Guidelines for Financing Municipal Energy Efficiency Projects in the Commonwealth of Independent States

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The views expressed in this guidebook are those of the authors of the manual and do not necessarily reflect the views of other individuals and other agencies. The users of the manual are advised to consult with their legal advisors prior to finalizing and signing the contracts based on the templates presented in this manual.

TABLE OF CONTENTS

LIST OF ACRONYMS

CDM	Clean Development Mechanism
CIS	Commonwealth of Independent States
DCA	Development Credit Authority
EE	Energy Efficiency
EOI	Expression of Interest
ERU	Emission Reduction Unit
ESCO	Energy Service Company
FIs	Financial Institutions
FSD	Fund for Sustainable Development
GDP	Gross Domestic Product
GHG	Green House Gases
DH	District Heat
IEA	International Energy Agency
IFC	International Finance Corporation
IFIs	International Financial Institutions
IPMVP	International Performance Measurement & Verification Protocol
IRR	Internal Rate of Return
JI	Joint Implementation
kWh	Kilowatt Hour
M&V	Monitoring & Verification
NGO	Non-governmental Organization
PC	Performance Contract
REEEP	Renewable Energy and Energy Efficiency Partnership
RF	Revolving Fund
RFP	Request for Proposal
ROI	Return on Investment
TACIS	Technical Assistance to the Commonwealth of Independent States
TRA	Trust and Retention Account
USAID	United States Agency for International Development

I. INTRODUCTION

1. Why Municipal Energy Efficiency?

Melting glaciers, rising sea levels, an increase in average global temperature, and abnormal precipitation patterns have started to make global warming an apparent reality throughout the past decade. Meanwhile, increasing gross domestic product (GDP) remains the key target of the world's economic development strategy. In many countries, GDP growth is tied closely to increasing energy intensity. Unless economic growth is decoupled from increased energy consumption, the cornucopia of greenhouse gases in the atmosphere and the subsequent effect of global warming will hamper political and social aspects of the world's activities today. According to the Alliance to Save Energy, "energy efficiency is the quickest, cheapest, cleanest way to extend our world's energy supplies." Because tremendous energy losses occur in the outdated municipal infrastructure of the Commonwealth of Independent States[1] (CIS), this region presents many financially viable projects that can help decouple economic growth from uneconomical energy use.

According to the International Energy Agency (IEA), energy intensity in the CIS is significantly higher than the average of IEA member-countries due to "higher losses in the supply chain and inefficient use." (IEA 2003). Implementing energy efficiency measures in municipal infrastructure throughout the CIS is a guaranteed method for generating energy and financial savings from existing municipal buildings, heating, water supply, sewage, and street lighting infrastructure.

Energy efficiency in municipal water supply systems is especially beneficial: savings are accrued in water as well as energy, reducing costs while improving service. Efficiency in the provision of energy and water is one of the few cost-effective options available for meeting growing demands for vital services such as electricity, water and wastewater treatment. Energy efficiency retrofits contribute to improved well-being of the population, customer service and payment collection. If increasing energy efficiency is seen as a goal on a nation-wide scale, it can also contribute to a nation's energy security, be it energy exporting or energy importing.

Currently, municipal utility infrastructure in the CIS is outdated and its inefficiency places a hefty burden on meager municipal budgets. Devolution of crumbling heat, water and wastewater utilities from state to municipal ownership has strained the financial balance of the municipalities even further. With diminishing state support, local governments need to be proactive in attracting investment into their infrastructure to maintain their operating capacity and meet growing needs into the future. In light of the tumult over global climate change and the rising trend in green investment, attracting funding to municipal energy efficiency is a timely and valuable opportunity.

There are numerous examples of successful municipal energy efficiency projects to support the assertion that efficiency improvements yield cost-effective benefits accessible to municipalities

[1] The Commonwealth of Independent States is an international regional alliance that consists of 12 countries: Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan.

in the CIS. Such examples were highlighted in a recent workshop "Financing Municipal Energy Efficiency in the Commonwealth of Independent States" held in Moscow, Russia 13-14 November 2006. Stakeholders from around explored the current situation of financing municipal energy efficiency and shared one another's experiences. One example discussed in the workshop was Cheboksary City in Rostov Oblast in Russia, cited by the Institute for Urban Economics. Insight into the municipal budget demonstrated that out of the 32 percent allocated for the education sector, 21 percent is spent on communal service payments. Likewise, out of the 21 percent of the city budget allocated for heath care, 14 percent is spent on communal services. Together, payments made by the health and education sectors for communal services amount to 9.7 percent of the total municipal budget (Sivaev 2006). This demonstrates that due to lack of professional building management, economic incentives for rational energy consumption and metering, much energy and financial resources that can otherwise be used for additional teachers or doctors are being wasted. After meters were installed in educational institutions in Cheboksary City, heat savings of up to 69 percent and water savings of up to 67 percent were recorded.

2. Why are the Guidelines Useful?

Although the financial, environmental and social benefits of municipal energy and water efficiency are straightforward, the legal and administrative bases for stimulating municipal energy efficiency financing are weak. Municipalities that need to make such projects a reality are not familiar with the process for doing so. These guidelines serve as a starting point for choosing the appropriate type of financing mechanism that will provide the resources necessary to implement municipal energy efficiency projects. While macroeconomic analysis of each country's development needs is beyond the scope of this project, the following guidelines provide an overview of external financing mechanisms applicable generally throughout the CIS. The largest portion of the discussion is devoted to revolving funds and performance contracting because these mechanisms are viewed as vital local financing drivers into the future. This point of view emerges from the understanding that strengthening these two mechanisms relies heavily upon the initiative of the municipalities themselves – bottom up movement that is made possible through a better understanding of the important role energy efficiency can play in lessening the burden of financial and resource constraints.

3. The Audience

These guidelines are intended for decision makers at the municipal level who want an overview of the options available to municipalities for project financing without the technical details. Municipalities throughout the CIS are not yet fluent in project development and finance, and the relevant tools that can be used to help pay for investments in better energy efficiency. The guidelines are also meant for energy service companies (ESCOs) and financial institutions. Energy Service Companies (ESCOs) are often not familiar with how to adapt their services from the industrial to the municipal sector; in many instances municipalities aren't able to accrue and reinvest savings from energy efficiency upgrades. Financial institutions tend to associate projects outside the scope of their usual portfolio with high risk, sometimes for good reason when considering the "3Cs" described in Section III as the credentials for lending or granting funds.

Although the information contained here can be adapted around the world, it was written for the context of the CIS. Since these guidelines on financing municipal energy efficiency projects are regional in scope, municipal managers and financial advisors need to take into account the local markets and the presence and strength of financing institutions when choosing a financing mechanism for their project. Further reading and references are provided in order to give the reader additional details on the process for attracting financing.

II. OVERVIEW OF MUNICIPAL FINANCING IN THE CIS

Largely lacking in strategic financial foresight, the decentralization process of municipal governance and economy led to a deterioration of already worn out municipal utility infrastructure throughout the 1990s. Because state government financing is no longer available in significant volumes to the municipalities, they cannot continue to depend on state budgets to sustain the renovation of their infrastructure. Specifically, energy efficiency is usually overlooked when budgeting funding for reconstruction or renovation, and has to compete with other funding priorities such as road construction. In addition, until there is a legal framework enabling energy-cost savings to be reinvested or used to pay for projects, it can be difficult to attract investors to such projects.

Municipalities need to be keenly aware of the available options for financing their energy efficiency projects, and prioritize investments to maximize the savings from energy efficiency projects.

Experience suggests that even in countries where the local financial market has sufficient size and liquidity, consumers and investors may have limited access to local institutions due to perceptions of high risk, high transaction cost, lack of institutional infrastructure and project development capacity, or lack of awareness regarding technologies and their technical and financial performance characteristics. Supporting financial intermediaries and providing risk-sharing instruments to financial institutions (credit risk guarantees and other contingent finance instruments) can be cost-effective ways of addressing these barriers. Microcredit, commercial loan guarantees for ESCOs and revolving loan funds have all been successfully demonstrated in many CIS and East European countries.

While both external and internal financing is often used for financing a municipal energy efficiency (EE) project, internal financing relies mainly on the municipality's own equity, and external financing deals with borrowed funds or increase of debt. Though in general at least 20 percent of the total project costs must come from internal financing, it is usually difficult for municipalities in countries with economies in transition to put up enough internal funding to enable implementation of a sizeable project which would generate return on investment (ROI) quickly enough to make the project bankable and ensure adequate external borrowing. There are many reasons for this: for example, ambiguous and poorly defined ownership rights and responsibilities, low municipal revenues due to high unemployment and low salaries, limited local budget authority and borrowing limits placed on municipalities. A project heavily financed with internal equity might restrict municipal utility infrastructure growth and improvement, while too much external funding might make the project risky. External financing can be realized with bank loans, bonds, leasing, and state subsidies.

Though a variety of financing instruments exists, local financial markets still have limited capacity and are unable to provide adequate financing of municipalities' EE projects in many CIS countries. In theory, the municipalities should aim at attracting not only domestic, but also international financial markets for project funding. The discussion below will briefly mention all potential EE financing mechanisms available for municipalities. However, experience to date shows that the majority of water and wastewater, heat supply, and street lighting projects have been financed through funds from international donors and IFIs. These international development institutions typically use grants or loans to demonstrate how energy-efficiency projects generate cost savings to finance the improvements. Soft loans are common in such projects, which often aim to attract commercial finance. More innovative approaches unique to energy efficiency are revolving funds and performance contracts, and international partners often encourage demonstration of how such funds and contracts work in the local setting. Vendor credit is also becoming more popular in emerging market economies.

III. COMMONLY USED FINANCING MECHANISMS

Before launching into a discussion of financing mechanisms, it is necessary to mention that 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.

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, 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 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). Numerous reports are available on this subject, and they are listed in the Further Reading section at the end of this document.

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 in the CIS. A more detailed discussion of the special purpose and third party financing mechanisms follows.

Table 1. 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 Contracting	For projects that generate sufficient energy-cost savings to pay project costs.	Contract signed between 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.	Eliminates the need for the municipality to have the upfront capitol to fund the project.	Savings from 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.

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.

Technical Assistance to the Commonwealth of Independent States (TACIS) is another project implementation mechanism supported by the European Union that can provide grants for technical assistance purposes. The TACIS Small Grants Programme provides support for technical assistance projects where energy efficiency is involved. EU-based organizations serve as the implementers after being selected on a project tender basis. Energy efficiency has been a priority consideration for TACIS, however, the TACIS regulations expired at the end of 2006, and new ones were still under review when this paper went to print. For more information on TACIS priorities and programs visit http://ec.europa.eu/comm/external_relations/ceeca/tacis.

Smaller grants are sometimes available through donor-funded programs and implemented by international consulting companies and NGOs. An example of a street-lighting project in the Armenian city of Kapan financed by USAID in 2005 is provided in Box 1. In another example, local capacity builders and NGOs, such as the Fund for Sustainable Development (FSD) based in Moscow, Russia, sometimes have grants to work with remote communities and regions not easily accessible to multilateral corporations. Box 2 briefly describes the financing of municipal energy-efficiency projects in the Russian Far East provided by USAID with implementation by the FSD. This project illustrates that there are plentiful small-scale projects where significant energy savings can be reaped in remote geographic locations.

Box 1.
Financing Street-lighting in Kapan, Armenia

The city of Kapan with a population of 46,700 has a very small budget that exists on income from private land and real estate taxes. The budget supports 14 kindergartens, sport and music schools, 17 libraries, and various cultural centers. The income is so small that it does not permit the implementation of any capital repairs or improvements. Street lighting, an essential municipal service, had significantly deteriorated. In addition to old and inefficient light bulbs, the wires connecting the streetlights to the grid did not meet the standards; the copper and aluminum joints, which connected the wires together, were deteriorating, and would cause the wires to tear, especially during the winter frosts.

In 2005, the Kapan municipal authorities, with assistance from USAID and the project implementer PA Consulting, implemented a street lighting retrofit project. The objective of the project was to improve street lighting in Kapan, improve energy efficiency, ensure environmental safety, and enable automatic regulation of lighting schedules throughout the city. The project was carried out in three months, and the total cost was US $23,013, shared between the city (28 percent) and USAID (72 percent). Payback was estimated to be 3.7 years. USAID paid US $12,449 for purchase of equipment; and US $5,815 for technical services was provided by the municipality.

The project consisted of three installations: a) 315 lamps (primarily electric bulbs of 1,000 or 500 Watts), b) a mechanical clock to regulate street lighting on a fixed schedule that did not require technicians throughout the city to manually switch the transformer stations on and off, and 3) electricity meters on the street lighting. PA Consulting provided brief technical training to ensure proper implementation of the project.

RESULTS

Prior to project implementation, electricity consumption for street lighting amounted to 207,678 kWh per year. Estimated annual electricity that could be saved as a result of the simple measures carried out during this project amounted to 89,834 kWh or 43%, with the new consumption level of 117,834 kWh per year. The measures implemented from the project were able to produce savings of up to US $4,795 annually. Though the savings might seem small, they are significant for the municipality.

Box 2. ROLL Program in Russia

Under a grant project of the program title "Replication of Lessons Learned" (ROLL) carried out by the Institute for Sustainable Communities (ISC), 16 energy efficiency projects were implemented in Nizhegorodskaya, Samarskaya and Saratovskaya Oblasts and in Chuvashia in 2001-2002. The project was funded by USAID. The aim of the ROLL program was to build local capacity to utilize foreign donor grants to build project management and proposal writing skills, to improve health of the population, to create jobs, and to reduce GHG emissions. Total cost for these projects amounted to US $ 646,000. The aim of the projects was to catalyze decentralization of heating networks. The project consisted of shifting heating stations to alternative fuels; installing frequency converters, heat pumps, heat and gas meters; insulating buildings; and modernizing street lighting networks. According to the ISC, annual savings from all of these measures amounted to approximately US $344,000, assuring a payback of less than two years.

This program served as a catalyst for attracting both municipal budget and external investment funds to continue implementation of energy efficiency projects. For example, because installation by ROLL of several mini-boilers in the Kinel-Cherkassky Raion of Samarskaya Oblast was extremely successful in providing quality heat and saving money, the municipality procured over US $75,000 from both its own budget and private investments to install additional mini-boilers. The private sector was interested in participating because the payback on these projects had been demonstrated to be relatively short. The project also attracted participation of local community organizations from remote settlements that were previously inexperienced in working with grants, exposing them to a new area of financial procurement, project implementation and management.

This program demonstrated that grants are an effective way to demonstrate to communities not familiar with energy saving projects that small-scale investments can produce substantial financial and resource savings. It is useful for communities with little prior experience in project implementation and lack of local financing options to seek grant opportunities as they usually are accompanied by capacity building components built into the project, which helps the locals learn from the experts and perpetuate new projects after demonstration is over.

For more information on ROLL programs in Russia contact Fund for Sustainable Development, www.fund-sd.ru.

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.

Diagram 1 in Annex 1 shows the structure and mechanism of a RF created by the Bishkek City 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.

Box 3. 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.

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.

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.

Barriers are discussed in detail in Section IV on Barriers and in Annex 1 and Annex 3 case studies.

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 depends on 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.

Box 4. 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. *For more information consult http://www.usaid.gov/policy/budget/cbj2007/an/dcaaii.html*

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 4.

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);[2]
- Improving efficiency of street lighting;[3]
- 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

[2] 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.

[3] 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.

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.[4]

(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[5], 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.[6] 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

[4] Decision from COP/MOP to the Kyoto Protocol in Montreal.
[5] Outcome of the Conference of Parties (COP) to UNFCCC in Marrakesh (www.unfccc.int).
[6] www.cd4cdm.org

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: 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.[7]

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.[8]

[7] Full Validation report available at http://cdm.unfccc.int/UserManagement/FileStorage/B9T0BR5JFSQA6SVBUV61XC013CKDQP.
[8] http://cdm.unfccc.int should be consulted regularly for recent methodologies and guidelines.

Box 5.
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	9.1%	13.1%
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.

BOX 6.
STEPS FOR DEVELOPING A MUNICIPAL ENERGY EFFICIENCY PROJECT USING PERFORMANCE CONTRACTING

1) **Develop and Issue a Request for Expressions of Interest (EOI)** for conducting an Investment Grade Energy Audit and implementing an efficiency project in the sector(s) to be targeted (such as water, wastewater, street lighting and municipal buildings). The EOI contains a brief description of the scope of work and basic information on the municipal installations to be audited, and requests information on the technical and financial capabilities of the firm including their work force, audit instrumentation, and relevant experience.

2) **Issue a Request for Proposal (RFP)** to all viable firms who submitted EOIs. The RFP describes the facility's energy use, equipment, operating schedule, maintenance problems, and planned equipment replacement or renovation plans, as well as the utility bill history for the past three years. It is recommended that a site visit be organized for interested ESCOs to tour the facility and interview facility staff before submitting their responses to the RFP.

3) **Evaluate the Proposals** according to the terms of the RFP.

4) **Finalize ESCO Selection** based on its expertise and relevant experience, being sure to match the skills of the ESCO with the needs of the municipality.

5) **Award the Investment Grade Audit Contract**, an agreement with the ESCO to develop a project concept and perform the investment grade audit (IGA). The IGA report forms the basis for the energy performance contract between the municipality and ESCO, identifying all feasible short- medium- and long-term energy saving measures and their payback periods, and providing the baseline data to be used during monitoring and verification.

6) **Project Packaging for Third Party Financing,** if needed for the project. The party seeking project financing (be it the municipality or ESCO) puts together a package of information on the project, including the IGA report, for review by financial institutions. The financial information contained in the IGA report is critical for convincing a financial institution to issue a loan.

7) **Enter into the Performance Contract.** The contract dictates the terms and conditions by which the ESCO implements the energy efficiency measures, including the responsibilities of the ESCO and municipality, the compensation schedule for the ESCO, financing conditions, maintenance, personnel training, monitoring and verification procedures, risks and a risk mitigation plan, and the definition of the baseline and possible adjustments to it. There are two distinct types of a performance contract: *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 ESCO guarantees loan repayment and a given amount of excess savings.

8) **Monitoring and Verification** of results in performed according to the procedures in the performance contract. M&V determines the actual savings over the period of the contract and ensures that all parties are getting full value from the energy performance contract, including compensation for the ESCO. It includes approval of equipment installation based on the contract specifications, and involves regular communication between the ESCO and municipality to monitor successful implementation of the energy saving measures.

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.

IV. BARRIERS TO DEVELOPMENT OF FINANCING MECHANISMS

Given the constraints on public budgets, financing for municipal projects must come from other sources and there are conditions upon which those sources – grantors, lenders or co-investors (in the case of shared savings for a performance contract) – will contribute their resources to municipal projects. Grantors need some assurance that the money they provide to municipal projects will be used for its intended purpose. Lenders and co-investors need a guarantee of repayment and their agreed-upon share of a project's payback.

The team of experts working on this research believes that there are several basic problems constraining investment: 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 cash flow to be generated by a project, and any mechanisms for credit enhancement (such as collateral and loan guarantees). In addition, discussions at the workshop on financing municipal energy efficiency in Kiev, Ukraine confirmed that problems associated with financing municipal EE projects in the CIS are attributed to the inability to access funds in a timely manner. This is due in part to a rather cumbersome and underdeveloped legal environment, but is mainly due to the inability of municipalities to develop a project and elaborate on the projects' technical aspects and savings (Alliance 2006). Private sector investors are reluctant to put their money into municipal projects due to associated risks; the municipalities suffer because information flow between the private and public sectors are hampered. In addition, the potential market value of energy efficiency retrofits is distorted by cross-subsidies and energy tariffs that are below cost-recovery levels. Finally, municipalities fail to market the projects in a way that would be attractive to the investor community.

These problems are compounded by the "small project" problem of high transaction costs. In other words, because projects such as municipal energy-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.

Credit enhancement can be undertaken to some degree for municipalities that 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 seize bank accounts or other assets if the borrower were to default? Nations can no longer realistically provide sovereign guarantees to back loans and investments in

municipal projects because of the tremendous transactions costs imposed on governments to undertake them, primarily in the form of time for busy leaders. Moreover, the multilateral development banks can finance only a small fraction of projects in the CIS (ASE 2007).

Most CIS governments set a limit on the amount of debt that can be assigned to municipal budgets. Therefore, municipalities are restricted in how much they can borrow. For example, even in Bulgaria, which has progressed significantly in its municipal management due to procedural requirements for its EU accession in 2007, borrowing capacity of municipalities is limited to 25 percent of municipal budget (Doukov 2006). Another barrier apparent in much of the CIS is that the municipal budgets are not able to retain the financial savings from energy-efficiency projects. This is an obvious disincentive for cities to carry out energy efficiency measures – if they save money, their budget might be reduced by the amount saved for the upcoming year. In fact, this reason explains why revolving funds have failed to be established in those places throughout the CIS where the local government was not willing to cooperate and permit the municipal budget to accumulate and reinvest savings from EE measures.

In addition, a lack of energy consumption data in buildings and a lack of information about available technologies and financial mechanisms prevent municipalities from taking full advantage of EE measures. This was cited, for example, by Demozone, a Norwegian-Kyrgyz energy consultancy, with regard to Kyrgyz municipalities (Sovkutsan 2006). The Alliance has witnessed this problem throughout the CIS region, exemplified by outdated infrastructure and normative billing mechanisms common everywhere in the region.

Other varied financial, legal, and institutional barriers to financing municipal EE projects are abundant. Presented by category below, some of the most acute reasons that impede EE project implementation are:

Financial:

- Lack of credit guarantee mechanisms;
- Insufficient transparency of financial transactions;
- Low activity of existing lending institutions in EE area;
- Incongruous municipal financial policies;
- Weak lending institutions;

Legal:

- Lack of clear and transparent ownership rights within the existing legal framework;
- Weak legislative structures that are unable to enforce existing laws;
- Absence of mandatory medium-term budget forecasting prevents long-term service agreements and deters involvement of ESCOs.

Institutional:

- Lack of monitoring of data;
- No single energy management office in municipalities;
- Absence of energy procurement practices for municipalities;
- Underdeveloped ESCO market;

- Lack of experience in project financing, managing budgets, assets, debt;
- Inadequate managerial and technical expertise on municipal level in designing and implementing bankable EE projects;
- Inadequacy of information about the financial markets and services available to regional and city administrations.

Means to overcome these barriers to increase the implementation of EE projects are discussed in the next section.

V. SUGGESTIONS TO MUNICIPALITIES FOR MOVING FORWARD

The experience of the Alliance to Save Energy with energy planning and energy accounting of municipal level EE projects in the CIS highlight the importance for municipalities to keep project design simple and allow for some flexibility in implementation to adjust to changing conditions. It is also crucial to ensure transparency of project management procedures, and to avoid political interference and micro-management by the government. Subsidized interest rates can be a helpful tool in encouraging municipalities to apply for commercial bank loans. Municipalities can also increase their ability to obtain financing and increase energy savings by cooperating with each other to bundle small projects. Municipalities should also seek financing and technical expertise for the development of a viable project portfolio from capacity building NGOs and international organizations.

From our analysis of the existing situation regarding financing municipal EE in the CIS, we recommend the following steps to promote municipal energy efficiency financing to municipalities, lawmakers, and investors alike:

Municipal Management

- Create a municipal energy manager responsible for energy-related performance of all energy consuming entities under municipal management. This is generally considered a key step for municipalities that desire to obtain benefits from EE measures. It is relatively easy to implement, and does not require hiring additional staff as an existing employee can take on the role of overseeing energy consumption in the municipality.
- Incorporate EE retrofit funding into the existing municipal utility structure which will enable existing levels of tariffs to support EE retrofits.
- Devote an increased share of the budget to EE so that the internal financing acts as a catalyst for attracting co-financing; in parallel, make budget planning long-term to enable large-scale project implementation.
- Transfer energy monitoring and service activities to a contractor.
- Implement medium- to long-term planning of municipal budgets.
- Build technical, managerial and institutional capacity.
- consider private sector participation in municipal services;
- Restructure municipalities to operate on a for-profit basis.

Policy

- Adjust the existing legal and regulatory frameworks to enable synergies and promotion of EE financing, technologies, and project implementation
- Reform legislation regulating municipal budgets to allow for increased debt to be incurred by municipalities;
- Promote energy sector reform, mandates and standards to promote EE;
- Ensure transparency in enforcement of laws and regulations for municipal and energy sectors;

Financing

- Develop mechanisms for enforcing payment for services by end-user;
- Establish guarantee funds for ESCOs to decrease financial risks;
- Explore possibilities for vendor credit financing;
- When decentralizing and restructuring the municipalities, pay close attention to the ability of the municipal budgets to be self-sustaining, enabling the budgets to claim savings from energy efficiency projects. Make seamless the privatization and restructuring of municipalities.
- Empower and educate the local commercial banking sector of the benefits of financing municipal EE projects.
- Encourage the commercial banks to work with national credit guarantee institutions to obtain credit guarantees in order to promote domestic EE financing.

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Annex 1 Case Study: Process of Creating a Revolving Fund in City of Bishkek, Kyrgyz Republic

Financing Project Overview

The Bishkek City Administration (BCA) decided to develop and implement a long-term Energy Saving Program on the municipal level. The project was conducted as part of the Municipal Energy Efficiency Planning for Buildings Project implemented from 2006 to 2016 by Energy Saving International (ENSI) and Demozone, a Norwegian-Kyrgyz Company, and coordinated by the Household and Communal Services Department (HCSD) and Fuel and Energy Complex (FEC), The BCA established a special department for implementation of the program and appointed an officer to manage the program. The goal of the Program was to optimize allocation of budget funds, start a modern energy consumption system, improve indoor climate of municipal buildings, and benefit the environment.

A typical kindergarten building found throughout the CIS

Financing Approach

The BCA initiated the creation of a municipal revolving fund, called the Special Settlement Account (SSA), within the HCSD and FEC. The creation of the SSA stemmed from a regulation approved by the mayor of Bishkek on "Establishment and expending the SSA funds for energy saving" that was developed by the City's Finance Department. The regulation defined the operational rules of the SSA, detailing how fund formation should be carried out, specifying project selection and financing procedures; budget planning and the process of allocating and repaying the investments; maintenance and schedule of revolutions of the fund; as well as maintenance of the SAA.

Upon review of the energy audit report, the annual implementation plan of the projects is prepared by the HCSD, and the Bishkek City Administration approves the project plan and estimates for savings. Financing for the fund is provided based on the decision of Executive Authorities of the BCA, according to the SSA regulations and the current provisions of the budget code. The City Finance Department then allocates either an initial investment from the BCA, or from the savings accrued during the previous project to the SSA for implementation of the project. Diagram 1a illustrates the flow of funds to and from the SSA in Bishkek.

Results

With funding from the SSA, Demozone and HCSD several projects were implemented in kindergartens and schools. The implemented energy efficiency measures consisted of:

- Installing automated regulators, which allowed regulation of indoor temperature during non-business hours, lowering heat consumption;
- Installing hot water mixers;
- Balancing of the heating system;
- Insulating the hot water pipeline
- Installing meters and window panes;

- Installing an Energy Monitoring System

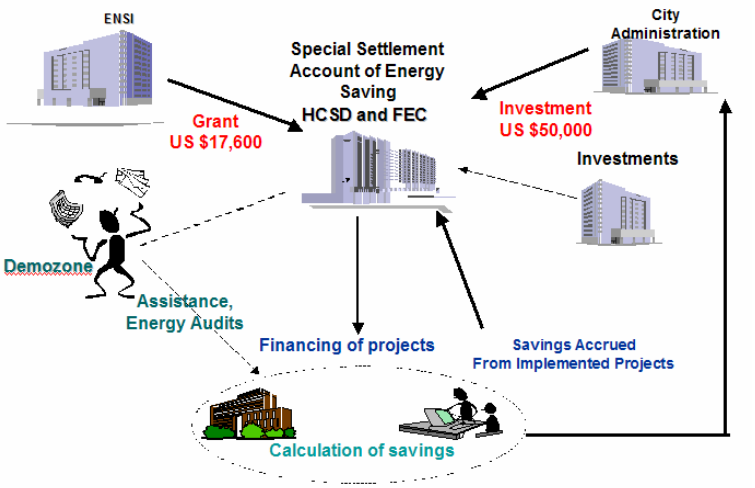

Diagram 1a: Structure of the SSA: Bishkek
Source: Sovkutsan 2006

Though three projects were implemented in kindergartens and one in a school during 2-3 months during 2006, two projects in particular are worth mentioning in detail. Overall project investment in School No. 11 was US $23,000 and US $6,700 in Kindergarten No. 28. Annual estimated savings were US $5,300 and US $1,800 with a payback of 4.4 and 3.7 years respectively. Estimated annual savings for 2007 in School No. 11 were 407,200 kWh, and 85,000 kWh in Kindergarten No. 28. By 2016, savings from the four projects are estimated 23,300,000 kWh. Annual carbon dioxide reduction after project implementation is estimated at 210 metric tonnes.

Throughout the 11 years of project life and its completion in 2016, the city plans to retrofit 312 buildings. Depending on the volume of retrofits conducted in each building, total investment will range from US $2 to 5 million, with US $560 to 1.6 million coming from the city budget, and US 1,440,000 to US $3,400,000 from the SSA. Overall savings in 312 buildings are estimated to range from US $440,000 to US $7,800,000, depending on whether 107 or 247 EE projects are implemented respectively.

Lessons Learned
Thus far, the lessons learned from this project show that it is necessary to establish an effective energy accounting mechanism in order to accurately account for the savings from the EE retrofits. It is also important to have the support of the authorities on the municipal level in order to assure smooth and robust long-term development of a revolving fund and an energy-saving project implementation scheme.

Source: Demozone (Demonstration Zone of Energy and Water Efficiency), Bishkek, Kyrgyzstan. www.dzb.in.kg

Annex 2 Case Study: Development of Energy Service Companies (ESCO) in Kyrgyz Republic

Project Overview

The project aims to develop the mechanism of Energy Performance Contracting and stimulate its replication throughout Kyrgyzstan. The project was implemented with the financial support of Slovak Official Development Assistance (Slovak AID) and the Canadian International Development Agency (CIDA). Implementing partners were Energy Consulting s.r.o. from the Slovak Republic, Civic Environmental Foundation UNISON, and municipal organization and Energy Service Company (ESCO Narynteplokomenergo). The project was implemented between October 2004 and July 2006. The project objectives consisted of promoting and introducing energy performance contracting (EPCs) as a tool to enhance energy efficiency of the municipal energy sector; to support sustainable development of the Kyrgyz municipal energy infrastructure; and reduce energy waste. UNISON and Energy Consulting s.r.o. worked to increase awareness about EPCs through information dissemination, a seminar, and a demonstration project carried out by local ESCO Narynteplocommunenergy in kindergarten Altyn Balalyk No. 14.

Kyrgyz regions, particularly rural areas, suffer tremendously from difficulties with energy supply. Meanwhile, significant amounts of energy are wasted due to deteriorated infrastructure and the inability of municipalities to maintain it. In addition, municipalities do not have sufficient capacity to understand and identify the key measures that are necessary to reduce energy waste and consumption.

Development of ESCOs during this projects aims to benefit not only cash-strapped municipalities, but also improve the functionality of commercial infrastructure as well, which can in turn help stimulate the market for energy saving technologies. An assessment of ESCO potential in the Kyrgyz Republic showed that the largest potential for ESCO intervention was in the public and commercial services sector, with potential heat-related savings amounting to US $25 million, and savings of US $16.5 million from reduced electricity consumption.

ESCO Background and Project Approach

Fearful that its clients would disconnect from the district heating network, project partner Narynteplocommunenergo, a district heating company, was interested in EPC in order to be able to provide quality services to its clients. The Narynteplocommunenergo established an ESCO as a separate branch of the DH company. The ESCO carries with it all of the capacities applicable to a DH company, especially the software analysis that enables it to carry out economic assessment of energy efficiency projects.

The implementing team worked with the ESCO to adapt their tools to the project environment, and local professionals were trained on creating energy performance contracts, energy performance reports, project implementation agreements, protocols of delivery/acceptance of implemented measures, and the ESCO administration scheme. Five case studies were assessed, of a school, kindergarten, public administration buildings, and boiler plant. The criteria for assessment included:

- Level of energy saving potential;

- replication potential throughout Kyrgyzstan;
- payback period of 2-3 years favorable to the ESCO;
- social significance of the facility;
- motivation of the client;
- willingness of local authorities to provide guarantees.

Kindergarten No. 14 Altyn Balalyk, Naryn, Kyrgyz Republic

UNISON, Energy Consulting s.r.o. and the ESCO chose municipal kindergarten Altyn Balalyk in the city of Naryn, Kyrgyz Republic as a demonstration project. In November, 2005 a four year EPC between Altyn Balalyk and the ESCO was signed. Also, the ESCO, the kindergarten, and municipality of Naryn City signed a budget agreement until 2019 with guaranteed savings of 20 percent from the baseline of 48,120 Mcal per year. The agreement states that after EE measures are implemented, the Naryn city administration is obligated to issue a budget in the same amount as before EE project was implemented. Therefore, the energy savings from the project will provide the kindergarten with continuous funding for future EE activities. The agreement also obligates the ESCO to continue servicing the equipment installed during project implementation until 2019.

The total cost of the project, including equipment, installation, start-up, maintenance and operation, amounted to US $304,000. Assessment of EE saving potential for Altyn Balalyk kindergarten using ESCO-TOOL software indicated a 24 percent reduction from the baseline consumption of about 57,744 Mcal per year[9]. The simple payback for the package of implemented measures according to the contract is about 1.4 years. Taking into account the inflation rate in Kyrgyzstan of approximately 9 percent and a real interest rate of 8 percent, the pay back period is about 2.3 years with an internal rate of return (IRR) of 43 percent. That makes the EPC contract signed for four years profitable for the ESCO as well as the municipality.

The following EE retrofit activities included in the contract were implemented:

- installation of automatic regulation valve;
- installation of heat meter;
- rehabilitation and sealing of windows and doors;
- rehabilitation and insulation of the main horizontal heating pipes with the high quality isolation material of AF Armaflex.

[9]The baseline heat energy consumption is based on existing standard methodology for calculation of heat consumption. Kyrgyz heat providers in cases no heat meter is installed use that methodology and energy bills are invoiced according to such calculations. The nominal baseline energy consumption takes into account the standard number of 3624 Degree days for the Kindergarten facility, -6 °C of outdoor air temperature during the heating season in Naryn as well the standard duration of the heating season of 151 days and 24 h of heating operation. The heat provider quite frequently interrupts the heating operation due to lack of automatic control according to outdoor conditions in the boiler plants and thus reduces the number of hours of daily operation. That has been reflected in energy bills invoiced before installation of heat meters through different correction factors, what makes entire methodology of bill calculation not transparent for the Clients.

In addition to the contractual activities, the ESCO performed some *pro-bono* work due to the appalling overall state of the kindergarten. This included:

- cleaning the basement from residuals of communal waste and pre-existing glass fibre insulation;
- filling with concrete an floor hole of about 1,5 m^2 in diameter and 50cm deep;
- scrubbing rust from heat pipes in the basement and painting with anti-rust paint;
- removing non-functional ventilation in cloak-rooms.

Results

By insulating the pipes, heat loss was reduced by approximately 60 percent. After sealing the windows, heat lost through ventilation was reduced by approximately 30 percent, which reduced heat demand further. Overall monitoring of the 2005-2006 heating season indicated that energy savings were 67 percent, which significantly exceeds the 20 percent of savings guaranteed in the EPC. Because of poor calculation of the baseline energy consumption[10], the actual savings from project implementation were determined to be 24-28 percent, which still exceeds the guarantees savings. The 40-43 percent difference is attributed to varying methodologies used by different parties in estimating baselines, which points to inadequate standards on measuring and monitoring building energy performance in Kyrgyzstan.

Lessons Learned

The following barriers were identified during project implementation:

- Cloudy utility billing procedures;
- Low capacity of energy officers and public authorities to coordinate and plan EE projects;
- Subsidized energy tariffs, which do not motivate energy efficiency interventions;
- Lack of supportive legal framework.

As a result of the project, the ESCO branch of the DH company generated profits while the DH company kept the market share for heat by retaining a client. The kindergarten benefited from lower energy bills, improved indoor temperatures and better quality of heat supply.

A national program to install heat meters combined with a new tariff calculation methodology could make the energy billing procedures transparent and incentive for energy savings. The heat providers could benefit from higher tariffs, allowing affordable and adequate production and distribution costs. The municipal and state budgets will benefit from reduced subsidies on much lower real heat consumption. Budget subsidies will be used transparently and effectively. Clients and energy end-users could benefit from better quality of energy services and will pay for real energy consumed instead of theoretical use. That will motivate them on energy efficiency investments and good energy habits.

Source & Further Information: Civil Environmental Foundation UNISON, www.unison.kg

[10]Climate conditions during the heating season 2005/2006 lasting through November – March were more severe than the long-term statistical average. The outdoor air temperature was –8,42 °C compared with the statistical average of –6 °C. Therefore, the number of degree days (DD) of 3994 exceed the standard baseline number by 10.2%. In order to calculate an accurate baseline that takes into account the real average of operation hours, the baseline consumption was updated according to the real number of DD. That allowed a comparison to energy consumption without EPC measures.

Annex 3 Case Study: Petrozavodsk Revolving Fund

Financing Overview:
The Nordic Environment Finance Corporation (NEFCO), established in 1990, is a multilateral financial institution that invests in projects that produce a positive environmental impact, and are economically viable in Russia, Ukraine and the Baltic States. In financing projects in Northwest Russia, NEFCO works with the Norwegian Ministry of Foreign Affairs, and the Norwegian Energy Efficiency Group (NEEG) to provide support to the local project implementers. Energy Saving International (ENSI), part of NEEG, works with the local energy efficiency centers, such as the Karelia Energy Efficiency Center (KAEEC) to manage and monitor project implementation on the ground.

NEFCO utilizes several mechanisms for financing its projects – the Investment Fund (IF), the Nordic Investment Development Fund (NEDF), and Special Purpose Revolving Facilities in Northwest Russia and Ukraine. All of the financial mechanisms that NEFCO has in its portfolio are available to municipalities and private enterprises alike and the financing is provided as a complement or supplement to funding provided by other bilateral and international financial institutions such as UNDP/GEF, and supports the realization of projects that would not materialize with this additional funding.

The Special Purpose Revolving Facilities in Northwest Russia and Ukraine consist of four varied programs that aim to reduce consumption of energy and water in municipal buildings, one of which is the Energy Savings Programme. Launched in 1999 in Russia, the Energy Saving Programme (ESP) provides grant financing amounting to 50 percent of project cost on the condition that that the other 50 percent is generated from local financing and savings from the project be repaid to the local revolving fund. The Fund, in turn, funds future energy and water saving projects. NEFCO's approval is required before any projects planned from the accumulated funds can be implemented. Thus far, five projects were initiated using the funding accumulated in the revolving funds.

Heat substation before upgrade (left) and after (photo courtesy of ENSI)

Project Approach
In 2002, as part of the ESP, ENSI launched a project in the city of Petrozavodsk, which consisted of creating a project management team, establishing the Karelia Energy Efficiency Centre, installing energy meters and an energy management system for 113 municipal buildings, and establishing a Petrozavodsk revolving fund (PRF). The creation of the PRF resulted from close

cooperation with the Petrozavodsk City Administration (CA), and the Petrozavodsk City Council, which was instrumental in approving the creation of the fund.

Both NEFCO and CA made initial contributions to the fund between 2003 and 2006 for the installation of energy meters and energy monitoring retrofits in Petrozavodsk School No. 3 and in the Derzhavin Lyceum. The energy saving project in the Derzhavin Lyceum was part of the UNDP/GEF-Russia education sector energy saving program. Between 2003 and 2006, NEFCO invested approximately $187,595 into the fund, while the CA contributed $141,595. At the end of 2005, $141,900 was repaid into the fund from the three projects. Table 1 provides an overview of the payment structure of the PRF up to 2006.

Table 1: Petrozavodsk Revolving Fund Payments (USD $), source: ENSI 2005

Project	**NEFCO Input**	**CA Input**	**Repay-ment Total**	**Annual Payment** minimum	**Performed Payments**	**With-drawals**	**Account Balance**	**Year of Payment**
Installation of Energy Meters & Energy Monitoring	$125,000	$85,000	$170,000	$42,500	$18,000 $67,000 $42,500			2003 2004 2005 2006
School No. 3	$24,000	$18,000	$36,000	$7,200	$7,200 $7,200	$18,000		2004 2005 2006 (2007 & 2008 remain)
Derzhavin Lyceum (additional $25,000 funded by UNDP/ GEF)	$38,750	$38,750	$77,500	$13,200		$13,200		2005 2006-2010 remain
Meter Calibration in Municipal Buildings						$750		2005-06
Total	**$187,750**	**$141,750**	**$283,500**	**$62,900**	**$141,900**	**$31,950**	**$109,950**	

Results

Total investment in the project at the Derzhavin Lyceum amounted to US $77,500 with an expected average payback period of 5.6 years, and annual savings of 366,069 kWh that amounts to a 32 percent decrease in energy use, and US $13,725. The project will also result in 140 tonnes of annual CO_2 emissions reductions or a decrease of 32 percent from 443 tonnes/year to 303 tonnes/year.

Upgrading the heating sub-station in the Derzhavin Lyceum, which cost US $32,125 with a 7.4 year payback, is expected to generate annual savings of 16,147 kWh and US $4,350. Balancing the heating system and installing thermostatic valves cost US $26,000 with a 5.9 year payback, and is expected to provide annual savings of 117,315 kWh and US $4,400. And finally, a simple activity such as sealing all the windows in the Lyceum cost US $19,375 with a 3.9 year payback, and is expected to generate annual savings of 132,607 kWh and US $ 4,975. During the 1st half of the 2005-06 heating season, the project improvements results in actual savings of 147,784 kWh, a decrease of 18 percent compared to the 819,888 kWh average recorded in 2004.

Lessons Learned

In 2006 due to successful performance of the revolving fund, KAEEC and ENSI intended to implement three new projects that would rely solely on the savings from the PRF. The projects were:

- Upgrade of heating sub-station in 3 music schools $ 38,100
- Installation of heat meters in Children's School of Arts $ 6,300
- Sealing windows in the city library $ 12,200

Despite the successes of the PRF, municipalities throughout Russia are facing challenges with the use of revolving funds, since existing budget regulations often do not allow the municipality to retain the savings from the municipal energy saving project. In the case of PRF, the City Council issued special permission to use the savings accrued in the PRF for implementing new energy efficiency projects as long as the investment is completed in the same budget year that it is accrued. In addition, though the PRF proved successful due to the close cooperation of ENSI and KAEEC with the municipal administration, the turnover of municipal officials is usually too frequent to allow the long-term relationships to be established that are needed to foster an understanding of the conditions necessary to achieve sustainable and beneficial revolving funds. There is a long way to go in reforming federal legislation in order to promote fluid functioning of the revolving funds in Russia and throughout the CIS. Provided that the projects financed by the revolving funds are economically viable, successfully implemented and monitored, further examples demonstrating the relative ease of creation and management of revolving funds will help engage municipalities in advocating change and raising awareness of the need for legislative reform on the federal level.

Source: Nordic Environment Financing Corporation, www.nefco.org