of Work

All details of the scope of work for the ESCO/consultant should be clearly defined. The scope of work typically includes the description of services to be delivered relating to engineering, design, construction services, operations and maintenance, and training. It will also include procurement, installation, financing, evaluation and monitoring of all energy saving measures included in the contract.

Roles and Responsibilities of Parties

The municipality plays a key role in realizing the savings from the performance contract. Therefore the contract has to define the actions that municipal facilities need to take in order to achieve savings. This can include, for example, the requirements to operate the equipment installed by under the contract according to specified standards or to maintain certain parameters of the system operation. The contract can specify the information that the municipality has to provide to the ESCO during the contract term, such as drawings, specifications, energy usage data, and other operating data.

The ESCO is responsible for implementing all items as described in the scope of work, as well as helping to obtain licenses and approvals and coordinating engineering and construction services done as part of the project.

Term

The contract must specify the term of agreement and the conditions under which it can be terminated. Such conditions can include, for example, failure to perform according to schedule or failure to reach financial closure on the financing for the project.

Payment Terms

The contract must clearly specify price of the contract, the methods of payment to all parties to the contract, as well as billing procedures.

Ownership of Equipment

The contract must specify who owns the new equipment during the contract term. Usually the installed equipment is owned by ESCO with ownership transferred to municipality after contract expiration.

Standards of Service and Comfort

The contract has to specify the levels of lighting, temperature, humidity, and air ventilation acceptable to the municipality. These requirements must apply to equipment specification and operating parameters during the contract term. The standards of service and comfort prevent ESCO from operating the equipment at lower levels of lighting and cooling or heating in order to generate greater energy savings.

Efficiency Projects

The contract has to specify all efficiency projects to be implemented by the ESCO. Usually, they include the projects identified during the energy audit. The contract has to specify the project plan, including the method for calculating the baseline. As explained in Section IV.2.2 above, the baseline may be modified to ensure the proper accounting of saving in situations where the municipal facility undergoes significant changes during the contract term (for example, an expansion of operations).

Risks, Indemnification and Insurance

The contract contains provisions to protect municipality and its employees from any damages or liability caused by the ESCO‘s performance during the contract term. Risk management includes a hazardous waste disposal plan, if applicable. In cases where the contract includes savings guarantees, the contract specifies the period and amount of for each guarantee. Guarantees can take various forms but generally cover at least the loan payments to cover the construction costs. A guarantee clause can also include a provision for reimbursement to the municipality in case of deficit savings.

Annex II. Currently Active Regional, In-Country and Multi-Donor Mechanisms

The below list of financing schemes is presented to illustrate the various solutions for composition, financing terms, cooperation frameworks, including jointly established or regional funds. These funds are relatively new, hence their effectiveness cannot be evaluated, however they all are currently working and financing energy efficiency for different beneficiary groups. The below information was compiled for coordination within the framework of the Energy Community Energy Efficiency Task Force.[14]

In addition to the below funds and financing tools, gradually the commercial banks are filling the lending niche by offering energy efficiency financing products, still however largely relying on the IFIs for the investment capital.

Regional Mechanisms

Fund Name	Source of Fund	Value of Fund	Purpose of Fund	Financial Structure	Distribution	Beneficiary of Fund
WeBESCLF	EBRD	€60m	1. Industrial Energy Projects 2. Building Sector EE 3. Renewable Energy	Loans	Banks	SMEs
WeBSCDFF	EBRD	€50m	1. Energy Projects 2. Renewable Energy	Loans	Directly to end beneficiary	Private Industrial Cos. & SMEs
EE21	United Nations Economic Commission for Europe (UNESCE)	€6.15m, But includes funds for 2 EU countries	1. Source of financing with dedicated investment funds; 2. Training to help establish bankable project proposals; 3. Institutional and policy reforms; 4. Establishing network of energy efficiency managers;			Regional, sub-regional, country-oriented and interregional projects.

[14] Presentation available on the ECS website at http://www.energy-community.org/pls/portal/docs/906183.PDF

European Clean Energy Fund	UNECE	€250m (value of total fund) Information from World Bank indicates €30 million for Western Balkans	Cogeneration, fuel switching, boilers refurbishment, district heating rehabilitation, street lighting renovation; Renewable energy: wind, solar, bio- fuels, biomass; Create a financing facility for interaction with development and commercial lenders;	Funding on Commercial terms	Financing Energy Efficiency Investments Office (FEEI Office)	Financing of large scale projects
IPA 2007 Energy Efficiency Finance Facility (EEFF)	The EC, EIB, EBRD, and CEB in co-operation with KFW	€165m	Investments in energy demand side management contributing to improvements in energy performance of the buildings and industry sector	1. Credit line; 2.Community contribution (investment incentives may finance up to 25% of the investment cost)	Banks, end beneficiary.	Private entities, individual residents, housing associations, public entities (municipalities and their associations) ESCOs.
Green for Growth Fund (GGF Fund) Southeast Europe Energy Efficiency Fund (called before as the ―SE4F Fund"), Investment company with variable shared capital (―SICAV")	EIB, KfW, Austrian Development Bank, the EC and where possible private investment	€80m	1. Promote investments in energy efficiency and renewable energies for private and public entities. 2. Harmonize and coordinate donor initiatives.	1. Medium to long term Senior Loans; 2. Subordinated loans; 3. Letters of credit; 4. Guarantees; 5. Mezzanine debt instruments; 6. Local debt securities; 7. Direct investment, TA	Financial Institutions; Non-Financial Institutions.	Households; Homeowner Associations Companies, including ESCOs and RE companies; Municipal & public entities
Special Fund for Energy Efficiency in SMEs	KfW	€63m	1. Energy-Efficient Construction; 2. Energy-Efficient Rehabilitation;	Loan	Banks	SMEs, Housing
Special Fund for	CEI Trust Fund at		•Increasing EE		Direct	SMEs, Private and

Climate and Environment protection. http://www.managenergy.net/indexes/I605.htm	the EBRD		•Improving and disseminating environmentally friendly technologies •Fostering research and development in the area of renewable energy •Rendering new technologies of sustainable energy use economically viable •Supporting the transfer of transport of both persons and goods to more energy efficient modes of traffic •Sanitation of old ecological burdens •Waste management •Drinking water supply, water management •Raising awareness for reaching goals in terms of training and educational measures			Public individuals.

In-Country Mechanisms

Fund Name	Source of Fund	Value of Fund	Purpose of Fund	Financial Structure	Distribution	Beneficiary of Fund
Development Credit Authority facility for EE for Bosnia and Herzegovina	USAID	€8.19m	1. Implementation of energy efficiency projects on behalf of municipalities under energy performance contracts	Lending Facility	Banks, ESCOs	Municipal and residential projects; EE and RE
Loan Program for the Preparation of Renewable Energy Resources Projects - CROATIA	HBOR approves loans in co-operation with the Environmental Protection and Energy Efficiency	No information on value available	1.Researches on-site 2.Environmental impact studies 3.Documentation for obtaining a location permit 4.Main design 5.Investment study	Loans		1. Units of local and regional government 2. Utility companies 3. Companies,

	Fund (FZOEU).		6.Documentation for obtaining a building permit 7.Other permissions, decisions, consents and documentation in compliance with the provisions regulating the energy sector			craftsmen and other legal entities
Housing for the elderly in Croatia	GreenMax Capital Advisor& Dutch International Guarantees on Housing (DIGH)	Not Defined € 0,5m	Energy Efficiency housing development	Loan	Bank	Households
Environmental Protection and Energy Efficiency Fund	Ministries for environmental protection and economy (energy) Extra-budgetary, specific purpose fund	€189m	Financing of preparation, development, and implementation of programs, projects in the fields of environmental protection, waste management, energy efficiency and use of renewable energy sources.	1. Loan - zero interest rate, for 7 years; 2.Subsidy of interest rate; 3. Financial aid - for regional and local self-governments; 4. Grant – for NGOs for educational, research and dev studies		1. Local and regional self- governments (Industrial, commercial and public sector); 2. Legal and private individuals.
IEE2 Intelligent Energy - Europe 2007-2013 Funding Program http://ec.europa.eu/energy/intelligent/call_for_proposals/index_en.htm	EC, EIB	€65m	1. Energy efficiency and the rational use of energy; 2. New and renewable energy sources;			
Modernizing municipal services (2006-2013)	GTZ	€1.5m	1. Municipal EE investments; 2. Advisory in planning and decision-making process, supporting strategies.	Includes TA	Not Known	Municipalities (Public buildings)

Sustainable Energy Financing Facility (SEFF), third component of the "Sustainable Energy Project" (2007-2010)	Global Environment Facility (GEF) on a co-financing basis with banks and Macedonian Bank of Development (€2.05m)	€3.03m	1. Development of sustainable market for energy efficiency and renewable energy; (€ 1.63m) 2.Qualified energy efficiency projects. (€ 1.4m);	loan guarantee facility, loan facility (a revolving fund), (50-70%) credit guarantees	Banks	Energy efficiency in all sectors on the industrial and municipal markets
Macedonian bank of development and promotion as (Supervisor)	EIB	€100m	1. 1st Type Investment in Energy efficiency projects; 2. 2nd Type Investment for renewable energy sources.	Credit	Banks	SMEs
GEF Sustainable Energy Project	World Bank	€4.51m	Financial Support for EE in Public Buildings;	Grant	Banks, ESCOs	Public Sector
Development Credit Authority facility for EE	USAID	€8.19m	Implementation of energy efficiency projects on behalf of municipalities under energy	Guarantee, facility	Banks, direct to ESCOs	Municipalities
Renewable Energies and Energy Efficiency Facility	KfW (Germany)	€15m; € 0,5m TA.	1.Promotion of renewable energies; 2.Energy efficiency related investments.	Revolving fund	Banks	SMEs
Montenegro housing energy efficiency Program	GreenMax Capital Advisor&Dutch International Guarantees on Housing (DIGH)	Not defined, but €1.67m invested since 2005	Housing energy efficiency development	Loans	Banks	Households with a (less than) standard income.
Energy Efficiency Project in Montenegro	World Bank	€7.71m	1. Improvement of Energy Efficiency performance in targeted Public Sector Buildings. 2.applications of new energy efficiency and supply technologies	Specific Investment Loans & TA	World Bank to Govt.	Public Sector (Republic of Montenegro, Minister of Finance) (MED, MES, MHLSW)

Component of MICLP: Serbia	KfW	€50m	1. Energy efficient projects; 2. Renewable Energy Projects	Loans & TA	Banks	Municipal infrastructure
RFfRE - Serbia	KfW	€75m	1. Renewable energy projects; 2. Increasing demand side energy efficiency.	Loans	Banks	Private investors (SMEs, householders), Public investors;
EIB Apex III Credit - Serbia	Facility EIB	€250m	Projects including those in energy &environmental protection	Loans	Banks	Private investors ,(SMEs, householders); Public investors;
Italian Credit Line - Serbia	Italian Government	€30m	1. Energy efficient projects; 2. Renewable Energy Projects	Loans	Banks	SMEs
EE Loan - Serbia	IFC	€10m	1. Energy efficient projects; 2. Renewable Energy Projects	Loans	Banks	SMEs
REPUBLIC OF SERBIA Revolving Credit Fund	Government	General credit line	Procurement of fixed assets.	Banks	Revolving Credit line	SMEs
Serbian Energy Efficiency Project - 2 2009-2012	IDA credit YF3870-1 + IBRD loan YF7466 WB for €22.95; €1.64m from Serbia.	€24.59m	• CC Nis – Rehabilitation of Heat supply System – Construction of new gas boiler room – Construction of new gas network – Construction of new heat substations (about 22), and – implementation of EE retrofit measures within 20 buildings of hospital complex • Other – EE improvement of Public buildings in health, education and social care sectors:	Credit line designed for project & TA		Public Sector, such as: Ministry of Education • Ministry of Health • Ministry of Lab our and Social Policy

Serbian Energy Efficiency Project 1 2004-2010	World Bank - 1IDA credit YF3870-1 Serbia 2004-2010;	€20.5m (€3.28m from Serbia)	1. PART A - CLINICAL CENTER Belgrade; 2. PART B - Public buildings – schools and hospitals;	Credit line designed for project & TA		Public Sector

Multi Donor Mechanisms:

Fund Name	Source of Fund	Value of Fund	Purpose of Fund	Financial Structure	Distribution	Beneficiary of Fund
IPA 2007 Energy Efficiency Finance Facility (EEFF)	EC, EIB, EBRD, and CEB, with KfW	€165m	Investments in energy supply and demand side management contributing to improvements in energy performance of the buildings and industry sector.	1. Credit line; 2. Community contribution; (investment incentives may finance up to 25% of investment cost)	Banks, end beneficiary	Private entities, individual residents, housing associations, public entities (municipalities and their associations), ESCOs.
Green for Growth Fund (GGF Fund) Southeast Europe Energy Efficiency Fund (called before as the —SEEF Fund"), Investment company with variable shared capital (—SICAV") IEE2 Intelligent Energy - Europe 2007-2013 Funding Programme http://ec.europa.eu/energy/intelligent/call_for_proposals/index_en.htm	EIB, KfW, Austrian dev bank, the EC and where possible private investment EC, EIB	€80m €65m	Promote investments in energy efficiency and renewable energies for private and public entities. Harmonize and coordinate donor initiatives. 1. EE and rational use of energy; 2. New and renewable energy sources in Croatia.	Medium to long- term senior loans; Subordinated loans; Letters of credit; Guarantees; Mezzanine debt instruments; Local debt securities; Direct investment, TA Implementation f training schemes for building workforce, aimed at making res buildings more efficient and transforming market for EE products. ELENA program managed by EIB (European Local	Financial Institutions; Non Financial Institutions	Households; Homeowner Associations, Companies, including ESCOs and RE companies; Municipal & public entities

				Energy Assistance)		
Serbian Energy Efficiency Project 1 2004-2010	World Bank – 1 IDA credit YF3870-1 Gov of Serbia 2004-2010;	€20.5m (€3.28m from Serbia)	1. PART A - CLINICAL CENTER Belgrade;2. PART B - Public buildings – schools and hospitals;	Credit line designed for project & TA		Public Sector