



The Greening of Macedonia's Public Buildings

# Financing Options for the National Program for Energy Efficiency in Public Buildings (NPEEPB) in the Former Yugoslav Republic of Macedonia, 2012–18



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## ABBREVIATIONS AND ACRONYMS

AC	Automatic control
BOD	Board of directors
CDM	Clean development mechanism
CO <sub>2</sub>	Carbon dioxide
DSM	Demand-side management
DCA	Development credit authority
EBRD	European Bank for Reconstruction and Development
EE	Energy efficiency
EIB	European Investment Bank
ENSI	Energy Saving International, AS
EOI	Expression of interest
ESPC	Energy saving performance contract
ESA	Energy service agreement
ESCO	Energy service company
ESD	Energy services directive
EU	European Union
FEEI	Financing energy efficiency investment
FI	Financial institution
FYR	Former Yugoslav Republic
GEF	Global Environment Facility
GHG	Greenhouse gas
GOM	Government of FYR Macedonia
IFC	International Finance Corporation
IFI	International financial institution
IPA	Instrument for pre-accession assistance
IPMVP	International Performance Measurement and Verification Protocol
KfW	Kreditanstalt für Wiederaufbau (German Development Bank)
ktoe	Thousand tons of oil equivalent
kWh	Kilowatt-hour
m <sup>2</sup>	Square meter
MBDP	Macedonian Bank for Development Promotion
MEEF	Macedonia Energy Efficiency Fund
MEEIP	Municipal Energy Efficiency Improvement Project



<b>MIDF</b>	Municipal Infrastructure Development Fund (EBRD/KfW)
<b>MOE</b>	Ministry of Economy
<b>MOF</b>	Ministry of Finance
<b>MSIP</b>	Municipal Services Improvement Program
<b>M&amp;V</b>	Measurement and verification
<b>MWh</b>	Megawatt-hour
<b>NEEAP</b>	National Energy Efficiency Action Plan
<b>NGO</b>	Nongovernmental organization
<b>NPV</b>	Net present value
<b>NPEEPB</b>	National Program for Energy Efficiency in Public Buildings
<b>OM</b>	Operational manual
<b>O&amp;M</b>	Operations and maintenance
<b>PMU</b>	Project Management Unit
<b>PPP</b>	Public-private partnership
<b>SMEs</b>	Small and medium enterprises
<b>TA</b>	Technical assistance
<b>toe</b>	Tons of oil equivalent
<b>TOR</b>	Terms of reference
<b>UNDP</b>	United Nations Development Programme
<b>UNECE</b>	United Nations Economic Commission for Europe
<b>UNFCCC</b>	United Nations Framework Convention for Climate Change
<b>USAID</b>	United States Agency for International Development
<b>VAT</b>	Value added tax
<b>WeBSEFF</b>	Western Balkans Sustainable Energy Finance Facility
<b>ZELS</b>	Association of the Units of Local Self Government

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# Executive Summary

## BACKGROUND AND RATIONALE

The Government of the Former Yugoslav Republic of Macedonia (hereinafter referred to as the Government of Macedonia, or GOM) plans to launch a National Program for Energy Efficiency in Public Buildings (NPEEPB) to achieve energy efficiency (EE) improvements in the buildings sector and meet the strategic targets outlined in the National Energy Efficiency Strategy (GOM 2010c) and National Energy Efficiency Action Plan (GOM 2010b). The national EE target is a 9 percent reduction in final energy consumption by 2018, compared to the average energy consumption of 2002–06. The NPEEPB, coordinated by the Ministry of Economy (MOE), aims to retrofit existing public buildings with EE measures. Its targets are buildings that are used for administrative and other activities of public interest and that are fully owned by government institutions or municipalities. The NPEEPB target for energy savings in public buildings is 13.6 ktoe<sup>1</sup>/year, which is about 56 percent of the national EE target for the commercial and service sectors.

Public buildings in the Former Yugoslav Republic of Macedonia (FYR Macedonia) are major purchasers of energy services and energy-using equipment. Improving EE in these buildings is important to reduce the waste of public resources resulting from inefficient energy use, provide the users of public facilities an opportunity to learn about and practice EE, demonstrate that the government is “leading by example,” and help develop mechanisms and institutions to leverage market transformation. The MOE has completed an assessment of the technical potential for EE in public buildings (ENSI 2012) and identified some potential options for financing the implementation of EE measures. This report has been prepared under the World Bank Institute (WBI) regional capacity-building program to provide information to government stakeholders on EE financing and implementation issues. It focuses on identifying financing mechanisms that are considered the best fit with the existing institutional environment to achieve the goals of the NPEEPB, then describes the implementation of these mechanisms in detail. The findings were discussed during a consultation process in which the views and feedback of various stakeholders were shared. The process served as a means to build coalition among these stakeholders and to advance the agenda of EE in the building sector. A regional experience-sharing workshop is being planned, where these findings will be shared with other countries from southeast Europe.

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1 Thousand tons of oil equivalent.

## OBJECTIVES

The principal objective of this report is to assess various financing mechanisms for implementing EE measures in public buildings to contribute to the achievement of the goals of the NPEEPB, and to recommend the most appropriate mechanisms and the related implementation plans.

## OVERVIEW OF THE PUBLIC BUILDINGS MARKET

The NPEEPB will include all public buildings in Macedonia and will be implemented in two phases. Phase 1 (2012–18) includes public buildings that are under the jurisdiction of the Ministry of Health, Ministry of Education and Science, Ministry of Local Self-Government, Ministry of Labor and Social Policy, MOE, Ministry of Environment and Physical Planning, Ministry of Transport and Communications, and Ministry of Finance (MOF), as well as the municipal administrative buildings in all 84 municipalities and the city of Skopje. These buildings are classified into five types: health care, education, social care, municipal administration, and state administration.

**Table ES.1. Summary of Public Buildings Market**

Sector	Heated Floor Area	Total Energy Consumption	Specific energy consumption	Total Energy Cost	Specific energy cost	Potential Energy Savings	Potential Cost Savings	Investment Needed	Payback Period
Units	m <sup>2</sup>	MWh/year	Kwh/m <sup>2</sup>	000€/year	€/m <sup>2</sup>	MWh	Million €	Million €	Years
Health	487,967	136,219	283	11,965	24.5	45,399	3.6	25.0	6.9
Education	1,464,735	270,244	202	23,544	16.1	88,259.0	7.8	54.9	7.0
Social care	220,459	48,547	229	4,809	21.8	17,587.0	1.9	10.3	5.5
Municipal Admin.	75,420	16,594	241	1,593	21.1	5,317.0	0.5	3.9	8.0
State Admin.	17,363	3,710	214	481	27.7	1,356.0	0.2	1.2	6.9
<b>Total</b>	<b>2,265,944</b>	<b>475,314</b>	<b>210</b>	<b>42,392</b>	<b>18.7</b>	<b>157,918.0</b>	<b>14.0</b>	<b>95.3</b>	<b>6.8</b>

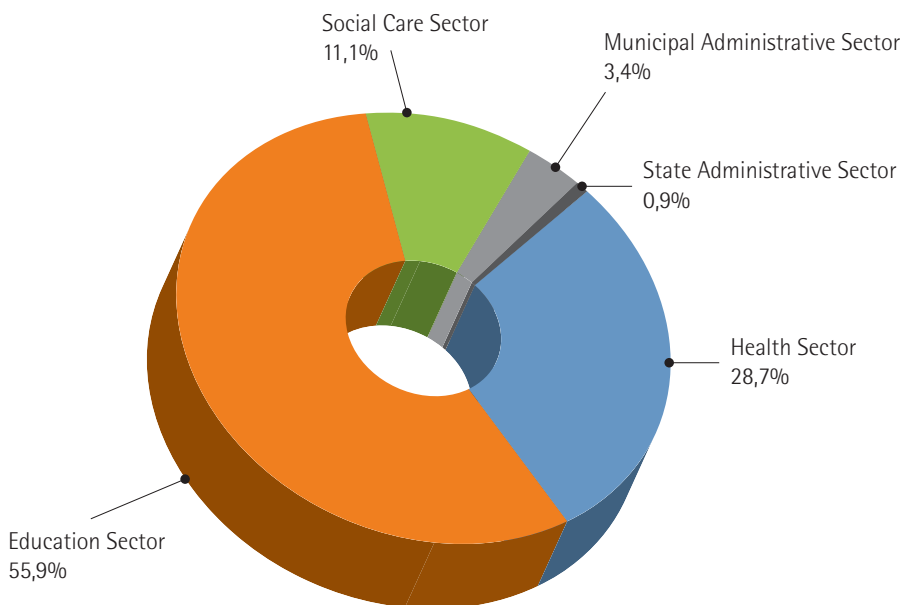
Source: ENSI 2012.

Note: kWh = kilowatt-hour; MWh = megawatt-hour.

The public buildings of these five types number 2,441; they have a total heated floor area of 2.27 million square meters (m<sup>2</sup>) (ENSI 2012). The education sector is by far the largest, with 1,515 buildings (62 percent of the total) and a 1.46 million m<sup>2</sup> heated floor area (65 percent of the total). The next largest is the health sector, with about 20 percent of the buildings and 21 percent of the heated floor area. The social care sector has about 10 percent of the buildings and heated area. Municipal and state administrative sectors have very small shares of public building stock, both in number of buildings and floor area (see table ES.1).

The total baseline energy consumption of the buildings in the five sectors was estimated at about 475,314 megawatt-hours (MWh) or 40.869 toe. This represents about 20 percent of the energy consumption in the commercial and services sector in Macedonia. The average specific energy consumption across all building types is 214 kilowatt-hours (kWh)/m<sup>2</sup> and the average energy cost is €18.7/m<sup>2</sup>. The major energy-saving measures identified in the study, prepared by Energy Saving International AS (ENSI), include thermal insulation of walls, roofs, and floors; replacement of windows and doors; installation of control systems; replacement of boilers, stoves, radiators, and pumps; and improvement of lighting systems. The application of all cost-effective measures can reduce energy consumption by 157,918 MWh (about 33.2 percent) and annual energy costs by €14.0 million. In addition, the reduced energy consumption would result in reducing greenhouse

**Figure ES.1. Estimated Shares of Energy Savings by Sector, Moderate Scenario**



Source: ENSI 2012.

gas (GHG) emissions by 39,000 tons CO<sub>2</sub>/year. The total investment needed is €95.2 million, with an estimated overall payback period of 6.8 years. Figure ES.1 illustrates the estimated shares of energy savings by sector under a moderate investment scenario.

## BARRIERS TO ENERGY EFFICIENCY

EE programs in public institutions are difficult to implement due to a number of barriers that have slowed down EE improvements in other sectors of the economy, such as lack of information on EE potential and benefits, lack of trained personnel, lack of incentives, high transaction costs, and scarcity of budgetary resources or external financing. In addition, several barriers specific to the public sector further hold back sustained improvements in EE in this sector. In Macedonia these barriers include the following:

- Public accounting, budgeting, and procurement rules that prevent public institutions from retaining the energy cost savings resulting from EE measures, and make it difficult to implement such measures.
- Financing restrictions that have put considerable fiscal pressure on the availability of budget funds for investment in EE improvements.
- Limited borrowing capacity of municipalities, due in part to incomplete decentralization.
- Limited willingness of municipalities to borrow from commercial banks, due to prevailing high interest rates, MOF restrictions on debt, onerous applications and reporting documentation, and so on.
- Limited interest of commercial banks in lending to the public sector, due to concerns over creditworthiness, insufficient available collateral, limited local revenue streams, and so on.
- Limited institutional capacity of government institutions, municipalities, and the private sector to identify and implement EE measures.
- Limited technical capacity in the public and private sectors to prepare bankable EE project proposals.

## FINANCING OPTIONS FOR ENERGY EFFICIENCY IN THE PUBLIC SECTOR

International experience with EE programs in the public sector indicates that a wide range of financing options have been implemented in various countries (Singh and others 2010). These include:

- Grant financing using government budget or external donor funds.
- Budget capture — financing by the MOF or parent budgeting agency, with repayments in the form of reduced future budgetary outlays.
- Establishment of an EE fund.
- Establishment of an EE credit line through an existing financial institution, such as a development or commercial bank.
- Creation of a risk-sharing facility, such as a partial credit guarantee program to cover commercial loans.
- Commercial financing from existing banks and financial institutions.
- Commercial financing using energy service companies (ESCOs) using an energy saving performance contracting (ESPC) approach.

While most of these options have been used in southeast Europe, an assessment of the current market and regulatory conditions conducted in this report indicates that some of them are unsuitable or impractical in Macedonia. For example, municipalities are still very reluctant to use debt financing for infrastructure projects, particularly at market interest rates. Therefore only very few have accessed commercial financing, including the risk guarantee program piloted by USAID using its Development Credit Authority (DCA). Some have operated concurrently, resulting in borrowers selecting the program with the more advantageous terms, thereby partially undermining those with a more commercial approach. ESCO financing is currently not an option because ESCOs do not yet operate in Macedonia, and new ones would be unlikely to take on municipal credit risk. Government grants for EE improvement are unavailable in the current environment of fiscal austerity. These considerations limit the choice of financing options.



## FINANCING OPTIONS PROPOSED FOR IMPLEMENTATION OF THE NPEEPB

This report analyzes the range of financing options, assesses those most suitable to the local context, and presents the three most appropriate options: (i) an independent, full-service EE fund; (ii) a dedicated EE credit line; and (iii) a municipal EE improvement program.

### **Independent, Full-Service Energy Efficiency Fund**

An independent, full-service EE fund would provide financing and associated services to all public sector entities on a commercial basis. The fund would be established as an independent, nongovernmental entity managed by a competitively selected, professional fund management company (referred to hereafter as a fund manager) that could be a consortium consisting of a local or international bank and entities with technical and financial expertise, or an existing foreign or Macedonian entity, such as a commercial bank operating in Macedonia. It would be staffed with a managing director and staff with technical, financial/credit, transaction, procurement, and outreach expertise. The fund manager would report to a board of directors chaired by the MOF (or designate) and comprised of representatives of the public and private sectors.

The mission of the fund would be to finance EE projects implemented by municipalities and other public sector entities that would use the energy cost savings resulting from the EE project to repay the financing costs. The repayments would be used by the fund to finance additional projects, thereby making it a revolving fund. If successful, the fund could be expanded to other underserved EE markets, such as the residential sector, in the future.

The fund would offer two financial products, targeted at two different types of public sector clients:

- For municipalities and public entities with revenue streams independent of the state budget that have demonstrated financial discipline and adequate administrative and institutional capacity for project implementation, the fund would provide loan financing for EE projects. These loans would be treated as municipal debt, with fixed repayment obligations to be made within their budget provisions in future years. The fund may also provide certain additional services with associated fees, such as contracting and overseeing energy audits, developing bidding documents for services related to project implementation, carrying out the procurement of design and works on behalf of municipalities, overseeing construction and commissioning, paying the contractors for services provided (from the proceeds of the loan), and monitoring the projects.

- For public sector entities without their own budgets or capacity to implement projects, the fund would offer comprehensive **energy service agreements** (ESAs) under which the fund would provide turnkey services, performing as an energy service provider and undertaking all of the actions needed to identify and implement the EE project. The ESA would obligate the public sector entity to pay fixed payments equal to 95–100 percent of the baseline energy costs (adjusted based on energy prices, changes in comfort levels, and weather variability) to the fund during the life of the agreement. These payments would be used by the fund to pay for all energy bills of the facility and reimburse the fund for the investment cost and service fee. In this way, EE projects could be financed without the public sector entity having to take on debt on its books. To reduce risk to the fund, it would retain the option to adjust the length of the contract, extending it to ensure full cost recovery or reducing it to avoid excessive profits.

### **Energy Efficiency Credit Line**

Under this financing mechanism, a dedicated credit line or lending window would be established through an existing financial institution (FI), such as a local bank, to finance public sector EE projects. The FI, which may be selected competitively, would establish a program management unit (PMU), with a managing director and several staff, reporting to the FI's executive management, and would identify, appraise, and select projects for which funds would be on-lent from the credit line.

The clients for the credit line would be municipalities and other public entities that can demonstrate creditworthiness and are able and willing to borrow. Procurement and implementation would be done by municipalities themselves, perhaps with the help of a procurement agent. The PMU would be responsible for marketing, review of applications, loan appraisals, portfolio management, monitoring and reporting, and so on.

### **Municipal Energy Efficiency Improvement Program (MEEIP)**

Under this option funding would be provided by the MOF from budget resources, or by international financial institutions (IFIs) and/or other donors through the MOF, to on-lend to creditworthy municipalities and public sector entities for EE projects, analogous to the current World Bank-funded Municipal Sector Improvement Project (MSIP). The borrowers would pay back the loans from the energy cost savings of the implemented EE projects. The repayments would be carried out through the "budget capture" approach, in the form of lowered outlays to the borrowers in future years. The MEEIP would be implemented by a PMU within the MOF. For public sector entities without their own budgets or

capacity to implement projects, a financing approach may be developed during preparation of the project that could allow the borrowers to repay the loan from the energy savings generated by the EE project.

The PMU would be responsible for marketing, review of applications, monitoring and reporting, and providing services to assist public entities with project preparation activities (such as review of feasibility studies, preparation of detailed design and bidding documents, and supervision of construction activities). The PMU would either have to charge a fee to borrowers for the services provided or cover the service costs from public budgets. The MEEIP could be implemented by building upon the experiences with the current MSIP, but would most likely require the expansion of the staffing and technical skills of the existing PMU or the establishment of a new PMU.

## POTENTIAL FINANCING SOURCES

There is a wide range of potential financing sources that may provide the needed funding — for investment capital, equity, and technical assistance (TA) — for the implementation of the NPEEPB. These sources include GOM budget allocations, IFIs (such as the World Bank and EBRD), the Global Environment Facility (GEF), United Nations (UN) organizations such as the United Nations Economic Commission for Europe (UNECE) and UNDP, the European Union (EU) through the Instrument for Pre-Accession Assistance (IPA) facility, Green for Growth Fund, bilateral FIs such as the German Development Bank (Kreditanstalt für Wiederaufbau, KfW), and commercial banks. TA funds may also be available from the USAID, GIZ, and the TA facilities established by the EU in cooperation with the European Investment Bank (EIB). For the capitalization of the three suggested financing mechanisms — EE fund, EE credit line, or the MEEIP — the choice of funding sources is more limited. Based on the current activities and interests of the various financing sources, it appears that the World Bank, the European Commission's IPA facility, GEF, EBRD, and KfW may be the most likely sources that need to be explored by the GOM for funding the financing mechanisms to support the NPEEPB. Most of these financing sources would prefer a sustainable financing mechanism that would leverage commercial bank financing in the long term.

## IMPLEMENTATION CONSIDERATIONS

The three financing options identified herein have a number of common features, including: (i) TA for energy audits and development of EE action plans, (ii) a role of the energy agency in providing TA, (iii) project eligibility criteria, (iv) cofinancing needs and collateral requirements, (v) TA for program marketing and capacity building of municipalities and energy service providers, (vi) considerations of sustainability and replicability, (vii) capacity building of the PMU, (viii) possible inclusion of a grant-financing component, (ix) encouragement of performance-based implementation and facilitation of the EE services delivery infrastructure, and (x) measurement and verification (M&V) of projects and monitoring and reporting to the GOM and the financing sources.

## THREE FINANCING OPTIONS: A COMPARISON

A comparison of the three financing mechanisms shows that the EE fund is the most comprehensive mechanism to address the needs of the largest number of municipalities and public entities and provides the broadest coverage and flexibility of the different implementation considerations. In addition to a loan product similar to the other two mechanisms, it provides the ESA option to address the needs of public entities without their own budgets or capacity to implement projects. By engaging a competitively selected professional fund manager, with substantial capabilities in the technical, financial, and institutional aspects of the implementation of EE projects, this option assures efficient and effective operation of the financing mechanisms to support the NPEEPB. It provides the highest probability of establishing a sustainable financing program that can leverage commercial financing. The only limitation is the need for establishing a new independent organization and engaging in a fairly substantial competitive bidding process to select the fund manager. It would also be necessary to provide a certain amount of equity for the fund to cover the risk of potential payment defaults.

The dedicated EE credit line would be simpler to implement and would not require the establishment of a new organization, but would be limited in its coverage as it would only provide loans to public borrowers that are creditworthy and willing and able to borrow (which may be limited to a small number). Also the FI responsible for managing the credit line may have limited capacity to provide support to clients in preparing and

implementing the project as provided in the other two options. And, no banks interviewed expressed strong interest in the municipal lending market.

The MEEIP would be structured similar to the existing MSIP and would not require the creation of a new organization. It could serve the needs of all public sector organizations including public entities without their own budgets or capacity to implement projects. But it would require substantial expansion of the staff and technical capacity of the existing MSIP PMU or the establishment of a new PMU within the MOF with substantial capacity in EE technologies, financing, and implementation strategies. There are also issues related to the scalability and sustainability of this option.

Chapter 6 of this report presents detailed information on the organizational structure and funds flow for each of the three financing options. A detailed comparison of the three options is presented in table 4.3.

## **SELECTING THE FINANCING OPTION**

Based on the above analysis, selecting one of the three financing options depends on which appears to be the most viable based on the local situation and the feedback received during the stakeholder consultation workshop. The EE fund was identified as a promising model that could address many of the barriers identified in the report. The final selection of the financing option would be made by the GOM with due consideration of a number of factors such as the difficulties of creating a new organization, the prospects of obtaining a qualified and experienced professional fund management company, the need to serve all public sector entities, the capacity of the energy agency, the suitability of existing financial institutions to manage the EE credit line, the interest and willingness of the MOF to establish another PMU, and the availability of funding for a particular option.

## PROPOSED INVESTMENT PLAN

The proposed investment plan for the years 2013–18 categorizes the public buildings into five types based on their building characteristics, energy consumption characteristics, and energy-saving opportunities. It assumes that the GOM selects the financing option by the end of 2012, and initial funding is obtained in 2013. The available funding is then expanded in 2014 or 2015 to scale up the financing and implementation of the EE projects. Since it may be very difficult to obtain sufficient financing during the period 2013–18 to implement all of the EE projects identified in the ENSI study, the investment plan assumes a total funding of €50 million, which would be sufficient to implement about 52 percent of the projects in the Phase 1 buildings. The investment plan is presented in table 7.2.

## TECHNICAL ASSISTANCE

For effective implementation of the financing options discussed in this report, there is a need for considerable TA for removal of administrative barriers to public sector EE projects; capacity building of various program participants including the PMU, the municipalities and other public entities, and private sector implementing organizations; capacity building of private sector banks and financial institutions; and development of a comprehensive approach and procedures for M&V of project results and capacity building of M&V agents. The specific responsibilities for providing/organizing TA may vary somewhat across the three financing options between the fund manager/PMU and energy agency. It is anticipated that the TA needs will amount to about €2 million, which may be financed by the same financing sources that will provide the funding for investment in the public sector EE projects; however, TA funding from some other donors and cofinancing from the GOM may also be made available. Coordination among donors will be essential. The TA activities, responsibilities, and funding levels are presented in tables 8.1 and 8.2.

CHAPTER



# Introduction and Country Context

The Government of Macedonia (GOM) plans to launch a National Program for Energy Efficiency in Public Buildings (NPEEPB, or “the program”) to achieve energy efficiency (EE) improvements in the buildings sector and meet the strategic targets outlined in the Energy Development Strategy of the Republic of Macedonia until 2030, the Energy Efficiency Strategy until 2020, and the National Energy Efficiency Action Plan in 2010–18. The NPEEPB, coordinated by the Ministry of Economy (MOE), aims to retrofit existing public buildings and to lead by example in the implementation of EE measures. Its targets are public buildings that are used for administrative and other activities of public interest and that are fully owned by government institutions or municipalities.

This report focuses on the financing mechanisms that are considered the best fit with the institutional environment to achieve the goals of the NPEEPB, and describes in detail the implementation of the proposed financing mechanisms: a full-service EE fund, a dedicated EE credit line, and a municipal EE improvement program implemented within the government. The report builds on the work on the NPEEPB completed by the Energy Saving International, AS (ENSI) and others and described in its report to the GOM (ENSI 2012), especially the selection of the buildings to be included in the first phase of the NPEEPB (2012–18), market potential, and the cost-effective EE measures likely to be carried out, as well as an estimation of the resulting investment costs and benefits. The national EE target is a 9 percent savings in final energy consumption by 2018, compared to average energy consumption in 2002–06. The NPEEPB target for energy savings in public buildings is 13.6 ktoe<sup>2</sup>/year, which is about 56 percent of the national EE target for the commercial and service sector.

## IMPORTANCE OF EE IN PUBLIC BUILDINGS

Government facilities are often major purchasers of energy services and energy-using equipment; they typically are the single largest energy user in a country. But the total amount of energy consumed by public buildings — for heating, air-conditioning, hot water preparation, lighting, and plug loads — is not particularly large compared to the rest of the economy, and by itself would not merit much special attention. Although few countries have reliable data, the public sector is estimated to account for about 10–20 percent of a country’s total energy consumption in the region.

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2 Thousand tons of oil equivalent.



There are, however, good reasons for central and local governments to engage in energy-saving activities in the buildings they own and operate. Four key reasons are:

- **Leading by example.** Government laws and regulations to protect the environment and promote sustainable development affect all entities and citizens. To be credible and inspire others, the government must set and follow its own regulations.
- **Multiplier effect.** Public institutions have an important educational role. Energy-saving projects in public facilities provide their users (such as teachers, students, and hospital staff or patients) an opportunity to learn about and practice EE in their everyday environment. Energy-saving projects in public buildings worldwide have been known to influence the behavior and lifestyle choices of building users.
- **Better use of public resources.** Tax payments, by citizens and the private sector, are the largest source of public funds. Inefficient energy consumption is a waste of public money, which is exacerbated as tariff reforms are implemented. Energy savings resulting from improved efficiency can be used for capital improvement projects or to free up budgets for other purposes.
- **Leveraging effect for market creation and transformation.** The public sector can use its market power to help develop mechanisms and institutions for energy conservation in society at large, creating a strong, sustained, buyer-led shift in the market toward EE. The government's buying power and active, visible leadership can provide a powerful nonregulatory means to stimulate demand for EE products and services. By establishing a reliable market, the government can encourage domestic suppliers to introduce more EE products at competitive prices and also create more opportunities for the EE services industry, including energy service companies (ESCOs), energy consultants, financing businesses, contractors, and equipment vendors.

## POLICY FRAMEWORK FOR ENERGY EFFICIENCY IN FYR MACEDONIA

During the past few years, the former Yugoslav Republic of Macedonia (FYR Macedonia) established a comprehensive strategic and legal framework for a reformed and sustainable energy sector with a strong emphasis on EE. This development is driven by the objective of getting full membership in the European Union (EU). As a contracting party to

the Energy Community Treaty, FYR Macedonia has committed to harmonize its national legislation with the existing EU legislation for the energy sector.

The main legal and strategic documents for establishing EE improvements as a major goal, in general and in the public sector, are the following:

- **The Energy Law** (adopted in February 2011). The law (GOM 2011a) establishes the major regulatory requirements for EE in public buildings. It specifies the following obligations for public sector entities (state bodies, public institutions, and municipalities):
  - Adopt and implement three-year programs for EE improvements.
  - Develop annual energy consumption analyses and monitor energy consumption.
  - Perform energy audits for buildings at least once every three years.
  - Develop a certification scheme for building energy use and provide building energy certificates.

For implementation of the law, secondary legislation needs to be adopted. This includes the Rulebook on Building Energy Performance (that is, building codes) and the Rulebook on Energy Audits. Already adopted is the Rulebook on Labeling the Energy and Other Resources Consumption of Products. The Energy Law also authorizes the establishment of an EE fund by means of a law, which would provide financial support for the public and private sectors to implement the obligations for EE improvement under the law.

- **Strategy for energy development in FYR Macedonia until 2030** (adopted in April 2010). This strategy (GOM 2010a) establishes FYR Macedonia's long-term goals in energy development for the purpose of safe energy supply. While energy demand will grow during the analyzed period (due to FYR Macedonia's exceptionally low energy consumption per capita in all sectors), the country is strongly dependent on energy imports and faces a relatively high trade deficit in which the import of energy accounts for a very large share. The fact that EE in all sectors is quite low provides an opportunity to moderate demand growth by significantly increasing EE in the production, transmission, distribution, and utilization of energy. The strategy therefore sets targets to reduce energy intensity by at least 30 percent by 2020 in comparison to 2006.
- **Energy efficiency strategy until 2020** (Strategy for Improvement of the Energy Efficiency in FYR Macedonia until 2020). This umbrella document (GOM 2010c) for EE, updated in 2010, outlines the institutional, legal, and financial framework for EE activities in the country. It sets national EE targets: a 9 percent savings in final energy consumption by 2018 (equivalent to energy savings of 147.2 ktoe), compared to 2002–06 average energy consumption, and 20 percent savings of primary energy consumption by 2020. Public buildings do not comprise a separate sector under the strategy,

but are combined with the commercial sector. Together they are expected to reduce their energy consumption by 24.19 ktoe/year in the last year of the period 2010–18, compared to 2002–06 average energy consumption. For public buildings the strategy places a high priority on EE investments in educational and health-care buildings, on building energy certification, inspection of boilers, energy management, and information campaigns. The EE strategy suggests as necessary the establishment of an EE fund to support the implementation of a successful EE program and promotion of investments. To comply with the EE strategy, municipalities are obligated to prepare and submit EE action plans and energy audits of their buildings; a few municipalities have already prepared such plans and submitted them to the energy agency.

- **National Energy Efficiency Action Plan 2010–18.** FYR Macedonia, as a contracting party of the Energy Community Treaty, is required to prepare three National Energy Efficiency Action Plans (NEEAPs) for the period 2010–18, following the EU Directive 2006/32/EC on energy end-use efficiency and energy services (ESD). The first NEEAP was prepared and submitted to the Energy Community Secretariat on June 25, 2010 (GOM 2010b). The GOM started the adoption procedure in March 2011. The NEEAP presents the recommended programs that will achieve the 9 percent energy savings target specified in the EE strategy, as well as the implementation time frame, financial means, and expected energy savings. As in the strategy, public buildings are included in the commercial and services sector. The NEEAP puts priority on the public sector as the easiest to address in the short term, as well as for its potential to lead commercial sector actors by example. It also emphasizes that capacity for EE needs to be built in both the MOE and the energy agency and that an EE fund should be established.

## NPEEPB ACTIVITIES TO DATE

A report on NPEEPB was developed in 2011 with financing from the World Bank/Global Environmental Facility (GEF) Sustainable Energy Project. Under the coordination of the MOE, the work was carried out by a consulting team consisting of ENSI, TIMEL, and E3 International (ENSI 2012). The objective of the NPEEPB is to prepare public buildings to make a significant contribution toward the national target of cutting energy consumption by 9 percent by 2018, as outlined in the EE strategy and the NEEAP, and in doing so, to support the commercial and services sector. Further program objectives include:

- To provide support and incentivize public entities for implementation of their obligations under the energy law
- To improve the conditions in public buildings in the country
- To support the introduction of EE practices in the management of public buildings
- To provide examples of EE practices to other sectors
- To encourage and facilitate the development of the market for EE services and products in the country

The National Program will include all public buildings in Macedonia and will be implemented in two phases. Phase 1 (2012–18), overlapping with the NEEAP period, includes public buildings under the jurisdiction of eight ministries (see chapter 2), as well as the municipal administrative buildings in all 84 municipalities and the city of Skopje. These buildings comprise:

- Ministry office buildings
- Administrative buildings of all 84 municipalities and the city of Skopje
- Educational buildings (of primary and secondary public schools, public universities, research institutes, and other education-related institutions)
- Kindergartens
- Health sector buildings (including hospitals, clinics, and ambulatories)
- Buildings for social care (including shelters and retirement homes)

The ENSI report provides estimates of the energy use of the public building stock and its EE potential, based on the modeling of a large number of different building types (ENSI 2012). The EE potential was estimated based on applying EE measures aimed at thermal and electricity savings that are cost-effective. The energy savings that could be achieved during program implementation are expected to amount to about one-third of current energy consumption and would require investments of about €95 million with an estimated average payback time of less than seven years. Details are presented in chapters 2 and 7 of this report. In addition to physical investments, the program also proposes support to public entities for energy audits and measurement and verification (M&V) activi-

ties, a capacity-building program for all stakeholders involved, and a marketing campaign for the program. These activities are estimated to cost an additional €12 million.

The MOE will be responsible for the implementation of the NPEEPB. It is recommended in the program document that the MOE chair a program supervisory board that would include the ministries mentioned in chapter 2 and some nongovernmental actors, such as representatives from municipalities (for example, Association of the Units of Local Self Government, ZELS), academia, environmental groups, and the private sector. Day-to-day management of the program, including its implementation, monitoring, and evaluation, would be carried out by a program management unit (PMU). This unit should be autonomous, with a clear mandate and its own budget. It could be located in the energy agency as a separate department. Details of the proposed institutional arrangements for the NPEEPB are elaborated in the ENSI report.

CHAPTER

A large, stylized number '2' in a muted green color is centered within a thin green circular outline. The number is bold and sans-serif, with a slight curve at the top of the vertical stroke.

# Characteristics of Public Buildings Included in the NPEEPB

As part of the development of the National Program for Energy Efficiency in Public Buildings (NPEEPB), the Ministry of Economy (MOE) commissioned a study conducted by a consultant team led by Energy Saving International, AS (ENSI) to develop a detailed assessment of the technical characteristics of public buildings in Macedonia, the typical energy efficiency (EE) technologies applicable to these buildings, and the potential for energy savings through the application of these technologies (ENSI 2012). This chapter summarizes some of the major findings of that assessment.

## MAJOR SECTORS

The ENSI assessment included public buildings under the jurisdiction of the following ministries: Ministry of Health, Ministry of Education and Science, Ministry of Local Self-Government, Ministry of Labor and Social Policy, MOE, Ministry of Environment and Physical Planning, Ministry of Transport and Communications, Ministry of Finance (MOF), and municipal administrative buildings in all 84 municipalities and the city of Skopje. These facilities were given priority in Phase 1 of the NPEEPB to be implemented during the period 2012–18.

The ENSI study categorized the buildings in the following five sectors:

- Health care
- Education
- Social care
- Municipal administration
- State administration

These were further subdivided into various subsectors. Using available data from a number of sources, the study defined the number of entities, number of buildings, total floor area, and heated floor area for all. This information is summarized in table 2.1.

As indicated in table 2.1, the public buildings market for Phase 1 of the NPEEPB consists of 2,441 public buildings with a total heated floor area of 2.27 million square meters (m<sup>2</sup>).

The education sector is by far is the largest, with 1,515 buildings (62.1 percent of the total) and 1.46 million m<sup>2</sup> heated floor area (64.6 percent of the total). The next largest is the health sector, with about 20 percent of the buildings and 21.4 percent of the heated floor area. The social care sector has about 10 percent of the buildings and heated area. Municipal and state administrative sectors have very small shares of the public building stock and floor area.

**Table 2.1 Summary of Number of Public Buildings and Floor Area by Sector**

Sector	Legal entities	Total buildings	Floor area	
	Number	Number	Total	Heated
			m <sup>2</sup>	m <sup>2</sup>
1. Health care	111	485	539,201	487,967
2. Education	1,406	1,515	1,667,197	1,464,735
3. Social care	85	246	235,914	220,459
4. Municipal administration	85	167	103,090	75,420
5. State administration	9	28	18,714	17,363
Total (all sectors)	1,696	2,441	2,564,116	2,265,944

Source: ENSI 2012.

## AGE OF BUILDING STOCK

Information on the time of construction of the public buildings was compiled in the ENSI study. The data showed that 59 percent of the buildings were constructed before 1970, 30 percent between 1971 and 1990, and only 11 percent after 1990.

## ENERGY CONSUMPTION

The ENSI study collected data on energy consumption using a data collection form sent to the public buildings by the MOE. Some of the information received was incomplete



and inconsistent, and ENSI made appropriate estimations and adjustments to develop a profile of energy consumption in public buildings by sector and subsector for heating (including heating with fuels and with electricity; a share of 83 percent of total energy consumption) and for nonheating electrical usage (17 percent). This information is summarized at the sector level in table 2.2.

The total baseline energy consumption of the buildings in the five sectors was estimated at about 506,599 megawatt-hours (MWh) or 43,560 toe.<sup>3</sup> This represents about 20 percent of the energy consumption in the commercial and services sector in Macedonia.

Table 2.3 shows that the specific energy consumption per unit of floor area is highest for the health sector (283 kilowatt-hours [kWh]/m<sup>2</sup>) and lowest for the education sector (202 kWh/m<sup>2</sup>). The total energy cost is the highest for the state administration sector (€27.7/m<sup>2</sup>) followed by the health sector (€24.5/m<sup>2</sup>). The lowest energy cost is in the education sector (€16.2/m<sup>2</sup>) due to lower specific energy consumption and the use of firewood, the lowest price fuel, for heating in many schools. The average specific energy consumption across all building types is 214 kWh/m<sup>2</sup> and the average energy cost is €18.7/m<sup>2</sup>.

**Table 2.2 Energy Consumption and Costs by Sector\***

Sector	Heated Floor area	Heating Energy Consumption		Electricity Consumption		Total Energy Consumption		Specific Energy Consumption	Total Energy Cost	Total Energy Cost/m <sup>2</sup>
		MWh/year	Toe/year	MWh/year	Toe/year	MWh/year	Toe/year			
Units	m <sup>2</sup>	MWh/year	Toe/year	MWh/year	Toe/year	MWh/year	Toe/year	Kwh/m <sup>2</sup>	000€/year	€/m <sup>2</sup>
Health	487,967	108,584	9,337	29,444	2,532	138,029	11,868	283	11,965	24.5
Education	1,464,735	256,493	22,054	39,713	3,415	296,206	25,469	202	23,544	16.1
Social care	220,459	40,853	3,513	9,662	831	50,514	4,344	229	4,809	21.8
Municipal Admin.	75,420	14,313	1,231	3,827	329	18,140	1,560	241	1,593	21.1
State Admin.	17,363	2,579	222	1,131	97	3,710	319	214	481	27.7
<b>Total</b>	<b>2,265,944</b>	<b>422,822</b>	<b>36,356</b>	<b>83,777</b>	<b>7,204</b>	<b>506,599</b>	<b>43,560</b>	<b>224</b>	<b>42,392</b>	<b>18.7</b>

Source: Prepared by authors based on ENSI (2012).

Note: KWh = kilowatt-hour; MWh = megawatt-hour.

\*The ENSI study estimated energy consumption based on 2009 data; the estimated costs were calculated using 2011 prices.

<sup>3</sup> Tons of oil equivalent.

## ENERGY EFFICIENCY MEASURES

The major EE measures examined in the ENSI study included the following.

- EE measures aimed at thermal energy savings:
  - Thermal insulation in outside walls
  - Replacement of existing windows and outside doors with new, energy-efficient ones
  - Thermal insulation of the roof (attic)
  - Thermal insulation in the floor
  - Installation of automatic control (AC) systems in existing heating substations in those public buildings connected to the district heating system
  - Reconstruction of boiler stations in existing hot water radiator heating systems
  - Installation of AC systems in boiler stations in existing hot water radiator heating systems
  - Replacement of existing room stoves operating on firewood with new, highly efficient ones
  - Replacement of existing radiator masks in kindergartens with new ones, to enable better emission of the heat produced from the radiator units
- EE measures aimed at electricity savings:
  - Improvement of lighting arrangements
  - Replacement of existing pumps in hot water supply systems with new EE pumps

## POTENTIAL FOR EE IMPROVEMENT

ENSI estimated the energy savings potential using representative buildings as a model and proprietary software. In parallel, the model outputs were compared with the results of already implemented projects (by the United States Agency for International Development [USAID], World Bank, and United Nations Development Programme [UNDP]), available energy audits, and energy analyses of similar buildings.

In conducting the analysis, the public buildings were divided in 44 groups, which were further studied and subjected to estimations of their energy-savings potential. The EE potential was estimated by extrapolating the energy and monetary savings of representa-

tive buildings within each group. Only EE measures with an estimated payback time of less than 12 years were included.

The results of this analysis as presented in the ENSI report are shown in table 2.3 for the “moderate investment” scenario that included the investments with an average payback period of 7 years. These results indicate that the potential energy savings are about 158 gigawatt-hours (GWh) per year (13.6 million toe/year) or about 33 percent of the energy consumption. These energy savings would result in reducing greenhouse gas (GHG) emissions by about 39,000 tons CO<sub>2</sub>/year. The potential cost savings are about €14 million per year.<sup>4</sup>

The investment required to achieve these energy and cost savings is €95.2 million, and the estimated average payback period is 6.8 years.

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4 Other benefits include the creation of local employment, estimated at 3,000 jobs, and reduction of energy imports. Experiences from other countries show that public funding for EE investments results in additional tax income and reduced unemployment payments. Examples include the programs of the German Development Bank (Kreditanstalt für Wiederaufbau, KfW) for energy-efficient building and rehabilitation in the public and private sectors, which resulted in net income for the government in excess of 500 percent of initial program costs (see Juelich 2011).

**Table 2.3 Estimation of Energy and Cost Savings, Total Investment, and Payback:  
ENSI Moderate Investment Scenario\***

No	SECTOR / SUBSECTOR	Actual (baseline) Energy Consumption		Saving Potential under Moderate Investment Scenario					
				Total Monetary Saving			Total Monetary Saving	Total Investment	Payback Period
				[MWh/ year]	[toe/year]	[MWh/ year]	[toe/year]	[%]	[Euro/year]
<b>1</b>	<b>HEALTH SECTOR</b>	<b>136,219</b>	<b>11,712.60</b>	<b>45,399.00</b>	<b>3,903.60</b>	<b>33.30</b>	<b>3,609,935</b>	<b>24,956,222.00</b>	<b>6.9</b>
1.1	University Clinical Center	45,377	3,901.70	7,558	649.85	16.7	445,393	3,029,420	6.8
1.2	General hospitals	29,387	2,526.80	15,805	1,359.00	53.8	1,144,764	8,535,795	7.5
1.3	Special hospitals	15,742	1,353.50	8,087	695.4	51.4	684,080	3,692,528	5.4
1.4	Institutes	10,475	900.7	4,490	386.1	42.9	381,180	2,148,111	5.6
1.5	Health care stations	732	62.9	242	20.82	33.1	30,144	166,830	5.5
1.6	Health care houses	33,407	2,872.50	9,056	778.7	27.1	909,452	7,247,195	8.0
1.7	Centers for public health	1,099	94.5	161	13.9	14.7	14,921	136,342	9.1
<b>2</b>	<b>EDUCATION SECTOR</b>	<b>270,244</b>	<b>23,236.70</b>	<b>88,259</b>	<b>7,588.90</b>	<b>32.7</b>	<b>7,821,151</b>	<b>54,924,985</b>	<b>7.0</b>
2.1	Primary schools	153,025	13,157.70	46,225	3,974.60	30.2	3,143,566	25,649,775	8.2
2.2	Secondary schools	51,019	4,387	19,121	1,644	38	2,037,272	14,618,044	7
2.3	Universities	36,393	3,129.30	13,345	1,147.40	36.7	1,610,246	8,534,269	5.3
2.4	Pupils dormitories	6,118	526	1,871	160.9	30.6	218,633	1,404,135	6.4
2.5	Student dormitories	22,529	1,937.20	7,181	617.4	31.9	747,178	4,289,656	5.7
2.6	Science institutes	1,159	99.7	518	44.5	44.7	64,256	429,107	6.7
<b>3</b>	<b>SOCIAL CARE SECTOR</b>	<b>48,547</b>	<b>4,174.20</b>	<b>17,587</b>	<b>1,512.20</b>	<b>36.2</b>	<b>1,878,245</b>	<b>10,283,683</b>	<b>5.5</b>
3.1	Kindergartens	37,038	3,184.70	12,468	1,072.10	33.7	1,374,126	7,397,508	5.4
3.2	Social care institutions	9,452	812.7	4,491	386.1	47.5	439,147	2,346,693	5.3
3.3	Centers for social affairs	2,057	176.8	628	54	30.5	64,972	539,482	8.3
<b>4</b>	<b>MUNICIPAL ADMINISTRATIVE SECTOR</b>	<b>16,594</b>	<b>1,427</b>	<b>5,317</b>	<b>457</b>	<b>32</b>	<b>488,664</b>	<b>3,896,171</b>	<b>8</b>
4.1	Municipal administrative sector	16,594	1,427	5,317	457	32	488,664	3,896,171	8
<b>5</b>	<b>STATE ADMINISTRATIVE SECTOR</b>	<b>3,710</b>	<b>319</b>	<b>1,355</b>	<b>117</b>	<b>37</b>	<b>168,986</b>	<b>1,200,888</b>	<b>7</b>
5.1	Ministry of Economy	1,180	102	421	36	36	53,027	425,053	8
5.2	Ministry of Education and Science	1,279	110	555	48	43	68,886	531,476	8
5.3	Ministry of Environment	304	26	91	8	30	11,277	52,157	5
5.4	Ministry of Transport	947	81	288	25	30	35,796	192,202	5
	<b>TOTAL</b>	<b>475,314</b>	<b>40,869</b>	<b>157,918</b>	<b>13,578.40</b>	<b>33.2</b>	<b>13,966,981</b>	<b>95,261,949</b>	<b>6.8</b>

Source: ENSI 2012.

Note: \*The moderate investment scenario assumes that only measures with a payback of less than 7.0 years are implemented. MWh = megawatt-hour; toe = tons of oil equivalent.

CHAPTER

# 3

## **Barriers and Constraints to EE Investment in the Public Sector**

## BARRIERS TO ENERGY EFFICIENCY

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

**Figure 3.1 Barriers to EE in the Public Sector**

Policy/Regulatory	Public End Users	Equipment/Service Providers	Financiers
<ul style="list-style-type: none"> <li>- Low energy pricing and collections</li> <li>- Rigid procurement and budgeting policies</li> <li>- Limitations on public financing</li> <li>- Ad hoc planning</li> <li>- Limited and poor data</li> </ul>	<ul style="list-style-type: none"> <li>- Limited incentives to save energy/try new approaches</li> <li>- No discretionary budgets for special projects/upgrades</li> <li>- Unclear ownership of cost/energy savings</li> <li>- Limited availability of financing</li> <li>- Lack of awareness and technical expertise</li> <li>- Behavioral biases</li> </ul>	<ul style="list-style-type: none"> <li>- Higher transaction costs for public sector projects</li> <li>- Perceived risk of late/non-payment of public sector</li> <li>- High project development costs</li> <li>- Limited technical, business and risk management skills</li> <li>- Limited access to equity and financing</li> </ul>	<ul style="list-style-type: none"> <li>- High perceived public credit risks</li> <li>- New technologies and contractual mechanisms</li> <li>- Small sizes/high transaction costs</li> <li>- Behavioral biases</li> </ul>

Source: Singh and others 2010.

## BARRIERS TO EE IN THE PUBLIC SECTOR IN FYR MACEDONIA

The following discussion addresses barriers that are specific to the Former Yugoslav Republic (FYR) Macedonia and that constrain the implementation of financial mechanisms that could be used to make investments to meet the objectives of the National Program for Energy Efficiency in Public Buildings (NPEEPB):

- **Public accounting, budgeting, and procurement rules.** Public institutions currently have a very limited ability to retain the energy cost savings resulting from EE or other cost-saving investments. Municipalities may only borrow in general obligations, to be repaid from general revenues, which limits public sector incentives to pursue such investments. Public tender procedures are complicated and rigid, particularly contract evaluation criteria, awarding procedures, time schedules, fees, and contract conditions (UNECE 2009). Procurement generally favors the lowest up-front costs, rather than life-cycle costs. The new Law on Concessions and Public-Private Partnerships allows the combination of design and works/services in one contract. This is relevant to energy service company (ESCO) operations and other performance-based contracting.
- **Financing restrictions for the central government and municipalities.** Because of ongoing austerity measures following the global financial crisis, both the national government and the municipalities are facing considerable fiscal pressures that limit the availability of budget funds for investment in general and for EE improvements and implementation of their EE action plans in particular. Most public institutions — with the exception of some municipalities (see below) — cannot take on commercial debt. These public institutions still generally require additional approvals by the Ministry of Finance (MOF) in order to do so.
- **Limited borrowing capacity of municipalities.** Since 2002 the 84 municipalities in FYR Macedonia and the city of Skopje are undergoing a gradual decentralization process. The decentralization gives them increased responsibilities for the delivery of social services, particularly education (see box 3.1 for details on the current funding responsibilities in the education sector), and some revenue-raising ability. In addition to receiving funds from the central government (conditional and unconditional grants), municipalities have income from communal fees, certain taxes (property tax, property sales tax, and so on), and a share of value added tax (VAT, ~4.5 percent) and personal income tax (3 percent). Most municipalities can now borrow funds within limits as regulated by law (Law on Financing Municipalities, last amended in 2011), provided they get the consent of the MOF (which may depend on their stage of fiscal decentralization) and are able to provide the necessary guarantees and collaterals.

Borrowing, however, is subject to conditions, such as: (i) the total amount of short-term debt incurred cannot exceed the revenues of the previous year, and (ii) debt service for long-term debt is limited to 30 percent of revenues of the previous year. As a result, the overall municipal debt ceiling at the beginning of 2012 amounted to about €100 million. This is a fairly limited amount, considering the vast needs for infrastructure investments (including for EE in public buildings and street lighting). Part of this debt ceiling will be used in the coming years by municipalities to borrow for infrastructure projects from the World Bank-funded Municipal Services Improvement Project (MSIP) (see box 4.3).

### BOX 3.1 SCHOOL/KINDERGARTEN FUNDING

Municipalities receive block grants from the central budget, which are used mostly for teachers' salaries and operations and maintenance (O&M), particularly students' transportation and utility bills. The MOF still pays for investments, but this responsibility is scheduled to be devolved to municipalities during the next few years. According to an analysis by the Association of the Units of Local Self Government (ZELS), the municipal deficit in the education sector amounts to 1.1 billion denar (about \$24 million).

*Sources:* <http://www.zels.org.mk/Upload/Content/Documents/Izdanija/EN/ZELS%20Godisen%20izvestaj%202011%20EN%20za%20web.pdf>, 59.

- **Limited willingness of municipalities to use debt**, especially on commercial terms, to borrow for infrastructure projects. Given their brief experience with fiscal responsibility and limited ability to incur debt, even those municipalities with a sufficient debt capacity and available collateral prefer to access concessional financing with some grant components. This is available, for example, from the World Bank's MSIP. The experience of the World Bank's FYR Macedonia Sustainable Energy Project (MSEP, World Bank 2012b) has shown, however, that municipalities are willing to gradually move from grant funding of EE projects to forms of financing that require substantial equity or cofinancing contributions.
- **The limited willingness of commercial banks to lend to the public sector.** Access to commercial financing is limited to a few municipalities because local banks are gen-



erally not enthusiastic to lend to municipalities. Banks emphasize that little financial information is available from municipalities, since their bank accounts are kept at the Treasury, and budgets are rarely made public in sufficient detail. Furthermore, municipalities have restrictions on the assets that could serve as collateral: for example, buildings used for essential public services, such as education, cannot be pledged as collateral. The introduction of a partial credit guarantee through the United States Agency for International Development (USAID) Development Credit Authority (DCA) was thought to increase the willingness of commercial banks to lend to municipalities for EE, but has resulted in only one project so far.<sup>5</sup> While many countries set up special municipal lending programs through their national development banks, which can be accessed by municipalities through commercial banks (for example, the German Development Bank [Kreditanstalt für Wiederaufbau, KfW] in Germany has several programs for EE retrofits of schools and other municipal infrastructure), this option is not available in FYR Macedonia, since the 2009 Law (GOM 2009) on the FYR Macedonian Bank for Development Promotion (MBDP) does not allow the MBDP to lend to the municipal sector.

- **Limited institutional capacities of government institutions, municipalities, and the private sector:**
  - **Energy Agency.** This agency was established under the Law of Energy and is tasked with several important responsibilities, such as: (i) to collect and process the EE programs from the local self-government units and to prepare a report on the compliance of the programs with the EE Strategy and the Action Plan, (ii) to collect the summary reports from energy audits performed in the previous year and to develop and submit the annual reports on energy audits performed every year, and (iii) to develop and submit to the Minister of Economy (MOE) contents and templates of reports from energy audits performed in the public sector entities' buildings during the previous year. These tasks are important for the development of the NPEEPB, but the agency has a staff of only six and thus insufficient capacity to manage their completion. In addition, the Energy Agency has important responsibilities in the development of the National Energy Efficiency Action Plan (NEEAP) and related reporting tasks, such as preparing relevant rulebooks for energy auditing and labeling and providing energy auditor training.
  - **Municipalities.** The capacity to manage debt, carry out procurement for goods and services, and develop and implement EE action plans varies considerably among FYR Macedonian municipalities. Several municipalities are quite advanced,

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<sup>5</sup> The limited interest in the DCA facility is most likely the result of the need for MOF approval for municipal borrowing, the lack of interest by commercial banks to finance public institutions, and the availability of financing from MSIP that provides more attractive terms than commercial financing through the DCA.

capable, and have some experience; other municipalities are interested but don't have experience; and the majority of municipalities have neither capacity nor interest at the current time.

- **Macedonian Bank for Development Promotion.** The bank cannot lend to municipalities and has no risk management function.
  - **Private sector.** An ESCO industry has not yet emerged in FYR Macedonia despite many international initiatives.
- 
- **Limited technical capacities in the public and private sectors.** A lack of professional skills in the preparation of bankable EE projects is pervasive. Municipalities also lack the necessary professional profiles for implementing the required action plans.

These barriers will have to be addressed before or in parallel with the development and preparation of a financing mechanism.

CHAPTER

4

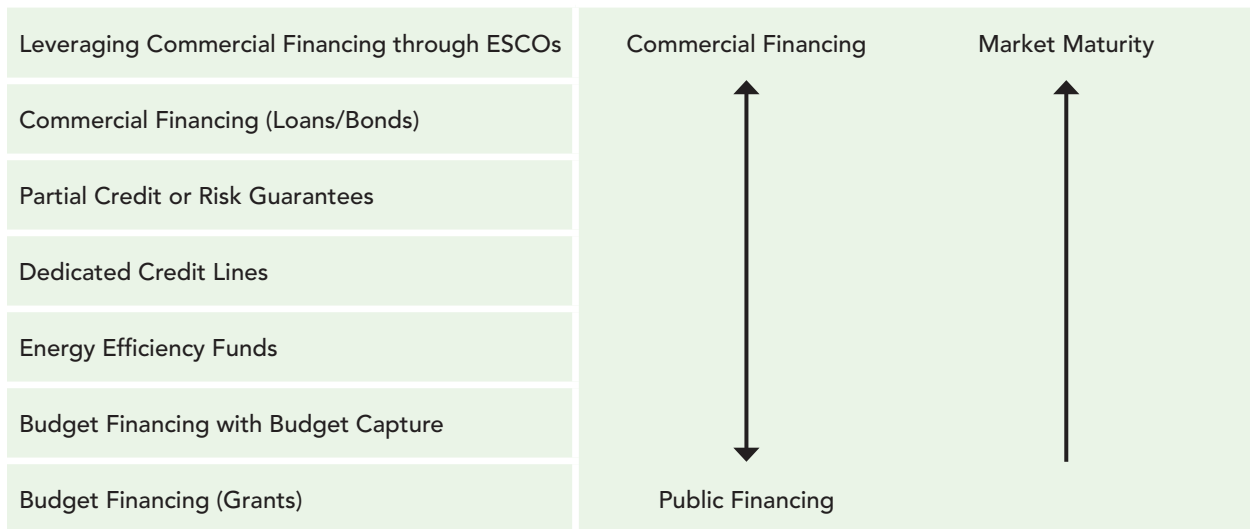
# Financing Options

## OPTIONS IDENTIFIED IN PREVIOUS STUDIES

In general, the financing options available to public sector institutions can be characterized on a scale ranging from full public budget financing to full commercial financing, with several options in between. Figure 4.1 shows this range among financing options that are typically available to the public sector in the region.

The following discussion presents a number of financing options that were mentioned in the Energy Saving International, AS (ENSI) report.<sup>6</sup>

**Figure 4.1 Financing Energy Efficiency in the Public Sector: Moving from Public to Commercial Financing**



Source: Authors.

Note: ESCO = energy service company.

<sup>6</sup> Not described here are two of the options discussed in the ENSI report: municipal bonds and donor buyout of commercial loans. Both mechanisms are untested in the region for the purpose of EE financing in the public sector. Many other financial mechanisms exist, for example, carbon finance. The NPEEPB would reduce greenhouse gas (GHG) emissions and could be considered under the clean development mechanism (CDM) to benefit from additional revenues from the sale of the carbon credits. A report by Ryding (2011) provides a complete overview of the financial support facilities that are currently available in the region for the financing of investments and technical assistance (TA) for energy efficiency and renewable energy projects. Most of them are targeted at the private sector, however.

- **Financing by the Ministry of Finance (MOF)** may be provided as a grant or repaid through budget capture, using government budget allocations, and/or international financial institution (IFI)/donor funds. Under this approach, the MOF would provide the funds to pay for the up-front cost of energy efficiency (EE) projects. If the Government of FYR Macedonia (GOM) is not willing or able to provide the funds as investment grants, it could take “repayment” in the form of reduced outlays for energy bills of state institutions in future years. The size of the reduced outlay would be based on the amount of measured savings. So the flow of funds to pay for EE improvements would follow the same flow as the normal appropriations from the MOF. The repayment to the MOF could be complete or partial. The latter would provide more incentives to public entities to participate in the program, since they would receive a share of the savings achieved.
- **Energy efficiency fund.** In many countries where the availability of commercial funding for EE is quite limited and/or financial institutions (FIs) exhibit high risk aversion, governments have created EE funds that provide direct financing for EE projects, sometimes requiring cofinancing from commercial banks. Such funds can be structured to aggressively seek out projects; market EE loans; work closely with potential borrowers; and perform loan intake, supervision, and collection services. Several funds in the region — the Romanian and the Bulgarian EE funds (box 4.1) among them — are managed by independent professional fund managers. Alternatively, existing financial institutions could manage such funds. Many funds are fairly broad in that they serve a range of different sectors (public/private) and provide financing for EE as well as renewable energy projects. Depending on the needs of clients and the financial sector, they may offer different products such as loans, guarantees, and various capacity-building and project preparation and implementation services.
- **Dedicated credit line, implemented through commercial banks.** Such credit lines may be established by a public entity (such as a government agency and/or donor organization) to enable the financing of EE projects by a private sector organization (bank or financial institution). A credit line is most appropriate when the commercial financial market is less mature and local financial institutions are not undertaking much financing of EE projects, due to lack of knowledge and understanding of the characteristics and benefits of EE projects and/or limited liquidity. The donor often requires that the recipient of the credit line contribute an equal share of each loan from its own funds to encourage proper credit and risk analysis and to leverage public funding.
- **Risk sharing program — partial credit guarantee (PCG).** Such a program, with funding from a donor or public entity, is established to reduce the private sector’s risk in financing EE projects (by sharing the risk through a guarantee mechanism), thereby enabling increased private sector lending to EE. This is a suitable mechanism where

the commercial financing market is somewhat more mature, and local financial institutions are willing to consider financing EE but are concerned about the potential risks of such projects. Experience in various countries shows that loan/credit guarantees have sometimes been successful in stimulating EE lending from primary lenders.<sup>7</sup> PCG facilities typically provide a 50 percent guarantee on loss due to defaults on EE loans of a commercial bank participating in the program. This means that, while the risk associated with the loan transaction is reduced, the lender still has a substantial amount of its capital on the line and will therefore carefully appraise the creditworthiness of the borrower and the viability of the underlying transaction. The reduced risk for the lender may result in lower collateral requirements for the borrower.

- **Financing through energy service companies (ESCOs); creation of a public ESCO or “super” ESCO.** ESCOs or other types of energy service providers offer a broad range of services, including providing or arranging commercial financing (to public agencies, industries, housing associations, and so on) under a performance-based agreement, in which guarantees are provided for the energy savings achieved. The client, in this case the public agency, makes payments to the ESCO only upon the satisfaction of the guarantees, thereby eliminating much of the technical and performance risk for the agency (Singh and others 2010). In cases where the energy services industry is weak or nonexistent, it could be strengthened by initially creating a public ESCO, for example, within a utility. This entity would perform ESCO services and sub-contract project implementation to private sector companies.

## THE PROS AND CONS OF THE DIFFERENT FINANCING OPTIONS

The five EE financing options introduced in the previous section are all used in the region, but they do not all appear viable to support the financing of public sector EE activities as envisioned in the National Program for Energy Efficiency in Public Buildings (NPEEPB). Table 4.1 provides a list of the conditions under which each option should ideally be used, its pros and cons, possible issues to be addressed, and examples of where in the region and elsewhere the financing option has been introduced.

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<sup>7</sup> For example, the International Finance Corporation’s (IFC’s) Commercializing Energy Efficiency Finance Program that successfully leveraged commercial bank financing for EE programs in Hungary, the Czech Republic, and Slovakia (IFC 2012); World Bank China Second Energy Conservation Project; and USAID DCA in Bulgaria and Macedonia. These programs have supported both public and private EE project financing.

**Table 4.1 Financing Options and Their Pros and Cons**

Financing option	Conditions	Pros	Cons	Possible issues to be addressed	Examples
1. Financing by the MOF using government budget allocations or IFI/donor funds, investment grants, or budget capture (MEEIP).	Credit barrier is too high, underdeveloped banking sector, overcollateralization. Grants should target new and underdeveloped markets, programs must be efficiently administered, initial subproject results should be intensely disseminated, need viable cofinancing. Availability of such funding.	Easy to implement. Can directly finance municipalities.	Sustainability is questionable. Funding ceases if not designed as revolving fund or there are no future replenishments.	Who will manage/administer funds, for example, (existing) PMU in the MOF?	Hungary, Lithuania, Armenia, Belarus, FYR Macedonia (MSIP), Montenegro, Serbia. Under preparation: Kazakhstan.
2. Energy efficiency fund	Insufficient liquidity in banking sector, major aversion to risk among lenders. Use of grant funds as subordinated debt can help mobilize commercial cofinancing. TA to disseminate information on EE subproject performance/ financial data critical to sustainability. Professional, well-incentivized fund manager and team is key.	Can be structured to address financing needs and evolving capacity of municipalities.	It may be difficult to cover the costs of the fund from its revenues.	Needs a strong fund manager.	Bulgaria, Romania, Armenia.
3. Risk sharing program (partial credit guarantee)	Well-developed banking sector, banks are liquid and willing to accept some risks, and sufficient market activity to develop project pipeline. Guarantees cannot solve systemic banking or credit problems.	Has worked well in some Central and Eastern European countries. May scale up commercial financing.	Needs a relatively mature banking sector and eligible borrowers. Poor experience reported by the World Bank in some countries.	Is the banking sector in FYR Macedonia mature enough? USAID DCA had limited success.	DCA in FYR Macedonia, Bulgaria, and other countries of the region. Bulgaria, CEEF Program (IFC), China, Croatia, Hungary (IFC), Poland.
4. Dedicated credit line with commercial institution	Well-developed banking sectors, banks are willing to accept risks and EE as line of business, and sufficient market activity to develop project pipeline. Need for parallel TA to develop strong demand, create sustained quality pipeline.	Leveraging of private funds.	Need municipalities or ESCOs that have borrowing capacity. Both are limited in FYR Macedonia.		KfW credit line in Serbia, Hungary, China, Turkey, Ukraine, Uzbekistan. Under preparation: Russia, Turkey.
5. Commercial financing using ESCOs/ performance contracts	Supportive policies and enabling environment. Introduction of simpler business models first. Appropriate financing schemes. Early market development through public sector projects. Development of PPP models (for example, public ESCO, super ESCO, ESCO agents, ESCO financing windows) to kick-start market.	Can address public sector EE implementation issues.	Needs a market with operating ESCOs.	FYR Macedonia does not seem to have ESCOs ready for this option.	World Bank China ESCO program.
6. Public ESCO or “super” ESCO	No private sector ESCO industry, but interest/demand to develop ESCO industry. Contracting between public ESCOs and public sector clients may be easier than with private sector service providers.	Can address financing issues and build ESCO capacity.	Need to create a new organization—has been tried in FYR Macedonia without success. Need to provide funding.	Where will such a public ESCO be located?	Ukraine Public ESCO (EBRD), Croatia HEP ESCO (World Bank/ GEF), Armenia, Uruguay.

Source: Authors.

Note: CEEF = Commercializing Energy Efficiency Finance; DCA = Development Credit Authority; EBRD = European Bank for Reconstruction and Development; EE = energy efficiency; ESCO = energy service company; FYR = Former Yugoslav Republic; GEF = Global Environment Facility; HEP = Hrvatska Elektroprivreda d.d.; IFC = International Finance Corporation; IFI = international financial institution; KfW = Kreditanstalt für Wiederaufbau; MEEIP = Municipal Energy Efficiency Improvement Project; MOF = Ministry of Finance; PMU = Project Management Unit; PPP = public private partnership; TA = technical assistance; USAID = United States Agency for International Development.

The two most flexible financing mechanisms that would be able to serve all public entities are (i) financing through the MOF, similar to the current Municipal Services Improvement Program (MSIP) (World Bank 2009b), and (ii) an EE fund. While the MSIP has some limitations, in that municipalities need approval of the MOF to be eligible for project financing, these could be overcome with other forms of securitization (see chapter 6). For public entities that are dependent entirely on the central budget, financing conditions and mechanisms that would enable them to participate would have to be explored during the detailed design of the financing mechanism. These two financing options can also accommodate the provision of other services that are considered necessary for the successful implementation of the NPEEPB — assistance and support for energy auditing, project design, procurement, and measurement and verification (M&V). One of the main questions to be answered for the establishment of an EE fund is whether to establish it as a new entity or whether it can be operated by an existing organization, such as a commercial financial institution. This will be discussed in detail in chapter 6.

The credit line and PCG cannot, in the near future, serve the largest part of the public sector market — that is, those public entities that are not creditworthy. But the dedicated credit line is still included as one of the three financing options to be discussed further, since there is some, albeit limited, experience with it in FYR Macedonia. Municipal borrowing on commercial credit terms is taking place in FYR Macedonia on a limited basis. Five municipalities have commercial loans, 15 municipalities are participating in a World Bank program that provides concessional loans to municipalities, and 1 municipality has a loan from the European Bank for Reconstruction and Development (EBRD). Each loan must be approved by the MOF and the municipal council. Commercial banks are lending to municipalities at 7–9 percent for 5 to 7 years, but the maturities can be stretched to as long as 10 years depending on the financial condition of the municipality. The banks are providing a 1-year grace period on repayment. For private borrowers, the banks require collateral up to 130 percent. Meanwhile, the law prohibits municipalities from using public property for collateral, but the banks may place a lien on a municipality's bank account, into which it can be asked to deposit its revenues. It is unclear if any bank has ever created such a lien mechanism. Instead, loan security is provided by the MOF, through a repayment guarantee to the banks. Alongside ongoing decentralization and the increasing autonomy of municipalities, commercial financing of municipal public infrastructure will become more important and widespread in the future, as it already is in other countries of the region (NALAS 2012). Of the four banks interviewed, none expressed interest in financing municipalities due to concerns regarding collateral, creditworthiness, independent revenues, and other factors.



The PCG instrument will be excluded from further consideration since there is already one ongoing in FYR Macedonia. The Development Credit Authority (DCA), financed by the United States Agency for International Development (USAID), has been established with two commercial financial institutions, but there has been only one municipal EE project supported to date. The reasons for the slow uptake appear to be: the reluctance of municipalities (they need to be certified by the MOF and are unaccustomed to borrowing commercially for infrastructure projects), the availability of better financing terms from the MSIP, and banks' unfamiliarity with this kind of client. The DCA is now being restructured to focus more on small and medium enterprises (SMEs).

The concept of the public entity engaging an ESCO to provide EE services (including financing) under the energy saving performance contracting (ESPC) approach — with payback generated by energy savings — is intriguing. In FYR Macedonia, however, this concept is not yet a reality. Construction companies, design institutes, and energy consultants are still quite content to stick to their basic lines of business and/or are unable to provide the wide range of services required from a full-service ESCO. They may also lack the capital and creditworthiness to undertake multiple projects, payments for which might stretch out over several years. The most important barriers, however, are related to public budgeting, accounting, and procurement rules:

- Many public agencies still receive annual budgets for their operating costs (including energy) from the central budget. If energy costs were reduced due to energy savings, budgets could be reduced.
- Accounting systems do not clearly distinguish energy savings from other cash items — under the current system, municipalities may only borrow in general obligations, to be repaid from general municipal revenues.
- Provisions in the Law on Public Procurement made it impractical in the past to operate an ESCO model — the 2012 Law on Concessions and Public-Private Partnership (GOM 2012) would apply to contracts between public sector entities and ESCOs, but its novel tendering and contracting provisions and approval mechanisms are still largely untested. Until these new provisions have been applied successfully in several initial projects and the budgeting and accounting rules are changed, the ESPC will be difficult to implement in FYR Macedonia's public sector buildings.

There is no public agency apparently capable of operating a public ESCO. The efforts of the district heating utility to establish an ESCO have not been successful thus far.

Some key issues to be considered in the determination of financing mechanisms that can be considered viable under the current (or somewhat modified) conditions ruling the public, service, and financial sectors in FYR Macedonia are listed in table 4.2. The main considerations are:

**Table 4.2 Key Considerations for Establishing a Shortlist of Financing Mechanisms in FYR Macedonia**

	Financing by MOF (MEEIP)	EE fund	Credit line	Partial credit guarantee	Financing through ESCOs
Public sector market segments to be served	All.	All.	Creditworthy municipalities and entities.	Creditworthy municipalities and entities.	All.
Types of instruments and risk coverage provided	Grant/loan support to preparation of a project pipeline.	Loans, energy services, project pipeline.	Loans.	Loans; credit guarantee.	Energy services; technical and performance risk.
Grant funding or loan financing	Loan; could include some grant.	Loan; could include some grant.	Loan; could include some grant.	Loan.	Repayment from savings.
Project identification, packaging, preparation	Identification — PMU packaging/preparation — client with some support from the PMU.	Fund service.	Identification — bank packaging/preparation — client.		Yes, through ESCO.
Oversight; management	MOF/donor; managed by the PMU within the MOF.	Board; fund manager.	IFI/donor; bank.	IFI/donor; bank.	Not applicable.
Potential funding sources	Donors/IFIs: World Bank, EU (IPA).	Donors/IFIs: World Bank, EU (IPA).	Donors/IFIs.	Donors: USAID (DCA).	Commercial banks (own funds, credit line).
Other					Needs support from nodal agency to develop public sector market.

Source: Authors.

Note: DCA = Development Credit Authority; EE = energy efficiency; ESCO = energy service company; EU = European Union; FYR = Former Yugoslav Republic; IFI = international financial institution; IPA = Instrument for Pre-Accession Assistance; MEEIF = Municipal Energy Efficiency Improvement Project; MOF = Ministry of Finance; PMU = Project Management Unit; USAID = United States Agency for International Development.

- Can all public entities be served by the financial mechanism?
- Can windows for different financial instruments be offered?
- Can different financial conditions be offered for different kinds of clients?
- Can different services be offered in addition to financial services, depending on the capability of clients?
- Is it likely that the build-up of a project pipeline will be aggressively pursued?
- Is it likely that project implementation will be feasible under the current structure of the EE delivery infrastructure?
- Are donors willing/able to contribute funds to the particular mechanism?
- Is oversight likely to be effective but nonintrusive, leaving financing decisions to the management/PMU of the financial mechanism?

The answers to these questions confirm that further consideration should be limited to the MOF financing (MEEIP), EE fund, and EE credit line and that the partial credit guarantee and ESCO financing should not be considered further.

## RECOMMENDED OPTIONS FOR FYR MACEDONIA

In the following discussion, the three shortlisted options considered in this report and their major characteristics will be introduced (see table 4.3 for a comparison). Detailed implementation plans are proposed in chapter 6.

### **Option 1: Independent, Full-service FYR Macedonia Energy Efficiency Fund**

The Energy Law (GOM 2011a) provides for the establishment of an EE fund (Article 130), which would disburse support for the public and private sectors when implementing obligations under the law (Article 131). The fund and its institutions would be governed by its bylaws; an operational manual would specify the specific rules and regulations under

## BOX 4.1 EXAMPLES OF ENERGY EFFICIENCY FUNDS IN THE REGION

### Bulgaria Energy Efficiency Fund (BEEF)

The fund was established in 2006 and capitalized with \$15 million grant funds from the Global Environment Facility (GEF), the governments of Austria and Bulgaria, and several private shareholders. It is overseen by a nonpolitical **board of directors**, which includes the government, the private sector, and NGOs.

A competitively selected **fund manager** is responsible for the operation of the fund and is compensated on a performance basis. The fund operates on a fully **commercial basis**, including covering administration costs and defaults.

The fund serves mostly the **SME industry, and the public and residential sectors**, with about 60 percent of projects in municipalities. It provides loans to end users, portfolio loans to ESCOs, and **loan guarantees**.

The fund is financially sustainable and to date has financed or guaranteed over 160 projects totaling **\$80 million**.

*Source:* World Bank 2010a.

which the fund would finance EE investments in public sector entities. A board of directors comprised of representatives from both the public and private/nongovernmental organization (NGO) sectors would oversee the fund.

The fund could be capitalized initially from international financial institution (IFI)/international donor funds. Those could be channeled through the MOF or go directly to the fund. It would be managed by an independent, professional fund management company ("fund manager"). Eligible to participate in a competitive selection of the fund manager would be a consortium consisting of local or international banks and entities with technical and financial expertise; or an existing FYR Macedonian entity, such as a commercial bank operating in FYR Macedonia.

The mission of the fund would be to finance EE projects implemented by municipalities and other public entities on a commercial basis, using the energy cost savings resulting

## BOX 4.1 EXAMPLES OF ENERGY EFFICIENCY FUNDS IN THE REGION

### Armenia Renewable Resources and Energy Efficiency Fund (R2E2 Fund)

The fund was established in 2005 and is capitalized with an **\$8 million** International Development Association (IDA) credit. The fund is overseen by a **board of directors**, which includes the government, private sector, and academia and operates on a fully **commercial basis**.

The fund currently implements a World Bank/GEF project that provides EE services in **public sector** facilities—for example, municipal street lighting, schools, hospitals, and administration buildings (average size about \$100,000). It is expected to finance projects worth \$8.7 million between 2012 and 2015 and to provide technical assistance (TA) for project preparation and capacity building.

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

- **Loans** will be provided under an ESA, whereby the fund will also provide additional services against a service fee (conduct a preliminary screening, carry out the procurement of design and works, oversee construction and commissioning, pay the contractors for services provided, and monitor the subprojects). The loans will be treated as municipal debt, with fixed repayment obligations to be made within their budget provisions in future years. The amount of the repayments will be designed to allow fund clients to repay the investment costs and service fees from the accrued energy cost savings.
- **Energy service agreements.** The fund will first determine the average baseline energy use, identify the general scope of a subproject, develop bidding documents, conduct the procurement, finance the project, oversee construction and commissioning, and monitor the subproject. The ESA will obligate the facility to pay the baseline energy costs (with adjustments for energy prices, usage, and so on) over the life of the agreement. In such cases, there is no loan or debt incurred by the client entity. With these payments, the fund will pay the energy bills on the facility's behalf and retain the balance to cover its investment cost and service fee of up to 10 years. The agreement will also be designed so that the duration can be adjusted if the fund recovers its full investment earlier or later.

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

*Source:* World Bank 2012d.

from the projects to repay the financing costs. The repayments would be used by the fund to finance additional projects, thereby making it a revolving fund. Several such funds have been established in the region (box 4.1 presents various aspects of the EE funds in Bulgaria and Armenia).

The objective of an independent, full-service fund is to provide EE financing and associated services to all public sector entities. The fund would be established as an independent, nongovernmental entity. It would be staffed with a managing director and staff with technical, financial/credit, transaction, procurement, and outreach expertise. It would offer different products to different segments of the public institutions.

Initially, two products would be offered, targeted at two different kinds of public sector clients:

- The fund would provide loan financing for EE projects for municipalities and public entities with revenue streams independent of the state budget (for example, municipalities that have completed fiscal decentralization, universities, hospitals, and so on) and with financial discipline and adequate administrative and institutional capacity for project implementation. Loans would be treated as municipal debt, with fixed repayment obligations to be made within their budget provisions in future years. With these borrowers the fund would enter into loan agreements that will define the terms of the loans and certain additional services with associated fees. Such services could include developing bidding documents for services related to project implementation, carrying out the procurement of design and works on behalf of municipalities, overseeing construction and commissioning, paying contractors for services provided (from the proceeds of the loan), and monitoring the projects.
- For all other public sector entities (without their own budgets or capacity to implement projects), the fund would offer comprehensive energy service agreements (ESAs) under which the fund provides a very broad range of services, performing as an energy service provider and undertaking all of the actions needed to identify and implement the EE project. The ESA would obligate the participating organization to pay fixed payments equal to 95–100 percent of the baseline energy costs to the fund during the life of the agreement; these payments would be used to pay for all energy bills of the facility and reimburse the fund for the investment cost and service fee. In this way, EE projects could be financed without the municipality or public entity having to take on debt.

In addition, to the extent grant funds are provided by the GOM or donors for central government facilities, the fund shall have a separate “window” for offering partial grant funding for such projects.

#### **BOX 4.2 EXAMPLE OF A MUNICIPAL CREDIT LINE IN THE REGION: SERBIA**

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

**Sources:** <http://www.miclp-serbia.org/index.php?Itemid=51>; [http://www.energy-community.org/portal/page/portal/ENC\\_HOME/AREAS\\_OF\\_WORK/ENERGY\\_EFFICIENCY/Financing](http://www.energy-community.org/portal/page/portal/ENC_HOME/AREAS_OF_WORK/ENERGY_EFFICIENCY/Financing).

#### **Option 2: Dedicated Municipal EE Credit Line with an Existing Financial Institution**

A financial institution would be selected, preferably on a competitive basis, to operate a credit line. It would set up a separate program management unit (PMU) with a managing director and several staff. The PMU would report to the executive management and be in charge of identifying, appraising, and selecting projects and developing loan agreements with the public facilities. The final approval of the projects would be the responsibility of the executive management of the financial institution. An advisory board with GOM participation would provide guidance to the PMU.

Eligible clients would be municipalities and other public entities that can demonstrate creditworthiness. It may not be possible to operate several windows for different types of clients and requirements for value-added services in the credit line option. Procurement would be done by municipalities themselves, but perhaps with the help of a procurement consultant. While a variety of EE credit lines exist in the region, none specifically target municipalities and none of the local banks interviewed expressed an interest in lending to the municipal sector.

### Option 3: MOF Financing of Municipal Energy Efficiency Projects Using Budget Capture

Under this option IFIs such as the World Bank or other international donors provide funding to the GOM (MOF), which is on-lent to municipalities and other public sector entities, similar to the current MSIP project where municipalities sign subloan agreements with the MOF. For public entities that are depending entirely on the central budget, financing

#### BOX 4.3 EXAMPLE OF A MUNICIPAL PROJECT: MSIP IN FYR MACEDONIA

A PMU within the MOF is implementing the World Bank Municipal Services Improvement Project (MSIP). The key elements of the MSIP are:

- A total of \$75 million is being made available between 2009 and 2017, including 9 million for TA/grants.
- Creditworthy municipalities that have received approval from the MOF to borrow and that have publicized budgets and audit reports are eligible.
- Eligible projects have to be revenue generating or cost reducing. EE improvement projects are eligible, but only few have been proposed so far.
- The terms and conditions of the loans are the same as the conditions of the World Bank loan to the GOM, meaning that the interest rate is below the market rate and repayment is over a period of 10–15 years.
- The World Bank needs to provide a no-objection to every project.
- Since some municipalities lack capacity to do project design and procurement, they can receive some support from the PMU and be financed from the TA funds.

The MSIP also provides performance-based incentives. Municipalities can apply for grants (paid out of loan proceeds) for additional infrastructure projects (5–20 percent of the original loan amount) after successful project completion and implementation of reform initiatives aimed at performance improvements in service delivery.

*Sources:* World Bank 2009b; 2012c.



conditions and mechanisms would have to be explored during the detailed design of the financing mechanism that would enable them to participate. For example, some funds might be provided as grant funding to central government agencies.

Public sector entities would pay back loans from the energy cost savings of the implemented EE projects. This could be carried out through “budget capture,” where “repayment” would take place in the form of lowered outlays to the public entities in future years. The size of the reduced outlay would be based on the amount of measured savings. The flow of funds to pay for EE improvements would thus follow the same path as the normal appropriations from the MOF. The MOF should allow the institutions to keep a portion of the savings as an incentive for their active participation and support in identifying and implementing the EE projects. This would probably require some changes in public budgeting procedures. The development of such procedures could be supported by TA.

The program would be implemented by a PMU within the MOF. The PMU could de facto carry out many of the tasks that the EE fund would carry out under option 1, such as marketing, review of applications, monitoring and reporting, and assisting public entities with project preparation activities (such as a review of feasibility studies, preparation of detailed design and bidding documents, and supervision of construction activities). This would build upon experiences with the current MSIP project (see box 4.3) and the pilot projects implemented under the World Bank/GEF Macedonia Sustainable Energy Project (MSEP). Unless the size and skills of the MSIP PMU can be expanded, this would require the establishment of a new PMU with the necessary staffing and technical skills to carry out such responsibilities. The PMU would either have to charge a fee to municipalities for such services or cover their costs from public budgets.

But while building some capacity and demonstrating the benefits of EE retrofits in public buildings, this financing mechanism is not sustainable — once the funds are disbursed and/or the project is closed, the commercial sector is not necessarily going to take over funding of public sector EE projects. It might however be an option that the energy cost savings are not automatically deducted from next years’ budgets but instead provide the basis for a revolving fund that could operate over a longer period (see the Armenian example in box 4.1).

### **Comparison of the Three Options**

The main characteristics of the three financing options are compared in table 4.3.

**Table 4.3 Comparison of Financing Mechanism Options**

	<b>Independent full-service EE Fund</b>	<b>Dedicated credit line managed by existing entity</b>	<b>MEEIP (budget capture)</b>
<b>Financial facility manager</b>	Competitively procured international or national fund manager with technical, financial, and business experience to run the fund on a commercial basis (could be a consortium). Alternatively, existing financial institutions (for example, the MBDP) could be asked to express their interest in managing the EE fund.	Selected or competitively procured existing FI, supplemented with technical and other experts as needed; FI would set up a separate unit with a managing director.	PMU within the MOF—either new unit or within the existing MSIP PMU.
<b>Clients</b>	All public entities—municipalities, other public sector entities. Model 1: Creditworthy municipalities and public entities with own budgets. Model 2: Public sector entities without their own budgets or capacity to implement projects.	Creditworthy municipalities and public entities with own budgets.	All public entities—municipalities, other public sector entities. For those entirely dependent on the central budget, financing conditions and mechanisms would have to be explored during the detailed design of the financing mechanism that would enable them to participate.
<b>Services/responsibilities</b>	Model 1: Credit and project review, disbursement, loan monitoring, reporting plus additional services: developing bidding documents for services related to project implementation, carrying out the procurement of design and works on behalf of municipalities, overseeing construction and commissioning, paying the contractors for services provided (from the proceeds of the loan), and monitoring the projects. Model 2: Full services under an energy service agreement—help entities identify and prepare projects, develop bidding documents for project implementation services, conduct the procurement, finance the project, oversee construction and commissioning, and conduct the M&V.	FI: Credit and project review, disbursement, loan monitoring, reporting, credit line marketing and outreach, staff development, results reporting. Client: Project design, procurement. Third party: Project M&V. Energy agency: Capacity building and support for project design and procurement.	Preliminary screening to identify general scope of EE projects, develop bidding documents for services related to project implementation, support clients with project design and procurement, carry out project assessment, pay contractors for services provided, and monitor the projects.
<b>Loans/grants</b>	Could be commercial loans, concessional loans—depending on requirements of the funding sources.  Grants may be offered, if grant funds are made available by financing sources.	Could be commercial loans, concessional loans, depending on requirements/ conditions of the funding sources. Grants may be offered, if grant funds are made available by financing sources.	Could be commercial loans, concessional loans—depending on requirements of the funding sources. Grants may be offered, if grant funds are made available by financing sources.
<b>Client contribution</b>	Own capital (cost-share of about 20 percent) for model 1. Payment of 100 percent of baseline energy bills to fund for model 2.	Own capital (cost-share of about 20 percent).	Own capital (cost-share of about 20 percent).
<b>Collateral</b>	Yes, for model 1.	Yes.	Yes, for municipalities.
<b>Contractors/private sector involvement</b>	To be procured by client (model 1) and by fund (model 2); payment could be (partially) based on performance.	To be procured by client.	To be procured by client, with support by the PMU.
<b>Technical assistance</b>	Yes, project-specific TA provided through the fund. General TA may be organized by the energy agency.	Yes, project-specific TA to building capacity of the FI and its staff and to carry out marketing campaign. Other TA to be channeled through the energy agency.	Yes, project-specific TA provided through the PMU. General TA may be organized by the energy agency.
<b>Interaction FM—Board (PMU—MOF)</b>	Board approves transactions proposed by the FM. For projects meeting certain board-specified requirements, FM would have sole responsibility. The MOF has to confirm eligibility of the public entity to borrow.	Advisory role only of board. FI reports to managing FI executive. The MOF has to confirm eligibility of the public entity to borrow.	The MOF has to confirm eligibility of the public entity to borrow.
<b>Risks</b> - <b>Repayment</b> - <b>Technical</b> - <b>Energy savings</b>	R: Fund. T: Contractor. ES: Contractor (if performance-based contract)/Client.	R: FI managing the credit line. T/ES: Contractor (if performance-based contract)/client.	R: Client (budget capture). T/ES: Contractor (if performance-based contract)/client.

Source: Authors.

Note: EE = energy efficiency; ES = energy savings; FI = financial institution; FM = fund manager; M&V = measurement and verification; MBDP = Macedonian Bank for Development Promotion; MOF = Ministry of Finance; MSIP = Municipal Services Improvement Program; PMU = Project Management Unit; R = repayment; T = technical; TA = technical assistance.

CHAPTER

# 5

## Financing Sources

## POTENTIAL FINANCING SOURCES FOR INVESTMENT FUNDS AND TECHNICAL ASSISTANCE

For implementation of the first phase of the National Program for Energy Efficiency in Public Buildings (NPEEPB), the total costs are estimated at about €107 million — €95 million alone for energy efficiency (EE) investments and €12 million for technical assistance (TA) (ENSI 2012). It is assumed that the financing mechanisms identified in this report would be able to implement about 50 percent of the investments identified<sup>8</sup> (see chapter 7). Most of the funding will have to come from sources other than central and local government budgets due to the tight fiscal environment. This section surveys the relevant activities and plans of the international organizations that have in the past contributed funding for EE activities in Former Yugoslav Republic (FYR) Macedonia.

### Government Budget

Due to austerity measures, special funding for EE investments is not expected to be made available from the central government budget in the near future.

### IFIs/International Donors

Potential international financial institutions (IFIs) and donors include:

- **The World Bank** is a possible source of financing for the NPEEPB, preferably in the form of an EE fund or through the Ministry of Finance (MOF). Such funding could be available starting in 2014, based on a request from the Government of FYR Macedonia (GOM).
- **The European Bank for Reconstruction and Development (EBRD)** is currently preparing the Western Balkan Energy Service Company (ESCO) Program for the funding of public sector EE investments and is planning to provide TA to improve the enabling environment for ESCO operations, and to support ESCO project preparation and development of financial products for ESCO projects (see, for example, Miller [2012]). The ESCOs are already eligible to apply for funding from the EBRD's Western Balkans

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<sup>8</sup> This assumption is based on an informal assessment of the potential willingness of the various financing sources to dedicate resources for EE in public buildings in FYR Macedonia.

Sustainable Energy Financing Facility (WebSEFF)<sup>9</sup> through three local FYR Macedonian banks (NLB Tutunska Banka, Ohridska Bank, and Halkbank). This credit line is targeted at private sector lending, but improvements in public buildings with energy savings of at least 30 percent are among the eligible projects. The WebSEFF includes an institutional capacity-building component to address deficiencies in the regulatory framework and other obstacles to the development of the market for sustainable energy projects. The EBRD is currently developing a regional municipal infrastructure development fund (MIDF), together with the German Development Bank (Kreditanstalt für Wiederaufbau, KfW), and with possible funding from the European Union (EU). The MIDF will focus on those municipalities that have borrowing constraints, low capacity of project implementation, and need for training and support. It is expected to be active from 2013 to 2014. If EE investments in public buildings are eligible investments, the MIDF could support the NPEEPB's implementation in parallel to any specific financing mechanism as discussed in this report.

- **The United Nations Economic Commission for Europe (UNECE).** The Financing Energy Efficiency Investments for Climate Change Mitigation Project (FEEI)<sup>10</sup> is designed to establish a public-private partnership investment fund with a target capital of €250 million and to develop a pipeline of new and existing projects to be financed by it in countries in Southeast Europe, Eastern Europe, and Central Asia. The energy agency is the national implementing agency for FYR Macedonia. A project pipeline was identified (based on a survey of municipalities and project developers) that includes 26 proposals with a total project size of €33.8 million, and requests for financing in the amount of €17.4 million. Twelve of those projects were investigated in greater detail with the aim of presenting them to the investment fund developer. Their total project costs were €16.2 million and total finance requirements €9.6 million.<sup>11</sup> The project is also providing assistance to national governments and local authorities for economic, institutional, and regulatory reforms for the support of investment projects. The FEEI could thus contribute to accomplishing the NPEEPB goals, but only indirectly, not as a direct financing source for the financing mechanism.
- **The United Nations Development Programme (UNDP)** will provide funding for energy management in several municipalities, including in Skopje. Future funding in support of the NPEEPB is possible, but no decisions will be made before the adoption of the program by the GOM.

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<sup>9</sup> <http://www.webseff.com/>.

<sup>10</sup> <http://www.feei.info/eng/background>

<sup>11</sup> Energy Agency 2011; [http://www.ea.gov.mk/projects/unece/docs/web\\_Second\\_Progress\\_report\\_UNECE\\_FEEI\\_2.pdf](http://www.ea.gov.mk/projects/unece/docs/web_Second_Progress_report_UNECE_FEEI_2.pdf)

- **The Global Environment Facility (GEF).** FYR Macedonia has an allocation of \$2–3 million in the next GEF cycle. The GEF funds could possibly fund transactions and institution building under the NPEEPB, perhaps in parallel with an IFI-financed project. If the World Bank were to finance a project from 2014 onwards, it could be coordinated with a GEF project to fund TA and investment incentives.
- **Carbon finance.** EE improvement projects mitigate greenhouse gas (GHG) emissions; they could be eligible for carbon finance, thus accessing financial resources to reduce their incremental costs. Financial flows (carbon credits) start only once the underlying project has been successfully implemented and is operational. Given that the NPEEPB would result in reducing GHG emissions by about 39,000 tons carbon dioxide (CO<sub>2</sub>)/year — based on Energy Saving International AS (ENSI) estimations — development of the carbon finance component should be explored.

## EU Funding

EU funding can come from the following:

- **Instrument for pre-accession assistance (IPA).** There is strong interest among the EU delegation that FYR Macedonia contribute to a potential financial platform for EE in public buildings through IPA funds (grants). In the current (2007–13) planning cycle more than €100 million was made available, mostly for projects in the transport and environmental sector. Building the capacity of the Ministry of Economy (MOE) to implement the energy acquis is another activity to be supported. The 2014–18 cycle might provide an opportunity to apply for investment and TA funds in support of the NPEEPB. Though a new financial framework is currently being developed for the IPA II, funds under this framework will not be available before 2015. Hopefully EE projects will be among the eligible types of projects. Other funds might also become available in the short term, particularly from the Intelligent Energy Europe (IEE) operational initiative of the Competitiveness and Innovation Framework Programme, to support preparatory activities of the NPEEPB.
- **The Green for Growth Fund**<sup>12</sup> in Southeast Europe was initiated by the European Investment Bank (EIB) and KfW. Its shares are owned by donors, IFIs, and private investors. The aim is to serve all of the main groups of potential borrowers — small and medium enterprises (SMEs), private households, energy service companies, and so

<sup>12</sup> [http://www.ggf.lu/About-the-Fund\\_site.site..html\\_dir\\_nav\\_2\\_likecms.html](http://www.ggf.lu/About-the-Fund_site.site..html_dir_nav_2_likecms.html)

on — with appropriate mixes of loan, grant, TA, and guarantees. In FYR Macedonia, Halkbank received a €5 million loan from the fund, to contribute to the development of the EE lending operations of the Bank with private households and businesses.

- **European Investment Bank (EIB).** The TA facilities established by the EIB and the EU — ELENA European Local Energy Assistance, Joint European Support for Sustainable Investment in City Areas, and JASPERS Joint Assistance to Support Projects in European Regions — are in general available to EU member states only.

## Bilateral Donors

Bilateral donors include the following:

- **The United States Agency for International Development (USAID)** established the Development Credit Authority (DCA) with \$9 million, with the participation of two local banks (Unibanka and NLB Leasing).<sup>13</sup> As mentioned earlier, demand from the public sector has been low — Karpos is the only municipality that received a loan under the DCA — partially because concessionary financing from the Municipal Services Improvement Program (MSIP) is available to municipalities. The USAID has therefore decided to refocus the DCA to private sector clients, and new initiatives related to financing the NPEEPB are not in the USAID pipeline for the next few years; however, the USAID may provide additional training on energy auditing, ESCOs, and so on.
- **The German Development Bank (KfW)** is currently funding a credit line for residential, commercial, and industrial clients with Procredit. In other countries (for example, Serbia; see box 4.2) KfW has credit lines that are targeted at municipalities and are in high demand. KfW and the EBRD are currently developing a regional municipal infrastructure development fund (see above, under the EBRD).
- No other donors (such as Austria or Switzerland) are currently supporting energy or public sector projects in FYR Macedonia or have signaled intentions to do so in the near future.

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13 [http://macedonia.usaid.gov/en/sectors/economic/msme\\_dca.html](http://macedonia.usaid.gov/en/sectors/economic/msme_dca.html)

## Commercial Banks

As mentioned in chapter 2, commercial banks are reluctant to lend to public sector entities. Several municipalities have taken commercial loans, but the majority have problems accessing commercial financing due to lack of information and, possibly, issues with collateral. As long as municipalities have access to concessional financing (through the MSIP or similar instruments), they will be reluctant to consider higher-cost commercial loans.

## NPEEPB FINANCIAL SUPPORT: CONSEQUENCES AND NECESSARY ACTIONS

The above survey of potential financing sources shows some availability of international funding for direct and indirect support of the NPEEPB. It also shows that many donors seem to favor public sector financing through local FIs, since this is more sustainable and can leverage commercial financing. Because decentralization is not as advanced in FYR Macedonia as in other countries in the region, its public sector has fewer financing options than many neighboring countries. Nevertheless, the EBRD and KfW are considering programs that might be combined with other funding sources for implementation of the NPEEPB.

A promising direct funding option appears to be a combination of World Bank/GEF/EU-IPA funding. All three sources could provide investment funds as well as technical assistance for capacity building, and they would be able to do so under any of the three recommended financial mechanisms. Other donors could offer investment and TA support from their respective programs to complement the financing and implementation program adopted by the GOM. In this respect, the upcoming EBRD/KfW regional municipal fund seems particularly relevant. Not only would such an option provide excellent leverage, but it would also allow all interested donors to participate in the program while ensuring coordination under a single government-led initiative.

The GOM (MOF) would need to consider these options and determine the most appropriate ones. Should the GOM agree with the World Bank on financing to support the NPEEPB, it could be developed over the next year or two. The GEF focal point in the GOM, the Ministry of Environment and Physical Planning, would need to endorse such a proposal and allocate sufficient funding within the next GEF cycle for submission to the GEF Secretariat for consideration. Finally, the GOM (MOE) would apply to the EU Delegation for IPA funds to finance the NPEEPB.



CHAPTER



# Implementation Plan

## THREE FINANCING OPTIONS: COMMON FEATURES OF IMPLEMENTATION

As indicated earlier in this report, the former Yugoslav Republic (FYR) Macedonia has established a comprehensive strategic and legal framework for a reformed and sustainable energy sector with a strong emphasis on energy efficiency (EE). The Energy Law, adopted in 2011, and the related EE strategy and National Energy Efficiency Action Plan (NEEAP) provide the legislative and policy framework for implementing the EE actions in public buildings and facilities. This chapter identifies the major elements of the EE strategy for municipal and public facilities that are common to the three financing options that are identified in this report — the EE fund, EE credit line, and Municipal Energy Efficiency Improvement Program (MEEIP).

### Requirements for EE Plans

Municipalities in FYR Macedonia are required to develop EE plans and provide them to the energy agency. A number of municipalities have already initiated activities for the development of such EE action plans. The United Nations Development Programme (UNDP) has assisted some of the municipalities in developing their plans, while other municipalities have moved forward without assistance from donors. In all three of the proposed financing schemes, there is provision for technical assistance (TA) to assist the municipalities and public entities to comply with the requirements of developing their EE plans.

### Energy Audits

The NEEAP requires the municipalities to conduct energy audits of their buildings and facilities. Some activities have been initiated by municipalities to conduct such audits, while others may need TA for conducting audits. In all of the proposed financing options, it is anticipated that TA funds will be available to assist the municipalities and public entities to conduct energy audits.

### Role of the Energy Agency

Under the Energy Law and NEEAP, the energy agency has been assigned the responsibility for reviewing the energy audits and the EE plans prepared and submitted by the municipalities and public entities. The specific TA to be organized by the energy agency (but most likely outsourced and provided by private sector entities) may vary somewhat

under the three financing mechanisms (as discussed later in this chapter), but the general responsibilities will remain constant.

### **Establishment of the Project Management Unit**

All three options identified in this report envision the establishment of a project management unit (PMU) that will be assigned the major responsibilities for the implementation of the financing mechanisms to contribute to the NPEEPB. The PMU will be staffed with individuals with capabilities and experience in EE project implementation, experience with working in FYR Macedonia, and understanding of the financial and technical issues faced by FYR Macedonian municipalities. The specific location of the PMU will depend on the organizational structure of each option. In the case of the EE fund, the PMU will be established by the fund manager selected competitively to manage the fund. In the second option, the EE credit line, the PMU will be established by the financial institution selected to manage the credit line, and in the MEEIP, the PMU will be established within the Ministry of Finance (MOF).

### **Project Eligibility Criteria**

Most of the project eligibility criteria will be common to the three options. To be eligible for project financing (from the EE fund, EE credit line, or MEEIP), projects will need to meet the following criteria: (i) the building or facility must be publicly owned (for example, be a school, kindergarten, hospital, administrative building, or social facility and so on); (ii) the facility should be structurally sound (without major structural damages that may jeopardize the integral stability of the building); (iii) there should be no plans for closure, downsizing, or privatization of the facility; and (iv) there should be a comfort level of more than 50 percent.<sup>14</sup> In addition, the project should meet the following criteria: (i) the project should yield a minimum of 20 percent energy savings, (ii) the simple payback based on the investment cost divided by energy savings should be less than 10 years, and (iii) the project investment should be between \$50,000 and \$1,000,000.

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<sup>14</sup> Comfort level = Actual consumed energy × 100 / energy for normal conditions (%), where normal conditions mean that the entire building area is heated, and indoor temperature and number of days that facilities are heated are equal to the established norms.

## **Technical EE Measures**

In all three financing options, the technical measures to be implemented include insulation of walls, basements and attics; repair/replacement of external doors and windows; reflective surfacing of walls behind radiators, and improvement/replacement of boilers and heating systems; installation of controls on heating systems; replacement of incandescent bulbs with compact fluorescent lamps (CFLs); and replacement of inefficient fluorescent tube lights and lighting fixtures with efficient alternatives.

## **Cofinancing Needs**

It is anticipated that in all three financing options the municipality or public entity will be required to contribute a portion of the total project cost as its cofinancing or “project equity” contribution. Such contribution will be about 20–30 percent of the total investment cost of the EE measures. The only exception to this cofinancing requirement will be in the case of the EE Fund Investment Model 2, in which the fund will negotiate an energy services agreement (ESA) with the municipal or public entity “client” under which the fund will provide a full range of implementation services and the client will agree to pay an annual fixed amount of about 95–100 percent of the baseline energy costs to the fund.

## **Collateral Requirements and Securitization**

For the loan agreements signed with municipalities and public entities under the EE fund and EE credit line, the borrowers will need to provide appropriate collateral. The PMU will define the type of acceptable collateral in cooperation with the MOF. As a result of the fiscal decentralization process, many municipalities now have certain assets (buildings, land, and so on) that may be usable as collateral for the loans. It may also be possible to establish escrow accounts at the banks where the borrowers may open operating accounts. Another possibility is to utilize the payments to municipalities from the MOF for their share of the communal fees, certain taxes (property tax, property sales tax, and so on), value added tax (VAT) receipts, and personal income taxes. Such collateral requirements may not be required for the MEEIP, where the loans to the municipalities are provided directly by the MOF.

## The Provision of Technical Assistance

All financing options will include the provision of TA. Examples include:

- Program marketing to and capacity building of the target public sector entities to address the information and knowledge gaps related to EE, build demand for financing, and improve the sustainability of energy savings. Activities will include program workshops and flyers, development of a program Web site, development of successful case studies for broader dissemination, and training on educational programs that schools and other organizations can implement to reduce energy waste and collect/analyze energy consumption data.
- Development of the procedures for assisting the municipalities and public entities to engage energy service providers under public-private partnerships (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 in FYR Macedonia. Bundling procurements by multiple public entities implementing similar projects should also be explored, as this would presumably lower transaction and equipment costs through bulk purchases.
- 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 (for example, blend of goods, works, and services; use of net present value [NPV] rather than least cost; retention of savings by beneficiaries; use of measurement and verification [M&V] protocols as basis for payments to service providers), development of alternate financing models for EE in the public sector, regulatory support to assess and develop feasible DSM mechanisms, development of methodologies and functions related to energy and EE statistics, and updating of the EE action plan.
- Capacity building for energy service providers 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 methodologies for M&V and providing M&V training to PMU staff, public sector facility managers and engineers, and private sector service providers.

## **The PMU: Capacity Building**

Under all three financing options, a PMU will be established. There will be a need to build the capacity of the PMU staff to be able to manage the financing and implementation of the EE projects. The TA for such capacity building would include training related to EE technologies and relevant implementation strategies, basic concepts and tools for performance-based contracts, guidelines and procedures for M&V of energy savings, and monitoring and reporting of the overall program results to the financing sources. In addition, in the case of the EE fund and MEEIP, the capacity building TA may also include funding for the initial set-up, administration and operation of the PMU, and for purchase of equipment for auditing, data collection, and M&V.

## **Possible Grant Financing**

It is possible under all three options that the financing sources may provide some grant financing for public sector EE projects. For example, the current Municipal Services Improvement Program (MSIP) implemented by the MOF has a grant component. Also, some grant funding may be available from the European Union's (EU's) Instrument for Pre-Accession Assistance (IPA) funds. To the extent such grant funds are available for public sector EE projects, the fund, credit line, or MEEIP can incorporate these into the financing package.

## **Encouragement of Performance-based Implementation Contracts**

Under all three financing options, the PMU shall encourage the use of performance-based contracts for the energy services to implement the EE projects.

## **Sustainability and Replicability**

Under each of the financing options, the PMU will devote efforts to select projects carefully to assure sustainability of EE investments. Project eligibility criteria have been determined in such a way that EE investments in the eligible public sector facilities are financially viable and can provide sufficient energy cost savings to justify the investment. EE investments in social and other public facilities can help stimulate the market by creating demand for energy-efficient equipment and services, and send a strong signal to the private sector and general public about the government's commitment to EE.

The PMU will strive to achieve **replicability** of EE investments in cooperation with relevant government agencies of the GOM by: (i) removal of existing legal, regulatory, procurement, and information barriers to EE project implementation in the public sector; (ii) development and testing of various financing, implementation, and repayment schemes for EE projects in public sector facilities, which will also have a strong demonstration effect; (iii) training for public agencies to support implementation of EE policies and regulations; (iv) capacity building for private sector service providers to strengthen their capacity in carrying out energy audits, energy management, financial appraisal of EE investments, M&V, and other key areas related to provision of energy services and management; (v) revolving of the investment funds by the fund, and (vi) increasing familiarity of municipalities with commercial borrowing for EE and of financial institutions with municipal customers, respectively.

### **Building the Energy Services Delivery Infrastructure**

In the case of the EE fund and MEEIP, the PMU will make every effort to engage local energy service providers in the project implementation to contribute to the development of an energy services delivery infrastructure and ensure its sustainability. To accomplish this, the PMU will develop approaches for the borrowers to enter into performance-based service contracts with contractors, installers, construction firms, and other types of service providers. The contracts will include project design, and supply, installation, commissioning, and (possibly) maintenance of equipment, as well as M&V. The contracts will include provisions to allocate some of the project performance risks to the service providers based on the actual energy savings generated from the project. It may be unrealistic to expect that such activities would be undertaken by the financial institution (FI) managing the EE credit line; however, in this option, provision may be made to engage international experts to provide such support.

### **Measurement and Verification of Subprojects**

A key element of EE project implementation is the M&V of energy savings and related reductions in greenhouse gas (GHG) emissions. All financing sources will require formal M&V. Therefore, under all of the three financing options, guidelines and procedures for M&V will be specified. The specific elements of the M&V approach will depend on the nature of the project and individual measures, but in general the M&V procedures will define the specification of baseline operating conditions and energy consumption, methods for measuring the postinstallation energy consumption, approaches and formulas for adjusting the baseline in case the operating conditions change, and formats for reporting the M&V results.

A number of different methodologies have been developed for conducting M&V.<sup>15</sup> One of the most common and internationally accepted approaches is the International Performance Measurement and Verification Protocol (IPMVP) (EVO 2012). Most M&V protocols provide a range of M&V methods and approaches of varying degrees of complexity. The IPMVP, for example, provides four options that may be used for different EE measures. Some public agencies, particularly in developing countries with nascent EE markets, have used simpler methods with a “deemed savings” approach for M&V. Deemed savings is a predetermined, validated estimate of energy and peak demand savings attributable to an EE measure instead of energy and peak demand savings determined through M&V activities (Singh and others 2010). Under the deemed savings approach, the public agency and the energy service provider agree to a simplified savings calculation procedure, and the savings are then “deemed” or calculated using this procedure. Under any of the proposed financing approaches, guidelines for M&V will be developed, using a combination of deemed savings and the IPMVP.

In FYR Macedonia, an M&V methodology is being developed, with support from GIZ (Teskeredzic 2011), to meet the needs of the EU’s Energy Services Directive (ESD) (EU 2006). One of the major objectives of this directive is to quantify the energy savings resulting from energy services and other EE improvement measures. A consortium of 21 partners has developed, under the Evaluation and Monitoring for the EU Directive on Energy End-Use Efficiency and Energy Services (EMEES) project,<sup>16</sup> methods to evaluate the measures implemented to achieve the 9 percent energy savings target set out in the ESD. The project has developed a system of bottom-up and top-down methods and their integrated application for the evaluation of 20 types of EE technologies. The proposed approach for M&V and the design of the TA will be developed using an appropriate combination of these methods as well as the approaches and methodologies of the IPMVP.

## **Operational Manual**

The PMU shall prepare an operational manual (OM) that will specify project procedures for participating public entities and the PMU, and include project documents, such as procurement guidelines and terms of and conditions of the loan agreement. The OM shall also specify:

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<sup>15</sup> For example, M&V methodologies have been developed by the U.S. Federal Energy Management Program; California Public Utilities Commission; Australian Department of Industry, Science and Trade; and the United Nations Framework Convention for Climate Change (UNFCCC).

<sup>16</sup> [http://www.evaluate-energy-savings.eu/emeees/en/the\\_project/project\\_description.php](http://www.evaluate-energy-savings.eu/emeees/en/the_project/project_description.php).



- Project implementation activities/responsibilities, including procurement and financial management procedures and safeguards as required by the financing sources.
- Reporting requirements for participating borrowers and the PMU.
- Project preparation activities and responsibilities, including procedures and formats for proposals, appraisal, and approval activities.
- Terms of reference and responsibilities of the PMU staff.
- Formats for quarterly or semi-annual project progress reports.

### **Monitoring and Reporting of Program Indicators**

Another important requirement of the financing sources will be the monitoring and reporting of the results of the financing program. Indicators will likely include: number of projects financed/commissioned, total amount of financing, energy savings, GHG reductions, and so on. Under all of the financing options, the PMU will be responsible for project monitoring, results evaluation, and reporting. It will conduct pre- and postassessment of the project development indicators to determine project impact on the performance of municipalities and public entities. The monitoring and reporting of project progress against plans will be reflected in the quarterly or semi-annual progress reports prepared by the PMU. The progress will include financial management reports and updates on the status of the individual loans (and ESAs, in the case of the EE fund). These reports will also outline any corrective actions needed to sustain or improve project progress.

## **UNIQUE CHARACTERISTICS OF THE ENERGY EFFICIENCY FUND**

### **Organizational Structure**

The operations of the FYR Macedonia Energy Efficiency Fund (MEEF) will be conducted under the supervision and oversight of a board of directors (BOD). The BOD will consist of eight members, six of them representing the public sector and two representing the private sector and nongovernmental organizations (NGOs) engaged in the areas of EE. It will be chaired by the MOF. The public sector members will include representatives of the

Ministry of Economy (MOE), the Energy Agency, Ministry of Local Self-Government, Ministry of Education, and Ministry of Health. The NGO/private sector members could include organizations such as the Association of the Units of Local Self Government (ZELS) and Chamber of Certified Architects and Engineers. The BOD will be responsible for strategic decisions, including the approval of the annual business plan of the fund.

Two options are available for the management of the fund: (i) a professional fund manager, and (ii) an existing financial institution (such as a commercial bank).

Under the first option, the BOD shall select a professional fund management organization (fund manager) using a competitive bidding process. The fund manager may be a single entity/company or a consortium. The selection of the fund manager will be based on a specified set of criteria, including the experience and capabilities of the organization in managing public funds, knowledge and understanding of EE project implementation, experience with working in FYR Macedonia, understanding of the financial and technical issues faced by FYR Macedonian municipalities, and so on.

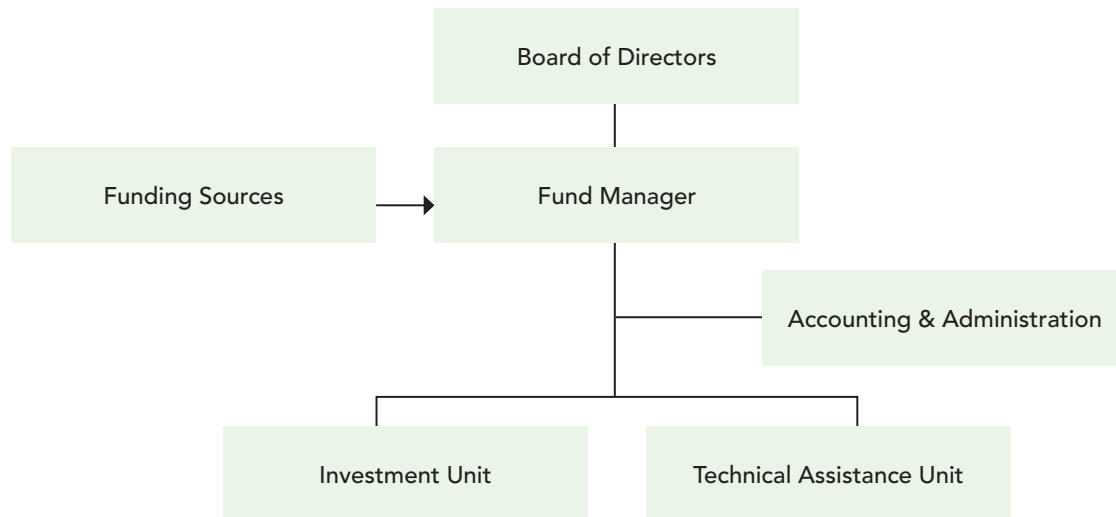
Under the second option, the BOD shall select an existing organization to be the fund manager, using a competitive bidding process with the same terms of reference as in option 1. Examples would be the Macedonian Bank for Development Promotion (MBDP) or another FI with operations in FYR Macedonia. The organization will be selected based on its experience, interest, and willingness to undertake the fund management responsibilities, and its capacity to implement the actions needed (as described below).

The fund manager shall be responsible for identifying, appraising, and selecting projects and developing the project agreements (loan agreements and ESAs) with the municipalities and public facilities. The BOD shall be responsible for developing the rules and procedures for project approval. The Board may retain the authority to approve large projects, but may delegate the approval authority to the fund manager for smaller projects subject to the projects meeting certain predefined guidelines and criteria.

The organization of the fund shall include two major units — the investment unit and the TA unit. The investment unit will be responsible for development of (i) the loan agreements with municipalities and public entities with revenue streams independent of the state budget (for example, municipalities that have completed fiscal decentralization, universities, hospitals, and so on) and with financial discipline and adequate administrative and institutional capacity for project implementation; and (ii) the ESAs with public sector entities (without their own budgets or capacity to implement projects). The TA unit will provide a range of technical services to the municipalities and public entities as well as to service providers, M&V agents, and so on.

The organizational structure of the EE fund is illustrated in figure 6.1.

**Figure 6.1 Organization Structure — Energy Efficiency Fund**



Source: Authors.

### Scope of Services and Pricing

The fund shall offer two investment models each with a different financial product:

#### a) Investment Model 1 — Loan Agreements

The fund shall enter into loan agreements with municipalities and other public entities (borrowers) to finance EE projects. The terms and conditions of the loan agreements will be structured consistent with the requirements and conditions specified by the funding sources. In general the terms of the loan would be consistent with the items identified above. The loans will be treated as municipal debt, with fixed repayment obligations to be made within their budget provisions in future years. The fund will also offer optional additional services to the borrowers that may include the development of bidding documents for services related to project implementation, carrying out the procurement of design and works on behalf of borrowers, overseeing construction and commissioning, paying the contractors for services provided (from the proceeds of the loan), and monitoring the projects.

The interest rate, repayment period, and other loan terms will be based on the re-

quirements and conditions specified by the funding sources. The additional services, should the borrower elect to accept them, will be either priced into the loan terms or charged as a separate fee to the borrower. If grant funds were available, these could be channeled by the fund to its public clients, according to criteria developed for awarding those grant funds.

#### **b) Investment Model 2 — Energy Service Agreements**

The second product offered by the fund manager shall be comprehensive services to undertake all of the actions needed to identify and implement the EE project. Such services will be offered under an ESA to municipalities and public entities (clients) without their own budgets or with limited capacity to undertake project implementation. Under the terms of such an ESA, the client would be obligated to pay the fund a fixed annual payment equal to 95–100 percent of the baseline energy costs over the life of the ESA; the fund manager would establish the baseline and provide the full range of implementation services. The fixed annual payment will be subject to adjustments, should the facility's baseline conditions change (for example, due to changes in the heated area or comfort levels, increases in tariffs, colder than usual climate, and so on). With these payments, the fund will pay the energy bills (gas, oil, power) on the facility's behalf and reimburse itself for its investment cost and service fee. The agreement shall not be longer than 10 years, and will be designed in such a way that the duration can be adjusted if the fund recovers its full investment earlier or later. An ESA should not be considered as a liability on the balance sheet of the public entity, and therefore would not be part of the entity's debt ceiling. An ESA would, however, be more expensive than a pure loan since other services are included that need to be paid for.

In addition to the two main products described above, the fund would be able to offer other services if the market requires them, such as guarantees for municipal loans from commercial banks, or channeling of subsidy funds or outright grants to eligible clients. Eventually the fund could also serve private sector clients (as per the Energy Law).

#### **Equity Needs for the EE Fund**

A certain amount of equity is needed to kick-start the fund to cover the risk of payment defaults, both in the case of a loan agreement that would be secured with collateral and in the case of the ESA for which a method of securitization of the pledged energy bill payments will have to be devised. Such equity, estimated at \$2–\$10 million for a fund capital of \$25–\$30 million, could be provided through donor or GOM contributions. For example, in the case of the Armenia Public Sector EE project, implemented by the R2E2

**Table 6.1 Illustrative Operational Costs of Energy Efficiency Funds (million \$)**

	Romania	Bulgaria	Armenia (Appraisal)
Signed contracts (\$ million)	11.4	16+2 (guarantees)	121 with a volume of \$8.7 million
Disbursements (\$ million)	9.7	n.a.	n.a.
Cumulative leveraged investments (\$ million)	34	40	n.a.
Operating costs (\$ million)	1.4 (+0.3 for TA)	1.1 (possibly included TA)	n.a.
Years of operation	5	5	n.a.
Total fund capitalization (\$ million)	8.0	13.9	8.7
Of which GEF contribution	8.0	10.0	0.7
Operational costs as % of signed contracts	12.4%	6%	n.a.

Sources: World Bank 2009a, 2010a, and 2012a.

n.a. Not applicable.

Note: GEF = Global Environment Facility; TA = technical assistance.

Fund, equity is indirectly brought into the fund by \$0.7 million of the Global Environment Facility (GEF) grant component. This will finance the first 7–10 projects to be funded under ESAs (World Bank 2012a). If repayment takes place without problems, this amount will stay with the fund and can provide some amount of risk provision. For the new Moldova EE Fund that is expected to start operation in late 2012, the Government of Moldova has pledged €15 million from its budget as an equity contribution (Moldova’s News 2012). Bulgaria also has about a €15 million equity base from which to cover its operating costs, finance investments, and cover any losses (World Bank 2010a).

### **Operational Costs for the EE Fund**

One of the issues with the EE fund is the higher operational cost of engaging the fund manager. The detailed estimation of operational costs will be developed during the project design phase if this option is selected by the GOM. To illustrate the potential costs of this option, table 6.1 shows the operational costs of EE funds in Romania (World Bank 2009a), Bulgaria (World Bank 2010a), and Armenia (World Bank 2012a). It should be noted that the operational costs in Bulgaria are higher than Romania because the organization of the fund included two parallel structures (a fund manager and an executive director).

#### **Technical Assistance**

**Table 6.2 Implementation Steps for Fund Investment Models**

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

Source: Authors.

Note: EE = energy efficiency; ESAs = energy services agreements; EOIs = expressions of interest; M&V = measurement and verification; MOF = Ministry of Finance; PMU = project management unit.

In addition to the TA described above, the fund manager would provide TA related to:

- Development of the terms and conditions of the ESAs with municipalities and public entities under Investment Model 2.
- Definition of the broad range of services offered under the ESA.
- Establishment of the baseline conditions and identification of the changes in baseline that would require an adjustment of the fixed annual payments.

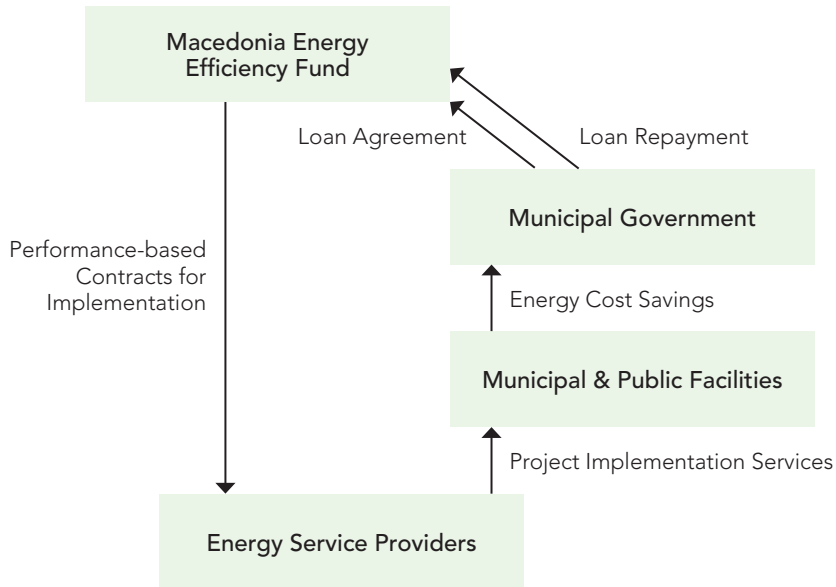
### **Implementation Process**

The step-by step implementation process for the two investment models is summarized in table 6.2. The implementation process for Investment Model 2 is different from Investment Model 1, mainly in terms of the type of agreement.

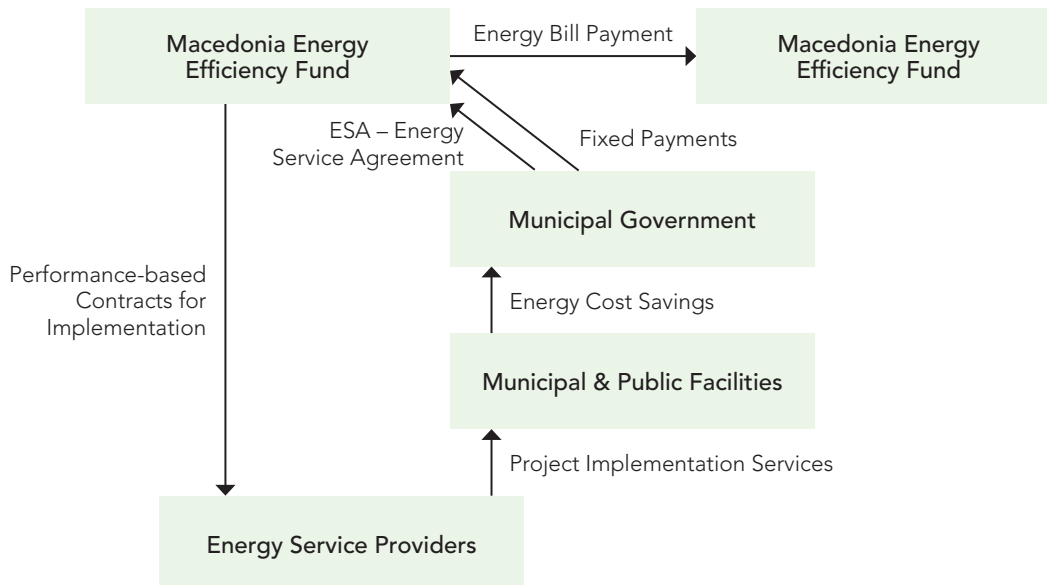
### **Flow of Funds**

Figures 6.2 and 6.3 show the funds flows under Investment Models 1 and 2.

**Figure 6.2 Funds Flow — Investment Model 1\***



**Figure 6.3 Funds Flow — Investment Model 2**



Source: [Authors].

Note: \*The performance-based contract with the energy service provider could be with the EE fund or with the municipality, depending on the loan agreement



## UNIQUE CHARACTERISTICS OF THE ENERGY EFFICIENCY CREDIT LINE

### Organizational Structure

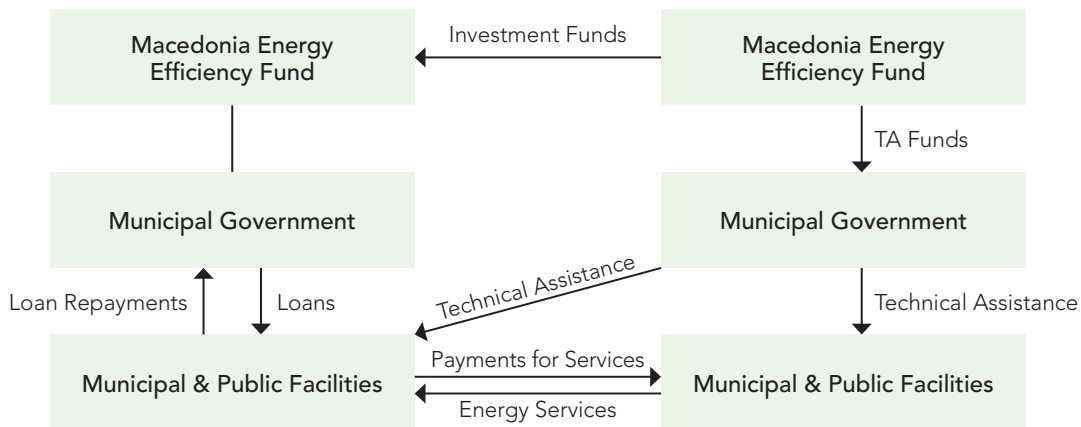
The EE credit line will be managed by an existing public or private FI in FYR Macedonia. Under this option the FI would receive the funds provided by an international financial institution (IFI) or other donor(s) and would on-lend the funds for EE projects undertaken by municipalities and other public entities. An advisory board would be established under the chairmanship of the MOF, with representation from appropriate public and private sector entities to provide guidance to the FI.

Eligible clients would be municipalities and public entities that are eligible to incur debt and can demonstrate creditworthiness. The FI managing the credit line would sign a loan agreement with the borrower specifying the terms and conditions of the loan, which would be based on the requirements and conditions of the financing sources. Implementation of the EE project would be done by the borrowers themselves, but perhaps with the help of technical assistance provided by the FI or by the energy agency.

The FI would set up a separate PMU with a managing director and several staff. The PMU would report to the executive management of the FI and be in charge of identifying, appraising, and selecting projects and developing the loan agreements with the municipalities and public facilities. The final approval of the projects shall be the responsibility of the FI's executive management.

The organization structure of the credit line is shown in figure 6.4.

**Figure 6.4 Organization Structure — Energy Efficiency Credit Line**



Source: Authors.

Note: EE = energy efficiency; TA = technical assistance.

## Scope of Services and Pricing

The services offered to the municipalities and public entities by the FI managing the credit line are primarily financial services related to the development of the loan agreement with the borrower. The pricing (terms and conditions) of the loan will be in accordance with the requirements and conditions of the financing sources. If grant funds were available, these could be channeled by the FI to its public clients, according to the criteria developed for awarding these grant funds.

## Technical Assistance

TA may be organized and coordinated by the energy agency (and outsourced to the private sector) with respect to energy audits, project implementation support, M&V protocols, and so on (see table 8.1).

## Implementation Process

The step-by-step implementation process for the EE credit line is summarized below:

- **Step 1.** The PMU established by the FI prepares and announces the availability of loan funds from the credit line for EE projects and invites expressions of interest (EOIs) from municipalities and public facilities to borrow funds for projects.
- **Step 2.** The PMU receives applications from municipalities and public facilities.
- **Step 3.** The PMU conducts preliminary screening of EOIs and creditworthiness of the applicants, and selects promising candidate municipalities and public facilities (borrowers).
- **Step 4.** The PMU invites detailed proposals from potential borrowers and recommends to the energy agency to provide TA to help develop proposals.
- **Step 5.** The borrower applies for TA and conducts audit and economic and financial analysis to prepare the project-financing proposal. The proposal specifies the EE measures to be implemented, total project costs, anticipated energy savings, borrower's equity contribution, and amount to be borrowed from the credit line.
- **Step 6.** The PMU reviews the proposal, and if acceptable, negotiates the terms and

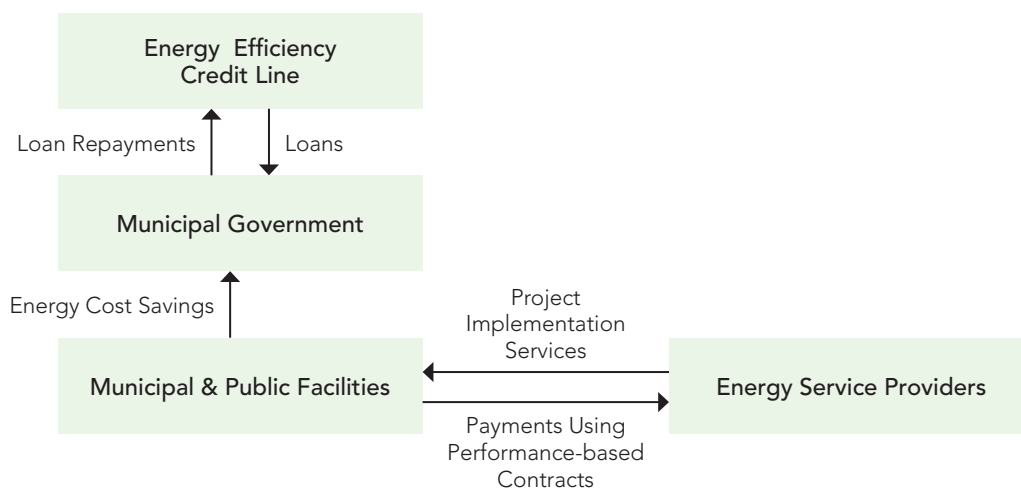
conditions of the loan agreement including the interest rate, repayment period, and other key elements. The borrower obtains approval from the MOF to borrow funds.

- **Step 7.** The loan agreement is signed between the FI and the borrower.
- **Step 8.** The borrower prepares performance-based bidding documents for project implementation services (with TA from the energy agency) and conducts the procurement of the service providers. The contracts for the project implementation services are partly performance based as specified in the bidding documents.
- **Step 9.** The energy service providers implement and commission the project.
- **Step 10.** Upon completion of implementation and commissioning, the M&V agent conducts the M&V of project results. Payments are made to service providers by the borrower based on the payment criteria.
- **Step 11.** The borrower repays the loan to the FI from the savings achieved, in accordance with the terms of the loan agreement.

### Flow of Funds

Figure 6.5 shows the funds flow under this option.

**Figure 6.5 Funds Flow: Energy Efficiency Credit Line**



Source: Authors.

## UNIQUE CHARACTERISTICS OF THE MUNICIPAL ENERGY EFFICIENCY IMPROVEMENT PROGRAM

### Organizational Structure

The MEEIP will be implemented by the MOF, which will establish a PMU that can either be (i) a part of the existing PMU established for the MSIP, or (ii) a new PMU established specifically for the MEEIP. The PMU will include a director who will have overall management responsibility for project implementation — ensuring compliance with requirements of the funding source(s) and environmental and social requirements — and will liaison with government entities and the funding sources. The director will ensure appropriate and timely reporting, monitoring, and evaluation.

The PMU will be adequately staffed; key staff will be selected based on their knowledge and understanding of EE project implementation, experience with working in FYR Macedonia, and understanding of the financial and technical issues faced by FYR Macedonian municipalities and other public sector entities.

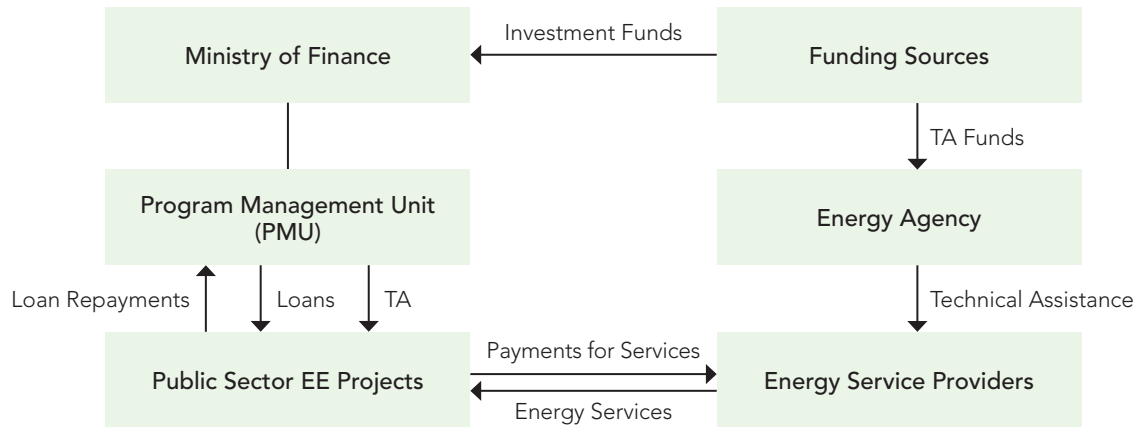
A project-coordinating committee will be established to obtain the advice and assistance of government agencies that have oversight of the municipal sector (such as ministries of economy, local self-government, education, and health, in addition to the MOF). The committee will provide a forum for information sharing and advise the PMU on project selection and management. The committee's main responsibilities will be to ensure good interagency communications on project objectives, rules, and implementation progress; to advise the PMU on sectoral or interministerial issues that may affect project-funded activities, such as those pertaining to EE policies and action plans; and to assure transparency in the selection of beneficiaries and projects. The MOF will chair the committee.

The organizational structure of the MEEIP is shown in figure 6.6.

### Scope of Services and Pricing

The funds will be lent by the MOF to public sector entities by entering into loan agreements. The loans will be provided to municipalities and legally independent public entities (the borrowers) with borrowing capacity, the capability to manage implementation of EE projects, and demonstrated willingness to commit to repay the loans from energy savings.

**Figure 6.6 Organization Structure — Municipal Energy Efficiency Improvement Program**



Source: Authors.

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

For public entities that are depending entirely on the central budget, financing conditions and mechanisms that would enable them to participate will have to be explored during the detailed design of the financing mechanism. For example, some funds might be provided as grant funding to central government agencies.

### Technical Assistance

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

Additional TA may be provided by the energy agency (outsourced to the private sector) with respect to energy audits, project implementation support, M&V protocols, and so on (see table 8.1).

### Implementation Process

The step-by-step implementation process for this option is summarized below:

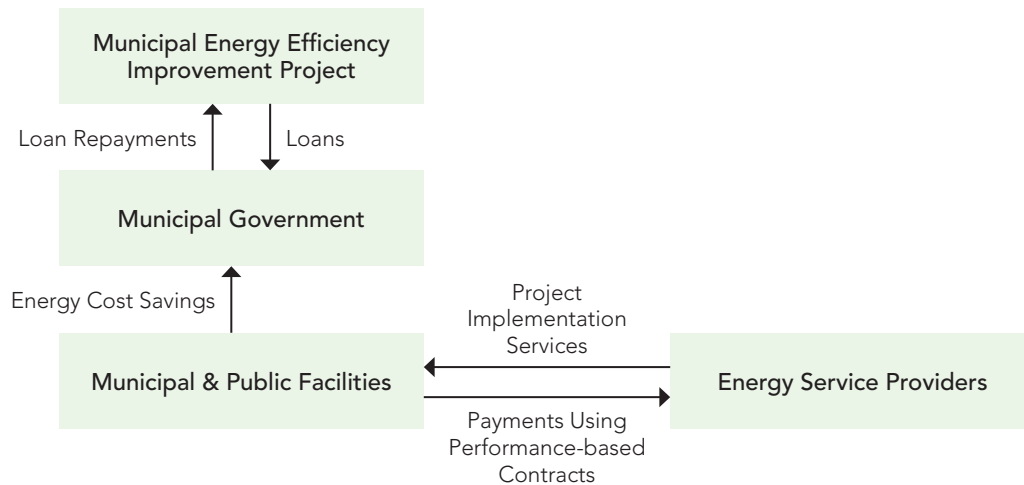
- **Step 1.** The PMU in the MOF prepares and announces the availability of loan funds for EE projects and invites EOIs from municipalities and public facilities to borrow funds for projects.
- **Step 2.** The PMU receives applications from municipalities and public facilities.
- **Step 3.** The PMU and MOF conduct preliminary screening of EOIs and borrowing capacity of the municipalities, and identify promising candidate municipalities and public facilities (borrowers).
- **Step 4.** The PMU invites detailed proposals from potential borrowers and makes recommendations to the energy agency to provide TA to help develop proposals.
- **Step 5.** The borrower applies to the energy agency for TA and conducts audit and economic financial analysis to prepare the project-financing proposal. The proposal specifies the EE measures to be implemented, the total project costs, anticipated energy savings, the borrower's equity contribution, and the amount to be borrowed from the MEEIP.
- **Step 6.** The PMU reviews the proposal, and if acceptable, negotiates the terms of the terms and conditions of the loan including the period of the loan agreement, interest rate, and other key elements. The borrower obtains approval from the MOF to borrow funds.
- **Step 7.** The loan agreement is signed between the fund and the borrower.
- **Step 8.** The borrower prepares performance-based bidding documents for project implementation services (with TA from the energy agency) and procures the service providers. The procurement may have to follow procedures of the IFI/donor, for example, in the case of World Bank or GEF funding. The contracts for the project implementation services are partly performance based as specified in the bidding documents.

- **Step 9.** The energy service providers implement and commission the project.
- **Step 10.** Upon completion of the implementation and commissioning, the M&V agent conducts the M&V of project results. Payments are made to the service providers by the borrower based on the performance criteria.
- **Step 11.** The borrower repays the loan to the MOF in accordance with the terms of loan agreement from the savings achieved.

### Flow of Funds

Figure 6.7 shows the funds flow under this option.

**Figure 6.7 Funds Flow: Municipal Energy Efficiency Improvement Program**



Source: Authors.

## CONCLUDING REMARKS

The above discussion indicates that the three financing options appear to be the most viable based on the local situation and the feedback received during the stakeholder consultation workshop, while the EE fund was identified as a promising model that could address many of the barriers identified in the report. But the selection of the financing option will be made by the GOM with due consideration to a number of factors such as:

- Issues related to creating a new organization.
- Prospects of obtaining a qualified and experienced professional fund manager.
- Need to serve all public sector entities.
- Capacity of the energy agency.
- Suitability of existing FIs to manage the EE credit line.
- Interest and willingness of the MOF to establish another PMU.
- Availability of funding for a particular option



CHAPTER



# Proposed Investment Plan

This chapter presents the proposed investment plan for the years 2013–18. The investment plan has categorized public buildings into the following types based on their building characteristics, energy consumption characteristics, and energy-saving opportunities:

- Municipal administration buildings
- Primary schools
- Secondary schools
- Kindergartens
- Health-care buildings
- Universities
- Other buildings (such as state administration buildings, social service facilities, and so on)

### Key Assumptions

The Ministry of Economy (MOE) in collaboration with the Ministry of Finance (MOF) will select the financing option (energy efficiency [EE] fund, EE credit line, or Municipal Energy Efficiency Improvement Program [MEEIP]) by the end of 2012. Initial funding will be obtained in 2013. The available funding is then expanded in 2014 or 2015 to scale up the financing and implementation of the EE projects. The number of potential buildings identified in the Energy Saving International, AS (ENSI) study as the market for the first phase of the National Program for Energy Efficiency in Public Buildings (NPEEPB) and the average size of the investment in the EE projects for each building type are summarized in table 7.1.

**Table 7.1 Number of Buildings and Average Project Size**

Building Type	No. of Potential Projects	Average Project Size (€)
Municipal administration	134	30,000
Primary schools	308	75,000
Secondary schools	152	112,000
Kindergartens	166	45,000
Health care	444	60,000
Universities	184	75,000
Other	90	40,000
<b>Total</b>	<b>1,478</b>	<b>64,650</b>

Source: ENSI 2012.

It should be noted that in the above estimates, primary school projects involving the replacement of heating systems that are currently using firewood have been excluded, because these projects are estimated to have an average cost of only €3,750 and it is unlikely that these would be financed under any of the financing schemes discussed in this report.

It is assumed that it would be very difficult to obtain sufficient financing and to implement all of the identified projects during the time period 2013–18. Therefore, we assume that the financing mechanisms identified in this report will be able to implement about 52 percent of these projects over this period.

## PROPOSED INVESTMENT PLAN

Using the assumptions outlined above, the proposed investment plan is summarized in table 7.2. This plan shows the number of projects and investment by year for each of the seven building types.

The total investment amount over the period 2013–18 is about €50 million. The first year's (2013) investment is small (€3 million) because it will take some time to establish the financing mechanism, implement the project management unit (PMU), fund the start-up of the PMU, and provide the initial training and capacity building. The second year's (2014) investment is about double that of the first year (€6 million), and the investment level then ramps up to €9–12 million during the period 2015–18.

It is possible that the investment plan shown above may have to be modified in the case of the EE credit line if the financial institution selected to implement such a credit line will only work with creditworthy municipalities and public entities that have sufficient collateral to be able to borrow funds from the credit line — thus excluding the municipalities and public entities that have limited or no collateral and also limited capacity for project implementation. In this case, additional analysis may have to be conducted to develop a revised investment plan.

**Table 7.2 Investment Plan**

Type of building		Year						Total
		2013	2014	2015	2016	2017	2018	
Municipal Admin	No. of Projects	5	10	12	12	15	20	74
	Investment (000 Euors)	150	300	360	360	450	600	2220
Primary Schools	No. of Projects	10	20	30	30	40	40	170
	Investment (000 Euors)	750	1500	2250	2250	3000	3000	12750
Secondary Schools	No. of Projects	5	10	10	15	15	20	75
	Investment (000 Euors)	560	1120	1120	1680	1680	2240	8400
Kindergartens	No. of Projects	7	13	15	15	15	20	85
	Investment (000 Euors)	315	585	675	675	675	900	3825
Health Care Buildings	No. of Projects	10	20	40	40	50	50	210
	Investment (000 Euors)	600	1200	2400	2400	3000	3000	12600
Universities	No. of Projects	7	13	20	20	25	25	110
	Investment (000 Euors)	525	975	1500	1500	1875	1875	8250
Other	No. of Projects	3	7	10	10	10	10	50
	Investment (000 Euors)	120	280	400	400	400	400	2000
<b>Total</b>	<b>No. of Projects</b>	<b>47</b>	<b>93</b>	<b>137</b>	<b>142</b>	<b>170</b>	<b>185</b>	<b>774</b>
	<b>Investment (000 Euors)</b>	<b>3020</b>	<b>5960</b>	<b>8705</b>	<b>9265</b>	<b>11,080</b>	<b>12,015</b>	<b>50,045</b>

Source: Authors.

CHAPTER

8

# Technical Assistance Plan

For effective implementation of the financing options discussed in this report, there is a need for supporting activities, including:

- Removal of administrative barriers to public sector energy efficiency (EE) projects, including activities to support changes in public accounting, procurement, and budgeting rules and procedures.
- Capacity building of various program participants, including the project management unit (PMU), the municipalities and public entities, and private sector organizations involved in supporting implementation activities (energy auditors, contractors, installers, and so on).
- Capacity building of private sector banks and financial institutions.
- Development of the methodology and procedures for measurement and verification (M&V) of project results and capacity building of M&V agents.

These supporting activities will be funded through a technical assistance (TA) program. This chapter defines the characteristics of the TA program.

## FUNDING THE TECHNICAL ASSISTANCE PROGRAM

Each of the three financing options discussed herein will have a TA component. It may be financed by the same financing sources that will also provide the funding for investment in the public sector EE projects, but some other donors may also be able to provide funding, and some cofinancing from the Government of FYR Macedonia (GOM) may also be made available. As indicated in chapter 6, the details of TA provided may vary across the three financing options, but in all cases the TA will focus on the areas listed above. It is anticipated that the total amount of TA will be about €2.0 million or about 4 percent of the investment funds. The allocation of this amount to the various TA activities is discussed later in this chapter. Table 8.2 provides the details.

## REMOVAL OF ADMINISTRATIVE BARRIERS

As indicated in chapter 3 of this report, there are some important administrative barriers to implementation of EE projects in the public sector in Former Yugoslav Republic (FYR) Macedonia. These include:

- Availability of public funds for investments in EE projects.
- Public accounting, budgeting, and procurement rules.
- Limited borrowing capacity of municipalities.

The GOM needs to make changes in policies and procedures to address these barriers. TA to support the development of the necessary regulations should preferably start right away, since it will be crucial for the successful implementation of the National Program for Energy Efficiency in Public Buildings (NPEEPB).

With respect to the financing of the EE projects, each of the financing options (except the EE Fund Investment Model 2, which involves energy service agreements [ESAs]) will require cofinancing of project investments through a project equity contribution of at least 20 percent by the borrower. Therefore, the municipalities or public entities need to provide such funds to be eligible to borrow from the EE fund, EE credit line, or MEEIP. The GOM needs to facilitate public sector borrowers to contribute this share of the project funds.

The GOM may also need to make changes in public accounting, budgeting, and procurement rules to allow public institutions to retain some of the energy cost savings resulting from EE investments. Also, changes may need to be made in rules and procedures limiting municipalities to only borrow in general obligations to be repaid from general revenues, in order to provide additional incentives to public institutions to pursue such investments. Finally, public tender procedures may have to be modified in order to be more simple and transparent and to allow for performance-based contracts to be entered into for the provision of various services related to project implementation.

The borrowing capacity of municipalities and public entities is currently limited. The GOM needs to explore options to increase borrowing capacity to allow public institutions to borrow funds for EE projects. Also, the GOM needs to facilitate innovative financing options such as equipment leasing and public-private partnerships under which public institutions can make payments to private sector organizations over multiple years, with

such payments not counting against the borrowing capacity of the public institutions. It is proposed that public entities without their own budgets or with limited capacity to undertake project implementation under the EE fund option enter into ESAs and would be obligated to pay the fund a fixed annual payment equal to 95–100 percent of the baseline energy costs over the life of the ESA, while the fund undertakes all project preparation and implementation services (see chapter 6). An ESA should not be considered as a liability on the balance sheet of the public entity and therefore not be part of its debt ceiling. TA activities would support such changes.

TA provided under the financing options will help identify the effects of the institutional barriers, identify options and solutions to overcome such barriers, and recommend specific actions that the GOM can take to implement these solutions. Changes in the accounting, budgeting, and procurement rules are essential in making the NPEEPB work. The TA component will support the reform of those rules.

## CAPACITY BUILDING OF PROGRAM PARTICIPANTS

A key element of TA will be the capacity building of the PMU. As discussed in chapter 6, TA would address training of the PMU staff to manage the financing and implementation of EE projects. TA would include training related to EE technologies and relevant implementation strategies, basic concepts and tools for performance-based contracts, guidelines and procedures for M&V of energy savings, and monitoring and reporting of the overall program results to the financing sources. In addition, in the case of the EE fund and MEEIP, the capacity-building TA may also include funding for the initial set-up, administration, and operation of the PMU; and the purchase of equipment for auditing, data collection, and M&V.

Also, as described in chapter 6, TA will be provided in the following areas:

- Program marketing to and capacity building of the target public sector entities to address the information and knowledge gaps related to EE, build demand for financing, and improve the sustainability of energy savings.
- Assistance to the municipalities and public entities in conducting energy audits and developing EE action plans.



- Development of procedures for assisting municipalities and public entities to engage energy service providers under performance-based contracts, prepare performance-based bidding documents for procurement of various elements of project implementation services, and refine these bidding documents based on the implementation experience to provide standard documents for future use in FYR Macedonia.
- Capacity building for energy service providers and other market actors to conduct energy audits, and to screen, design, evaluate, appraise/finance, implement, and measure EE investments in the public sector.

## **CAPACITY BUILDING OF COMMERCIAL BANKS AND FINANCIAL INSTITUTIONS**

Currently most banks and financial institutions (FIs) in FYR Macedonia are reluctant to provide loans to municipalities. For the financing program to be sustainable, it will be important to develop the market for commercial financing of public sector EE projects in the long term. One of the TA components will therefore address capacity building of banks/FIs to encourage and facilitate their lending for public sector EE projects. This will include training in technical and economic characteristics, appraisal procedures, risk profiles, and implementation business models (including performance-based contracts) for EE projects.

## **MEASUREMENT AND VERIFICATION**

A key element of any EE project is the M&V of results. It is anticipated that the financing sources providing the resources for the EE fund, credit line, or MEEIP will require formal M&V of the projects financed. Currently there is very limited capacity in FYR Macedonia to conduct M&V. Therefore a key component of the M&V will focus on development/adaptation of methodologies for M&V and on providing M&V training to PMU staff, public sector facility managers and engineers, and private sector service providers.

**Table 8.1 Technical Assistance Activities and Responsibilities**

TA Activities	Responsibility for TA Activities		
	EE Fund	EE Credit Line	MEEIP
Addressing institutional barriers	Energy agency	Energy Agency	Energy Agency
Capacity building of PMU staff	Fund manager	PMU of the FI managing credit line	MEEIP PMU
Program marketing	Fund manager	PMU of the FI managing credit line	MEEIP PMU
Capacity building of borrowers	Fund manager	PMU of the FI managing credit line	MEEIP PMU
Energy auditing and development of EE action plans	Fund manager	PMU of the FI managing credit line	MEEIP PMU
Development of performance-based agreements	Fund manager	PMU of the FI managing credit line	MEEIP PMU
Capacity building of service providers	Fund manager	PMU of the FI managing credit line	MEEIP PMU
Development of M&V methodology and procedures	Fund manager	PMU of the FI managing credit line	MEEIP PMU
Capacity building for M&V	Fund manager	PMU of the FI managing credit line	MEEIP PMU

*Source:* Authors.

*Note:* EE = energy efficiency; FI = financial institution; MEEIP = Municipal Energy Efficiency Improvement Project; M&V = measurement and verification; PMU = Project Management Unit; TA = technical assistance. Some of the TA may be outsourced by the fund manager or the PMU to private sector parties.

## RESPONSIBILITIES FOR PROVIDING TECHNICAL ASSISTANCE

Table 8.1 shows the likely allocation of responsibilities for TA activities under the three financing options. Most TA activities would be outsourced and provided by the private sector.

## TECHNICAL ASSISTANCE BUDGET

A preliminary allocation of the TA budget is shown in table 8.2. The specific amounts and allocation will be determined by the financing sources.

**Table 8.2 Preliminary Allocation of the TA Budget**

<b>TA Activity</b>	<b>Amount ('000 Euros)</b>
Addressing institutional barriers	250
Capacity building of PMU staff	250
Program marketing	200
Capacity building of borrowers	300
Energy auditing and development of EE action plans	250
Development of performance-based agreements	150
Capacity building of service providers	250
Development of M&V methodology and procedures	150
Capacity building for M&V	200
<b>Total</b>	<b>2,000</b>

*Source:* [Authors].

*Note:* EE = energy efficiency; M&V = measurement and verification; PMU = project management unit; TA = technical assistance.







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