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A Roundtable discussion was also held on April 28, 2016 at MOE to discuss some of the report’s findings and recommendations.
EXECUTIVE SUMMARY

Why Energy Efficiency is Important for Georgia

Energy efficiency (EE) should be a critical component of Georgia’s energy strategy to sustain its economic growth while meeting its global commitments for climate change mitigation and environmental sustainability because of its high dependence on imports of natural gas and electricity, particularly in the winter heating season. Georgia’s energy intensity, its energy use per unit of GDP, is about three times higher than that of the Organization for Economic Cooperation and Development (OECD) countries, showing substantial potential for EE improvement. Further, Georgia’s energy use per capita is about one-fifth of OECD countries and is likely to increase further as incomes rise.

EE Potential in Public Buildings

The public sector in Georgia (which includes central government and municipal buildings as well as facilities and street lighting) is a large user of energy. While there is no centralized database of public buildings or energy use, some data exists from city-level Sustainable Energy Action Plans (SEAPs) prepared under the European Covenant of Mayors partnership. Based on these figures and extrapolated on a national-level, the public building sector includes an estimated 2,000 public buildings, of which about 48 percent are schools and kindergartens. Cost effective investments in EE can be made to reduce energy use in these buildings by 30 to 40 percent. This would require an estimated €150 million in investment, lead to some 2,200 GWh of equipment lifetime energy savings, 1.1 million tons of greenhouse gas (GHG) reduction and create about 1,600 green jobs. Georgia also has a draft National Energy Efficiency Action Plan (NEEAP) which includes EE measures in the public buildings sector.

Global Experience with Financing EE in Public Buildings

Barriers. Despite the economic viability of EE, numerous barriers often prevent it from happening on its own. These can include:

(i) policy and regulatory barriers, such as budgetary and borrowing limitations, restrictive budgeting procedures, public procurement rules, low energy tariffs and lack of building and construction codes and enforcement;

(ii) underdeveloped market conditions, including limited demand for EE goods and services, high project development costs, limited experience and capabilities of EE service providers and a lack of commercial financing;

(iii) institutional constraints, such as limited incentives of public agencies to invest in EE, limited awareness of and knowledge about EE opportunities, lack of credible data, low service levels, lack of implementation capacity, etc.; and

(iv) a lack of commercial financing, including unattractive financing terms, overcollateralization, high transaction costs, and informational and behavioral biases among financiers.

Financing models. There are a number of financing models that countries have used to support public EE programs. These range from budget financing or grants to advanced project or energy service company (ESCO) financing. Selecting the most suitable option depends on a number of factors, including the current legislative and regulatory conditions, market maturity, state of the local EE service industry, and technical and financial capacity of
public agencies to undertake EE. Once the option is selected, it must then be carefully designed to suit the local market characteristics. Consideration should also be given for mechanisms capable of serving multiple market segments (e.g., central government agencies, creditworthy municipalities with implementation capacity, creditworthy municipalities without implementation capacity and non-creditworthy municipalities). Over time, as local markets evolve, the goal should be to move up the ladder to more commercial financing mechanisms.

**Figure ES1. Georgian Options for Financing Public EE**

![Diagram showing financing options]

**Options for Financing Public EE in Georgia**

For a country such as Georgia that has limited implementation experience, and an underdeveloped EE service/ESCO market, financing mechanisms in the middle rungs of the ladder were deemed more appropriate. (However, utility on-bill financing was not deemed viable because the local distribution companies do not have the regulatory authority, capacity or interest in offering such services at present.) Based on the analysis conducted, three appropriate models were identified for Georgia. These include:

1. **Budget financing with capital recovery.** Under this option, the Ministry of Finance (MOF), or another parent budgeting agency, provides budgetary resources necessary for an EE investment and then recovers the investment by reducing future budgetary outlays (thus capturing the energy cost savings). This is also known as the ‘budget capture method’. This can work for central and municipal entities and, since there is almost no risk of nonpayment, this can work for municipalities without credit histories as well.

2. **Energy efficiency revolving fund (EERF).** An independent financing institution, called an EE revolving fund or EERF, is created using public funds to provide financing to public sector EE projects. Since both the borrower and lender are publicly-owned, such funds may often offer lower-cost financing with longer tenors (repayment periods) and less-stringent security requirements than typical commercial loans. As loans are repaid from energy cost savings, they can be redeployed to new projects, thereby revolving over time.

3. **Public ESCO.** Established by the government, a public (or super) ESCO functions as an ESCO for the public sector market, entering into energy performance contracts and
outsourcing actual project implementation to small, private ESCOs and other EE service providers. A primary function of the public ESCO is to facilitate access to project financing by developing relationships with local or international financial institutions (IFIs). The public ESCO may also provide credit or risk guarantees for ESCO projects, or act as a leasing or financing company to provide ESCOs and/or customers with EE equipment on lease or on benefit-sharing terms.

**ESAs.** Energy service agreements (ESAs) are a more recent product that some EERFs have now begun offering, in addition to traditional loans. They can be very useful for public agencies that typically lack capacity to borrow funds and implement EE projects. (See Box ES1.)

**Box ES1. Energy Service Agreements**

Under an ESA, the financier (an EERF, in this case) offers a full package of services to identify, finance, procure, implement, and monitor EE projects for clients. The client is only asked to pay what it is currently paying for energy (i.e., its *baseline energy costs*), from which the financier makes the new (lower) energy payments and recovers its investment cost and associated fees until the contract period ends.

The figure on the right illustrates the basic idea of a client’s cash flows under the ESA, with payments equal to their baseline energy bill. This allows them to maintain a constant cash flow while retaining their energy cost savings for the duration of the ESA. In some cases, the contract duration is fixed; in other cases, the contract is terminated after an agreed level of payment has been made, which encourages the client to save more energy.

For public clients, ESAs are generally not viewed as debt, but rather long-term service contracts, thereby allowing financing of central government entities that are typically not allowed to borrow, and municipalities that may have already reached their debt limits or otherwise have borrowing restrictions. This provides a dual advantage to the client of being relatively simple to implement with very little risk. It also helps ensure that the public client is able to retain the energy cost savings for the duration of the ESA.

**Recommendations**

Regardless of the option selected, the Government of Georgia (GOG) will need to identify the potential sources of financing, implement the needed legislative and regulatory changes, build implementation capacity and leverage private sector participation. Because each of the proposed models have advantages and limitations, GOG will need to consult with the relevant stakeholders before selecting the most appropriate model. The next steps would include developing the detailed design and implementation plans for the selected option.

Based on the analysis and current state of the Georgia market, the World Bank recommends creating a dedicated Georgian EERF (“GEERF”) for the public sector. While it would be preferred for the GEERF to be established as a new, independent entity, it should be noted that the Government is reluctant to create a new institution at this time. The GEERF could be managed by an existing entity, such as the Municipal Development Fund (MDF) or the Georgia Energy Development Fund, and transition to an independent Fund at a future date.

Establishment of the GEERF can help the government meet its national EE targets under the NEEAP while providing significant co-benefits, including reduced energy imports and public
energy costs, improved comfort levels, refurbished public building stock, creation of an ESCO industry and new jobs, and reduced GHG emissions. GEERF will be sustainable, since no recurring Government budget will be needed, and operate on a revolving basis for more than 20 years. It can provide the basis for extension or replication to other municipal sectors (e.g., street lighting, water pumping, etc.). Other advantages include:

- The GEERF will represent the interests of all the relevant stakeholders (including various Ministries and private sector stakeholders).
- Fund management can be independent and thus avoid political influence.
- The GEERF can allow pooling of government and donor funds to avoid parallel initiatives.
- The Board can select a highly qualified management team.
- Fund management staff would be long-term and could be compensated at market-based levels.
- The Fund may not have to comply with government procurement rules and bureaucratic procedures.
- It can operate with more flexibility and faster decision-making than a government agency.

**Capitalization of the GEERF.** The Fund could be capitalized with equity of €10 million – from the Green Climate Fund (GCF), Global Environment Facility (GEF), government contributions, and other donors – with €25 million in concessional debt financing from IFI and GCF loans. Assuming adequate deal flow and operations, it would likely require a recapitalization of about €20 million in Year 6.

**Results.** It is projected that the GEERF would make investments in EE projects of about €5.0 million in Years 1 and 2, increasing to €6.0 million per year from Years 3 through 5, and €7.0 million from Years 6 to 15. The GEERF would be likely to breakeven in terms of covering its administrative and overhead costs and fees from its revenues from Year 3 onward. Over a 15-year period, other impacts could include:

- Cumulative project investments by Year 15 – €98 million.
- Annual government budget savings by Year 15 – about €14 million.
- Lifetime energy savings – 2,198 GWh.
- Lifetime GHG reductions – 1.1 million tons of CO₂e.
- Increase in green employment – 1,600 jobs.

**Next steps.** The most critical next step is for the GOG to make a decision regarding the most suitable option and institutional set-up for the proposed financing program. Subsequent steps include adopting the necessary legislative framework to establish the Fund, mobilizing the required financing, developing the governance structure and operating procedures, preparing the investment and staffing plan, and identifying a pipeline of potential projects.
SECTION 1 - INTRODUCTION

Importance of Energy Efficiency in Georgia

Energy efficiency (EE) is critical for Georgia to sustain its economic growth while meeting its global commitments for climate change mitigation and environmental sustainability. Georgia has a high dependence on imports of natural gas and electricity (EEC 2014), particularly in the winter heating season. At current trends, continued growth in electricity demand is projected to deplete the power reserve margins within the next five years.

Figure 1.1 shows a comparison of the energy intensity\(^1\) of Georgia relative to many other countries in the Caucasus, Western Balkans, and the European Union (EU). At 0.40 tpe/000 US$ GDP, the energy intensity of Georgia compares favorably with some of its neighboring countries such as Armenia, Azerbaijan, Kosovo and Bulgaria, but it is three times higher than that of OECD countries (0.13) and over four times higher than EU countries such as Denmark, Italy and Germany (0.07 to 0.10).\(^2\) It has been rising – by about 5 percent from 2010 to 2012 – while OECD countries have declined by about 9 percent over the same period. The energy use per capita in Georgia is 0.87 which is only about one-fifth of the average of OECD countries. As the per capita energy use rises, its energy intensity is expected to continue to grow (see Figure 1.2).

Figure 1.1 – Energy Intensity of Georgia and Other Countries

\(^1\) Energy intensity is expressed as tons of primary energy supply divided by gross domestic product (GDP) in thousand US dollars (2005).


Source: IEA 2015
The relatively high energy intensity in Georgia and the potential increase in energy needs to support economic growth points out the need for improving EE. Georgia has recently signed the EU Association Agreement and has applied for full membership in the Energy Community. To meet the requirements of the EU and the Energy Community, Georgia needs to commit to improve EE.

The public sector in Georgia (which includes central government and municipal buildings and facilities) is a large user of energy. There is very limited data on the number of public sector buildings and facilities and their energy consumption. Some data has been compiled in the Sustainable Energy Action Plans (SEAPs) of seven major cities. Energy use in the public sector is increasing (Tbilisi 2011). Figure 1.3 shows a projection of energy use in public buildings in Tbilisi. Therefore, EE improvement in public buildings is very important.

The public sector, by implementing EE projects, can lead by example while helping to catalyze markets for EE goods and services. Common ownership and public financing facilitates potential bundling of smaller projects, thus lowering purchasing and implementation costs and implementing at a larger scale. And, a scaled-up public sector
program can create jobs, fostering a sustainable local ESCO industry—as shown in other countries such as Canada, Germany, Japan, the Republic of Korea and the United States (World Bank 2014b). Therefore, a national-scale program to improve EE in public buildings in Georgia could be developed with the Government and IFI partners to realize such benefits.

**Government Initiatives**

With technical assistance from European Bank for Reconstruction and Development (EBRD), the GOG has initiated the development of the NEEAP, which is expected to be completed in June 2016. The NEEAP focuses on the implementation from 2017 to 2019, with indicative targets to be set for 2020, 2025 and 2030. The initial NEEAP efforts have identified that, to meet the NEEAP targets, Georgia will need assistance in the following areas (Arabidze 2016):

- Access to finance and targeted investment to unlock EE potential
- Technical assistance in capacity building (industry and building sector)
- Technical assistance in legislative and program development
- Support to collect, analyze and maintain energy consumption data, including a registry for public buildings
- Grants to support incentive schemes

The NEEAP has identified efficiency improvement and renovation of public buildings and facilities as an important target.

Efforts have also been initiated to draft a national energy efficiency law (Tsurtsumia 2016), which is expected to reflect the requirements of the EU energy efficiency directives. It is anticipated that the EE law would include some provisions for EE improvement in public buildings.

Ten cities in Georgia have initiated the development of SEAPs. Some of the completed SEAPs have provided data on a number of public buildings and floor space. Other SEAPs include energy audits of public buildings that have provided information on energy use and energy savings potential. To some extent, the calculation of CO₂ reduction potential from the SEAPs provides an indication of energy savings potential. The information from the SEAPs points out that there is a large potential for EE improvement in public buildings. Estimates of such potential are provided in Section 2 of this report.

**World Bank Experience with Public Sector EE**

Since 2007, the World Bank Group has provided about US$10 billion in financing for EE globally. Within the Europe and Central Asia region, the World Bank has financed about US$4 billion for EE and US$500 million in public building EE. Such projects have generally led to a 25 to 40 percent energy savings with simple payback periods of less than 8 to 10 years, substantial co-benefits (e.g., improved indoor comfort, better air quality, and health), and increased public awareness. Repayments have been extremely good, with a demonstrated willingness for public building administrators to co-finance such investments.

Despite attractive payback periods and energy savings potential, EE financing in the public sector is plagued by a number of market barriers. Perhaps the most critical gaps are the lack of suitable and sustainable financing mechanisms, along with supporting institutional.

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structures for public building programs to be implemented at scale. The creation of a national-level program, with access to financing, technical assistance (TA), specialized ESCO procurement schemes with standardized audit/contracts, specialized ESCO windows, etc. could substantially unlock the EE potential of this sector.

**Project Objectives**

The primary objective of this project is to identify options that can address the barriers to financing and help scale-up EE implementation in public buildings in Georgia. Specifically, the project is designed to:

- Review existing information on energy consumption in public buildings and assess energy savings opportunities in this sector.
- Document the existing legislative and regulatory framework for facilitating EE projects in public buildings.
- Identify the major barriers to EE financing in the public sector.
- Review international experience with financing options for public sector EE implementation.
- Identify attractive options for EE implementation in public buildings in Georgia.
- Conduct a comparative assessment of the advantages and limitations of the options.
- Define the steps for selection and implementation.

**Summary of Approach**

The project consisted of the following activities:

1. Inception Mission and review of current situation;
2. Development of a long list of financing options based on international experience with public sector EE financing and implementation;
3. Assessment of the options in the context of Georgia;
4. Selection of a short list of three options;
5. Assessment of the selected options; and
6. Preparation of a final report.

This report was presented and discussed at an EE Roundtable in Tbilisi on April 28, 2016 in order to define the steps for moving forward with the detailed design and implementation of the preferred financing option. A summary of the results of this Roundtable is provided in Annex D.

**Outline of This Report**

Section 2 provides a summary of the country context, including the legislative and regulatory framework, energy consumption characteristics of central government buildings, and estimates of potential for energy savings and investments needed.

Section 3 summarizes the barriers to financing EE in the public sector in Georgia, including legal and regulatory barriers, lack of access to commercial financing, institutional barriers, and limited implementation capacity.

Section 4 provides information on international experience with financing public sector EE projects. It includes a review of six financing mechanisms: budget financing, EE revolving
funds, dedicated EE credit lines, risk-sharing programs, public or super ESCO, and commercial financing with ESCOs and performance contracting. It also presents a comparative assessment of the key characteristics of these financing options.

Section 5 identifies the three options considered appropriate for implementation in Georgia — budget financing, EERFs, and public or super ESCO—and provides detailed information on each. It also presents information on the potential role of international financial institutions in providing complementary financial and TA.

Section 6 summarizes the advantages and limitations of the three financing options and provides guidance on moving forward with the recommended option, the EE revolving fund. A road map for implementing the EERF is included.
SECTION 2 - COUNTRY CONTEXT

Legislative and Regulatory Framework

Georgia does not have any primary or secondary legislation on EE. However, a number of efforts are currently underway with respect to the development of a national EE policy and legislation framework:

- Draft Energy Efficiency Law
- Draft Spatial Planning and Construction Code
- Code on Environmental Assessment (expected to come into effect on 1 January 2017).

The activities related to preparation of a Draft Construction Code have been ongoing for a decade. There were several initiatives aiming at development of new codes which encompassed different international standards (e.g. International Building Codes and Eurocodes) and were supported by different (international) organizations. It is important to note that the terms “building codes” and “construction codes” can be used in Georgia to denote a wider scope of regulatory subjects than technical standards for building design and construction, while the technical standards for building design and construction are known as “SNIPPs.” This adds a degree of uncertainty with regard to the type, and possibly the number, of codes that are awaiting ratification.

The Government has prepared a draft of the new construction code which is expected to address EE. According to government announcements, it will reflect the best European experience, and address quality of construction materials, rules of issuing the construction permits, and supervision.

The Ministry of Economy and Sustainable Development of Georgia (MoESD) has created the draft version of the following Eurocodes:

- Basis of Structural Design
- Actions on Structures
- Design of Concrete Structures
- Geotechnical Design
- Design of Structures for Earthquake Resistance.

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4 See Tsurtsumia 2013. This draft was developed in 2008 but was never approved. A new EE Law is being developed consistent with the June 2015 Energy Policy and EU Energy Efficiency Directive 2012/27/EC.
9 In a presentation to the IEA in June 2015, Mr. Davit Sharikadze, a Ministry of Energy official announced that the “draft of New Building Code is ready for ratification.”
“Support to Energy Efficiency and Sustainable Energy in Georgia, 2015-2019,” a new project launched in June 2016 and supported by DANIDA, will provide assistance to the GOG for:

- Formulation of New National Energy Efficiency Building Code to support introduction of minimum EE requirements in public buildings.
- Labeling of energy related products.
- Development of methodology for monitoring and reporting.
- Development of national grid code regulation and standards to enable electricity from RE sources to feed into the national power grid.

**International Standards and Initiatives**

The GOG has signed the following international agreements:

- *Covenant of Mayors* (CoM), 2010.
- *Global Network for Resource Efficient and Cleaner Production* (RECPnet) – Georgia became an Observer Member in December 2015.

**Energy Efficiency Responsibilities**

A number of ministries share responsibilities related to policy development and implementation of EE.

*The Ministry of Energy (MOE)* has primary responsibility over policy in the energy sector. MOE is in charge of drafting the national energy policy and submitting it to the Parliament for approval, and for developing and implementing short-, medium- and long-term strategies and priorities for the power sector of the country. MOE participates in the Energy Community Secretariat (ECS) EE coordination group meetings as a candidate country, with the goal of full membership.

*The Ministry of Economy and Sustainable Development (MoESD)*, through its Spatial Planning & Construction Policy Department, is responsible for defining, implementing, coordinating, managing and monitoring policy in the field of spatial planning and construction activities. Within this Ministry, the Technical and Construction Supervision Agency is responsible for issuing special construction permits and related supervision of the buildings and public infrastructure in the highest risk category.

*The Ministry of Environment and Natural Resources Protection (MENRP)* is the lead agency for the introduction of Strategic Environmental Assessment (SEA), and the Government counterpart for the Global Network for Resource Efficient and Cleaner Production (RECPNet), and RECP demonstration program “Greening Economies in the
European Union’s Eastern Neighborhood”.

The Ministry of Regional Development and Infrastructure (MRDI) is responsible for the development of international and secondary roads, water supply systems, and other regional and municipal infrastructure. MRDI is currently planning about 189 km of new highways in Georgia, to be financed by JICA, ADB and the World Bank. They are planning to install LEDs in all of these. MRDI is home to the Municipal Development Fund (MDF), established in 1997 as a public entity whose objective is to strengthen institutional and financial capacity of local government units.\(^\text{10}\) The MDF cooperates with many of the major international donors for climate and development finance, including the World Bank, EBRD, ADB, KfW, United States Agency for International Development (USAID), UNDP, Swedish International Development Agency (SIDA), as well as a number of national governments. MDF has implemented 15 projects in the building sector since 2013, including renovations of municipal buildings, and renovated a few street lighting systems.

The Energy Efficiency Center (EEC), created in 1998 by the EU, \(^\text{11}\) the EEC is a leading NGO in Georgia dedicated to promotion of energy efficiency and renewable energy policies though policy development and public awareness activities. EEC is a member of several international organizations, including the European Council for an Energy-Efficient Economy (ECEEE) and is a supporter of the CoM. Since its establishment, EEC has been the main local partner for donor-funded TA projects and frequently works with the government and the private sector. EEC is a major contributor to the development of the NEEAP.

Activities Related to Energy Efficiency

Georgia has not yet formulated an EE policy. The current energy sector policies and measures remain hydro-centered as evidenced by energy sector priorities of the GOG for 2009-2012 set out in the “Basic Data and Directions for 2009-2012”\(^\text{12}\). However, according to MOE, several documents that will define Georgia’s EE policy are forthcoming\(^\text{13}\) and the next national energy strategy will include EE policy.\(^\text{14}\) The engagement with the international institutions and obligations arising from international treaties suggest that the policy development process will proceed in coordination with international standards and EU recommendations.

National Energy Efficiency Action Plan (NEEAP)

Georgia is currently carrying out preparatory activities for its first NEEAP which should be finalized by the Fall 2016 (Arabidze 2016a). This effort is led by the MOE with TA from EBRD and financial support from SIDA. The NEEAP includes financing schemes for setting up an EE fund, introduction of energy audits and management systems, boiler inspections in the industry sector, EPBD transposition and enforcement, mandatory labeling for electrical home-appliances, and amendment to the law on procurement procedures.

The NEEAP also includes the following specific measures for public buildings (Arabidze 2016b):

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\(^\text{10}\) [http://www.mdf.org.ge/?site-lang=en](http://www.mdf.org.ge/?site-lang=en)

\(^\text{11}\) [EE Center: http://www.eecgeo.org/](http://www.eecgeo.org/)


\(^\text{13}\) A draft of the new policy includes EE implementation and has been in force since June 25, 2015, but is not yet finalized.

\(^\text{14}\) The announcements were made in June 2015 by Davit Sharikadze, Ministry of Energy of Georgia. [https://www.iea.org/media/workshops/2015/platformistanbul2015/GovernmentPoliciesandMeasuresPromotingI](https://www.iea.org/media/workshops/2015/platformistanbul2015/GovernmentPoliciesandMeasuresPromotingI) nvestmentsforEEandREFocusonGeorgia.pdf
• Development of a national EE information system for publicly-owned buildings and street lighting.
• Improvement of the data on the public building stock, lighting, and energy consumption.
• Pilot projects for low-energy public sector buildings and renovation of administrative buildings to demonstrate the potential costs and benefits.
• Efficient lighting systems in public buildings.\footnote{At the Sustainable Energy Week in Georgia in June 2016, the Energy Minister announced that MOE is working on legislation to install LED lights in all state institutions from 2017.}
• Improvement of the EE in central government-owned public buildings.
• Green Procurement on Energy Efficiency.

**Low Emission Development Strategy (LEDS)**

MENRP and the Climate Change Office are leading the process of LEDS, which was initiated in 2013. The Strategy is intended to provide a long-term, economy-wide plan for reduction of GHG emissions, and it is expected to be finalized in 2016. In order to ensure management of the processes, USAID funded the Enhancing Capacity for Low Emission Development Strategies (EC-LEDS) project.\footnote{https://www.usaid.gov/georgia/environment} This effort is focused on improving EE in Georgian Municipalities, Green Building Rating and Certification Systems, and Advisory assistance to the national LEDS development process.

**Nationally Appropriate Mitigation Actions (NAMA)**

The development of NAMA started in 2014 when Georgia joined the Mitigation Momentum project\footnote{http://www.mitigationmomentum.org/partner_countries_georgia.html}. NAMAs, a part of the LEDS, include three components: financial mechanisms, market transformation, and outreach. Energy efficiency in buildings is one of the key thematic areas under climate change mitigation and local sustainable development. A NAMA proposal for energy-efficient refurbishment of public buildings has been prepared (Mitigation Momentum 2016).

**RE/EE Trust Fund**

The GOG plans to establish the Renewable Energy and Energy Efficiency Technology Development and Promotion Fund as a trust fund.\footnote{Georgia’s Third Communication to UNFCCC. December, 2015.} Its establishment is identified as one of the main strategic goals in the Climate Change Strategy of Georgia – 2014.

**Energy Consumption in Public Buildings in Georgia**

The public buildings in Georgia include:

• Buildings belonging to the national government (state) and are in possession of the MoESD of Georgia or sectoral Ministries.
• Buildings belonging to the Autonomous Republic and are in possession of the Ministry of Economy of Autonomous Republic or sectoral Ministries.
• Buildings belonging to the municipalities and are in possession of the municipalities or self-governing cities.

Unfortunately, there is very limited data on these buildings and facilities and their energy

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\footnote{At the Sustainable Energy Week in Georgia in June 2016, the Energy Minister announced that MOE is working on legislation to install LED lights in all state institutions from 2017.}
\footnote{https://www.usaid.gov/georgia/environment}
\footnote{http://www.mitigationmomentum.org/partner_countries_georgia.html}
\footnote{Georgia’s Third Communication to UNFCCC. December, 2015.}
consumption. Some information on municipal buildings is available from the SEAPs developed by cities.

**Information from SEAPs**

The City of Tbilisi has provided information on public buildings in its SEAP. Table 2.1 shows the number of buildings and floor area by building type for municipally-owned and other buildings within the city. This information covers over 1,000 buildings with a total floor area of about one million square meters. However, it does not include any state-owned office or administrative buildings in Tbilisi.

<table>
<thead>
<tr>
<th>Building Type</th>
<th>Number of Buildings</th>
<th>Floor Area (m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Municipally-owned Buildings</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buildings in the Parks</td>
<td>10</td>
<td>15,112</td>
</tr>
<tr>
<td>Schools of Arts</td>
<td>26</td>
<td>18,576</td>
</tr>
<tr>
<td>Museums</td>
<td>14</td>
<td>2,537</td>
</tr>
<tr>
<td>Theaters</td>
<td>3</td>
<td>5,100</td>
</tr>
<tr>
<td>Sport &amp; Fitness Centers</td>
<td>12</td>
<td>38,342</td>
</tr>
<tr>
<td>Libraries</td>
<td>42</td>
<td>11,225</td>
</tr>
<tr>
<td>Medical Service Centers</td>
<td>27</td>
<td>26,763</td>
</tr>
<tr>
<td>Kindergartens</td>
<td>158</td>
<td>222,090</td>
</tr>
<tr>
<td>Administrative Buildings</td>
<td>14</td>
<td>11,203</td>
</tr>
<tr>
<td>Different purpose buildings</td>
<td>66</td>
<td>102,704</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>372</td>
<td>453,652</td>
</tr>
<tr>
<td><strong>Other Public Buildings</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public Schools</td>
<td>371</td>
<td>362,630</td>
</tr>
<tr>
<td>Hospitals</td>
<td>203</td>
<td>142,113</td>
</tr>
<tr>
<td>Dispensaries/Clinics</td>
<td>92</td>
<td>41,205</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>666</td>
<td>545,948</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1,038</td>
<td>999,600</td>
</tr>
</tbody>
</table>

*Source: USAID 2015*

Similar information is available from five other SEAPs. Table 2.2 summarizes this information. The total floor space of the buildings from these SEAPs is 1.5 million square meters.

Some additional information can be obtained from energy audits conducted by USAID as part of the development of the SEAPs. Audit data was available from ten audits of public buildings (two medical facilities, four kindergartens, and four buildings of Georgia Technical University. While this is only a small sample of public buildings, the audits have provided useful information on floor area, energy consumption, energy savings potential and investment requirements, which help the estimation of energy consumption per square meter, percent energy savings, energy cost savings, investment needs per square meter, and simple payback periods. Table 2.3 shows the results.

It should be noted that these audits identified EE measures with very low payback periods. It is quite likely that deeper retrofits can provide additional savings with higher investment needs and longer paybacks.
Table 2.2 – Public Buildings Information from SEAPs

<table>
<thead>
<tr>
<th>CITY</th>
<th>POPULATION</th>
<th>BUILDING TYPE</th>
<th>NO. OF BLDGS.</th>
<th>FLOOR AREA (m²)</th>
<th>m²/BLDG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tbilisi</td>
<td>1,175,000</td>
<td>Kindergartens</td>
<td>158</td>
<td>222,090</td>
<td>1,406</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other Municipal</td>
<td>214</td>
<td>231,562</td>
<td>1,082</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Schools</td>
<td>371</td>
<td>362,630</td>
<td>977</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hospitals &amp; Clinic+D2s</td>
<td>295</td>
<td>183,318</td>
<td>621</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>1038</td>
<td>999,600</td>
<td>963</td>
</tr>
<tr>
<td>Zugdidi</td>
<td>76,600</td>
<td>Municipal Buildings</td>
<td>12</td>
<td>22,782</td>
<td>1,899</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Schools</td>
<td>12</td>
<td>36,059</td>
<td>1,502</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kindergartens</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>36</td>
<td>58,841</td>
<td>1,634</td>
</tr>
<tr>
<td>Batumi</td>
<td>170,000</td>
<td>Administrative</td>
<td>85</td>
<td>19,000</td>
<td>224</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>85</td>
<td>19,000</td>
<td>224</td>
</tr>
<tr>
<td>Kutaisi</td>
<td>196,600</td>
<td>Kindergartens</td>
<td>35</td>
<td>47,707</td>
<td>1,363</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Schools</td>
<td>38</td>
<td>187,555</td>
<td>4,936</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Medical Centers</td>
<td>28</td>
<td>81,626</td>
<td>2,915</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>101</td>
<td>316,888</td>
<td>3,138</td>
</tr>
<tr>
<td>Telavi</td>
<td>21,800</td>
<td>Municipal Buildings</td>
<td>56</td>
<td>37,628</td>
<td>672</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Schools</td>
<td>9</td>
<td>23,677</td>
<td>2,631</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Medical Centers</td>
<td>18</td>
<td>11,520</td>
<td>640</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>83</td>
<td>72,825</td>
<td>877</td>
</tr>
<tr>
<td>Gori</td>
<td>50,400</td>
<td>Municipal Buildings</td>
<td>31</td>
<td>60,397</td>
<td>1,948</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Schools</td>
<td>13</td>
<td>46,627</td>
<td>3,587</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hospitals</td>
<td>8</td>
<td>11,810</td>
<td>1,476</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>52</td>
<td>118,834</td>
<td>2,285</td>
</tr>
<tr>
<td>Grand Total</td>
<td>1,690,400</td>
<td>All Types</td>
<td>1359</td>
<td>1,527,147</td>
<td>1,124</td>
</tr>
</tbody>
</table>

Source: SEAP reports of the cities

Table 2.3 – Summary of Results of Energy Audits

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Units</th>
<th>Medical (2 bldgs)</th>
<th>Georgia Tech U. (4 bldgs)</th>
<th>Kindergartens (4 buildings)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Floor Area</td>
<td>m²</td>
<td>18,255</td>
<td>52,909</td>
<td>N/A</td>
</tr>
<tr>
<td>Consumption</td>
<td>kWh</td>
<td>3,849,725</td>
<td>7,213,255</td>
<td>1,249,994</td>
</tr>
<tr>
<td>Cons. Per m²</td>
<td>kWh/m²</td>
<td>211</td>
<td>136</td>
<td>N/A</td>
</tr>
<tr>
<td>Savings</td>
<td>kWh</td>
<td>1,225,585</td>
<td>2,249,409</td>
<td>514,390</td>
</tr>
<tr>
<td>% Savings</td>
<td>%</td>
<td>32%</td>
<td>31%</td>
<td>41%</td>
</tr>
<tr>
<td>Investment</td>
<td>GEL</td>
<td>509,690</td>
<td>1,159,015</td>
<td>N/A</td>
</tr>
<tr>
<td>Savings</td>
<td>GEL</td>
<td>120,052</td>
<td>364,263</td>
<td>61,267</td>
</tr>
<tr>
<td>Payback</td>
<td>Years</td>
<td>4.2</td>
<td>3.2</td>
<td>N/A</td>
</tr>
<tr>
<td>Inv/sq. m</td>
<td>GEL/m²</td>
<td>27.9</td>
<td>21.9</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Source: Energy Audit Reports provided by Winrock International

Note: US$1 is equal to about 2.345 Georgian Lari (GEL).

Estimating Total Floor Area

The information in Table 2.2 covers six of the larger cities. The SEAPs did not develop an exhaustive inventory of all municipal and other public buildings. These six cities have a total population of 1.7 million or about 40 percent of the population of Georgia. Since they are the large urban areas, they probably represent 70 to 80 percent of the total floor area.

Also, the SEAPs do not include any State-owned office and administrative buildings. According to the information provided in the NAMA proposal (Mitigation Momentum 2016), about 20 percent of the public buildings are State-owned (see Figure 2.1).

Extrapolating the floor area of the six cities, taking into account that (i) the SEAPs did not have an exhaustive list of buildings; (ii) they included only six cities; and (iii) they exclude State-owned office and administrative buildings, it is estimated that the total floor area of public buildings in Georgia is about 2.25 million square meters.

Issues Related to Low Comfort Levels and Need for Structural Rehabilitation

Many of the public buildings in Georgia (particularly kindergartens and schools) are underheated and need significant structural rehabilitation. For such buildings, the investment costs and typical payback periods of EE investments may be underestimated in the energy audits. Table 2.4 shows the results of estimates by USAID of the need for rehabilitation and the related investment costs.

Table 2.4 – Estimated Unit Investment Needs for Structural Rehabilitation

<table>
<thead>
<tr>
<th>Need for Rehabilitation</th>
<th>Area (m²)</th>
<th>Share (%)</th>
<th>Investment Need (€/m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severe need</td>
<td>69,543</td>
<td>31.5</td>
<td>356-456</td>
</tr>
<tr>
<td>Moderate need</td>
<td>135,775</td>
<td>61.2</td>
<td>250-325</td>
</tr>
<tr>
<td>Low need</td>
<td>15,455</td>
<td>7.2</td>
<td>100-130</td>
</tr>
<tr>
<td>Total</td>
<td>220,773</td>
<td>100</td>
<td>-</td>
</tr>
</tbody>
</table>
The NAMA proposal has estimated even higher costs (€200-300/m²) for “deep renovation” of public buildings in Georgia. Underheating and structural rehabilitation are common in the region, and some measures to address this can be included in typical EE investments. However, to recover the full investment cost from EE savings, such investments in structural rehabilitation or upgrading comfort levels need to be limited so that the investment costs can be recovered through energy cost savings in no more than 10 years. If not, some budgetary or grant support would be necessary.

**Estimating Potential Investment Needs for Energy Efficiency Improvement**

International experience shows that the investments needed in the public sector for EE improvements to provide reasonable comfort levels and allow for some structural rehabilitation are typically in the range of €50 to 80 per square meter and typical simple payback periods are in the range of 8 to 10 years. Assuming a total floor area of 2.5 million square meters, this means the total investment needs for EE improvement in Georgia could be in the range of €112 to 180 million. These EE investments are likely to provide annual savings of €15 to 20 million. Table 2.5 summarizes these estimates.

<table>
<thead>
<tr>
<th>Investments and Savings</th>
<th>Units</th>
<th>Amounts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated Total Floor Area</td>
<td>m²</td>
<td>2.25 million</td>
</tr>
<tr>
<td>Estimated Investment per m²</td>
<td>€/m²</td>
<td>50 - 80</td>
</tr>
<tr>
<td>Estimated Total Investment Needs</td>
<td>€</td>
<td>112 – 180 million</td>
</tr>
<tr>
<td>Estimated Simple Paybacks</td>
<td>Years</td>
<td>8 - 10</td>
</tr>
<tr>
<td>Estimated Annual Cost Savings</td>
<td>€</td>
<td>15 – 20 million</td>
</tr>
</tbody>
</table>

**Table 2.5 – Estimated Investments Needs and Savings Potential**

---

*Based on World Bank studies/investment projects in Armenia, Bosnia & Herzegovina, Kosovo, FYR Macedonia, Serbia and other countries. Georgia which has cheaper natural gas prices, lower cost hydro-based electricity, and a prevalence of wood-based heating may thus have higher payback periods requiring longer-term financing.*
SECTION 3 - BARRIERS TO FINANCING PUBLIC SECTOR EE

Introduction

Energy efficiency investment programs in public institutions are notoriously difficult to implement. They are impeded by the same barriers that have slowed down EE improvements in other sectors of the economy, such as lack of information on EE potential and benefits, lack of trained personnel, lack of incentives, high transaction costs, and scarcity of financing. In addition, several barriers specific to the public sector further hold back sustained EE improvements. Among them are public accounting, budgeting and procurement rules, financing constraints, and very limited staff capacity and motivation for identifying and implementing EE measures. Figure 3.1 lists the barriers to EE in the public sector based on international experience.

![Figure 3.1: Barriers to EE in the Public Sector](source: Adapted by authors from World Bank 2013)

**Barriers to Financing Public Sector EE in Georgia**

The barriers to financing public sector EE projects in Georgia have been summarized below in the following categories:

- Policy and regulatory barriers
- Barriers related to equipment and service providers
- Barriers related to end users
- Lack of access to commercial financing

In addition, the public sector has very limited capacity to identify, develop and implement EE projects.
Policy and Regulatory Barriers

- **Budgetary and borrowing limitations.** Both central government agencies and municipalities have limited availability of budget funds for investment in EE improvements. The existing legal framework in Georgia does not allow central government agencies to undertake loans. The creditworthiness and borrowing capacity of municipalities are both limited and MOF approval is needed to borrow funds.

- **Restrictive budgetary procedures.** Existing budgetary rules generally do not allow public agencies (central government agencies and municipalities) to benefit from energy savings they achieve, since each year’s budget allocation is based on the previous year’s expenditures. Therefore, the reduction of budgetary spending for energy costs can lead to a decrease in allocation in the next budget cycle. Also, operating cost reductions are typically unable to cover capital expenditures.

- **Public procurement rules.** Public procurement regulations and procedures require tenders to be evaluated purely on the basis of lowest cost, and the value of the energy savings from EE is not adequately taken into account.

- **Low energy tariffs.** Due in part to the hydropower dominated grid, electricity prices in Georgia are low. The market prices of fuels such as natural gas and firewood do not reflect their production costs. These lower energy costs provide limited incentives for investments in EE.

- **Building codes and certification.** There is a lack of building code promulgation and enforcement and the new energy performance in buildings directive, which includes building certification, has not yet been implemented.

Barriers related to Equipment and Service Providers

- **Limited demand and high development cost.** There is limited demand for EE services in the public sector, and equipment and service providers need to devote substantial time and effort to develop EE projects, which leads to high project development costs.

- **Limited experience and capabilities.** Georgia has very limited experience with mechanisms such as energy saving performance contracting (ESPC). There are few energy service companies (ESCOs) in the market and none of them have experience working with the public sector. The existing energy service providers have limited technical, business development, and risk management skills and capabilities.

- **Lack of commercial financing.** Equipment suppliers and energy service providers have limited access to commercial financing and cannot invest much of their own equity in EE projects. Also, innovative financing mechanisms such as leasing or vendor financing for EE equipment are not common in Georgia.

Barriers related to End-Users

- **Limited budget capacity and incentives.** There are generally no discretionary budgets for special projects or efficiency upgrades. Also, public sector decision-makers do not have any incentives to undertake EE projects because they do not benefit from the resulting cost savings.

- **Limited knowledge of EE options.** Public sector facility and energy managers (both in central government agencies and in municipalities) have limited
Options for Financing Energy Efficiency in Public Buildings in Georgia

knowledge and awareness of EE technologies and implementation options.

- **Lack of sufficient, credible data.** There is very limited data on the number, characteristics, and energy use of public buildings. There is limited information available to public sector decision-makers on the characteristics and benefits of EE technologies.

- **Low existing comfort levels and poor structural conditions.** The conditions of many public buildings limits the cost-effectiveness of EE improvements, without larger investments that may not generate cost savings.

**Lack of Access to Commercial Financing**

- **Lack of interest and unattractive financing terms.** Commercial banks have limited or no interest in lending to the public sector. Most banks consider loans to municipalities or other public agencies riskier than loans to private sector companies, in part because budgets are allocated annually and accounting practices may be underdeveloped. The commercial financing terms (interest rate, loan tenor, collateral requirements, etc.) are not attractive from the perspectives of the public agency decision-makers.

- **Overcollateralization.** Commercial banks require substantial assets to be pledged as collateral. They are unwilling or unable to offer debt financing to public agencies, because it is very difficult to collateralize public assets for debt financing.

- **High transaction costs.** The small size of public sector EE projects leads to relatively high transaction costs, which makes financing such projects unattractive.

**Implementation Capacity**

- **Public agency decision-makers.** Both central government agencies and municipalities have limited capacity to identify EE opportunities, prepare “bankable” project proposals, access financing, carry out procurement for goods and services, and develop and implement EE projects.

- **Public agency implementers.** No Ministry in Georgia has full responsibility for EE and none are assigned to assist public agencies with EE implementation. Therefore, the institutional capabilities, roles, and expertise are fragmented. Public agencies that are interested in EE have no single agency that can assist or guide them through the financing and implementation process.

- **Inadequate delivery infrastructure.** Georgia has a very limited energy services delivery infrastructure. The fragmented nature of the private sector, the small number of ESCOs in the local market, and their lack of experience with the public sector, limit the use of performance-based contracting options in the public sector. While government entities can provide some of these services, none are assigned responsibilities to do so.
SECTION 4 - INTERNATIONAL EXPERIENCE IN FINANCING PUBLIC SECTOR ENERGY EFFICIENCY PROJECTS

Introduction

Beyond grant financing, various countries have implemented a range of more sustainable financing and implementation mechanisms, either to enhance the financial leverage of public funds or to better transition to commercial funding for public sector EE projects. These include:

- Budget financing with capital recovery (financing by the MOF or a parent budgeting agency using donor funds, with repayments in the form of reduced future budgetary outlays)
- Utility on-bill financing
- Establishment of an EE revolving fund
- Establishment of a public or super ESCO
- Establishment of an EE credit line through existing financial institutions, such as a development bank or commercial banks
- Creation of a risk-sharing facility, such as a partial risk guarantee program, to cover commercial loans
- Commercial financing using bonds or leasing
- Leveraging commercial financing using ESCOs under the ESPC approach.

Figure 4.1 illustrates these options in the form of a “financing ladder” for public sector projects, moving from public (bottom) to commercial (top) financing. A brief description of each of these options follows.

**Figure 4.1. Illustrative Financing Ladder for Municipal EE Projects**

Source: Adapted from World Bank 2013
Budget Financing with Capital Recovery
Under this approach, financing is provided by a government agency, such as the MOF, using a combination of government budget allocations and IFI or donor funds. This funding covers the investment costs of the EE projects in both central and municipal buildings and facilities. The funding recipient “repays” the funds using the savings generated by the investment project in the form of reduced budgetary outlays for energy bills of the public entity in future years (“budget financing”). The size of the reduced outlay is usually based on the amount of energy cost savings. The flow of funds to pay for EE improvements follows the same flow as the normal appropriations from the MOF. The repayment to the MOF could be complete or partial; the partial approach encourages municipal utilities and public agencies to participate in the program because they retain a share of the savings achieved.

Utility On-Bill Financing
Utility on-bill financing is a mechanism under which a utility provides financing for the implementation of EE projects. The funds are provided as a loan to the customer (which could be a public sector entity) for equipment purchase and installation, and loan repayments are recovered by the utility through the energy bill (ECO-Asia 2009). Individual customers whose facilities have installed EE measures (the direct beneficiaries of the energy savings and related cost reductions) bear the associated costs.

The utility on-bill financing approach is designed to overcome the first cost barrier (lack of availability of internal funds) for investment in EE. Under this approach, the utility provides or arranges for the financing needed for the project investment. The customer signs a Loan Agreement (LA) with the utility and the utility collects the loan repayments from the customer through the customer’s utility bill by adding a line item on the bill. In most cases, the loan repayments are arranged such that the amount of the repayment is smaller than the customer’s cost reduction from the energy savings created by the energy-efficient equipment. This allows the customer to be “cash flow positive” throughout the life of the EE project.

Energy Efficiency Revolving Fund (EERF)
An EERF is a viable option for scaling-up EE financing in the public sector. Under a typical EERF, created using public funds and IFI loans, financing is provided to public agencies to cover the initial investment costs of EE projects. Some of the resulting savings are then used to repay the EERF until the original investment is recovered, plus interest and service charges. The repayments can then be used to finance additional projects, thereby allowing the capital to revolve and creating a sustainable financing mechanism (World Bank 2014a).

Since both the borrower and lender are publicly owned, such funds may often offer lower-cost financing with longer tenors (repayment periods) and less-stringent security requirements than typical commercial loans. Because EE projects have positive financial rates of return, capturing these cost savings and reusing them for new investments creates a more efficient use of public funds than typical budget- or grant-funded approaches. This can help demonstrate the commercial viability of EE investments and provide credit histories for public agencies, paving the way for future commercial financing.

Public or Super ESCO
Several countries have taken a more active role in promoting EE projects using the performance contracting approach, creating either public or “super” ESCOs that are wholly or partly owned by the state (World Bank 2013). Often this was done to promote ESCOs
generally. Examples include China (pilot EMCs created by the World Bank in Beijing, Shandong, and Liaoning), Poland, (MPEC) Croatia (HEP ESCO), and Ukraine (UkrESCO). Such public ESCOs were typically formed when the local ESCO markets were nascent and some public effort was deemed necessary to catalyze them. The advantage of a public ESCO is that often no competitive process is required for project development since a public agency is simply contracting with another public entity.

The super ESCO is a special type of public ESCO. Established by the government, it functions as an ESCO for the public sector market (hospitals, schools, municipal utilities, government buildings, and other public facilities) while also supporting the capacity development and project development activities of existing private sector ESCOs. The government, possibly with help from IFIs, capitalizes the super ESCO with sufficient funds to undertake public sector ESPC projects and to leverage commercial financing.

A primary function of the super ESCO is to facilitate access to project financing by developing relationships with local or international financial institutions. The super ESCO may also provide credit or risk guarantees for ESCO projects, or act as a leasing or financing company to provide ESCOs and/or customers with EE equipment on lease or on benefit-sharing terms (Limaye and Limaye 2011).

**Public Sector Energy Efficiency Credit Line**

A public sector EE credit line is a financing mechanism that makes funds available to local banks and financial institutions (FIs) to provide debt financing of EE projects in utilities and public buildings and facilities. The major purpose of such a credit line is to increase the funding available from these lenders for debt financing of municipal EE project investments. These can be managed by a development bank, municipal bank, commercial bank(s), or other FIs.

Dedicated EE credit lines may be established by governments, multilateral or bilateral financial institutions, or governments in cooperation with international donor agencies. The funds provided by the donors or governments to lenders are often leveraged by additional funds provided by the participating banks and/or financial institutions to increase the total amounts available for debt financing (Limaye 2013a).

**Risk-Sharing Facility**

A major barrier to commercial financing of public EE projects is commercial lenders’ perception that EE projects are inherently riskier than their traditional investments. A risk-sharing facility is designed to address this by providing partial coverage of the risk involved in extending loans for EE projects. The facility, essentially a bilateral loss-sharing agreement, includes a subordinated recovery guarantee and might also have a “first loss reserve” to be used to absorb up to a specified amount of losses before the risk-sharing occurs.

A partial risk-guarantee facility, provided by a government, donor agency, or other public agency, can assist municipal utilities and public agencies by: (a) providing them access to finance, (b) reducing the cost of capital, and (c) expanding the loan tenor or grace periods to match project cash flows (Mostert 2010). Such a facility would also build commercial lenders’ capacity to finance EE projects on a commercially-sustainable basis.

**Commercial Financing, Bonds**

Under this option, municipalities take commercial bank loans (if they are creditworthy and have borrowing capacity) or issue bonds to finance EE investments. This option can mobilize
commercial financing which can deliver scale and be sustainable. The elements of competition can help lower financing costs, address overcollateralization/short tenor issues, and allow public agencies to undertake its own procurement/implementation.

This option can work if there are well-developed municipal credit and rating systems, financial institutions who are willing and able to lend to public sector for EE projects, and large municipalities with strong technical capacity willing and able to bundle many EE projects together.

**Vendor Credit and Leasing**

A lease is a contractual arrangement in which a leasing company (lessor) gives a customer (lessee) the right to use its equipment for a specified length of time (lease term) and specified payment (usually monthly). Depending on the lease structure, at the end of the lease term the customer can purchase, return, or continue to lease the equipment. Many types of organizations, including proprietorships, partnerships, corporations, government agencies, religious and non-profit organizations, use leasing throughout the world. Suppliers of energy efficient equipment can provide such equipment under a leasing arrangement, usually with lease payments based on estimated energy savings.

Equipment leases are broadly classified into two types: operating lease and finance or capital lease (Lee 2003). In an operating lease, the lessor (or owner) transfers only the right to use the property to the lessee. At the end of the lease period, the lessee returns the property to the lessor. Since the lessee does not assume the risk of ownership, the lease expense is treated as an operating expense in the income statement and the lease does not affect the balance sheet.

**Leveraging Commercial Financing with Private ESCOs**

At the top of the “financing ladder” for public sector projects described earlier is the development of private sector energy service providers, such as ESCOs that specialize in EE project development and implementation. Private ESCOs can help overcome important barriers to scaling-up implementation of public sector EE projects. They can (a) offer a range of services spanning the energy services value chain and (b) provide the technical skills and resources needed to identify and implement EE opportunities, perform services using performance based contracts (thereby reducing the risks to the municipal utilities and public agencies), facilitate access to financing from commercial lenders, and enable energy users to pay for services out of the cost savings achieved.

*Performance contracting* refers to EE implementation services offered by private ESCOs under ESPCs. These have the following key attributes (SRC Global 2005):

- ESCOs offer a complete range of implementation services, including design, engineering, construction, commissioning, and maintenance of EE measures, and monitoring and verification of the resulting energy and cost savings.
- ESCOs provide or arrange financing (often 100 percent) and undertake “shared savings” or “guaranteed savings” contracts, such that the payments to the ESCO are less than the cost savings resulting from the project implementation.
- Under the performance contract, ESCOs offer specific performance guarantees for the entire project (as opposed to individual equipment guarantees offered by equipment manufacturers or suppliers) and generally guarantee a level of energy cost savings.
- Payments to the ESCO are contingent upon demonstrated satisfaction of the performance guarantees.
• Most of the technical, financial, and maintenance risk is assumed by the ESCO, thereby substantially reducing the risks to the energy user.

Comparison of the Financing Options

Table 4.1 provides a comparative assessment of the key characteristics of the finance and delivery models discussed above.
<table>
<thead>
<tr>
<th>Financing Option</th>
<th>Conditions</th>
<th>Pros</th>
<th>Cons</th>
<th>Issues to be addressed</th>
<th>Examples</th>
</tr>
</thead>
</table>
| 1. Budget financing with capital recovery           | • Credit barrier is too high, underdeveloped banking sector, collateralization is difficult  
• Financing should target new and underdeveloped markets, programs must be efficiently administered, initial subproject results should be intensely disseminated, need viable co-financing  
• Availability of funding for EE projects                                                                                                           | • Easy to implement  
• Can directly finance municipal entities and central government agencies                                                                                                                                                                                                                                                      | • Sustainability may be questionable, even if repayment is obtained through budget financing  
• Who will manage and administer the funds?  
• Is there sufficient implementation capacity?                                                                                                             |                                                                                                                                                                                                                                                                                                                                  | • Hungary  
• Lithuania  
• Armenia  
• Belarus  
• FYR Macedonia  
• Montenegro  
• Serbia                                                                                                                                                                                                                                                                                                                                                                                                  |
| 2. Utility on-bill financing                         | • Requires regulations for utility participation  
• Strong financial position and financial management of utilities  
• Payment discipline among public clients, adequate energy pricing and billing practices                                                                                                                                                                                                                                               | • Streamlined repayments, lower repayment risk if risk of utility disconnection,  
• Builds off of utility relationships and services  
• Can be done on a sustainable and scalable basis                                                                                                                                                                                                                                                                          | • Requires changes in utility regulations and billing systems  
• Creates potential for monopolistic behaviors  
• Financing may compete with local banks, Limited experience with heat utilities  
• Are utilities interested and willing?  
• Do they have capacity and billing systems for on-bill financing?  
• What regulatory changes may be needed?                                                                                                             |                                                                                                                                                                                                                                                                                                                                  | • Brazil  
• China  
• India  
• Mexico  
• Sri Lanka  
• Tunisia  
• U.S.  
• Vietnam                                                                                                                                                                                                                                                                                                                                                                                                  |
| 3. Energy efficiency revolving fund                  | • Insufficient liquidity in banking sector, major aversion to risk among lenders  
• Use of grant funds as subordinated debt can help mobilize commercial co-financing  
• TA to disseminate information on EE subproject performance/financial data critical to sustainability  
• Need for professional, well-incentivized Fund Management Team                                                                                                                                                                                                                                                                     | • Can be structured to address financing needs and evolving capacity of all public buildings (central and municipal)  
• ESA option can be very useful for municipalities with poor credit and lack of capacity                                                                                                                                                                                                                                 | • May require new legislation  
• May be difficult to cover administrative costs of the fund from its revenues  
• Needs a strong and capable fund manager or management team  
• Needs supporting legislative framework for establishment                                                                                              |                                                                                                                                                                                                                                                                                                                                  | • Bulgaria  
• Romania  
• Armenia                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

Table 4.1 - Summary of Characteristics of Financing Options for Public Sector Energy Efficiency Projects
<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
</table>
| **4. Dedicated credit line with development bank** | - Underdeveloped public/municipal credit market  
- High commercial bank lending rates and low tenors  
- Existence of credible development bank willing to lend for EE and assume repayment risks  
- Municipalities must have ability and willingness to borrow  
- Public agencies able to retain energy cost savings  
- Builds commercial lending market by demonstrating public agencies can repay  
- Allows public agencies to undertake own procurement and implementation  
- Allows for lower interest rates  
- Funds can revolve making it more sustainable  
- Relies on strong banking partner with incentive and ability to proactively develop pipeline and offer good financial products  
- Serves only creditworthy municipalities  
- Some development banks do not conduct proper risk assessments and appraisals  
- Is there a suitable development bank?  
- How many public agencies can borrow and are creditworthy?  
- Brazil  
- India (municipal infrastructure fund)  
- Mexico |}
| **5. Dedicated EE credit line with commercial financial institution(s)** | - Well-developed banking sector, willingness of banks to accept risks and EE as line of business  
- Sufficient market activity to develop project pipeline  
- Need for parallel TA to develop strong demand, create sustained quality pipeline  
- Leveraging of private funds  
- Utilization of existing banking infrastructure for financing public sector  
- Needs municipalities or ESCOs that have borrowing capacity (credit and collateral)  
- Banks/FIs need to be willing to lend to public sector  
- Has worked well in some Central and Eastern European countries  
- May scale up commercial financing  
- Will the participating financial institutions provide loans to municipal utilities & public agencies?  
- How many public agencies are creditworthy and have borrowing capacity?  
- KfW (credit line in Serbia)  
- Hungary  
- China  
- Ukraine  
- Uzbekistan |}
| **6. Risk-sharing program (such as partial credit guarantee)** | - Well-developed banking sector, banks are liquid and willing to accept some risks but have a perception of high risk with respect to EE projects  
- Sufficient market activity to develop project pipeline  
- Has worked well in some Central and Eastern European countries  
- May scale up commercial financing  
- Needs a relatively mature banking sector and eligible borrowers  
- Poor experience of WB and USAID in some countries with respect to public agencies  
- Is the banking sector mature enough?  
- How many municipalities are creditworthy?  
- USAID DCA in FYR Macedonia, Bulgaria and other countries  
- Bulgaria, CEEF (Central/Eastern Europe), China, Croatia, Hungary, Poland |}
| **7. Public ESCO or super ESCO** | - Immature private sector ESCO industry, but interest/demand to develop ESCO industry  
- Contracting between public ESCO and public sector entities may be easier than with private sector service providers  
- Can address financing issues and build ESCO capacity  
- Need to create a new organization  
- Need to provide funding  
- Needs to operate efficiently and avoid acting as monopoly  
- Where will such a public ESCO be located?  
- Will donors be interested in funding such an entity?  
- Ukraine Public ESCO (EBRD)  
- Croatia HEP ESCO (WB/GEF), Armenia, Uruguay, EESL (India) |
<table>
<thead>
<tr>
<th>Options for Financing Energy Efficiency in Public Buildings in Georgia</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>8. Commercial financing, bonds</strong></td>
</tr>
<tr>
<td>- Requires well-developed public sector credit and rating systems</td>
</tr>
<tr>
<td>- Financiers willing and able to lend to public sector for EE projects</td>
</tr>
<tr>
<td>- Large municipalities with strong technical capacity willing to bundle many EE projects together</td>
</tr>
<tr>
<td>- Mobilizes commercial financing which can deliver scale and be sustainable</td>
</tr>
<tr>
<td>- Elements of competition can help lower financing costs</td>
</tr>
<tr>
<td>- Can help address overcollateralization/short tenor issues</td>
</tr>
<tr>
<td>- Only makes sense for very large bundles of projects</td>
</tr>
<tr>
<td>- Only highly creditworthy agencies can use these schemes</td>
</tr>
<tr>
<td>- Relatively high transactions costs</td>
</tr>
<tr>
<td>- Are financiers willing and able to lend to public sector?</td>
</tr>
<tr>
<td>- How many public agencies are creditworthy and have borrowing capacity?</td>
</tr>
<tr>
<td>- Bulgaria</td>
</tr>
<tr>
<td>- Denmark</td>
</tr>
<tr>
<td>- India</td>
</tr>
<tr>
<td>- U.S.</td>
</tr>
<tr>
<td><strong>9. Vendor credit, leasing</strong></td>
</tr>
<tr>
<td>- Large, credible local and/or international vendors able and willing to finance public EE projects</td>
</tr>
<tr>
<td>- Local bank financing available for vendor leasing</td>
</tr>
<tr>
<td>- Creditworthy public agencies able to sign long-term vendor contracts</td>
</tr>
<tr>
<td>- Public agencies able to retain energy cost savings, pay based on consumption</td>
</tr>
<tr>
<td>- Mobilizes commercial financing which can deliver scale and be sustainable</td>
</tr>
<tr>
<td>- Can help address overcollateralization/short tenor issues</td>
</tr>
<tr>
<td>- Financing and procurement in one contract</td>
</tr>
<tr>
<td>- Lease may not count against public debt</td>
</tr>
<tr>
<td>- Relies on local banks and leasing companies</td>
</tr>
<tr>
<td>- Serves only very creditworthy public agencies</td>
</tr>
<tr>
<td>- Vendors must assume substantial debt and offer long-term financing</td>
</tr>
<tr>
<td>- Only some building equipment suited for leasing (lighting, SWH, boilers)</td>
</tr>
<tr>
<td>- How many public agencies are creditworthy and have borrowing capacity?</td>
</tr>
<tr>
<td>- China</td>
</tr>
<tr>
<td>- EU</td>
</tr>
<tr>
<td>- U.S.</td>
</tr>
<tr>
<td><strong>10. Leveraging commercial financing using private ESCOs/performance contracts</strong></td>
</tr>
<tr>
<td>- Supportive policies and enabling environment</td>
</tr>
<tr>
<td>- Introduction of simpler business models first</td>
</tr>
<tr>
<td>- Appropriate financing schemes</td>
</tr>
<tr>
<td>- Early market development through public sector projects</td>
</tr>
<tr>
<td>- Development of public-private partnership (PPP) models to kick-start market</td>
</tr>
<tr>
<td>- Mobilizes commercial financing which can deliver scale and be sustainable</td>
</tr>
<tr>
<td>- Helps address overcollateralization/short tenor issues</td>
</tr>
<tr>
<td>- ESPC may not count against public debt, public agency shifts technical risks to third party</td>
</tr>
<tr>
<td>- Needs local banks and ESCOs to provide reasonable cost financing and assume credit risk</td>
</tr>
<tr>
<td>- Serves only very creditworthy public agencies</td>
</tr>
<tr>
<td>- ESCO industry is difficult to develop</td>
</tr>
<tr>
<td>- Public procurement issues difficult to address</td>
</tr>
<tr>
<td>- Are there any private ESCOs in the market?</td>
</tr>
<tr>
<td>- Are private ESCOs and/or municipalities creditworthy for commercial project financing?</td>
</tr>
<tr>
<td>- WB China ESCO program</td>
</tr>
<tr>
<td>- Czech Republic</td>
</tr>
<tr>
<td>- Germany</td>
</tr>
<tr>
<td>- Hungary</td>
</tr>
<tr>
<td>- India</td>
</tr>
<tr>
<td>- Japan</td>
</tr>
<tr>
<td>- South Korea</td>
</tr>
<tr>
<td>- U.S.</td>
</tr>
<tr>
<td>- Canada</td>
</tr>
</tbody>
</table>

*Source: Adapted by authors from World Bank 2013*
SECTION 5 - ASSESSMENT OF FINANCING AND IMPLEMENTATION OPTIONS FOR PUBLIC SECTOR ENERGY EFFICIENCY IN GEORGIA

Characteristics of Financing Options in the Georgia Context

This section reviews the potential applicability of the public sector financing options identified in Section 4 to the public sector in Georgia. For assessing the suitability and benefits of the financing options, three distinct types of public sector entities are considered:

I. Creditworthy municipalities, or municipal entities with their own budgets;
II. Municipal entities without their own budgets and/or with little or no capacity to implement projects; and
III. Central government agencies.

The financing options may have different applicability, advantages, and limitations for each type. Of the 10 options summarized in Section 4 (based on international experience), four were not considered further:

- Utility on-bill financing, because the local distribution companies do not appear to have the regulatory authority, capacity or interest in offering such services.
- Credit line with development bank, because these credit lines have very limited or no applicability to central government agencies and many municipalities, and there is no development bank in Georgia.
- Commercial financing and bonds, because of the limited capacity to issue bonds and lack of a market for such bonds.
- Vendor credit and leasing, because of the immaturity of the existing market for these options.

The key characteristics of the other six options for Georgia are summarized in Table 5.1.

Narrowing the Financing Options: Rationale and Results

As shown in Table 5.1, six EE financing options can be applicable to Georgia, but they are not equally viable in terms of serving the needs of all public agencies. The comparison indicates that three of the options do not appear to be suitable for the needs of public sector entities (central government and municipal) in the short-to-medium term (approximately the next five years).

- While dedicated public sector EE credit lines may be attractive and useful for financing projects using commercial lending, they are limited to serving only a few creditworthy municipal entities that have sufficient borrowing capacity. These financing options will therefore not be able to serve the needs of central government agencies and many municipalities.
- Similarly, risk sharing or guarantee programs would be limited to creditworthy municipal entities seeing commercial loans and, thus, would not meet the needs of central government agencies or other municipalities.
- While commercial financing can be leveraged using performance contracting and private ESCOs, such financing options are likely to be limited only to creditworthy municipalities or ESCOs with strong balance sheets and borrowing capacity. There are few ESCOs in Georgia and none have experience with public agencies – the private ESCO market today is nascent and will take many years’ focused efforts to mature.
### Table 5.1 – Key Characteristics of the Public Sector Energy Efficiency Financing Options in Georgia Context

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Budget Financing with Capital Recovery</th>
<th>EE Revolving Fund</th>
<th>Dedicated Public Sector Credit Line</th>
<th>Risk Sharing Program</th>
<th>Public or Super ESCO</th>
<th>Private ESCOs &amp; Performance Contracting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Financing</td>
<td>Loans and TA; may include some grants</td>
<td>Loans, TA, ESAs</td>
<td>Loans, TA</td>
<td>Guarantees, TA</td>
<td>Loans</td>
<td>Loans</td>
</tr>
<tr>
<td>Public Entities Served*</td>
<td>I, II and III</td>
<td>I only</td>
<td>I only</td>
<td>I, II and III</td>
<td>I and III</td>
<td></td>
</tr>
<tr>
<td>Management and Governance</td>
<td>Project implementation unit (PIU) within MOF</td>
<td>Board of directors, Fund management team</td>
<td>IFI, participating financial institutions</td>
<td>IFI, participating financial institutions</td>
<td>Board of directors</td>
<td>IFI, participating financial institutions</td>
</tr>
<tr>
<td>Project Development</td>
<td>By PIU</td>
<td>Fund management team</td>
<td>Participating financial institutions</td>
<td>Participating financial institutions</td>
<td>Management team of public or super ESCO</td>
<td>Private ESCOs</td>
</tr>
<tr>
<td>Project Implementation</td>
<td>By Type I municipalities and Type III central entities; PIU may implement for Type II &amp; some Type III</td>
<td>Type I municipalities Type III central entities; Fund Mgmt. Team via ESA for Type II and some Type III</td>
<td>Type I municipalities</td>
<td>Type I municipalities</td>
<td>Management team of public or super ESCO</td>
<td>Private ESCOs</td>
</tr>
<tr>
<td>Advantages</td>
<td>• Easy to implement</td>
<td>• Addresses needs of all three types</td>
<td>• Can leverage commercial financing</td>
<td>• Can leverage commercial financing</td>
<td>• Can address needs of all three types</td>
<td>• Can address needs of all three types</td>
</tr>
<tr>
<td></td>
<td>• Analogous to some existing models</td>
<td>• Multiple windows (including ESA) to address financing needs and evolving capacity of central agencies and municipalities</td>
<td>• Existing credit lines provide experience</td>
<td>• Existing guarantee programs provide some relevant experience</td>
<td>• Multiple windows to address financing needs and evolving capacity of municipalities and central agencies</td>
<td>• Need the creation of new organizations</td>
</tr>
<tr>
<td></td>
<td>• Can address all three types</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limitations</td>
<td>• Requires capable PIU</td>
<td>• Needs new legislation for implementation</td>
<td>• Cannot address needs of Type III municipalities</td>
<td>• Cannot address needs of Type III municipalities</td>
<td>• Need the creation of new organizations</td>
<td>• Need a mature ESCO industry</td>
</tr>
<tr>
<td></td>
<td>• Sustainability not assured</td>
<td>• Need a strong and capable Fund Management Team</td>
<td>• Only serves municipalities or ESCOs that have borrowing capacity</td>
<td>• Only serves municipalities or ESCOs that have borrowing capacity</td>
<td>• Needs capable management team</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Needs of some Type III municipalities may not be easily met</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can be Implemented under Current Regulations?</td>
<td>Yes</td>
<td>Yes, unless a new entity needs to be created.</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes, but requires creation of a new company.</td>
<td>Yes</td>
</tr>
</tbody>
</table>

*Source: Authors

* Types of public entities: I - Creditworthy Municipalities or Municipal Entities with their own budgets; II - Municipal entities without their own budgets, having poor credit, and/or little or no capacity to implement projects; III – Central government agencies;
The three remaining options are discussed in detail below.

**Budget Financing with Capital Recovery**

**Overview**

This option involves actions by the MOF, with funding provided by budgets or donor agencies to establish a Public Sector EE Financing Facility to finance EE project investments in municipalities and central government agencies that are funded from the national budget. The funds provided are used by these entities to make capital investments in EE projects that will result in energy cost savings.

The recipient public entity is then required to “repay” the investment over a specified period of time from the cost savings generated by the investment project. This will be accomplished by the MOF in the form of reduced budgets for energy bills of the budget agencies in future years (hence the term “budget financing”). The size of the reduced outlay is usually structured to be lower than the energy cost savings. Figure 5.1 shows a typical structure of such a project.

![Figure 5.1 – Budget Financing - Public Sector EE Improvement Project](image)

**Funds flow**

The flow of funds to pay for EE improvements follows the same flow as the normal appropriations from the MOF. The repayment to the MOF could be complete or partial and may allow public agencies to retain a share of the savings achieved. It would be desirable for MOF to allow the public entities to keep a portion of the savings as an incentive for their active participation and support in identifying and implementing the EE projects. This could require some changes in public budgeting procedures. The development of such procedures could be supported by TA.

Figure 5.2 illustrates the funds flow.
Implementation

The program would be implemented by a Project Implementation Unit (PIU) within the MOF or another suitable government agency (such as the MOE or MoESD), staffed with appointed specialists and consultants. The PIU could carry out tasks such as project identification, review of applications, and monitoring and reporting as well as assisting public entities with project preparation activities. These include review of feasibility studies, preparation of detailed design and bidding documents, and supervision of construction activities.

This option requires the establishment of a ministry PIU and training and capacity building of the PIU staff to undertake the activities envisioned. Some TA could be provided by the MOE, but the MOF would have to assume responsibilities for budget allocation and repayments.

The funds would be lent by the MOF to public agencies by entering into LAs. The funds will be provided to central government agencies and municipalities that have capabilities to manage implementation of EE projects and demonstrated willingness to commit to repay the loans from energy savings.

The MOF would provide loans for projects undertaken by these borrowers that will be treated as debt, with fixed repayment obligations to be made within their budget provisions in future years. The PIU would negotiate LAs with the borrowers that will define the terms of the loans, determined by the MOF or in negotiations between the MOF and donors.

Technical Assistance

Certain additional services may be provided to the borrowers by the PIU as technical assistance. Such services may include: conducting a preliminary screening to identify and define the general scope of the EE projects; providing standard bidding documents for services related to project implementation; and providing measurement and verification (M&V) protocols. The borrowers will be responsible for engaging energy service providers (as needed), implementing the project, properly maintaining the systems, and repaying the loan in accordance with the terms of the LA. The repayment installments will be designed to allow borrowers to repay the investment costs and, if applicable, service fee from the accrued energy cost savings.
TA may be provided by the MOE with respect to energy audits, project implementation support, and M&V protocols.

**Energy Efficiency Revolving Fund**

The basic structure of an EERF was described in Section 4. Key design elements that need to be considered to implement such a fund in Georgia are discussed below.

**Legal Framework**

The establishment of an EERF is likely to require legislative action. The options for establishing an EERF include creating the fund under an existing ministry, energy agency, or development bank; creating a new legal entity (independent corporation or new statutory agency); not-for-profit entity; or establishing a public-private partnership (PPP). The preferred option is generally the creation of a new independent corporation or a new statutory agency. However, the Georgian Energy Efficiency Revolving Fund (GEERF) focusing on financing public sector EE projects could be established either under an existing entity (such as the Municipal Development Fund of Georgia (MDF), the Georgia Energy Development Fund (GEDF),21 or as a new, independent organization that would serve as the Fund administrator. Consequently, if the Georgia government decides to establish an EERF, the relevant legislation should specify its legal organization and ownership.

**Fund Management and Governance**

The key elements of management and governance of the GEERF include the following:

- Oversight arrangements
- Fund manager selection
- Monitoring and evaluation
- Reporting

**Oversight Arrangements**

Although oversight arrangements vary, they typically include all relevant ministries that have some authority over EE, such as those responsible for finance, construction, economy/energy, environment, or urban/regional development. Options for oversight arrangements are listed below:

- For the Bulgarian Energy Efficiency Fund, or BEEF, oversight is by a management board appointed by the national government;
- The Renewable Resources and Energy Efficiency Fund (R2E2 Fund) in Armenia is governed by a government-appointed board of trustees and comprises representatives from the government, private sector, NGOs and academia;
- The Romanian Energy Efficiency Fund (FREE) is governed by a government-appointed board of administration consisting of seven members, five from the private sector; and
- Salix Finance in the U.K. has a three-person board, two of which are from the private sector.

21 GEDF is a joint stock company established by Government of Georgia in 2010 to promote and develop clean energy projects in the country. GEDF supports clean energy project development either though early project development investment and/or through an offering of the government’s shares in GEDF to potential investors.
If Georgia establishes the GEERF, it is strongly recommended to have representation from both the public and private sectors.

The main functions of the oversight body will be setting the investment strategy and policy of the fund, hiring the fund management team, establishing the overall criteria for selecting projects, approving the annual business plans and budgets formulated by the management team, preparing and submitting an annual financial report to the government, and assuring that the fund is operating in compliance with national EE strategy and plans.

**Fund Manager Selection**

Reviews of international experience with EE funds (World Bank 2014a) have identified a number of options for the choice of a fund manager, including an existing government agency or development bank, a utility, or a special directorate related to municipal services or building management. Alternatively, a new organization may be created to manage the fund—an independent agency, a new statutory authority, a public corporation, or a PPP. Any of these types of organizations could also hire a fund manager or fund management team under a contract.

In Bulgaria, an independent fund management team was appointed (World Bank 2010). This team was competitively selected and included a consortium of three firms. In the case of the Armenia R2E2 Fund (World Bank 2012), the government appointed an executive director and supporting financial and technical staff to manage the fund.

Whatever form the fund manager takes, the fund management team must have expertise in a number of areas, including knowledge and understanding of EE technologies and options; skills in market assessment and pipeline development; capabilities in credit analysis, financial analysis, and project appraisal; and understanding of EE and energy services markets.

**Debt Financing Window**

For creditworthy municipalities that can borrow and are able to identify, design, and implement projects, the GEERF can offer debt financing. One of the advantages of an EERF is that—unlike commercial financing, which may require an equity contribution from the borrower—the Fund may provide up to 100 percent debt financing. Also, the fund may not require the type of collateral typically requested by commercial borrowers because the public agencies may not be legally able to pledge public assets.

The tenor (repayment period) of the loan will be based on (i) the type of project and (ii) the anticipated cash flows resulting from the energy cost savings; usually the repayment period will be structured in such a way that the loan repayments are less than the energy cost savings. It is anticipated that GEERF will offer tenors that can be longer than typical commercial bank loans.

**Energy Services Window**

This is an innovative feature of EERFs that can be very effective for public agencies that lack the capacity to borrow funds or to effectively implement EE projects. An ESA can offer a full package of services to identify, finance, implement, and monitor EE projects. The public agency is usually required to pay some or all of its baseline energy bill into an EERF-established escrow account to cover the investment cost and associated fees during the

22 The Consortium includes an EE consultancy (Econoler International), a Foundation (Center for Energy Efficiency EnEffect), and a non-banking financial institution (Elana Holding PLC).
contract period. Figure 5.4 illustrates the basic concept of a public agency’s cash flows under the ESA, with payments equal to its baseline energy bill during the contract period.

For example, let us assume that the monthly energy bill for the public agency prior to the EE project implementation is €10,000. The ESA will specify this as the baseline amount, and the public agency will agree to pay this amount each month into an escrow account for the duration of the ESA, which is assumed to be five years. The EERF will then make the EE project investment (assumed in this example to be €150,000). This investment will reduce the energy costs by 30 percent, to €7,000 per month. During the five-year ESA period, the agency will pay into the escrow account (i) its monthly energy bill of €7,000 and (ii) the remaining €3,000 per month, thus allowing the fund to recover its investment (plus interest and fees). Following the five-year period, the agency will be able to retain its energy cost savings and its overall energy bill will fall to the assumed €7,000.

**Figure 5.4 - The Energy Services Agreement Model**

In some cases, the contract duration is fixed; in other cases, the contract can be terminated after an agreed number of payments have been made to the EERF—thereby offering a greater incentive for the agency to save more energy. Either way, one of the main advantages of Energy Services Window model is that the ESA payments generally do not count as public debt, allowing public entities that are not allowed to borrow, or municipalities that do not have sufficient debt capacity, to implement EE measures. In this way, the model also helps public agencies to use their limited budget/debt space for higher-priority investments while still being able to implement EE. In addition, the repayments to the EERF and energy payments can be bundled together, providing some added leverage to the Fund to cut off the energy supply should the public agency default on its ESA repayment obligations.

**Technical Assistance**

An important feature for the success of the GEERF is the TA provided. The types of TA that the GEERF may provide could include the following:

- Program marketing to and capacity building of the target public agencies to address the information and knowledge gaps related to EE, build demand for financing, and improve the sustainability of energy savings.
- Developing procedures that help public agencies engage ESCOs under public-private partnerships such as performance-based contracts; preparing performance-based bidding documents for procurement of various elements of project implementation services; and refining these bidding documents based on the implementation experience.
- Identifying ways to bundle procurements by multiple public entities implementing similar projects, thus reducing transaction costs and equipment costs through bulk purchases. Under some financing arrangements, the GEERF can even conduct the preliminary audit, procure the ESCO, and monitor the project on behalf of the clients.
- Identification, assessment, and recommendation of changes, if needed, in rules for public accounting, budgeting, and procurement to facilitate the financing of EE projects and procurement of EE services.
- Carrying out capacity building for ESCOs and other market actors to enhance their ability (i) to conduct energy audits and (ii) to screen, design, evaluate, appraise, finance, implement, and measure EE investments in the public sector.
- Developing or adapting appropriate methodologies for M&V and providing M&V training to public agency staffs and ESCOs.
- Developing the terms and conditions of the ESAs with public agencies for the ESA option, including establishment of the baseline conditions and identification of the baseline changes that would require an adjustment of the fixed annual payments.

**Procurement of Implementation Services**

Under the ESA option, the EERF can engage private ESCOs to provide some implementation services using simple performance-based contracts. This approach can help transfer some of the project implementation risk to the private sector. It can also help build the capacity of the ESCOs and facilitate the development of an energy services market (World Bank 2010b).

**Organization Structure**

The organizational structure of the GEERF could be developed as illustrated in Figure 5.5.

![Figure 5.5 - Organization Structure - GEERF](image)

**Investment Models**

The GEERF should be structured to offer two main financing mechanisms, debt financing
and ESAs. The step-by-step process for the two financing instruments is shown in Table 5.2.

**Table 5.2 - Implementation Steps for Fund Investment Models**

<table>
<thead>
<tr>
<th>Step</th>
<th>Model 1: Loans</th>
<th>Model 2: Energy Services Agreements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td>Fund manager prepares and announces the availability of loan funds for EE projects in municipalities and other public entities and invites Expressions of Interest (EOIs) from municipalities and public facilities to borrow funds for projects.</td>
<td>Fund manager prepares and announces the availability of ESAs for public sector EE projects and invites EOIs from municipalities and public facilities to participate in such agreements.</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td>Fund Manager receives applications from municipalities and public entities.</td>
<td></td>
</tr>
<tr>
<td><strong>Step 3</strong></td>
<td>Fund Manager conducts preliminary screening of EOIs and selects promising candidates.</td>
<td></td>
</tr>
<tr>
<td><strong>Step 4</strong></td>
<td>Fund Manager conducts preliminary assessment of energy savings opportunities including a walk-through audit.</td>
<td></td>
</tr>
<tr>
<td><strong>Step 5</strong></td>
<td>If walk-through audit shows promising opportunities for energy savings, a project design is prepared by the borrower; the PIU may provide assistance in the preparation of the project design. The borrower needs to obtain approval from MOF for the loan. A LA is then negotiated between the Fund and the borrower. The LA specifies the responsibilities of the Fund and the borrower, the EE measures to be implemented, the total project costs and the amount to be loaned by the Fund, assignment of collateral, the length of the agreement, the terms of the loan repayment, the selection of the M&amp;V methodology and M&amp;V agent, etc. The LA also specifies the responsibilities of the borrower for conducting the project implementation activities, the services that are to be provided by the Fund to assist the borrower with implementation, and the terms for payment for such services, if any.</td>
<td>If walk-through audit shows promising opportunities for energy savings, an ESA is negotiated between the Fund and the facility. The ESA specifies that the facility will pay the Fund a fixed amount equal to between 95 and 100 percent of the baseline energy costs for a fixed period of time as determined and agreed to after a detailed assessment is conducted of the facility's baseline energy use and costs and operating characteristics. The ESA also specifies the adjustments to be made to the fixed payments in case of any changes to the facility characteristics, operating conditions, or other baseline parameters. An ESA would most likely not be considered as a liability on the balance sheet and therefore may not be part of the entity’s debt ceiling.</td>
</tr>
<tr>
<td><strong>Step 6</strong></td>
<td>A detailed audit is commissioned to identify the investment cost, energy savings, and implementation requirements.</td>
<td>A detailed audit is conducted by the Fund to identify the baseline conditions.</td>
</tr>
<tr>
<td><strong>Step 7</strong></td>
<td>The Fund prepares performance-based bidding documents for project implementation services and provides these to the borrower.</td>
<td>The Fund prepares and issues performance-based bidding documents for project implementation services.</td>
</tr>
<tr>
<td><strong>Step 8</strong></td>
<td>The borrower approves the bidding documents and the procurement of the service providers is conducted either by the borrower or by the Fund as specified in the LA. The contracts for the project implementation services are partly performance-based as specified in the bidding documents.</td>
<td>The Fund conducts the procurement of the service providers. The contracts for the project implementation services are partly performance-based as specified in the bidding documents.</td>
</tr>
<tr>
<td><strong>Step 9</strong></td>
<td>The energy service providers implement and commission the project under the supervision of the borrower or the Fund staff.</td>
<td>The energy service providers implement and commission the project under the supervision of the Fund staff.</td>
</tr>
<tr>
<td><strong>Step 10</strong></td>
<td>Upon completion of the implementation and commissioning, the M&amp;V agent conducts the M&amp;V of project results. Payments are made to the service providers by the borrower or the Fund based on the performance criteria.</td>
<td>Upon completion of the implementation and commissioning, the Fund conducts the M&amp;V (using its own staff or an M&amp;V agent). Payments are made to the service providers by the Fund based on the performance criteria.</td>
</tr>
</tbody>
</table>
Step 11: The borrower repays the loan over the term of the agreement from the savings achieved. The Fund receives the fixed payments as specified in the ESA (adjusted, if appropriate) for the specified time period. The Fund pays the facility’s energy bills and retains the remaining amount to cover its investment and service costs.

The investment models for the debt financing option and the ESA option are shown in Figures 5.6 and 5.7.

**Figure 5.6 – Investment Model – Debt**

**Figure 5.7 – Investment Model - ESA**

*Source: World Bank*

**How the GEERF Can Address the Barriers to EE Implementation**

Table 5.3 shows how the GEERF can address the barriers to EE implementation, identified in Section 3.

<table>
<thead>
<tr>
<th>Barrier Type</th>
<th>Barrier</th>
<th>How Addressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Legal/Regulatory</td>
<td>Limited number of creditworthy municipalities and borrowing capacity</td>
<td>Finance projects directly with creditworthy municipalities with borrowing capacity and engage in ESAs with others</td>
</tr>
<tr>
<td></td>
<td>Restrictive budgeting and procurement regulations and procedures</td>
<td>Enter into LAs or ESAs with public agencies without facing the restrictive regulations/procedures</td>
</tr>
<tr>
<td>Access to Financing</td>
<td>Lack of internal budgets</td>
<td>Provide financing from the GEERF or offer ESAs</td>
</tr>
<tr>
<td></td>
<td>Relatively high interest rates and short tenors from commercial banks</td>
<td>Provide lower interest rates and longer tenors than commercial banks and engage in ESAs</td>
</tr>
<tr>
<td></td>
<td>Small project sizes, leading to high project development and transaction costs</td>
<td>Standardize agreements and procedures; aggregate similar projects across public agencies</td>
</tr>
<tr>
<td>Institutional</td>
<td>Lack of information on energy-efficient technologies</td>
<td>Provide TA; offer ESAs</td>
</tr>
<tr>
<td>Implementation Capacity</td>
<td>Limited technical and implementation capacity</td>
<td>Provide TA; offer ESAs</td>
</tr>
<tr>
<td></td>
<td>Lack of development of energy service providers and performance-based contracting</td>
<td>Engage energy service providers in project implementation and develop their capacity for performance-based contracting</td>
</tr>
</tbody>
</table>

*Source: Adapted from World Bank 2014a*
Super ESCO

There has been much discussion about the benefits of the ESCO model using performance contracting to help implement EE projects (Singh et al. 2010). Unfortunately, implementing the ESCO model in developing countries has been challenging for many countries (Limaye et al. 2016).

Limitations on Growth of ESCOs in Developing Countries

The growth and development of the ESCO industry has often been constrained by a number of barriers, many of which are also present in Georgia:

- There are very few ESCOs. Existing ESCOs have a small capital base and have difficulties accessing project funding from commercial FIs because they can only provide limited equity financing.
- Due to the immaturity of the EE market, the costs of project development are relatively high, and ESCOs are likely to find it difficult to finance project development costs.
- The ESCO model is relatively new, and ESCOs have not yet developed good credibility with public sector energy users.
- The concept of project financing for ESCO projects is not commonly accepted by FIs. A major reason for this is that FIs require collateral and are generally unwilling to accept the savings stream generated by the project as appropriate collateral.
- The FIs have limited knowledge and understanding of EE projects and the ESPC concept.
- FIs also perceive EE projects as inherently more risky than other investments, and generally require a large proportion of equity funding from the ESCO for a project.

Also, large-scale implementation of EE projects in the public sector in Georgia is constrained by a number of barriers:

- Facility managers in public buildings generally do not have a good understanding of the opportunities, costs and benefits of EE options.
- There is very limited technical capacity in public agencies for conducting energy audits, designing and engineering projects, and/or contracting with and managing ESCOs or other energy service providers to implement projects.
- There is little or no incentive to staffs of public facilities to save energy as the resulting cost savings may simply lead to reduced operational budgets in future years (which may actually represent a disincentive to save energy).
- Public sector contracting and procurement rules are often rather restrictive; for example, they require the selection of the low bidder which may make it difficult to adopt the performance contracting approach.
- Responsibilities for capital and operating budgets in public agencies are often dispersed, making it difficult to deploy funds from capital budget to reduce operating costs.
- Commercial banks in Georgia are likely to be unwilling to provide project financing for ESCO projects with public agencies.

Georgia Super ESCO
The concept of a Super ESCO has recently evolved as one of the mechanisms for overcoming some of the limitations and barriers hindering the large-scale implementation of EE projects. The Super ESCO is a special case of a public ESCO. It is established by the Government and functions as an ESCO for the public sector market, including hospitals, schools, municipalities, government buildings, and other public facilities. It also supports capacity development and project development activities of existing private sector ESCOs including helping create new ESCOs (Limaye and Limaye 2011).

The GOG, with the assistance of the World Bank and/or other donors, can capitalize the Georgia Super ESCO (“GESCO”) with sufficient funds to undertake public sector ESPC projects and to leverage commercial financing. A primary function of GESCO will then be to facilitate access to project financing by developing relationships with local or international financial institutions. GESCO may also provide credit or risk guarantees for ESCO projects, or act as a leasing or financing company to provide ESCOs and/or customers energy-efficient equipment on lease or on benefit-sharing terms.

The World Bank study of the international experience in public procurement of EE services (Singh et al 2010) identified the Super ESCO as a potentially viable model for developing countries. GESCO may be uniquely positioned to overcome a number of the barriers faced by smaller ESCO companies. With its size and credibility as a public institution, GESCO can have the capability to support the growth of a nation’s private domestic ESCO business and can have the capacity to provide financing for EE projects. Figure 5.8 illustrates the structure of a Super ESCO.

A Super ESCO can have a unique ability to target the largely untapped EE market in the public sector. The EE potential in the public sector is generally substantial, but the implementation of energy savings programs is complicated by numerous factors, including a lack of commercial orientation of public agencies, limited incentives to lower energy costs, complex and strict budgeting and procurement procedures, and limited access to budgetary or commercial project financing. Many public agencies face budget constraints and often focus on the upfront cost as a matter of necessity.

![Figure 5.8 - Typical Structure of a Super ESCO](image)

Source: Adapted from Limaye 2013b

GESCO will also be assigned a major responsibility to help build the capacity of the local

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23 A Super ESCO may also be established by a private sector organization, an NGO or as a PPP.
24 The discussion in this section is extracted from Limaye and Limaye 2011.
private sector ESCOs and create a competitive private market for ESCO services. An appropriate role for GESCO will be to engage private ESCOs as subcontractors for parts of the implementation (such as installation, commissioning, and performance monitoring), thereby helping to build their capacity. GESCO may also be in a position to arrange financing for small private ESCOs to help them implement projects and build their capacity and credentials.

The payments from the municipalities and other public clients for the services provided by GESCO may need to be secured through a payment security mechanism such as an escrow account. For central government agencies, GESCO may sign a framework agreement with the MOF (or the Ministry responsible for payment of the energy bills) to secure payments from the energy savings generated by the EE projects. (Information on a number of Super ESCOs is provided in Annex C.)

**How GESCO Can Address EE Financing Barriers**

The key contributions that GESCO can make to the scaling up of EE project implementation are summarized in Table 5.4.

**The Potential Role of IFIs and Donors**

For all three shortlisted financing options, IFIs and donors can play a major role in their establishment and operation in three ways: (a) financial assistance, (b) capacity building, and (c) other technical assistance.

**Financial Assistance**

Financial assistance may be provided in the form of loans, grants, and guarantees. The loans would have the structures and characteristics of typical IFI loans, with sovereign guarantees. IFIs may also provide or arrange for grant funds (from the Global Environment Facility or the Global Climate Fund, for example). Another financing option would be risk-sharing facilities (such as partial credit or risk guarantees) to the GEERF or to GESCO.

**Table 5.4 - How GESCO Can Address Barriers to Implementation in the Public Sector**

<table>
<thead>
<tr>
<th>BARRIERS TO EE PROJECT IMPLEMENTATION IN THE PUBLIC SECTOR</th>
<th>HOW GESCO CAN ADDRESS THESE BARRIERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low awareness and interest on the part of public agencies in energy efficiency (EE) projects</td>
<td>GESCO can conduct “marketing campaign” to increase awareness and interest</td>
</tr>
<tr>
<td>Zero budgeting policy may provide little incentive for saving energy costs</td>
<td>GESCO can develop incentive mechanisms for public agencies</td>
</tr>
<tr>
<td>Budgeting Issues for public agencies - Capital Expenditure vs. Operating Expenditure</td>
<td>Agency can avoid issue by having project financed by a GESCO</td>
</tr>
<tr>
<td>Lack of procurement regulations that would allow ESCOs and Performance Contracting</td>
<td>Contracting with a GESCO can overcome this problem</td>
</tr>
<tr>
<td>Limited capacity in public agencies for performance contracting using ESCOs</td>
<td>GESCO can develop standard contracts customized for public agencies</td>
</tr>
<tr>
<td>Lack of interest on the part of local financial institutions to fund public sector projects</td>
<td>Financing can be provided by GESCO</td>
</tr>
<tr>
<td>Local financial institutions generally unwilling to provide “project financing” for EE projects</td>
<td>GESCO can provide “project financing” for public agency EE projects</td>
</tr>
<tr>
<td>Private ESCOs unwilling to invest in public sector projects</td>
<td>GESCO can invest in public agency EE projects</td>
</tr>
<tr>
<td>Public agencies not used to contracting with private sector for energy services</td>
<td>Public agencies may find it easier to contract with a GESCO</td>
</tr>
</tbody>
</table>
Options for Financing Energy Efficiency in Public Buildings in Georgia

Source: World Bank, 2011

Capacity Building

One of the most important ways in which IFIs can assist is through TA for capacity building. TA may be provided to:

- **PIU** – the TA would address training of PIU staff to build their capacity to manage the financing and implementation of the EE projects. The TA would include training related to EE technologies and relevant implementation strategies; basic concepts and tools for performance-based contracts; guidelines and procedures for measurement and verification of energy savings; and monitoring and reporting of the overall program results to the financing sources. In addition, in the case of the Budget Financing and GEERF, the capacity building TA may also include funding for the initial set-up, administration and operation of the PIU, and for purchase of equipment for auditing, data collection, and measurement and verification.

- **Central government agencies** – to help facility managers and engineers identify the opportunities for EE implementation in their buildings, conduct energy audits, and develop EE Action Plans.

- **Municipalities** – to help mayors, city councils, utility executives, facility managers, and facility engineers understand the need for and the importance of EE implementation, and to obtain information on the technical options for EE in municipal utilities and public buildings and facilities; also to conduct energy audits and develop EE Action Plans.

- **Banks and financial institutions** – to provide information on the characteristics of EE projects, implementation business models, financial and technical appraisal, M&V, and business opportunities in financing EE projects.

- **Energy service providers** – to build their capacity to develop projects; conduct energy audits; screen, design, evaluate, appraise/finance, implement, measure and verify EE investments in the public sector; and understand the perspectives of banks and financial institutions, M&V protocols, and preparation of “bankable” project proposals.

- **M&V agencies** – to create the M&V infrastructure and provide Georgia-specific protocols and supporting tools for conducting M&V of EE projects.

Other Technical Assistance

IFIs and donors may also provide other types of TA to facilitate the scaling-up of financing of EE projects. This may include the following:

**Building Energy Databases**

Development of a national inventory of public buildings and establish a database containing information by building type on floor area, annual energy use, and fuel type would be useful. An analysis can then be conducted to develop benchmarks such as energy use per square meter and identify the high and low energy users. The database can also be used to estimate EE potential and investment needs.

**Public Sector EE Programs and Projects**

IFIs can help develop and document information on existing and planned public sector EE programs, their costs, results and energy savings achieved.
**Incentives and Recognition**

The creation of a mix of voluntary and mandatory measures to identify and publicize the high and low energy performers (“fame and shame” program) could also be done. Such TA could also help establish EE targets and reporting requirements. These TA activities can be designed to achieve long-term, sustainable cultural changes in the public sector.

**Appliance Labeling and Standards**

There is a need to transform the market towards more efficient energy-using appliances and equipment. TA can be designed to:

- Ensure that building materials and appliances are properly tested and certified.
- Develop procedures to assure enforcement of the standards and labeling requirements.
- Accelerate the implementation of building energy certificates.
- Develop an ESCO certification scheme.

**Templates and Standard Contracts**

Other important areas of TA include:

- Developing and publishing case studies of EE projects and documenting the lessons learned.
- Providing templates for conducting energy audits.
- Preparing standard contract terms and conditions for ESPCs.
- Preparing an M&V User Guide.
SECTION 6 - MOVING FORWARD

Advantages and Limitations of the Three Options

A summary of the advantages and limitations of Budget Financing, GEERF, and GESCO is provided in Table 6.1.

Table 6.1 – Comparison of Public Sector Financing Options

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Budget Financing</th>
<th>GEERF</th>
<th>GESCO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Types of financing</td>
<td>Loans and TA; may include some grants</td>
<td>Loans, TA, ESAs</td>
<td>Loans, TA, ESAs</td>
</tr>
<tr>
<td>Governance and management</td>
<td>PIU</td>
<td>Board of Directors</td>
<td>Board of Directors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fund management team</td>
<td>GESCO management team</td>
</tr>
<tr>
<td>Project development</td>
<td>PIU</td>
<td>Fund management team</td>
<td>GESCO management team</td>
</tr>
<tr>
<td>Project implementation</td>
<td>Public agencies</td>
<td>Public agencies (for debt financing)</td>
<td>GESCO management team</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fund management team (for ESAs)</td>
<td></td>
</tr>
<tr>
<td>Sustainability</td>
<td>Based on GOG decisions</td>
<td>Yes, due to revolving investment capital and fees to cover operating costs</td>
<td>Yes, due to commercial operations and leverage of private financing</td>
</tr>
<tr>
<td>Repayment risk</td>
<td>None</td>
<td>Assumed by GEERF</td>
<td>Assumed by GESCO</td>
</tr>
<tr>
<td>Advantages</td>
<td>Easy to implement</td>
<td>Can address needs of all public agencies</td>
<td>Can address needs of all public agencies</td>
</tr>
<tr>
<td></td>
<td>Analogous to some existing models</td>
<td>Multiple windows to address financing needs and evolving capacity of public agencies</td>
<td>Multiple windows to address financing needs and evolving capacity of public agencies</td>
</tr>
<tr>
<td></td>
<td>Can serve all public agencies</td>
<td>ESA model useful for smaller and weaker public agencies</td>
<td>Can provide ESAs and introduce ESPCs</td>
</tr>
<tr>
<td></td>
<td>Does not require any investment from the public agencies</td>
<td>Helps introduce ESPCs and build local ESCO industry</td>
<td>Can help build capacity of private sector ESCOs</td>
</tr>
<tr>
<td>Limitations</td>
<td>Requires active participation of MOF</td>
<td>Need legislation for implementation</td>
<td>Need legislation to create a new state-owned enterprise</td>
</tr>
<tr>
<td></td>
<td>May need changes in budgeting procedures</td>
<td>Need strong, capable Fund management team</td>
<td>Need strong, capable GESCO management team</td>
</tr>
<tr>
<td></td>
<td>Requires capable PIU</td>
<td>May need payment security mechanism to assure payments for services</td>
<td>Need to develop payment security mechanism to assure payments for services</td>
</tr>
<tr>
<td></td>
<td>Sustainability is not assured</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are legislative changes needed?</td>
<td>Yes</td>
<td>No, requires new legislation; may require creation of a new entity.</td>
<td>No, requires new legislation and creation of a new state enterprise</td>
</tr>
</tbody>
</table>

Source: Prepared by World Bank
Moving Forward on the Public Sector EE Financing Agenda

Pursuing any one of the three potential options will require deliberate efforts by the government to:

- Identify the sources of the needed investment capital.
- Secure the commitments from IFIs as appropriate.
- Implement the needed legislative and regulatory initiatives.
- Design the delivery system.
- Build implementation capacity.
- Leverage private sector participation.

The Government should select one of the options for implementation only after review and consultation with all relevant stakeholders – including government officials, mayors and city councils, private sector representatives, banks and financial institutions, consumer groups, and the IFI community. The next step would then be the detailed design and implementation planning for the selected option.

In view of the analysis and state of the Georgia market, the World Bank recommends creating a dedicated GEERF for the public sector. The GEERF should be established as a government-owned organization and either managed by an existing entity (such as MDF or GEDF), or established as a new entity. This would fill a critical gap in public sector EE financing in Georgia and help address perhaps some of the most pressing public sector needs.

Possible Funding Structure

A preliminary concept for the proposed finding structure of the GEERF is summarized below (see Figure 6.1):

**Figure 6.1 – Possible Funding Structure of the GEERF**

- The GEERF could be capitalized with equity of €10 million. The equity sources could be the Green Climate Fund (GCF), Global Environment Facility (GEF), government contributions, and possibly other donors.
- The GEERF could also be eligible for concessional debt financing and IFI loans of €25 million through GCF loans.
- The GEERF can be staffed with a small permanent Fund staff with use of
The fee structure to cover administrative and overhead costs (preliminary audit, procurement, financial structuring, oversight, etc.) will be established. It is expected that the initial annual costs would be about €600,000.

**Results**

The GEERF would make investments in EE projects of €5.0 million in Years 1 and 2, increasing to €6.0 million per year from Years 3 through 5, and €7.0 million from Years 6 to 15. The typical simple paybacks would be in the range of about 7 years and the GEERF would be likely to achieve breakeven in terms of covering its administrative and overhead costs and fees from its revenues from Year 3 onwards. The GEERF could invest €28 million by Year 5 and it is assumed that it will need recapitalization of about €20 million in Year 6.

Estimated results based on a preliminary financial model would be:

- Cumulative project investments by Year 15 - €98 million
- Net equity after Year 15 - €13.0 million
- Annual energy savings - 147 GWh
- Annual government budget savings by Year 15 - about €14 million
- Lifetime energy savings - 2,198 GWh
- Lifetime GHG reductions - 1.1 million tons of CO₂e
- Increase in green employment - 1,600 jobs

**Roadmap for Establishing the GEERF**

The major steps in establishing the GEERF are shown in Figure 6.1.
Advantages of the GEERF

It is recommended that the GEERF be initially established as a government-owned organization managed by MDF, or established as a new, independent entity to serve the needs of central government agencies. It will be governed by a GOG-appointed Board of Directors comprised of public and private sector members. It will offer the following advantages:

- The GEERF will represent the interests of all the relevant stakeholders (including various Ministries and private sector stakeholders).
- Fund management can be independent and thus avoid political influence.
- The GEERF can allow pooling of government and donor funds to avoid parallel initiatives.
- The Board can select a highly qualified management team.
- Fund management staff would be long-term and could be compensated at market-based levels.
- The Fund may not have to comply with government procurement rules and bureaucratic procedures.
- It can operate with more flexibility and faster decision-making than a government agency.

Concluding Remarks

It is anticipated that the GEERF can reduce annual central government energy spending by €4 to 5 million and help meet national EE targets. It will also provide significant co-benefits, including reduced energy imports and public energy costs, improved comfort levels, refurbished public building stock, creation of an ESCO industry and new jobs, and reduced GHG emissions.

It will be sustainable, since no recurring government budget will be needed, and operate on a revolving basis for more than 20 years. It can provide the basis for extension or replication to other municipal sectors (e.g., street lighting, water pumping, etc.).
SECTION 7 - REFERENCES


Arabidze. 2016b. Plans for Energy Efficiency in Public Sector, presentation at EE Roundtable, Tbilisi, Georgia


Mitigation Momentum. 2016. Developing a NAMA for energy efficient refurbishment in the Georgian Public Building Sector, Tbilisi, Georgia.


## Options for Financing Energy Efficiency in Public Buildings in Georgia

### ANNEX A – AUDIT RESULTS

List of Energy Efficiency Measures Studied in Audits

- Wall Insulation
- Ceiling Insulation
- Efficient Lighting
- Helio System (Efficient Boiler)
- Window Replacement

### Table A.2 – Audit Results

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Units</th>
<th>JoAnn Medical Center</th>
<th>St. Joakim Maternity House</th>
<th>Medical (2 bldgs)</th>
<th>GTU - Bldg. 1</th>
<th>GTU - Bldg 3 &amp; 4</th>
<th>GTU - Bldg 10</th>
<th>GTU - Laboratory</th>
<th>Georgia Tech U. (4 bldgs)</th>
<th>Kindergarten No. 71</th>
<th>Kindergarten No. 70</th>
<th>Kindergarten No. 95</th>
<th>Kindergarten No. 112</th>
<th>Kindergartens (4 buildings)</th>
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</thead>
<tbody>
<tr>
<td>Floor Area</td>
<td>m²</td>
<td>12,349</td>
<td>5,906</td>
<td>18,255</td>
<td>30,354</td>
<td>12,137</td>
<td>9,977</td>
<td>441</td>
<td>52,909</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Consumption</td>
<td>kWh</td>
<td>2,327,016</td>
<td>1,522,709</td>
<td>3,849,725</td>
<td>4,461,090</td>
<td>1,372,073</td>
<td>1,317,564</td>
<td>62,528</td>
<td>7,213,255</td>
<td>281,790</td>
<td>97,624</td>
<td>534,154</td>
<td>336,426</td>
<td>1,249,994</td>
</tr>
<tr>
<td>Cons. Per m²</td>
<td>kWh/m²</td>
<td>188</td>
<td>258</td>
<td>211</td>
<td>147</td>
<td>113</td>
<td>132</td>
<td>142</td>
<td>136</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Savings</td>
<td>kWh</td>
<td>633,807</td>
<td>591,778</td>
<td>1,225,585</td>
<td>1,438,318</td>
<td>141,509</td>
<td>663,153</td>
<td>6,429</td>
<td>2,249,409</td>
<td>137,415</td>
<td>52,458</td>
<td>252,156</td>
<td>72,361</td>
<td>514,390</td>
</tr>
<tr>
<td>% Savings</td>
<td>%</td>
<td>27%</td>
<td>39%</td>
<td>32%</td>
<td>32%</td>
<td>10%</td>
<td>50%</td>
<td>10%</td>
<td>31%</td>
<td>49%</td>
<td>54%</td>
<td>47%</td>
<td>22%</td>
<td>41%</td>
</tr>
<tr>
<td>Investment</td>
<td>GEL</td>
<td>202,970</td>
<td>306,720</td>
<td>509,690</td>
<td>486,372</td>
<td>318,429</td>
<td>331,798</td>
<td>22,416</td>
<td>1,159,015</td>
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<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Savings</td>
<td>GEL</td>
<td>62,771</td>
<td>57,281</td>
<td>120,052</td>
<td>179,907</td>
<td>134,765</td>
<td>41,977</td>
<td>7,614</td>
<td>364,263</td>
<td>20,725</td>
<td>8,494</td>
<td>25,721</td>
<td>6,327</td>
<td>61,267</td>
</tr>
<tr>
<td>Payback Years</td>
<td></td>
<td>3.2</td>
<td>5.4</td>
<td>4.2</td>
<td>2.7</td>
<td>2.4</td>
<td>7.9</td>
<td>2.9</td>
<td>3.2</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Inv/sq. m</td>
<td>GEL/m²</td>
<td>16.4</td>
<td>51.9</td>
<td>27.9</td>
<td>16.0</td>
<td>26.2</td>
<td>33.3</td>
<td>50.8</td>
<td>21.9</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

*Source: Energy Audits conducted by USAID*
ANNEX B – ADDITIONAL INFORMATION ON SELECTED FINANCING MECHANISMS

Budget Financing with Capital Recovery

Figure B.1 shows a typical structure of a public EE improvement project using budget financing. An illustrative example of this approach is a project financed by the World Bank in the former Yugoslav Republic of Macedonia (see Box B.1).

**Figure B.1 - Structure of a Municipal EE Improvement Project Using Budget Financing**

![Diagram of budget financing structure]

*Source: World Bank*

**Box B.1 - Example of Budget Financing with Capital Recovery: Macedonia**

The World Bank provided a loan of US$25 million (later expanded to US$75 million) to Macedonia to fund the Municipal Services Improvement Project (approved in 2009), which sought to improve the transparency, financial sustainability, and delivery of municipal services in the participating municipalities through a focus on revenue-generating public services and investment projects with cost-saving potential. The loan funds were managed by the MOF and were on-lent to participating eligible municipalities through sub-loan and grant agreements on the same terms as the World Bank loan. The loan repayments were in the form of reduced budget outlays to the municipalities for energy.

Eligible borrowers were creditworthy municipalities that had received MOF approval to borrow, with publicized budgets and audit reports. The loan program was supplemented by technical assistance funds for capacity building and institutional reform, and also by a performance-based investment grant fund that provided incentives and rewards to municipalities for implementing reform initiatives to improve service delivery performance.

Utility On-Bill Financing

A summary of this mechanism was provided in Section 5. Some of the advantages of this mechanism, based on experience in 20 U.S. states, are (ACEEE 2011):

- It provides consumers access to financing using the utility’s relationship with its customers.
- It generally provides the customer the advantage of paying for the EE investment from the savings in the utility bills resulting from that investment.
- Such a program may be able to extend financing to otherwise underserved markets, such as consumers renting their facilities and residents of multi-family dwelling units.
- There is also the possibility of providing financing to consumers whose weak credit limits their ability to obtain conventional financing.
- The costs and risks related to the collection of loan repayments from consumers are reduced because very few consumers are delinquent on their utility bill payments.
- The equipment is generally owned by the consumer and the utility has a lien on the equipment under the loan agreement.
- The utility’s financing and administrative costs can be rolled into the equipment price and paid by the consumer as a part of the loan repayment.
- The risk of default is low as most consumers usually are diligent about paying their utility bills. In some cases, the utility may threaten to cut off the electricity service for non-payment of the equipment loan, providing a major incentive to the consumer to not be in default.
- Some utilities have found it difficult and cumbersome to modify their billing systems to add loan repayments for EE equipment to the electricity bills.

Key Characteristics

- The financing structure is generally on favorable loan terms. The interest rate is based on the utility’s cost of capital and is therefore usually below the commercial market rate. Some utility financing programs charge a zero interest rate.
- The length of the loan is determined based on the type of EE equipment being financed and is designed in such a way that the consumer’s monthly loan repayment is less than the bill savings generated by the equipment. For example, financing of CFLs may for a 9 to 18-month period which is commonly the payback period for such efficient lamps.
- The equipment is generally owned by the consumer and the utility has a lien on the equipment under the loan agreement.
- The utility’s financing and administrative costs can be rolled into the equipment price and paid by the consumer as a part of the loan repayment.
- The risk of default is low as most consumers usually are diligent about paying their utility bills. In some cases, the utility may threaten to cut off the electricity service for non-payment of the equipment loan, providing a major incentive to the consumer to not be in default.
- Some utilities have found it difficult and cumbersome to modify their billing systems to add loan repayments for EE equipment to the electricity bills.

Illustrative Examples

Recent examples of utility financing of EE projects through the billing mechanism include the Bangalore Efficient Lighting Program (BELP) launched by the Bangalore Electricity Supply Company (BESCOM) in India and the PROSOL program in Tunisia for installation of solar water heaters.

In the BELP program, the electric utility competitively selected manufacturers of energy-efficient Compact Fluorescent Lamps (CFL) based on price, quality, and warranties offered. Residential customers of BESCOM were able to obtain the CFLs from the manufacturers’ retail outlets. The customer signed an agreement with BESCOM to pay for the CFLs over a
9-month period through their electric bills (IIEC 2006).

The Tunisian program (called Programme Solaire or PROSOL) was a joint effort involving the Tunisian Ministry of Industry, Energy, and Small and Medium Enterprises, and the National Agency for Energy Conservation (ANME). The solar water heating manufacturers and suppliers worked with commercial banks to arrange financing for customers interested in purchasing solar water heating systems. The customers agreed to repay the loan through their electricity bill. The electric utility collected the customer payments and repaid the banks. A summary is provided in Box B.2.

Box B.2 – Tunisia PROSOL Program

The PROSOL project was initiated in 2005 by the Tunisian Ministry for Industry, Energy and Small and Medium Enterprises and the National Agency for Energy Conservation (ANME), with the support of the UNEP-MEDREP Finance Initiative. The objective of PROSOL was to revitalize the declining Tunisian solar water heater market. The innovative component of PROSOL was in its ability to actively involve the finance sector, and turn it into a key player for the promotion of clean energy and sustainable development. By identifying new lending opportunities, banks were able to build dedicated loan portfolios, thus helping to shift from a cash-based to a credit-based market.

The main features of the PROSOL financing scheme were:

- Loan mechanism for domestic customers to purchase solar water heaters
- Cost subsidy provided by the Tunisian government, up to 100 dinars (57 Euros) per m²
- Discounted interest rates on the loans, progressively phased out.
- A series of accompanying measures including an awareness raising campaign, a capacity building program and carbon finance.
- Key partners included:
  - Société Tunisienne de Banque (STB)
  - Two commercial banks (UBCI and Amen bank)
  - The State electricity utility STEG (Société Tunisienne d’Electricité et du Gaz)
  - Manufacturers, importers and installers of solar water heaters
  - Local consultants

Launched in April 2005, the PROSOL project achieved immediate success. In less than one year (April-December 2005), sales reached the record figure of 7,400 solar water heating systems, for a total surface installed of 23,000 m². By the end of 2006, an additional 11,000 units were sold, corresponding to approximately 34,000 m².

Sources: Touhami 2006, MacLean 2007.

The main advantages of utility on-bill financing are:

- Allows the customer to purchase EE equipment and pay for it from savings generated by the equipment.
- Facilitates the customer’s repayment of the equipment purchase by collecting the payments through the electricity bill.
- Reduces the transaction cost of recovering the loan repayments from customers.
- Reduces the risk of default.
- Improves the relationship between the utility and the customer.

There are also some limitations and challenges related to the utility consumer financing approach:

- Many utilities are unwilling to enter into such arrangements to finance equipment purchase through the electricity bill.
- The utility billing system may not be structured to handle the collection of loan repayments and the cost of modifying the system may be high.
The regulatory system may not allow the utility to collect payments for equipment loans.

While default risks are low in such programs, there are issues with respect to what actions the utility can take in case the customer does not pay the finance charge or only pays a part of the utility bill. While some utilities have included provisions to cut off service for non-payment of the EE finance component, consumer advocates have questioned the legal basis to do so.

Some of the other challenges include accurately estimating the utility financing and administration costs, assuring that the monthly payment is less than the bill savings, addressing the payments when the ownership of the property changes, addressing energy savings that are non-electric, etc.

**Energy Efficiency Revolving Fund**

EERFs have been successfully deployed in Bulgaria, Romania and (more recently) in Armenia. The typical structure of an EERF was presented in Section 5. Box B.3 provides an illustration of the Armenian R2E2 fund.

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**Box B.3 - Armenia Renewable Resources and Energy Efficiency Fund (R2E2 Fund)**

The Fund was established in 2005 and capitalized with an US$8 million IDA credit and US$0.7 million GEF grant. The Fund is overseen by a Board of Directors, which includes government and NGOs, and operates on a fully commercial basis.

The Fund currently implements a World Bank/GEF project that provides EE services in public sector facilities—such as municipal street lighting, schools, hospitals, and administration buildings (average size about US$100,000). It has already financed projects worth US$8.6 million between 2012 and 2015 and provide TA for project preparation and capacity building.

The Fund provides loans to municipalities and public entities with revenue streams independent of the state budget, and energy service agreements (ESAs) to schools and other public facilities, which are not legally independent:

- Loans will be provided under an ESA, whereby the Fund will also provide additional services against a service fee (conduct a preliminary screening; carry out the procurement of design and works; oversee construction and commissioning; pay the contractors for services provided; and monitor the sub-projects). The loans will be treated as municipal debt, with fixed repayment obligations to be made within their budget provisions in future years. The amount of the repayments will be designed to allow fund clients to repay the investment costs and service fee from the accrued energy cost savings.

- Energy Service Agreements: The Fund will first determine the average baseline energy use, identify the general scope of a sub-project, develop bidding documents, conduct the procurement, finance the project, oversee construction and commissioning, and monitor the sub-project. The ESA will obligate the facility to pay the baseline energy costs (with adjustments for energy prices, usage, etc.) over the life of the agreement. In such cases, there is no loan or debt incurred by the client entity. With these payments, the Fund will pay the energy bills on the facility’s behalf and retain the balance to cover its investment cost and service fee of up to 10 years. The agreement will also be designed so that the duration can be adjusted if the Fund recovers its full investment earlier or later.

To support the build-up of an ESCO industry in Armenia, the Fund uses simplified ESCO contracts to shift some performance risks to private construction firms/contractors.


**Financing Windows or Products**

An EERF would need to be designed to serve the needs of all municipalities and central government agencies. Some of these agencies may not be creditworthy, or have no borrowing history; others may not have available borrowing capacity; and others may not
have the internal capacity to identify, design, and manage the implementation of EE projects. To address some of these issues, an EERF may offer several financing products and “windows” as shown in Figure B.2:

![Figure B.2 – Financing Windows of an Energy Efficiency Revolving Fund](image)

The Debt Financing Window and ESAs were discussed in detail in Section 5. The other windows are summarized below.

**Risk Guarantee Window**

An EERF may offer a risk-sharing mechanism by providing credit or risk guarantees to commercial banks and other financial institutions (FIs) in order to leverage commercial financing for public sector EE projects. Risk-sharing programs are designed primarily to address the common perception of lenders that EE projects are inherently riskier than traditional investments (a major financing barrier), or to allow them to lend to marginally creditworthy clients with very attractive EE investment opportunities. They provide commercial banks/FIs with a partial coverage of the risk involved in extending loans for EE projects. The risk-sharing facility generally includes a subordinated recovery guarantee\(^{25}\) and may also have a “first-loss reserve”\(^{26}\) that may be used to absorb up to a specified amount of losses before the risk sharing occurs.

For example, the Bulgaria EE Fund provides three types of guarantees: (i) a credit guarantee covering up to 80 percent of the credit value to secure loans for EE projects, with individual guarantee commitments not to exceed Lev 800,000 (about $500,000); (ii) an uncollateralized guarantee to a portfolio of receivables of energy service companies (ESCOs) for their energy

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\(^{25}\) In a subordinated recovery guarantee, the guarantor ranks behind other lenders in the recovery of the guarantee funds it pays out in case the borrower defaults on the loan. This allows lenders to offer better loan terms, such as lower interest rates or longer tenors. A subordination provision may be useful, for example, when interest rates are high due to higher perceived risk, or if a new technology with limited operational experience is being deployed.

\(^{26}\) In the event of a loan default, a first-loss reserve pays for all losses incurred until the maximum first-loss reserve amount is exhausted. The lender incurs losses only if the total loan loss exceeds the first-loss amount. By covering all or a large share of first losses and sizing the definition of first losses to be a reasonable proportion of the loan portfolio (usually higher than the estimated default or loss rate), a first-loss reserve can provide meaningful risk coverage to the lender, but with a low level of total guarantee liability relative to the total size of the portfolio.
performance contracts (EPCs), covering the first 5 percent of the delayed payments of the portfolio covered; and (iii) a residential portfolio guarantee covering the first 5 percent of defaults within the portfolio of projects.27

**Budget Capture**

The budget capture option may be used by an EERF when the public agency receives dedicated funds from the MOF or another government agency to pay its energy bills. In such cases, after the EERF invests in EE projects implemented by the public agency, the government (i) reduces its budgetary outlays to that public agency by an amount equivalent to the amount of energy cost savings (thereby “capturing” the savings) and (ii) redirects these funds to the EERF. This would require that the government agrees to provide the same amount to the public agency for energy bill payments in subsequent years.

**Grants Window**

If an independent, sustainable financing source is available, EERF may also offer a grant window. For example, if a government (through special taxes, levies, or surcharges, for example) or a donor agency commits to funding EERF for a given number of years, a portion of the funding may be used for grants to public agencies to improve the economic attractiveness of the EE project from the public agency perspective.

However, if the EERF is established to operate on a fully commercial basis, it is unlikely that it will provide grant financing—except when such grant financing is available from another source and can be combined with the loan financing provided by the revolving fund. If such funds are made available, it should be made clear that these are limited; failing to do so may create false expectations for more grants, which may undermine the fund’s long-term sustainability.

**Forfaiting**

A possible service that an EERF can provide or arrange is forfaiting, the sale of receivables from an EE project. Forfaiting is useful in situations where an energy service provider (ESP) is providing its own equity for project financing. It is a form of transfer of future receivables from one party (the seller – an ESP) to another (the buyer – a financial institution).28 An example of forfaiting is the Bulgarian ESCO Fund (BEF) established under the Law for Special Investment Companies by the Bulgarian company Enemona. This fund received a loan of €7 million from the European Bank for Reconstruction and Development (EBRD) to buy receivables under the energy saving contracts signed by Enemona. The fund allows Enemona to use its capital for further development of projects in both the industrial and public sectors including kindergartens, schools, hospitals, and other municipal buildings.

**Dedicated EE Credit Lines**

Dedicated EE credit lines for public sector projects address many of the issues related to insufficient lending by banks and financial institutions. By establishing a credit line and providing funding, governments or donor agencies can help overcome some of the barriers to commercial financing. Most EE credit lines also have a TA component to build lender

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27 The residential portfolio guarantee was not used. The available funds were committed to the ESCO portfolio guarantees.
28 The original creditor (the ESP) cedes his claims to future revenues from the project and the new creditor (the FI) gains the right to claim these future receivables from the debtor (the client). The ESP receives a discounted one-time payment from the FI that then allows it to invest in new energy savings performance contract (ESPC) projects.
capacity relative to EE project financing. However, issues related to creditworthiness and adequate collateral limit their use in municipalities.

The typical structure of an EE credit line is shown in Figure B.3. Box B.4 provides an illustration of a municipal EE credit line in Serbia.

**Figure B.3 - Illustrative Structure of EE Credit Line**

Source: Limaye 2013a

**Box B.4 - Example of Municipal Credit Line in Serbia**

The German development bank, KfW, has launched a dedicated credit line for municipal environmental infrastructure and EE investments in Serbia. A total of €100 million will be made available and disbursed to eligible municipalities and public sector utility companies via Serbian on-lending banks, following the standard procedures for municipal borrowing. This is a continuation of the current KfW project on “Municipal Infrastructure via the Financial Sector”. To provide more incentives for Serbian municipalities to invest in EE and environmental projects, KfW and the European Commission signed an agreement at the end of 2011. A grant scheme will be implemented to award grants of 15 to 20 percent of the loan amount financed from the KfW credit line after their successful completion.


**Risk-Sharing Facility**

A typical structure of a risk-sharing facility is shown in Figure B.4. Box B.5 provides the example of the IFC/GEF risk sharing program for Commercializing Energy Efficiency Finance in Central and Eastern Europe (CEEF).
A Super ESCO can be uniquely positioned to overcome a number of the barriers faced by smaller ESCO companies. With its size and credibility as a public institution, a Super ESCO has the capacity both to support the growth of a nation’s private domestic ESCO business and to finance EE projects, since it typically subcontracts all project implementation to local ESCOs. Figure B.5 illustrates the structure of a Super ESCO.

Examples of Super ESCOs include the New York Power Authority (NYPA) in the United States, Fedesco in Belgium, Fakai Super ESCO in China, and Energy Efficiency Services Limited (EESL) in India (see Box B.6).
The business models typically utilized by ESPs are illustrated in Figure B.6.

Before an energy service market for the public sector can be developed, the government must first undertake a set of legislative, regulatory, and policy initiatives targeted at:

- Creating a large and stable demand for energy services projects in the public sector;
- Removing barriers to public procurement of EE services and establishing clear regulations, rules and procedures for public agencies to work with private ESCOs; and

**Box B.6 - Energy Efficiency Services Limited: India’s Super ESCO**

The government of India established Energy Efficiency Services Limited (EESL) as a super ESCO to carry out public sector undertakings under the Ministry of Power. EESL functions as the implementation arm of the National Mission for Enhanced Energy Efficiency (NMEEE). The purpose of setting up a separate corporate entity was to develop an EE market that was virtually nonexistent in the country. It has the mandate to implement EE projects in the public sector and facilitate and promote the development and growth of the private ESCO industry through partnerships and subcontract arrangements. The initial capital of EESL is about US$50 million.

Some of the major functions of EESL are EE planning and implementation in the residential sector, commercial buildings, industrial sites, municipal street lighting and water pumping, and agricultural pumping. EESL also does capacity building of utilities and state designated agencies (SDAs) responsible for EE implementation under India’s Energy Conservation Act.

EESL has successfully collaborated with state and local government agencies to implement a wide range of projects including LED lighting in homes, efficient agricultural pumps, efficient street lighting, and efficient chillers in commercial buildings. EESL has engaged in a number of partnerships with private sector organizations to implement these projects.

Source: EESL 2015

Source: Limaye 2013b

**Commercial Financing with ESCOs**

The business models typically utilized by ESPs are illustrated in Figure B.6.
Facilitating adequate and affordable financing of private ESCO projects. Table B.1 provides more detail on these initiatives.

**Figure B.6 - Summary of Business Models for Energy Service Companies (ESCOs)**

<table>
<thead>
<tr>
<th>Outsourced Energy Management Business Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Energy supply contracting: ESP takes over equipment operation and maintenance (O&amp;M) and sells output at fixed unit price (“chauffage,” “outsourcing,” “outsourced energy management”)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Performance Contracting Business Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Public or Super ESCO</td>
</tr>
<tr>
<td>- ESPs with third party financing design, finance, implement, verify, and get paid a share of actual energy saved (ESCO “Shared Savings”)</td>
</tr>
<tr>
<td>- ESPs with design/implement project, and guarantee minimum level of savings (ESCO “Guaranteed Savings”)</td>
</tr>
<tr>
<td>- ESPs with variable term contract act as full service ESCO, but contract term varies</td>
</tr>
<tr>
<td>- ESPs with 1-year contract design/implement project, receive 60–70% of payment</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Financial Services Business Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Supplier credit, an equipment vendor designs, implements, and commissions project</td>
</tr>
<tr>
<td>- Equipment leasing, similar to supplier credit except payments are generally fixed</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Engineering Services Business Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Engineering services with performance-based payments</td>
</tr>
<tr>
<td>- Engineering services with fixed payments</td>
</tr>
</tbody>
</table>

*Source: World Bank 2014c*

**Table B.1 - Government Actions to Foster Private ESCOs**

<table>
<thead>
<tr>
<th>Create Demand for EE Services</th>
<th>Remove Barriers to Public Procurement of EE Services</th>
<th>Facilitate Financing of ESP Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Increase PA knowledge and awareness of ESPs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Increase PA capacity to identify ESP opportunities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Require EE targets and action plans</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Develop standard, templates, benchmarks, and M&amp;V schemes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Organize workshops with PAs and ESPs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Aggregate similar projects across PAs</td>
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<tr>
<td>- Accredit or certify ESCOs</td>
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<td>- Allow PAs to sign multiple-year contracts</td>
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<td>- Allow retention of energy cost savings to pay ESPCs</td>
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<td>- Change procurement rules to select most value, not least cost</td>
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<tr>
<td>- Exclude ESP payments from PA debt</td>
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<tr>
<td>- Require consumption-based billing for district heating</td>
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<tr>
<td>- Allow PAs to engage in PPPs and EE equipment leasing</td>
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<tr>
<td>- Encourage PAs to use simple ESCO business models</td>
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<tr>
<td>- Establish EE revolving fund with loan facility</td>
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<td>- Establish EE revolving fund with ESAs</td>
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<td>- Provide budgetary grants</td>
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<td>- Provide risk-sharing facility</td>
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<td>- Facilitate forfaiting of ESPCs</td>
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<td>- Establish public or super ESCO</td>
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*Note: ESA = energy service agreements; ESPC = energy savings performance contract; M&V = measurement and verification; PA = public agency; PPP = public-private partnership.*

*Source: World Bank 2014b*
ANNEX C - EXAMPLES OF SUPER ESCOS

While the concept of the Super ESCO is still in its infancy, several countries have already adopted the idea of a Super ESCO and have created a Super ESCO to help encourage their domestic energy services market. Other nations are now considering the establishment of Super ESCOs. Some examples are provided below.

Belgium - FEDESCO

In 2005, the Belgian federal government created FEDESCO, a public but independent energy services company to encourage the development of a domestic energy services industry (FEDESCO 2010). The primary mission of FEDESCO is to study, facilitate and coordinate energy savings projects in public buildings through the use of third party financing (JRC, 2010). Phase 1 of FEDESCO's objectives focuses on 1800 buildings occupied by ministries, federal public services (administrations) and other governmental organizations with a floor area of over 8 million m² and an annual energy bill of over €100 million. These buildings are owned and managed by the Federal Building Agency. In subsequent phases, other public buildings (from regional governments, provinces, municipalities, public companies, etc.) and even private buildings will be included.

FEDESCO provides both professional energy services and innovative financial services (pre-financing, third party financing, and energy savings performance contracting) to private ESCO companies in Belgium. This Super ESCO also seeks to facilitate an annual investment program of up to €7.5 million to encourage private sector investment in energy efficiency. FEDESCO was created in the framework of the 2nd Belgian Federal plan for sustainable development (2004-2008) and the National Climate Plan (2002-2010). FEDESCO has been successful in achieving a 10 percent reduction in both total energy consumption and GHG emissions in federal public buildings in Belgium.

Croatia - HEP ESCO

In 2003, the World Bank and the Global Environment Facility (GEF) helped create an ESCO subsidiary within the national power utility, Hrvatska Elektroprivreda (HEP). This national HEP ESCO was capitalized by a World Bank loan (World Bank, 2003), HEP equity, local banks, and other sources, to offer EE services to public and private clients. GEF funds were also mobilized to provide additional credit enhancement for HEP ESCO projects and provide some technical assistance to the ESCO and local banks. Since the Croatian market was small and no private ESCOs were operating in the market, the government did not foresee inherent risks related to crowding out the private sector. The HEP ESCO used the “open book” model to keep its pricing fair and transparent. Government entities can directly contract with government companies and their subsidiaries, so public agencies are not required to conduct any competitive procurement to contract with HEP ESCO.

The HEP ESCO received a US$7 million GEF grant and a US$5 million World Bank loan, and equity investment from the parent utility. The ESCO also negotiated financing arrangements with local commercial bank debt facilities. By the end of 2008, about 186 million Kuna (US$35.4 million) in energy savings contracts have been signed. HEP ESCO has received a credit line from KfW to increase its financing capacity.

Province of Hebei, China - The Fakai Scientific Services Corporation

Recognizing that implementation of EE projects needed to be substantially increased in
Hebei to meet the goals established by the Chinese national government, the Hebei DSM Center established the Fakai Scientific Electricity Services Limited Corporation as a wholly-owned subsidiary to encourage, promote and implement EE and DSM projects (Hebei DRC, 2009). This company has been established as a Super ESCO. It is developing and implementing projects using the ESPC model, as well as assisting other ESCOs operations in Hebei to grow their businesses and undertake more ESPC projects (USAID, 2010).

Fakai was capitalized by the Hebei Development and Reform Commission (DRC) and will strive to work with local, national, and international financial institutions as well as donor agencies (such as the Asian Development bank) to mobilize resources in an effort to achieve the EPP goal of 600 MW. Fakai is also exploring the establishment of a PPP to scale up its Super ESCO activities.

**India - Energy Efficiency Services Limited**

The Bureau of Energy Efficiency (BEE), created by the Energy Conservation Act, 2001, has undertaken a number of initiatives to encourage and promote ESCOs and to create a market for ESCO services. BEE working with other agencies of the Government of India, established a national organization called Energy Efficiency Services Limited (EESL). EESL was capitalized by four existing national public sector undertakings (PSUs) namely National Thermal Power Corporation, Power Grid Corporation, Power Finance Corporation, and Rural Electrification Corporation (Business Standard, 2009). The initial capital of EESL was about US$50 million.

The company functions as the implementation arm of the National Mission for Enhanced Energy Efficiency (NMEEE). The purpose of setting up a separate corporate entity was to develop an EE market that was virtually nonexistent in India. Some of the major functions of EESL include EE planning and implementation in buildings and industrial sites, implementing the “Bachat Lamp Yojana” (a scheme for promotion of CFL lamps nationally using the Program of Activities concept for CDM), and demand-side management in the municipal and agricultural sectors. EESL is also assisting the growth and development of the existing ESCOs by engaging them in project implementation.
ANNEX D – GEORGIA EE ROUNDTABLE SUMMARY

Summary of Roundtable Discussion
Options for Financing Energy Efficiency in Public Buildings in Georgia

April 28, 2016, 10:00 am – 12:30 pm

As part of the World Bank’s ongoing policy dialogue in the energy sector in Georgia, the World Bank is developing a report on Options for Financing Energy Efficiency in Public Buildings in Georgia. This directly supports the Ministry of Energy’s (MOE’s) development of its National Energy Efficiency Action Plan (NEEAP), which among other things, includes measures for an Energy Efficiency Revolving Fund (EERF) and renovation of public buildings. On April 28, 2016 a Roundtable meeting was co-hosted by the World Bank and MOE at Public Service Hall. The Minister of Regional Development and Infrastructure opened the workshop. Participants included about 35 representatives from MOE, the Ministry of Finance (MOF), Ministry of Regional Development and Infrastructure (MRDI), Ministry of Economy and Sustainable Development (MoESD), Municipal Development Fund (MDF), Energy Efficiency Center (EEC), Sustainable Development Center Remissia (Remissia), KfW, USAID, Winrock, GiZ and other stakeholders.

MOE made a presentation on their draft NEEAP, expected to be completed by June and adopted by end September 2016 and summarized the proposed activities with respect to energy efficiency (EE) in public buildings. The World Bank team then presented the preliminary findings from the report, including preliminary estimates of the potential for EE improvements and related investments needed for public buildings, opportunities for and barriers to financing public building EE retrofits in Georgia, identification and assessment of alternate financing options based on experience in the region and elsewhere, and a comparison of options for Georgia. Three public sector EE financing schemes for Georgia were discussed in detail: (i) budget financing with capital recovery (i.e., ‘budget capture’), (ii) a Georgian Energy Efficiency Revolving Fund (GEERF); and (iii) a Georgia Super Energy Service Company (GESCO). Based on an evaluation of the limitations and advantages of the three options in the context of Georgia, the study concluded that the GEERF may be the most suitable option to finance EE in the public sector—either by a new or existing institution (e.g., MDF).

While there was general consensus that a revolving fund would appear to be a desirable option for the Government, some key issues and questions were raised and responded to by the Bank team in the development of GEERF or a similar structure:

- Several participants noted that many public buildings in Georgia (such as kindergartens) are underheated and may require new heating systems and structural rehabilitation (in addition to EE measures). Thus, the investment costs and typical payback periods of EE investments presented may be underestimated. The Bank team agreed that underheating and structural rehabilitation were common in the region. While the Bank has been able to include some measures to address these within typical EE investments elsewhere, it was only possible to recover the full investment cost from energy savings if these additional costs were about 10% of the total investment. When these costs were higher, some grants or subsidies may be necessary. The proposed GEERF
could accommodate such grants, when available. If not, the focus would have to be limited to public buildings with reasonably sound structural integrity and comfort.

- Several participants argued that Georgia lacked a comprehensive Energy Efficiency Law to address financing and funding, institutional frameworks, regulations (e.g., codes and standards, labeling, building certifications) and other measures. The Bank agreed that a comprehensive EE policy framework would be useful, but GEERF could be established in the near-term, possibly within an existing entity, without the enactment of a comprehensive law.

- A few participants, including the Minister of Regional Development and Infrastructure, believed that it was not desirable or feasible to establish a new organization for the management and operation of the GEERF, so using an existing organization may be preferred. The Bank agreed that creating new government entities is always difficult. While the creation of a new entity provides advantages of being structured exactly as needed to provide the best organizational and management structure, and therefore would be a preferred option, relying on an existing entity (such as MDF) for management at least in the initial stage may be the easiest option.

- A couple of questions were raised regarding the use of GEERF over commercial banks, and whether the financing offered by GEERF may distort the market. The Bank responded that there was limited bank lending to municipalities today in Georgia and none available for central government entities. This is, in part, why the Government created the MDF. Existing borrowing limits, creditworthiness and perceived risks by lenders also made such financing difficult. Credit lines to public entities was included in the ‘financing ladder’ presented in the Bank’s presentation, but this was deemed unlikely in the near-term, which is why the GEERF was recommended—namely to address prevailing public financing barriers in Georgia.

- A question was raised about the potential role of private energy service companies (ESCOs) in developing its options. It was pointed out that a study of potential role of ESCOs in the heating sector was being conducted by GiZ. The Bank noted while there were no active ESCOs in Georgia today, the GEERF was designed to allow for and even foster the development of ESCOs in the subcontractor procurement arrangements, as had been done successfully in other countries such as Armenia.

- Some participants noted that, regardless of which option was selected, substantial technical assistance (TA) would be needed to implement the selected option. The Bank fully agreed and noted that it would work with the Government and interested donor partners to develop a comprehensive package of TA to ensure the selected financing and implementation scheme was successful.

The participants generally agreed that the options presented were appropriate for Georgia and that the Government should give serious consideration to the options presented by the World Bank. MOE and the Bank teams thanked all participants for their candid and useful feedback. The next step is to finalize its draft Options Paper and share it with the Government for comments. Thereafter, the Bank will finalize its report and submit it to the Government for consideration. Once the Government is able to make a decision on the best option, the Bank will, together with MOE and other concerned ministries (MESD, MOF, MRDI), initiate mobilizing funds for the program and develop a detailed plan for program
development and implementation.