ESTABLISHING AND OPERATIONALIZING AN ENERGY EFFICIENCY REVOLVING FUND

GUIDANCE NOTE

The World Bank

April 2014
EXECUTIVE SUMMARY

An energy efficiency revolving fund (EERF) is a potentially viable option for scaling up energy efficiency (EE) financing in the public sector in the Western Balkans. Under a typical EERF targeting the public sector, loans are 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 any fees or service charges. The repayments can then be utilized to finance additional projects, thereby allowing the capital to revolve creating a sustainable financing mechanism. Since both the borrower and lender are publicly owned, such funds may often offer lower cost financing with longer tenors and reduced security requirements than typical commercial loans. Because EE projects have positive financial rates of return, so capturing these cost savings and reutilizing them for new investments creates a more efficient use of public funds, sustainable program than typical budget or grant-funded approaches. This can help demonstrate the commercial viability of EE investments and provides credit histories for public agencies, paving the way for more commercial financing options in future years. This Guidance Note defines the typical structure of EERFs, conditions under which they can be useful and effective, how they can address typical regional some of the financing barriers, and implementation options. The Note also provides examples, case studies, and lessons learned, and a "roadmap" for establishing such funds. It is targeted at government decision-makers interested in meeting their EE targets in the public sector establishing such EE revolving funds.

The typical structure of an EERF revolving fund is illustrated in the Figure ES1, below.

Figure ES1. Typical Structure of an EERF

An EERF is generally capitalized using a range of different sources of financing, such concessional loan or grant funds from donor agencies, government budget allocations, special tariffs or levies on electricity sales, petroleum taxes, revenue bonds, or other sources. The Fund then provides financing to public agencies that is then used to finance EE investments in public sector buildings and other facilities (e.g., street lighting) EE projects. The energy cost savings accruing from the results of the projects can then be utilized by the public agency to repay the principal and interest on the debt. The installation and other services for project implementation would generally be provided by independent energy service providers (ESPs).

The establishment of an EERF generally requires the development of a legal framework including national legislation and supporting secondary legislative or regulations that will define the structure of the EERF. Options include the creation of the fund under an existing Ministry, energy agency, or development bank, creating a new legal entity (independent corporation or new statutory agency), or establishing a public-private partnership (PPP).
fund structure should also define the management and governance, including oversight arrangements, selection of the fund management team, and monitoring, evaluation and reporting procedures.

An EERF should be designed to serve the needs of all public agencies. Therefore, in addition to debt financing of EE projects, the EERF may have other financing options or “windows” that may include energy service agreements, risk guarantees, grants and, budget capture, and forfeiting. This Guidance Note presents a summary of these options. The EERF should also provide technical assistance to public agencies and energy service providers (ESPs), and may provide procurement and implementation services that will transfer some of the implementation risk to ESPs and facilitate the development of an energy services market. The Guidance Note summarizes how an EERF can overcome the barriers to scaling up EE in the public sector and provides a step by step approach to operationalizing such a fund.

The key lessons learned from international experience (including four case studies presented herein) are:

- The pre-requisite conditions are: (i) government commitment to improving EE in public facilities; (ii) cost-effective opportunities for improving EE; (iii) an existing demand for financing EE projects; (iv) lack of available financing for EE projects; (v) existence of a mechanism to repay the fund from the achieved savings; and (vi) energy payment discipline with cost-reflective, consumption-based billing among public end users.

- An EE revolving fund is best established as an independent organization governed by a government-appointed Board of Governors or Board of Trustees comprising of both public sector and private sector members.

- The options for selecting a fund management organization include including an independent, newly created organization; an existing non-independent public agency; a national development bank, a utility, or other public enterprise.

- In order to be sustainable, the EERF may require accessible and continuing funding source(s) to ensure recapitalization over time.

The major steps in establishing an EERF are summarized in Figure ES1 below.

Figure ES1. Major Steps in Establishing an EERF
Purpose of this Guidance Note

In the Western Balkans, improving energy efficiency (EE) in buildings has been identified as a key priority, because it can contribute to efficient economic growth while providing one of the lowest-cost measures for reducing greenhouse gas (GHG) emissions (World Bank, 2013a). While the potential for EE is quite large, the actual implementation has been far short of potential due to a number of barriers, of which financing barriers are among the most important. In the public sector, these barriers arise because internal funds are limited and the incomplete state of fiscal decentralization has left many municipalities with a limited borrowing capacity, limited ability to secure loans, and a lack of borrowing history. Also, public agencies have a number of restrictive procedures (e.g., budgeting, procurement) and often lack capacity to identify and implement EE projects.

While progress is gradually being made towards improving relevant policy frameworks, completing fiscal decentralization, and developing municipal credit markets, one viable option identified for scaling up EE financing in the public sector in the near-term is the establishment of an EE revolving fund. Such funds can finance public sector EE projects without the typical collateral requirements and with longer tenors, and allow the public agency to repay the loan from energy cost savings. This helps demonstrate the commercial viability of EE investments and provides credit histories for public agencies, paving the way for more commercial financing options in future years. This Guidance Note is targeted at government decision-makers interested in establishing such EE revolving funds. The Note defines the typical structure of EE revolving funds, conditions under which they can be useful.

1 There are many different types of EE funds, some of which provide budgetary or donor-supported grants and incentives to EE projects or specific financial assistance to EE programs. However, this Guidance Note focuses only on EE revolving funds that finance EE projects and are repaid from the energy savings to allow the fund to revolve in a sustainable manner.
and effective, how they can address some of the financing barriers, and implementation options. The Note also provides examples, case studies, and lessons learned, and a "roadmap" for establishing such funds.

**Why Energy Efficiency Revolving Funds?**

**Public Building EE Market in the Western Balkans**

Buildings in the Western Balkans consume about half of the total energy, and estimated energy savings in buildings range between 20% and 40%, with the highest potential expected in the public sector (35-40%). The 2012 regional market assessment commissioned by the Energy Community Secretariat (ECS) concluded that potential annual energy savings amount to about €462 million or 7,940 GWh (ECS 2012). A substantial portion of this amount is in the public sector. While energy savings in the entire public sector were not estimated, the ECS study identified annual energy savings in schools and hospitals to be 515.4 GWh or €35.4 million (see Table 1).

**Table 1 - Projected Energy Savings in Schools and Hospitals in the Western Balkans**

<table>
<thead>
<tr>
<th>Country</th>
<th>Potential Energy Savings</th>
<th>Investment Needed</th>
<th>Average Payback</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GWh/year</td>
<td>Million €/year</td>
<td>Million €</td>
</tr>
<tr>
<td>Albania</td>
<td>53.7</td>
<td>5.1</td>
<td>33.3</td>
</tr>
<tr>
<td>Bosnia &amp; Herzegovina</td>
<td>69.8</td>
<td>4.5</td>
<td>32.4</td>
</tr>
<tr>
<td>Kosovo</td>
<td>79.3</td>
<td>4.3</td>
<td>23.3</td>
</tr>
<tr>
<td>FYR Macedonia</td>
<td>36.8</td>
<td>3.2</td>
<td>18.8</td>
</tr>
<tr>
<td>Montenegro*</td>
<td>7.1</td>
<td>0.7</td>
<td>5.6</td>
</tr>
<tr>
<td>Serbia</td>
<td>268.7</td>
<td>17.6</td>
<td>114.8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>515.4</strong></td>
<td><strong>35.4</strong></td>
<td><strong>226.2</strong></td>
</tr>
</tbody>
</table>

* = Estimated;
Source: ECS 2012

**Challenges and Barriers to Improving EE in Public Buildings**

Earlier efforts in this World Bank project (World Bank 2013a) have pointed out that implementation of EE projects in public facilities in the Western Balkans faces many key challenges and barriers, including: (i) limited number of creditworthy municipalities and borrowing capacity; (ii) restrictive budgeting and procurement regulations; (iii) low energy tariffs; (iv) norm-based billing systems for heating; (v) relatively high interest rates charged by commercial banks; (vi) small project sizes, leading to high project development and transaction costs; (vii) lack of development of energy service providers and performance based contracting; and (viii) low existing comfort levels.

**Financing Options for Scaling Up EE in Public Buildings**

Global experience with financing of public sector EE projects demonstrates a number of potential financing mechanisms as illustrated in the "financing ladder" in Figure 1 (World Bank 2013a).
What are EE Revolving Funds?

A financing mechanism that has received increasing acceptance in both developed and developing countries is the establishment of special purpose funds by national or state governments for financing EE projects. There is a wide range of EE funds. In some countries, international financial institutions (IFIs) such as the World Bank or Kreditanstalt fur Wiederaufbau (KfW) have established EE revolving funds to help finance public sector projects. In other countries national or local governments have established EE funds that provide grants or subsidies to public EE projects. The city of London has established a £100 million revolving fund (with funding from European Regional Development Fund and London Green Fund) to finance public and private sector EE projects. In the United States, electricity regulators at the state level have established funds using a tariff surcharge called the Public Benefit Charge (PBC) to establish funds for EE financing implementation that are partly used to provide revolving funds (as well as grants and incentives) for implementation of EE projects (Limaye 2010). This Guidance Note (GN) does not address funds that provide budgetary or donor-supported grants and incentives to EE projects or specific financial assistance to EE programs. Rather, this GN addresses EE Revolving Funds (EERFs) that are designed to be sustainable through financing of EE projects and recovery of repayments from the clients.

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2 A more detailed comparison of all of the options listed in Figure 1 is included in World Bank 2013a.
3 www.leef.co.uk/
<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Market conditions</th>
<th>Examples</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOF financing with</td>
<td>Budget financing to public agencies/municipalities, with repayment through</td>
<td>Underdeveloped public/municipal credit markets</td>
<td>Belarus, FYR Macedonia (MSIP), Hungary, Kosovo, Lithuania</td>
<td>Builds market capacity, relatively easy to implement, can directly finance municipalities that are not able to borrow, could allow</td>
<td>Requires MOF to allocate substantial budget for financing, sustainability relies on MOF PIU, scale relies on PIU and borrower capacities, reducing future budget provisions can be complex</td>
</tr>
<tr>
<td>budget capture</td>
<td>reduced future budgetary outlays</td>
<td>Limited equity among public agencies, High commercial bank lending rates and low</td>
<td></td>
<td>funds to revolve (if MOF reinvests reflows), no repayment risks</td>
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<td></td>
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<td>tenors</td>
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<td></td>
<td></td>
<td>Availability of budgetary space for MOF financing</td>
<td></td>
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<tr>
<td>Utility (on-bill) financing</td>
<td>Utility borrows and finances EE investments in public clients; recovers</td>
<td>Underdeveloped public/municipal credit market</td>
<td>Brazil, China, India, Mexico, Sri Lanka, Tunisia, U.S., Vietnam</td>
<td>Streamlined repayments, lower repayment risk if risk of utility disconnection, builds off of utility relationships and services,</td>
<td>Requires changes in utility regulations and billing systems, creates potential for monopolistic behaviors, financing competes with local banks, may be easier for power utilities than heating ones</td>
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<td></td>
<td>investments through customers’ utility bills</td>
<td>Access to public budget or IIF loans/grants to capitalize fund</td>
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<td>can be done on a sustainable and scalable basis</td>
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<td></td>
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<td>Strong financial position and financial management of utilities</td>
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<td></td>
<td></td>
<td>Payment discipline among public clients, adequate energy pricing and billing</td>
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<tr>
<td></td>
<td></td>
<td>practices</td>
<td></td>
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<tr>
<td>EE revolving funds</td>
<td>Independent, publicly-owned entity provides financing for EE to public clients</td>
<td>Underdeveloped public/municipal credit market</td>
<td>Armenia, Bulgaria, India, FYR Macedonia (proposed), Romania, Serbia (proposed), Uruguay</td>
<td>Builds market capacity, can directly finance municipalities that are not able to borrow, can better leverage funds by pooling, greater</td>
<td>Recovering operating costs in early years is difficult, using private fund manager to oversee public funds may not be politically desirable, heavy reliance on good fund manager, need mechanisms to help ensure public client repayment, fund can act monopolistic</td>
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<tr>
<td></td>
<td>repayments based on estimated energy cost savings</td>
<td>Access to public budget or IIF loans/grants to capitalize fund</td>
<td></td>
<td>potential for bundling of projects and development of simple ESCOs, centralized implementation and procurement can lower costs, can</td>
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<td>Credible and proactive fund manager can be recruited</td>
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<td>recover operating costs through fees</td>
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<td>Public agencies able to enter into multiyear obligations and retain energy cost</td>
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<td></td>
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<td>savings</td>
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<tr>
<td>Public ESCO</td>
<td>Publicly owned company that provides financing for EE projects with public</td>
<td>Underdeveloped public/municipal credit market</td>
<td>Armenia, China, Croatia, Poland, Ukraine, U.S., Uruguay</td>
<td>Builds ESCO market capacity through subcontracting, helps address public procurement and financing issues, centralized implementation</td>
<td>Public ESCO can be monopolistic and may be subject to public sector bureaucracies (procurement, staffing, budgeting), appropriate exit strategy may be needed if private ESCOs enter the market, public ESCO requires access to long-term financing</td>
</tr>
<tr>
<td></td>
<td>entities with repayments based on energy cost savings</td>
<td>No local, active, capable ESCOs</td>
<td></td>
<td>and procurement and financing issues, centralized implementation and procurement can lower costs, greater potential for bundling of projects and development of simple ESCOs models</td>
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<td></td>
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<td>Rigid public procurement rules make ESCO hiring difficult</td>
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<td>Credible public entity exists with demonstrated capacity to subcontract/manage</td>
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<td></td>
<td></td>
<td>subprojects</td>
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Source: Prepared by Authors based on information from World Bank 2013a and 2014a.
What are EE Revolving Funds?

A financing mechanism that has received increasing acceptance in both developed and developing countries is the establishment of special purpose funds by national or state governments for financing EE projects. There is a wide range of EE funds. In some countries, international financial institutions (IFIs) such as the World Bank or Kreditanstalt fur Wiederaufbau (KfW) have established EE revolving funds to help finance public sector projects. In other countries, national or local governments have established EE funds that provide grants or subsidies to public EE projects. The city of London has established a £100 million revolving fund (with funding from European Regional Development Fund and London Green Fund) to finance public and private sector EE projects.4 In the United States, electricity regulators at the state level have established funds using a tariff surcharge called the Public Benefit Charge (PBC) to establish funds for EE financing implementation that are partly used to provide revolving funds (as well as grants and incentives) for implementation of EE projects (Limaye 2010). This Guidance Note (GN) does not address funds that provide budgetary or donor supported grants and incentives to EE projects or specific financial assistance to EE programs. Rather, this GN addresses EE Revolving Funds (EERFs) that are designed to be sustainable through financing of EE projects and recovery of repayments from the clients.

EERFs can be established by national, state or local governments to provide long-term financing for public sector EE investments while also creating centers of expertise. Under a typical EERF targeting the public sector, loans are 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 any fees or service charges. The repayments can then be utilized to finance additional projects, thereby allowing the capital to revolve. Since both the borrower and lender are publicly owned, such funds may often offer lower cost financing with longer tenors and reduced security requirements than commercial loans. EE projects have positive financial rates of return, so capturing these cost savings and reutilizing them for new investments creates a more sustainable program than typical budget or grant-funded approaches.

By revolving the funds through repayments of principal and interest on the financed projects, such funds can help demonstrate the commercial feasibility and viability of EE projects, provide credit history for the public agencies borrowing the funds, and help build capacity among service providers such as auditors, installers, construction management firms, and energy service companies (ESCOs). Thus, the revolving fund can be helpful in providing the path towards increased commercial financing in the future as the market evolves.

Characteristics of EE Revolving Funds

Structure

The typical structure of a revolving fund is illustrated in Figure 2. An EERF is generally capitalized using a range of different sources of financing, such as concessional loan or grant funds from donor agencies, government budget allocations, special tariffs or levies on electricity sales, petroleum taxes, revenue bonds, etc. The Fund then provides financing to public agencies that is then used to finance investments in EE projects. The energy cost savings accruing from the results of the projects can then be utilized by the public agency to repay the principal and interest on the debt. The installation and other services for project implementation would generally be provided by independent energy service providers (ESPs).5 The public agency may pay the ESPs directly for the services provided.

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4 www.leef.co.uk/
5 Energy service providers may include energy service companies (ESCOs), engineering firms, installers, contractors, construction management firms, or other service providers.
The Fund is replenished by the repayments from the public agencies of principal and interest on the investment made. This allows for the funds to revolve. However, since the loan repayment periods may be long (sometimes as long as 7 to 10 years), it may be necessary to plan on periodic replenishments to operate after the initial capital has been deployed. EERFs may have equity bases to help cover some of their start-up and initial operating costs, but need to eventually cover their costs from public sector clients through principal and interest payments and fees.

**Legal Framework**

The establishment of an EERF will require legislative action. The provision for establishing a fund may be included in the general energy law or an EE law. For example, the Macedonian Energy Law authorizes the establishment of an EE Fund, which would provide financial support for the public and private sectors to implement the obligations for EE improvement (Macedonia 2011). In Serbia the establishment of an EE fund is authorized in the Law on Energy Efficiency (Serbia 2013). However, such provisions do not always imply the creation of a new, independent institution that would serve as an EERF administrator. Sometimes, such a provision only implies a line item in the budget (Serbia) or funding through an existing entity (such as existing Environmental Funds, as is the case with Bosnia & Herzegovina and Montenegro, which typically provide grants instead of loans).

If the government has decided to establish a new EERF, the secondary legislation should specify its legal organization and ownership. Options include the creation of the fund under an existing Ministry, energy agency, or development bank, creating a new legal entity (independent corporation or new statutory agency), or establishing a public-private partnership (PPP).

**Fund Management and Governance**

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

- Oversight arrangements
- Choosing the fund manager
- Monitoring and evaluation
- Reporting

**Oversight Arrangements**

The oversight arrangements vary depending on the organization of the fund, but they
typically include all relevant ministries that have some authority over EE (e.g., Finance, Construction, Economy/Energy, Environment, Urban/Regional Development). In the Bulgarian Energy Efficiency Fund (BEEF)⁶ (see all case studies in Annex A), the oversight was by a Management Board (MB) appointed by the Government of Bulgaria (see Box 1). The Renewable Resources and Energy Efficiency (R2E2) Fund in Armenia is governed by a Board of Trustees, which is appointed by the government and includes 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 7 members, of whom 5 are private sector representatives. Salix finance in the U.K. has a three-person Board with two of them from the private sector. Most of these governance arrangements are similar with representation from both the public and private sectors.

The main functions of the oversight bodies include: (i) setting the investment strategy and policy of the fund; (ii) hiring the fund management team; (iii) establishing the overall criteria for selecting projects; (iv) approving the annual business plans and budgets formulated by the management team; (v) preparing and submitting an annual financial report to the government; and (vi) assuring that the fund is operating in compliance with national EE strategy and plans.

### Box 1 - Composition of the BEEF Management Board

The Management Board (MB) is the primary governance body responsible for the overall strategic management of BEEF in compliance with its stated objectives and principles of operations. The Management board consists of 9 members:

- A representative of the Ministry of Economy, Energy and Tourism, designated by the Minister of Economy, Energy and Tourism, acting as the MB Chairman;
- A representative of the Ministry of Regional Development and Public Works, designated by the Minister;
- A representative of the Ministry of Environment and Waters, designated by the Minister;
- The Executive Director of the Sustainable Energy Development Agency;
- Five representatives elected by the General Donor's Assembly, as follows
  - a representative of non-government organizations, the activities of which are focused on reducing the risk of global climate changes;
  - two experts with higher economic education with experience in funding of projects in the area of power generation;
  - an expert in the field of EE with higher engineering education;
  - an expert in the field of renewable sources with higher engineering education;

The MB sessions are convened every month, upon formal invitation by the MB Chairman.


### Choosing the Fund Manager

Reviews of international experience with EE funds (Limaye, 2010; Limaye and Patankar, 2011) have identified a number of options for fund management. The fund management team needs to 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.

Many options are available 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, and such 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

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⁶ This fund is also known as the Energy Efficiency and Renewable Sources Fund (EERSF).
fund management team under a contract.

BEEF appointed an independent fund management team (World Bank 2010a). This team was competitively selected and included a consortium of three firms (Econoler International, EnEffect Consult and Elena Holding). In the case of the recently established Armenia R2E2 Fund (World Bank 2012), the government appointed an Executive Director and supporting financial and technical staff to manage the fund. The day-to-day activities of FREE are managed by an Executive Director (ED) appointed by the Board of Administration, supported by a small permanent staff and some short-term experts (FREE, undated). In addition, the ED engaged a Fund Manager with professional structured finance and EE expertise to manage the Fund's investment portfolio.

A public sector management team (such as in R2E2) is likely be less costly because of public salary caps, but the team may not be fully independent from political influence, and may have less incentive to perform than a private sector management team (such as in BEEF) for whom the compensation can be performance based and incentives and penalties can be imposed based on successes or failures. FREE chose a combination approach with its main management team being public sector but engaging a fund manager with incentives based on performance.

**Monitoring and Evaluation**

The progress of the fund needs to be monitored and evaluated on an ongoing basis. Monitoring is the process of routinely gathering of information on all aspects of the EERF implementation. Monitoring measures the quality and effect of the implementation process and procedures. The funding sources for an EERF (governments and/or donor agencies) need to obtain from the Board and management team periodic reports on the fund’s performance. The funding sources may define specific performance indicators and reporting periods. The Board will then have to report the fund’s performance annually as required in accordance with these indicators. The fund management team therefore needs to establish a monitoring system that will collect and report the data needed to assess these indicators. Box 2 presents the performance indicators established by FREE, which were required to be reported to the World Bank on a quarterly basis.

The fund needs to monitor and track the technical and financial status of projects. These activities need to assure that:

- Monitoring systems, appropriate for the type and scale of the projects, allow tracking both technical progress and financial status.
- The monitoring system should take into account all stages of the project and all project components (planning, implementation, outcomes and impacts, replicability, visibility etc.).
- Monitoring should include field supervision as appropriate and periodic audits as agreed.
- Periodic progress reports should form the basis for monitoring.
- Use of electronic reporting modalities is desirable.

A Project Review Committee can help appraise the progress of the project and support resolution of any problems encountered.

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7 The Consortium includes an energy efficiency consultancy (Econoler International), a Foundation (Center for Energy Efficiency EnEffect), and a non-banking financial institution (Elana Holding PLC).
Evaluation aims to determine whether project objectives set in terms of expected outputs, effects and impact are being or will be met. Evaluation is an important part of good governance and is needed to test planning assumptions, monitor overall results, compare program performance, fine-tune implementation processes, and incorporate lessons learned into improving the fund's future operations. Evaluation is performed at specific selected times (such as mid-term, interim special studies, at completion, after completion) in order to compare the fund’s achievements relative to expected performance. Evaluation includes a combination of quantitative data and qualitative information. Often the evaluation of the fund’s performance is conducted by an independent third party. Most World Bank funded projects include a mid-term and a final evaluation.

An important element of Monitoring and Evaluation is measurement and verification (M&V), which is designed at the project level to:

- Develop baseline characteristics and typical operating conditions
- Lay out a clear methodology for measuring energy savings that are acceptable to all parties
- Develop estimates of the actual energy savings, cost savings, and/or other performance characteristics of a project

M&V is an important component to establish the baseline and make any modifications needed to the baseline if operating conditions change. There are many methodologies and protocols for M&V (World Bank 2010b), ranging from simple methods such as “Deemed Savings,” where the savings are calculated using stipulated formulas, to detailed metering or simulation modeling. There is a tradeoff between the cost of the M&V and the precision of the results, and it is desirable to use a pragmatic approach that balances the M&V costs against the required accuracy and precision of the savings estimates. The most important aspect is that all parties agree to the level of detail of the M&V plans. For public agency projects involving efficient lighting, deemed savings may be adequate. However, in the

### Box 2 - Performance Indicators - Romanian Energy Efficiency Fund

**Output Indicators**
- Number of projects received by the Fund Manager (by size, type, categories of clients)
- Number of projects appraised by the Fund Manager (by size, type, categories of clients)
- Number of the loans approved (by size, categories of clients, sectors)
- Deals under preparation/under appraisal/ submitted to the Investment Committee (IC)
- Total principal, interests and fees received during the quarter
- Number of projects with first disbursement, if in trenches
- Number of projects with second disbursement, in trenches
- Total operating expenses incurred during that quarter
- Non-performing loans, comprising of number, size, repayment schedules, type and reasons for non-compliance with the terms of contract
- Co-financing including actual contributions made to the investment projects
- Technical assistance delivered in terms of amount of time spent and nature of activities
- TA provided per development phases of deals;
- Relevant news indicating factors that could affect energy prices and thus attractiveness of energy savings instruments, and any changes in the business environment that could impact project demand.

**Process Indicators:**
- Average time for deals preparation (by type of investment, categories, sectors)
- Average time elapsed from the submission (preparation) to approval, by IC
- Average time elapsed from the submission (preparation) to final approval by Board
- Average time elapsed from the approval to concluding of the loan contract;
- Average time elapsed from the approval to the first payment, if disbursement by trenches
- Number of projects rejected by the Board, by reason of rejection?
- Number of projects with delays more than 30-60 days in the repayment of the installments/interest rate/commission by, with reason for delay /clarified with the client by the Fund Manager.

Source: FREE, undated
Western Balkans, where a large portion of the energy use is for heating, simple commissioning tests may be used to determine the amount of energy needed to heat one square meter of floor space by one degree before and after the renovation.

**Reporting**

Reporting involves providing information to the appropriate organizations (in this case the funding sources), on the progress of the implementation, so that timely decisions can be taken if needed to ensure progress is maintained according to schedule and performance goals. The collected data - both quantitative and qualitative – are provided in periodic reports to assess the status and quality of project activities. For example, R2E2 provides semiannual progress reports to the World Bank. In addition to periodic monitoring reports, the Board usually provides an annual report with details on the fund’s performance during the year.

The fund management is usually required to prepare periodic reports that cover:

- Financial reporting - periodic summary (usually monthly) of transactions, receipts and disbursements by type, cash flows, outstanding balances, etc. over the reporting period
- Technical reporting
- Annual reports - Annual reporting of technical, financial and administrative results to the Board of Directors or Trustees and to the major stakeholders including the funding sources.

**Financing Windows**

An EERF should be designed to serve the needs of all public 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 or “windows.”

**Debt Financing Window**

For creditworthy municipalities with borrowing capacity and capabilities to identify, design and implement projects, the fund can offer debt financing. One of the advantages of an EERF is that, unlike commercial financing that may require equity contribution from the borrower, the EERF may provide up to 100% debt financing. Also, the fund may not require typical collateral (such as usually required from commercial borrowers) from the public agencies as they may not be legally able to pledge public assets. Instead, the EERF could implement other payment security mechanisms, such as:

- Establishing an escrow account, into which the public agency pays funds equal to the baseline energy bills, paying the reduced energy bills from this escrow account and using the remaining funds to repay the principal and interest on the invested funds. Thus, if the public agency does not keep up payments the EERF has the option to not pay the energy bills, creating a risk of energy supply disruption.
- Pledging future tax collections, revenues or transfers that will be received from the Ministry of Finance (MOF) or other sources.
- Obtaining guarantees from MOF to back up the loan repayment.

The tenor (repayment period) of the loan will be based on the type of project and the anticipated cash flows from the cost reductions resulting from energy savings - usually the repayment period will be structured in such a way that the loan repayments are less than the energy cost savings. Oftentimes, EERF tenors can be longer than typical commercial bank loans. In some cases, EERFs could be used in concert with bank loans, through co-financing schemes, to involve banking partners in the EE business.
Establishing and Operationalizing an Energy Efficiency Revolving Fund

Energy Services Window

For municipalities that lack the capacity to borrow funds or to effectively implement EE projects, an energy services agreement (ESA) can offer the client a full package of services to identify, finance, implement and monitor EE projects. The public agency is usually required to pay to the EERF all, or a portion of its baseline energy bill into an escrow account to cover the investment cost and associated fees during the contract period. Figure 3 illustrates the basic concept of a public agency’s cash flows under the ESA, with payments equal to their baseline energy bill during the contract period.

Figure 3 - Illustration of the Energy Services Agreement Model

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 into an escrow account for the duration of the ESA. 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% to €7,000 per month. The duration of the ESA is assumed to be five years. During the five year ESA period, the energy bill of €7,000 per month will be paid from the escrow amount, and the remaining €3,000 per month will be paid to the fund to recover its investment with interest and fees. During this 5 year period, the public agency will pay €10,000 per month and thereafter its energy bill will be reduced to €7,000.

In some cases, the contract duration is fixed; in other cases, the contract can be terminated after an agreed level of payments have been made to the EERF - thereby offering a greater incentive for the agency to save more energy. One of the main advantages of this approach 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 still implement EE measures. In this way, it 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 are bundled to together, providing some added leverage to the EERF to cut off the energy supply should the public agency default on its ESA repayment obligations.

Risk Guarantee Window

The EERF may also utilize the risk sharing mechanism by providing credit or risk guarantees to banks and financial institutions (FIs) in order to leverage commercial financing for EE projects. Risk sharing programs are designed primarily to address the risk perception of banks/FIs that EE projects are inherently more risky than their traditional investments, or to allow them to lend to marginally creditworthy clients with very attractive EE investment opportunities. This perception of high risk creates a major barrier to commercial financing of...
Establishing and Operationalizing an Energy Efficiency Revolving Fund

EE projects. A risk sharing program provides 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\(^8\) and may also have a “first loss reserve”\(^9\) that may be used to absorb up to a specified amount of losses before the risk sharing occurs.

The Bulgaria EE Fund provided three types of guarantees (i) credit guarantee covering up to 80% of the credit value to secure loans for EE projects, with individual guarantee commitments not to exceed BGN 800,000 (about $500,000); (ii) an uncollateralized guarantee to a portfolio of receivables of energy services companies (ESCO) for their energy performance contracts (EPCs), covering the first 5% of the delayed payments of the portfolio covered; and (iii) residential portfolio guarantee covering the first 5% of defaults within the portfolio of projects.\(^{10}\)

**Budget Capture**

The budget capture option may be utilized when the public agency receives dedicated funds from MOF or another government agency to pay its energy bills. In such cases, the EERF invests in EE projects in the public agency and the government reduces its budgetary outlays to that public agency by the amount of energy savings, thereby “capturing” the savings, and 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**

An EE revolving fund may also have a grant window where an independent sustainable financing source is available for the fund. For example, if a government (through special taxes, levies, surcharges, etc.) or a donor agency makes a commitment of continuing funding for the revolving fund over a number of years, a portion of the funding may be used for grants to public agencies to improve the economics of the EE project from the public agency perspective.

However, if a revolving fund is established to operate on a fully commercial basis, it is unlikely that it will provide grant financing except when such grants 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 or it may create false expectations for more grants, which may undermine the long-term sustainability of the fund.

**Forfeiting**

A possible service that the EERF can provide or arrange is forfeiting, or the sale of receivables. Forfeiting is useful in situations where an ESP is providing its own equity for project financing. It is a form of transfer of future receivables from one party (seller – an ESP) to another (buyer – a financial institution).\(^{11}\) An example of forfeiting is provided by the

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\(^8\) In a subordinated recovery guarantee, the guarantor ranks behind other lenders in the recovery of the guarantee funds it paid out in case the borrower defaults on the loan. A subordinated guarantee is more valuable to lenders and they can be expected to provide better loan terms (such as lower interest rates, longer tenors, etc.) if they have subordinated recovery guarantee. 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.

\(^9\) A first loss reserve pays for all the losses due to loan defaults incurred until the maximum first loss reserve amount is exhausted, and 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.

\(^{10}\) The residential portfolio guarantee was not utilized. The available funds were committed to the ESCO portfolio guarantees.

\(^{11}\) The original creditor (the ESP) cedes his claims to future revenues from the project and the new creditor (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 Euros\(^\text{12}\) from the European Bank for Reconstruction and Development (EBRD) for the purchase of receivables under the energy saving contracts signed by Enemona. Such purchase enables 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.

**Other Services**

**Technical Assistance**

An important feature of successful EERFs is the technical assistance (TA) provided. The types of TA may include:

- 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. Examples of activities include program workshops and flyers, development of a program website, development of successful case studies for broader dissemination, market studies, advertising, and educational programs for schools and other organizations.

- Development of the procedures for assisting the public agencies to engage ESPs under PPPs such as performance-based contracts; preparation of performance-based bidding documents for procurement of various elements of project implementation services; and refinement of these bidding documents based on the implementation experience to provide standard documents for future use.

- Identifying options to bundle procurements by multiple public entities implementing similar projects in order to reduce transaction costs and equipment costs through bulk purchases. Under some financing arrangements, the EERF can even conduct the preliminary audit, procure the ESP, and monitor the project on behalf of the clients.

- Identification, assessment and recommendation of changes, if needed, in public accounting, budgeting and procurement rules to facilitate the financing of EE projects and procurement of EE services. These may include policy development related to existing public procurement and budgeting rules for EE services, development of alternate financing models for EE in the public sector, etc.

- Capacity building for ESPs and other market actors to conduct energy audits, and to screen, design, evaluate, appraise, finance, implement, and measure EE investments in the public sector.

- Development/adaptation of appropriate methodologies for M&V and providing M&V training to public agency staffs, facility managers and engineers, and private sector ESPs.

- Development of 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.

- Training on post-project operations and maintenance.

Procurement of Implementation Services

Under the ESA option, the EERF can procure implementation services from private sector ESPs. The fund can engage ESPs using simple performance-based contracts. This approach can help transfer some of the project implementation risk to the private sector. Also it will help build the capacity of the ESPs and facilitate the development of an energy services market.

The EERF can utilize output-based procurement for project implementation services. Traditional procurement of services such as auditing, installation, commissioning, etc. use input-based procurement, wherein the contracts and payments to the service providers are time-based or delivery based. Output-based contracts, on the other hand, use contracts and payments to performance and/or results (such as improved equipment efficiency, energy savings, cost savings, etc.). Such contracts require clear definitions of the baseline, performance indicators, and M&V approaches.\(^{13}\)

Eligibility Criteria

The eligibility criteria used for screening to assess whether public agencies that express interest in the EERF should proceed to the preliminary audit stage may include:

A. For debt financing

- Creditworthiness of the public agency
- Existence of consumption-based payments for heating
- Good energy bill payment discipline
- Existing comfort level of at least 50\(\%\).\(^{14}\)
- Building in reasonably sound structural shape
- No current or imminent plans for closure/privatization
- Ability to retain cost savings to allow loan repayments\(^{15}\)
- Potential use of commercially available technologies
- Minimum and maximum loan amounts
- Proper project preparation and documentation.

B. For Energy Services Agreements

- Availability of historical energy bill data
- Consumption-based billing and good energy bill payment discipline
- Building in reasonably sound structural shape
- No plans for closure or for major changes planned in building operations
- Willingness and ability to sign ESA agreement spanning multiple years
- Willingness to work with the fund’s payment security mechanism

How does an EERF Address the Barriers?

\(^{13}\) An excellent discussion of output based procurement of energy services can be found in World Bank 2010c.

\(^{14}\) The "comfort level" in a building is defined as the ratio of the actual energy consumed for providing heating comfort to the amount of energy that would be needed to provide the desired or standard comfort level. If this ratio is small it is unlikely that the EE project which will be designed to provide the desired comfort level can provide cost savings.

\(^{15}\) Alternatively, existence of a payment security mechanism that will assure loan repayment.
An EERF can address some of the important barriers to scaling up EE in the public sector that were listed above. Table 3 provides a summary.

**Table 3 - Addressing the Financing and Implementation Barriers**

<table>
<thead>
<tr>
<th>BARRIER</th>
<th>HOW Addressed</th>
</tr>
</thead>
<tbody>
<tr>
<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>Restrictive budgeting and procurement regulations and procedures</td>
<td>Since the fund will most likely be considered a public entity, it can enter into loan agreements or ESAs with public agencies without facing the restrictive regulations/procedures</td>
</tr>
<tr>
<td>Low energy tariffs</td>
<td>Provide longer tenor on loans and longer terms for the ESAs to allow public agencies to repay the loans from cost savings</td>
</tr>
<tr>
<td>Norm-based billing systems for heating</td>
<td>Install heat meters in the selected buildings and measure consumption before and after implementation of the EE project</td>
</tr>
<tr>
<td>Relatively high interest rates charged by commercial banks</td>
<td>Provide lower interest rates than commercial banks and engage in ESAs</td>
</tr>
<tr>
<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>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>
<tr>
<td>Low existing comfort levels</td>
<td>Work only with agencies that meet minimum comfort level standards; provide longer tenor loans and longer term ESAs to assure desired comfort levels and yet allow the public agencies to repay the loans or pay the ESA payments</td>
</tr>
</tbody>
</table>

*Source: Prepared by authors*

**Case Studies**

Annex A provides four case studies of EE revolving funds:

- Bulgaria Energy Efficiency Fund (BEEF)
- Armenia Renewable Energy and Energy Efficiency (R2E2) Fund
- Romanian Energy Efficiency Fund (FREE)
- Salix Finance - U.K.

A summary of the key features of these funds is provided in Table 4.
### Table 4 - Summary of Selected EE Revolving Funds

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Bulgarian Energy Efficiency Fund</th>
<th>Armenia R2E2 Fund</th>
<th>Romanian Energy Efficiency Fund</th>
<th>Salix Finance (U.K.)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year Established</strong></td>
<td>2005</td>
<td>2006</td>
<td>2003</td>
<td>2004</td>
</tr>
<tr>
<td><strong>Funding Sources</strong></td>
<td>World Bank, GEF, and Governments of Austria and Bulgaria</td>
<td>World Bank</td>
<td>GEF</td>
<td>U.K. Department of Energy and Climate Change (DECC)</td>
</tr>
<tr>
<td><strong>Fund Objectives</strong></td>
<td>Support the identification, development and financing of viable EE projects, resulting in substantial reduction of GHGs</td>
<td>Decrease GHG emissions through the removal of barriers to the implementation of EE investments in the public sector</td>
<td>Assists energy users in adopting the use of modern technologies for efficient use of energy</td>
<td>Improve public sector EE and reduce GHG emissions</td>
</tr>
<tr>
<td><strong>Legal Organization</strong></td>
<td>Independent organization</td>
<td>Independent NGO</td>
<td>Independent organization</td>
<td>Independent, publicly funded company</td>
</tr>
<tr>
<td><strong>Governance</strong></td>
<td>Management Board with 9 members (4 government, 5 non-government)</td>
<td>Board of Trustees - members include government, private sector, NGOs &amp; academia</td>
<td>Board of Administration with 7 members (2 government, 5 non-government)</td>
<td>Board of Trustees</td>
</tr>
<tr>
<td><strong>Fund Management</strong></td>
<td>Private sector fund management team selected competitively</td>
<td>Fund Director, Financial Manager, Investment Coordinator, and TA Coordinator</td>
<td>Executive Director (ED) appointed by Board; Fund Manager manages investment portfolio</td>
<td>CEO appointed by the Board</td>
</tr>
<tr>
<td><strong>Main Components</strong></td>
<td>Debt Financing Facility; Partial Credit Guarantees; and TA</td>
<td>Loans, ESAs and TA</td>
<td>Debt financing and TA</td>
<td>Provide interest-free capital through Recycling Fund &amp; Energy Efficient Loan</td>
</tr>
<tr>
<td><strong>Typical Projects</strong></td>
<td>Rehabilitation of public buildings; Improvement in individual heating systems</td>
<td>Improvements in individual heating systems</td>
<td>Replacing old energy generation equipment (boilers, CHP, hydro, geothermal)</td>
<td>Insulation</td>
</tr>
<tr>
<td></td>
<td>EE in industrial processes; Rehabilitation of public buildings</td>
<td>EE in industrial processes; Rehabilitation of public buildings</td>
<td>LED lighting and controls</td>
<td></td>
</tr>
<tr>
<td></td>
<td>EE Streetlighting; EE improvement in homes and buildings</td>
<td>EE Streetlighting; EE improvement in homes and buildings</td>
<td>Modernizing process industry equipment and public lighting</td>
<td>Building energy management systems</td>
</tr>
<tr>
<td></td>
<td>Improvements in heat distribution systems; Heat metering and regulating equipment</td>
<td>Improvements in heat distribution systems; Heat metering and regulating equipment</td>
<td>Heat recovery systems</td>
<td></td>
</tr>
<tr>
<td><strong>No. of Projects</strong></td>
<td>81 loans</td>
<td>14 ESAs</td>
<td>20 loans</td>
<td>7,400 loans</td>
</tr>
<tr>
<td><strong>Loan/ESA Volume</strong></td>
<td>$16 million</td>
<td>$2.4 million</td>
<td>$11.4 million</td>
<td>£115 million</td>
</tr>
<tr>
<td><strong>Lifetime Energy Savings</strong></td>
<td>90,000 toe</td>
<td>32.3 GWh</td>
<td>36,533 toe</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Lifetime GHG Reductions</strong></td>
<td>900,000 tCO₂e</td>
<td>7,906 tCO₂e</td>
<td>183,237 tCO₂e</td>
<td>2.5 million tCO₂e</td>
</tr>
</tbody>
</table>

Source: Prepared by Authors
Operationalizing an EE Revolving Fund

The major steps in the operationalization of an EERF are summarized below. For each step the options are identified and, where appropriate, the preferred option is identified based on international experience.

- **Establish the legal framework for the fund** - The legal framework may exist in prior legislation. If not, new legislation may need to be enacted. A key decision is to agree on whether to use an existing entity or establish a new one. The options include creating the fund within an existing Ministry, energy agency, or development bank, creating a new legal entity (independent corporation, NGO or new statutory agency), or establishing a PPP. Most important is the governance structure to incentivize EERF management to perform well while still providing a public service function.

- **Develop reliable and sustainable funding sources** - It is important that the EERF be capitalized with sufficient funds from the government, donor agencies and/or other sources to initiate operations and fund a number of projects. The government may also need to assure additional funding resources once the initial funds are deployed to ensure that the EERF can continue its operation over the long-term.

- **Define the fund objectives and target markets** - An EERF cannot be expected to serve all the energy consuming sectors. The government needs to focus the initial activities on a few targeted markets. The public sector, particularly schools and hospitals, represents a good target market for the initial deployment of the fund, because these markets offer high EE potential, lack internal financial resources/access to commercial financing, and have very limited capacity to implement EE projects.

- **Develop the governance structure** - The governing body is generally a Board of Trustees (or Administrating Board) appointed by the government. The preferred approach is to include both government and non-government representatives in the Board because the private sector representatives provide knowledge and experience while helping to prevent political capture of the EERF, which helps develop a clear strategy and policy of the fund.

- **Select and recruit the fund management** - The governing board will define the fund management options (existing ministry staff, an independent fund management organization, government agency with a fund management consultant, etc.). The preferred option is to engage a professional fund management team (“fund manager”) using a competitive bidding process, because a private sector fund manager: (i) brings financial structuring experience that may be very difficult to get from government officials; (ii) can be engaged using a performance based contract that rewards success and penalizes failure; (iii) provides incentives for performance that can be a great motivator; and (iv) can be terminated and replaced if performance falls substantially short of expectations. However, a private sector fund manager is likely to result in a higher fee structure.

- **Hire the staff** - The fund manager will recruit qualified staff to the management team. It is important that the staff have relevant experience in areas such as EE project financing, energy services, investment management, credit and risk assessment, loan disbursement and recovery, etc. Some of the staff will therefore need to be recruited from the private sector. However, the management and staff must also be responsive to the public sector needs and perspectives and the public benefit role of the fund. For example, the management team needs to avoid “creamskimming” (picking only the most...
economically attractive projects), and cater to the needs of a wide range of public agencies and protect the public interest when selecting EE projects for implementation.

- **Define the major financing products** - A major focus of the fund will be on debt financing (loans) to public agencies. However, in order to serve all public agencies, some of whom may not be creditworthy or have borrowing capacity, the EERF should consider the ESA option as one of the major components. The fund may also consider, depending on the financial markets, the option of credit or risk guarantee products.

- **Develop the operational procedures** - The fund needs to develop detailed operational procedures. For example, the fund management team needs to define the application procedures and prepare related forms based on the eligibility requirements and the major program components. There is also a need to prepare an Operations Manual that documents the principles and implementation rules governing the fund’s operations. It provides guidance to all the key participants involved in fund management, project implementation, and results monitoring, thereby providing a common understanding of all operational principles and practice for all stakeholders.

- **Define TA and other service offerings** - Another very important project component is TA, which is often critical to ensuring high quality deal flow and strong portfolios. For example, the fund may conduct procurement of equipment and services for a bundle of projects (centralized procurement) for a number of agencies in order to obtain better pricing for equipment and services and reduce administration and transaction costs.

- **Define target markets and develop marketing strategy and approach** - This step will include identification of the public agencies for each of the fund components, along with eligibility criteria. Then a marketing strategy and approach should be developed for each target market. This may include collecting energy consumption data and assessing creditworthiness and borrowing capacity of specific agencies, conducting walk-through audits, etc.

- **Develop project pipeline** - Using the marketing strategy and approach, specific projects shall be identified and a project pipeline established.

- **Define the application procedures and prepare related forms** - Based on the eligibility requirements and the major components, appropriate procedures and forms are prepared. The EEF should also have an Operations Manual, which lays out the principles and implementation rules governing the fund’s operations. It provides guidance to all the key participants involved in fund management, project implementation, and results monitoring, thereby providing a common understanding of all operational principles and practice for all stakeholders.

- **Develop and document eligibility criteria** - As discussed above, the fund should develop and document the eligibility criteria for the different financing windows offered by the fund.

- **Engage private ESPs as subcontractors for delivering energy services** to build their capacity – Develop simple performance-based business models for engaging ESPs in the implementation process. Such models may include equipment leasing, supplier credits, one-year ESP contracts, etc.\(^{16}\) The fund should develop a plan to engage private sector energy service providers in the implementation process of the ESAs. In this effort, the fund should try to

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\(^{16}\) These ESP models are described in the Guidance Note on Energy Services Market Development (World Bank 2014c)
develop standardized audit templates, agreements, contracts, and M&V procedures; and also introduce performance based contracts for energy services. Participation by the ESPs in project implementation will build their capacity for undertaking future energy services projects and contribute to the development of an energy services industry.

- **Develop approaches for project aggregation to reduce transaction costs** - EE projects generally have relatively high project development and transaction costs. In the public sector there may be examples of similar projects across a number of different public agencies (for example, street lighting projects). By aggregating such projects or at least standardizing them, the fund may be able to reduce transaction costs and improve project economics.

- **Develop and document the monitoring, reporting and evaluation procedures and approaches** - As discussed earlier, monitoring, reporting and devaluation are important functions, and the fund management team has to develop the monitoring system, define the data sources and databases to be developed, and specify the evaluation procedures and protocols.

### Lessons Learned

The major lessons from the assessment of EE revolving funds are summarized below:

#### Pre-requisite market conditions

The pre-requisite market conditions for an EE revolving fund focusing on the public sector are: (i) government commitment to improving EE in public facilities; (ii) potential opportunities for improving EE; (iii) an existing demand for financing EE projects; (iv) lack of available financing for EE projects; (v) existence of a mechanism to repay the fund from the achieved savings; and (vi) energy payment discipline with consumption-based billing among public end users.

#### Fund organization structure and governance

- An EE revolving fund is best established as an independent organization (either as a corporation or an NGO).
- The fund governance is usually by a government-appointed Board of Governors or Board of Trustees comprising of both public sector and private sector members.
- The governing board and the management team need to provide a balance between public interest (since the fund will be targeting public agencies) as well as private sector perspectives regarding financial structuring of projects, risk assessment, and market development.

#### Sustainability

In order for the EERF to be sustainable, it needs a reliable and continuing funding source(s). Once the Fund deploys its initial capital, the replenishment of that capital through loan repayments will take a number of years (sometimes as long as 5 to 7 years or more). Therefore the Fund needs to have access to financing sources to enable it to continue operations and finance additional projects.

In Bulgaria, the government initially demonstrated its strong commitment at the project’s outset by contributing significant budget funds for setting up BEEF. However, the government’s involvement was reduced gradually so that by the end of the project there was a lack of ownership and it did not assist BEEF in its efforts to increase its capital base (World Bank 2010a). Sustaining political commitment across administrations can be a big challenge, and therefore public campaigns, involving local politicians in building commissioning, satisfaction surveys, etc. can help build broad support.
Selection of fund manager (and related compensation structure and incentives)

- There are many options for selecting a fund management organization. These include including an independent, newly created organization; an existing non-independent public agency; a national development bank, a utility, or other public enterprise.

- If the fund manager is a public official (such as in Romania), it is likely that the Fund will be responsive to the public interest need, but there will be limited incentives to take risks and be innovative. The World Bank review of the performance of FREE concluded that the Fund Manager contract structure should have been weighted more towards performance instead of retainer (World Bank 2009).

- If the fund manager is a private organization or private consortium (such as in Bulgaria), the management team is likely to be more expensive but also more innovative and responsive to market needs. However, in smaller countries and markets, it may be difficult to recruit the talent needed for effective management and administration of the Fund.

- The fund manager may be a competitively selected professional organization or consortium, an individual financial consultant, or a public sector employee dedicated or seconded to the fund. The selection of a professional organization or individual, with performance-based incentive compensation is likely lead to successful performance of the fund.

Road Map for establishing an EE Revolving fund

The major steps in establishing an EE revolving fund are shown in Figure 6:

**Figure 6 - Road Map for Establishing a Revolving EE Fund**

- Obtain government commitment, adopt legislative initiative, and establish legal framework for the EERF
- Develop a reliable and sustainable funding source
- Define fund objectives and target markets
- Establish the governance structure for the fund
- Select the Fund Manager (or Management Team) and appoint key staff
- Define the financing mechanisms to be deployed, including TA and other services
- Identify target markets and develop marketing strategy and approach; develop a project pipeline
- Define the operating rules and procedures and the application forms. Prepare the Operations Manual
- Identify and document eligibility criteria
- Develop simple performance-based business models and engage private ESPs to provide a range of implementation services
- Develop approaches for project aggregation to reduce transaction costs
- Define the monitoring, reporting and evaluation procedures
References


ANNEX A - CASE STUDIES OF EE REVOLVING FUNDS
Case Study 1 - Bulgaria Energy Efficiency Fund

Introduction

The Bulgarian Energy Efficiency Fund (BEEF)\(^{17}\) was established under the Energy Efficiency Act of 2004. The Fund is designed as a revolving facility to create broad-based, sustainable commercial financing for EE projects. Its main objective is to support the identification, development and financing of viable EE projects, resulting in substantial reduction of greenhouse gases (GHGs). BEEF operates as an independent, not-for-profit organization, managed by a professional Fund Manager, and income from fees charged to the clients of the fund covers the operating costs and losses from defaults.

BEEF was capitalized with $10 million of GEF funding which was designed to support the establishment and operation of BEEF as a commercially oriented public-private finance facility. GEF funds were used to provide seed capital for BEEF and cover set-up and operating costs until BEEF reached financial self-sufficiency; and also to partially cover initial costs of EE capacity building. Additional financing was secured from the Bulgarian Government ($1.8 million), and the Austrian Government provided an additional $2.0 million.

Management and Governance

There are three entities that manage and govern the Fund. The Donors' Assembly (DA) consists of representatives of the donors. It convenes at regular sessions every two years and reviews and modifies (as needed) the regulations for the operation and organization of the Fund's activities.

The Management Board (MB) is the primary governance body responsible for the overall strategic management of the Fund. The composition of the MB was summarized in Box 1 above. The MB sessions are convened every month.

The Fund Manager (FM) is responsible for the day-to-day operation of the Fund. The objective of the FM\(^{18}\) is to operate the Fund as a profit-oriented business that promotes EE investments and helps the development of a sustainable EE market in Bulgaria. The FM selects and applies the appropriate financing tools based on specific project circumstances and overall project portfolio management considerations.

The compensation of the FM includes a combination of a fixed fee and a success fee which is based on the number of signed contracts and the investment volume of the projects. The fixed fee is about 30% of the total compensation; the remaining 70% of the payments is success fee. The payment based on the number of signed contracts is about 54% of the total amount of the success fee. The remaining part is based on the project volume.

Main Components

BEEF had three main components:

1. **Loan Financing Facility** to co-finance bankable EE projects on a commercial lending basis using a Loan Account

2. **Partial Credit Guarantees (PCG)** to share in the credit risk of EE finance transactions and to improve loan terms for project sponsors.

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\(^{17}\) This Fund is now known as the Energy Efficiency and Renewable Sources Fund (EERSF).

\(^{18}\) As indicated earlier the FM is a Consortium of Econoler International, the Center for Energy Efficiency (EnEffect), and Elana Holding PLC.
3. **Technical Assistance (TA)** to finance on a grant basis a portion of EE project development, capacity building, information barrier removal, and administration costs.

**Funding**

GEF provided grant financing of US$10 million for (i) providing seed capital for BEEF; (ii) defraying the initial set-up and operating costs until BEEF reached financial self-sufficiency; and (iii) partially defray initial costs of EE capacity building (project development, financial packaging, etc.).

The indicative GEF amount for the Loan Account was $4.0 million, and was expected to trigger investments of US$16.34 million. The GEF allocation for the Technical Assistance was US$1.5 million. Additional funding of $1.8 million was provided by the Government of Bulgaria. Also, the Austrian Government contributed $2.0 million to the Fund.

**Projects**

BEEF has both technical project development and financial structuring capability and is designed to be flexible, offering financial products for the evolving EE finance market. The types of projects financed by the Fund include:

- Investments in improved EE in industrial processes
- Rehabilitation of industrial, commercial, multifamily residential, single family residential and municipal buildings, health care facilities, schools, universities and cultural facilities.
- Improvements to the heat source and distribution system, including, but not limited to:
  - EE street lighting;
  - Other energy end-use applications, including off grid renewable energy generation

**Eligibility Criteria**

The main eligibility criteria for project financing included:

- The project should involve the application of well-proven technology.
- The project cost should range between €15,000 and €1,500,000
- Minimum equity of 10% under co-financing and 25% for stand-alone financing
- Payback time of up to five years
- Required collateral - mortgage, pledges under Special Pledges Act, claims on accounts and commercial contracts, financial risk insurance, bank guarantees, etc.

**Implementation Results**

By the end of the World Bank project in March 2010, BEEF had:

- Awarded 81 loans (with another 4-5 loans being in the process of final approval). The total loan volume was $16 million, and the total investment financed by these loans was $24 million.
- The lifetime energy savings from these loans were 0.09 mtoe, and the GHG-savings at 0.9 mtCO₂e.
- The average simple payback period was 4.7 years. The typical loan size was $250,000-$500,000.
- Contributed to EE financing for public sector projects in local municipal governments and other public institutions for which commercial banks were unwilling to finance.
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- Contributed, along with a number of other initiatives by EBRD and others, to an increase in the number of ESCOs from 14 to 38 and the number of banks extending loans to EE projects from 2 to 13.

Case Study 2 - Armenia Renewable Resources and Energy Efficiency Fund

Introduction
The Renewable Resources and Energy Efficiency (R2E2) Fund was established in 2005 initially as a PIU for a World Bank supported EE/renewable energy (RE) project (World Bank 2012b). The Fund was established by Government of Armenia as an independent NGO following the provisions of Armenia's “Law on Energy Efficiency and Renewable Energy” and started its operation in 2006. The overall objective of the Fund is to reduce energy consumption of social and other public facilities. The global environmental objective is to decrease greenhouse gas emissions through the removal of barriers to the implementation of EE investments in the public sector.

Management and Governance
The primary governing body of the R2E2 Fund is the Board of Trustees, which includes representatives from the government, private sector, NGOs and academia. The Board of Trustees has the ultimate authority and responsibility for the overall management of the Fund in accordance with the objectives and operational principles as defined in the Fund Charter. The Board also establishes the strategy and operating rules of the Fund, appoints the top management, and approves the budget and specific investments.

The day to day activities of the Fund are managed by the Fund Director, who is appointed by the Board. Other key management include the Financial Manager, Investment Coordinator, and Technical Assistance Coordinator.

The organization chart of R2E2 is shown in Figure 4.

Figure 4 - Organization Chart - R2E2 Fund

Source: http://r2e2.am/en/about-us/

Main Components
The Fund is currently implementing a World Bank/GEF-supported project that provides EE services in public sector facilities, including EE investments in schools, hospitals,
administration buildings and street lighting using a revolving fund scheme. The Fund offers two financing products to eligible public entities:

- For municipalities and public entities with revenue streams independent of the state budget, loans are provided. These loans do count as municipal debt, with fixed repayment obligations to be made within their budget provisions in future years. The amounts of the repayments are designed to allow clients to repay the investment costs and service fees from the estimated energy cost savings.

- For schools and other public entities that are not legally or budget independent, ESAs are used. Under the ESA, a public entity pays the Fund its baseline energy costs (with adjustments for energy prices, usage, and other factors) over the contract period. The Fund designs the project, hires subcontractors, oversees construction and commissioning, and monitors the project. In this case, there is no loan or debt incurred by the client entity. The Fund directly pays the energy bills to the utility on the client’s behalf, and retains the balance to cover its investment cost and service fee.

R2E2 uses simplified performance contracts to shift some performance risks to private construction firms/contractors and to support the build-up of an ESCO industry in Armenia. Under these contracts, firms are selected based on the net present value of the projects they propose, and a portion of their final payment (around 30%) is based on a commissioning test.

**Funding**

The initial funding is $8.7 million for investments in public facilities and $1.96 million for TA.

**Projects**

By January 2014, the Fund had commissioned 19 projects for public clients. The Fund has strengthened its implementation capacity by hiring EE, institutional and procurement consultants, and initiated a marketing campaign to increase the demand for investment funds from prospective public clients and build the 2014 pipeline.

**Eligibility Criteria**

The R2E2 Fund addresses financially viable projects in public facilities. The selection criteria include:

- Confirmation of public ownership of facility
- Structural soundness of the facility (absence of major structural damages that may jeopardize integral stability of the building)
- Absence of plans for closure, downsizing or privatization of the facility
- Comfort level of more than 50 percent.

A secondary set of eligibility criteria, which will be based on due diligence by the R2E2 Fund, include:

- Minimum of 20 percent energy savings
- Less than 10-year simple payback period for EE investments
- Project investment should be at least US$50,000 and not more than US$500,000
- Borrowers should be in good financial standing and demonstrate payment discipline.

**Implementation Results**

The total estimated cost of the 19 projects is US$2.35 million (World Bank 2014b).
Assuming a 20-year useful life of the project investments, the estimated lifetime energy savings are 32.3 GWh and GHG reductions are 7,930 tons of CO$_2$e.

Case Study 3 - Romanian Energy Efficiency Fund

Introduction

The Romanian Energy Efficiency Fund (FREE) is an independent fund providing commercial financing for EE investment projects. The Fund assists energy users in adopting the use of modern technologies for efficient use of energy. FREE was established under the Government Emergency Ordinance no. 124/2001 regarding the establishment, organization and operation of the FREE. The legal framework for FREE was adopted at the end of 2001 and the Fund started operations in June 2003 with a grant of $10 million from the GEF, with the World Bank as the grant implementing agency. The main objectives of the Fund are to enable companies in the industrial sector and other energy consumers to adopt and utilize energy-efficient technologies, financed under commercial criteria by FREE and co-financiers.

Management and Governance

The governance of the Fund is by the Board of Administration which consists of 7 members, representing the public and private sector, with one each from the Ministry of Industry and Resources and the Ministry of Water and Environmental Protection, and 5 representatives of the private sector, of whom minimum 2 members are financial experts. The Board appointed an investment committee that included several financial experts, with training and experience in credit analysis, in order to conduct the final check-up of the investment proposals.

The day-to-day activities of the Fund are managed by the Executive Director (ED) appointed by the Board using a competitive process, with criteria regarding professional training and experience as required by the nature of the Fund’s activity and as agreed with the World Bank. The ED is supported by a small permanent staff and short-term personnel and external professionals such as lawyers, auditors, technicians, environmental experts, and other experts. The Finance and Administration function of FREE is ensured by a highly qualified Financial Controller who has the overall responsibility for all financial management functions.

The ED has appointed a Fund Manager to manage the Fund's investment portfolio. The Fund Manager provides professional structured finance experience and EE expertise to develop and finance commercially viable EE investments which can provide sustainable and increasing reductions in GHG emissions in Romania. The FM is responsible for the investment aspects of the Fund and is expected to establish a portfolio of projects that allows the Fund to become self-financing within a period of three or a maximum of four years.

The Fund Manager's compensation includes a base fee plus a performance-based incentive based on the number of new loans and the loan repayment performance, plus a deal origination fee paid by the borrowers. In addition, the Fund Manager received a success fee calculated as a percentage of the increase in the net asset value of the Fund at the end of five years. The organization chart of FREE is shown in Figure 5.

Funding

The initial GEF Grant funding for FREE was $10 million, of which $8 million was for loan financing and $2 million for technical assistance.

Projects

During the five year implementation period of the GEF grant, FREE disbursed over US$9.73 million from the GEF grant, including 100 percent of the US$8 million GEF allocation for investment financing. FREE also used a part of the repayments in the revolving fund for additional loan commitments. All loans were being repaid punctually, without any late
Sixteen projects were completed, of which twelve were in the private sector, representing 83 percent of loan value and 93 percent of overall investment facilitated by FREE; the balance was in the public sector. The major technologies included replacing old energy generation equipment (boilers, CHP, hydro, geothermal) and modernizing process industry equipment and public lighting (4 projects).

Figure 5 - Organization Chart - Romanian Energy Efficiency Fund


Eligibility Criteria

The major project eligibility criteria included:

- Relatively short payback time (generally under three to four years);
- Project investment to be in the range of US$ 50,000 to $800,000;
- At least 50% of each project’s benefits must be from energy savings (process or capacity improvements that have ancillary energy savings benefits are not eligible);
- The technology must be well proven in the proposed application to avoid all technological risk.

The main EE technologies that meet these criteria are burners and boilers, variable speed drives, condensers for power factor improvement, compressors, controls, steam traps.

Implementation Results

During the five year implementation period of the GEF grant, FREE signed 20 loan contracts of which 18 proceeded to implementation with a commitment of US$11.4 million from the fund, for a total investment of US$34.19 million. Three commercial banks offered a total of US$18.2 million for four large projects.

By the end of 2008, 16 projects had been completed. The estimated energy savings were
36,533 toe (tons of oil equivalent) from the completed projects. These resulted in annual CO2 savings of 183,237 tons. The GHG reductions resulting from these 16 completed projects cumulated over their lifetime were estimated to be 2.18 million tons of CO2e.

Case Study 4 - Salix Finance

Introduction
Salix Finance Limited was established in 2004 in the U.K. as an independent, publicly funded organization, dedicated to providing the public sector with loans for EE projects to reduce their energy consumption and costs by replacing dated, inefficient technologies with modern, energy efficient technologies. Salix Finance operates in England, Scotland, Wales and Northern Ireland.

Salix is the Fund manager for funds provided by the U.K. Department of Energy and Climate Change (DECC) and delivers 100% interest-free capital to the public sector to improve their EE and reduce their carbon emissions. The administrative costs of the organization are paid by DECC.

Management and Governance
Salix Finance is a public limited company owned by the government. The governing body is the Board of Directors, whose Chairperson is appointed by the DECC and includes two other private sector members appointed by the chairperson and the company’s CEO.

Main Components
There are two types of Salix funding programs available.

The first program is the Recycling Fund that provides long term interest free funding to Local Authorities, Emergency Services, Universities and Hospital Trusts. These loan funds are managed by the public sector organizations who also provide matching funds. The loans are provided for specific EE projects and are repaid into the fund from the financial savings delivered by the projects – this allows the fund to be continually used for EE projects, hence the term "Recycling Fund". At the same time the public agencies continue to benefit from the savings that accumulate once the project has been fully repaid.

The second is the Salix Energy Efficient Loans Scheme - as an example: a school borrows £10,000 to put in new lighting and a new boiler which will save the school £2,000 per annum from reduced gas and electricity usage. For the first five years these savings are used to pay back the interest-free loan. Once the loan is repaid, the continued savings enable the school to use the capital for other budgets, such as the purchase of equipment.

Salix also facilitates knowledge sharing through quarterly regional meetings, technical workshops and project case studies. There is an extensive knowledge and enthusiasm for EE within the public sector, and enabling the sharing of this knowledge between organizations helps support our clients in delivering long term, cost effective savings.

Funding
Salix Finance Ltd is an independent, not for profit company mainly funded by the U.K. DECC, with some funding also provided by the Welsh Assembly Government, and the Scottish Government. Salix also works in partnership with The Higher Education Funding Council for England on its Revolving Green Fund.

Salix was established by the UK Department of Environment, Food and Rural Affairs (DEFRA), the predecessor to DECC, in 2004 to ensure that the public sector in the UK has

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access to interest free capital loans to increase EE. Since 2004 DECC has provided a total of £148m to Salix for the funding of EE loans and for the funding of its operations.

Projects

The Recycling Fund of Salix has financed a large number of public sector projects:

- Salix currently has 138 Recycling Fund partner organizations, including local authorities, higher education institutions, emergency services, and the National Health Service (NHS).
- The fund has financed over 7,400 projects, worth more than £115 million, and is expected to deliver over £456 million of financial savings and over 2.5 million tons of carbon dioxide over the lifetime of the projects.
- On average, projects have realized a payback of 3.5 years.
- The size of an individual Recycling Fund ranges from £100,000 to £1 million. A typical fund size would be £500,000. with Salix providing £250,000 with and the client match funding the other half.

Eligibility Criteria

Over 120 technology types are supported by the funding programs, some of which include building energy management systems, cavity wall insulation, combined heat and power systems, evaporative cooling, heat recovery systems, LED lighting, lighting controls, loft insulation, pipe insulation, server virtualization, T5 lighting and variable speed drives.

Salix funding includes all public sector organizations and across their whole estates, including schools, higher and further educational institutions, emergency services, hospitals, leisure centers, local authorities, prisons and the NHS. There has been a focus to commit more resources to increasing EE and driving down energy costs, which Salix aim to address and assist the public sector in doing.

Implementation Results

The results to date (including both the Recycling Fund and the Energy Efficient Loans) are:

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of projects funded</td>
<td>11,449</td>
</tr>
<tr>
<td>Value of projects funded</td>
<td>£273 million</td>
</tr>
<tr>
<td>Value of lifetime financial savings</td>
<td>£1,019 million</td>
</tr>
<tr>
<td>Lifetime carbon savings</td>
<td>5,750,877 tons of CO₂</td>
</tr>
</tbody>
</table>