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ESMAP
Energy Sector Management Assistance Program

Knowledge Series 018/14

Financing Municipal Energy Efficiency Projects

Energy Efficient Cities

MAYORAL GUIDANCE NOTE #2

For more information related to municipal energy efficiency financing, please refer to the following:

Municipal Budgeting and Finance,
http://www.worldbank.org/content/dam/Worldbank/Event/ECA/GN%20muni%20budget%20final.pdf

Establishing and Operationalizing an Energy Efficiency Revolving Fund,
http://www.worldbank.org/content/dam/Worldbank/Event/ECA/revolving.pdf

Energy Services Market Development,
http://www.worldbank.org/content/dam/Worldbank/Event/ECA/GN%20Energy%20Services%20final.pdf

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EXECUTIVE SUMMARY

Improving the energy efficiency (EE) of municipally owned buildings, such as schools and hospitals, and municipal infrastructure, such as public lighting, water supply, and district heating, offers budgetary savings on energy bills and a wide range of environmental and socioeconomic benefits. But relatively few municipal EE projects have been developed and implemented successfully. The challenges that limit EE investments in municipal buildings and facilities can be grouped into three broad areas: (i) a lack of awareness and incentives; (ii) insufficient implementation capacity; and (iii) limited access to financing. All three sets of challenges need to be addressed to scale up successful implementation of municipal EE projects.

This Guidance Note focuses on the key issues faced by municipalities in accessing financing for EE investments, particularly for projects in the following four areas:

1 | Indoor lighting. This includes replacing existing inefficient lamps and fixtures with efficient lamps (T-5 lamps, compact fluorescent lamps or CFLs, light-emitting diodes or LEDs) and luminaires.

2 | Building retrofits. This includes installing insulation, efficient windows, efficient boilers and chillers, and energy management systems.

3 | Public lighting. This includes replacing mercury vapor lamps with high-pressure sodium or LED lamps and installing lighting controls.

4 | Municipal utilities. This includes reducing losses in district heating and water-supply systems, installing efficient pumps, and optimizing systems.

The Guidance Note discusses the following potential financing mechanisms that can be used by municipalities to finance EE measures:

- **Budget financing.** This includes direct financing from municipal budgets, the use of external grants, and the use of budget-capture mechanisms.
- **Funds developed specifically to address energy efficiency.** This involves revolving funds that, once established from the general budget or donor funds, can become self-sustaining.
- **Public support to leverage commercial financing.** This includes public sector financing mechanisms—provided by donors and/or national or regional governments to municipalities—that can help support or leverage commercial financing.
- **Commercial financing.** This involves loans from commercial banks or funds raised by the issuance of municipal bonds.

The range of financing mechanisms available to a municipality depends on many factors, such as its financial strength and creditworthiness, the predictability of revenues and budget transfers, the local legal and regulatory framework, the commercial financing environment, the nature of the EE project, implementation capacity, and the available delivery mechanisms. Most of these factors are influenced by the size of a municipality, with large municipalities facing different challenges than smaller ones.

This Guidance Note contains summaries of illustrative case studies that can help policy-makers understand the characteristics of various financing options and identify which are most viable in any given situation. A more complete set of case studies in the full background report to this note is available to help identify and develop specific financing mechanisms.

The long-term goal is to increase commercial financing for municipal EE projects; but this requires enhancing the creditworthiness of municipalities and increasing their borrowing capacities. The table below provides an illustration of the energy efficiency options and related financing mechanisms.

Illustrative Municipal Energy Efficiency Projects and Related Financing Options

		Project Characteristics			Potential Financing Options for Municipalities	
Type of Measure	**Examples**	**Technical Complexity**	**Investment Needs**	**Paybacks**	**Weak Credit, Limited Borrowing Capacity**	**Strong Credit, Ample Borrowing Capacity**
Indoor Lighting	T-5 lamps, CFLs, LEDs, Efficient Luminaires	Low	Medium	Short	Budget Financing, EE Funds	Budget Financing, EE Funds, Public Support, Commercial Financing
Building Retrofit	Insulation, Efficient Chillers/ Boilers, EMS	Medium	Medium to High	Long		
Public Lighting	LED Lamps, Lighting Controls	Low to Medium	Medium to High	Medium		
Utilities	Loss Reduction, Efficient Pumps, System Optimization	Medium to High	Medium to High	Long		

Indicative Payback Periods: Short (<3 years), Medium (3-6 years), Long (>6 years)

Note | Indoor lighting EE measures, due to their low cost and short paybacks, may be implemented by municipalities using budgetary resources. However, often indoor lighting is combined with building retrofit options in a single project. Such bundling may reduce transaction costs and facilitate implementation of some of the longer payback building envelope and equipment options. However, it may require external financing due to the larger investment needs.

Source | Authors

With the exception of budget financing, other sources of financing for municipal EE investments require mechanisms to ensure the repayments of the invested funds, typically through cash flows generated by reduced energy costs resulting from the implementation of the EE projects. Such repayments require well defined and agreed upon procedures for determining project baselines, assessment and verification of energy and cost savings, and retention of budgetary savings.

Access to non-budgetary financing is linked to the creditworthiness of the municipality, its borrowing capacity, and the delivery mechanisms used for its EE projects. The use of energy saving performance contracts (ESPCs) is increasingly being proposed to access such financing. Under ESPC schemes, private EE service providers (such as energy

service companies or ESCOs) can develop the project, assist in securing commercial debt financing, implement the project, guarantee the energy and/or cost savings, and generally ensure that the resulting cash flows will be sufficient to repay the debt incurred. However, this requires the existence of reputable service providers with experience, capability, and the financial strength to back-up the guarantees provided. In less developed markets, some governments have relied on quasi-public financing schemes, such as EE Funds or public ESCOs.

Another option is the creation of public-private partnerships (PPPs) under which the private partner may operate and maintain energy systems or facilities, such as street lighting and water supply, under a service or lease agreement with the public partner, the municipality.

Piecemeal approaches to municipal EE investments may deter commercial financing because the transaction costs of individual small projects are usually high relative to a project's size and investment returns. In order to realize the substantial potential of EE and move towards scalable schemes, municipalities should conduct small-scale pilots to test the applicability of innovative financial schemes and business models before initiating large-scale investment programs. Scaled-up schemes that utilize opportunities for project bundling can result in lower transaction costs through economies of scale. In addition, expanded implementation can improve predictability within the market, often bringing in new financiers and service providers and leading to increased competition and lower costs. While large municipalities can develop in-house schemes to scale up EE projects, small municipalities can form alliances and partnerships, or participate in regional or national programs, to aggregate projects and reduce transaction costs.

FINANCING MUNICIPAL ENERGY EFFICIENCY PROJECTS

The benefits of improved energy efficiency have been clearly demonstrated and accepted by municipalities[1] worldwide. However, the process of designing, financing, and implementing EE initiatives, both by large and small municipalities, has proved to be challenging.

This Guidance Note provides a framework for municipal officials, including mayors and other senior officials, to identify appropriate financing options for EE projects in municipally owned buildings, facilities and infrastructure such as educational institutions, health care centers, public lighting, water supply facilities, and district heating systems.

This Guidance Note is designed to help municipal decision makers evaluate the applicability of a range of EE financing solutions that have been implemented around the world. Drawing on experiences from cities where such actions have succeeded, it offers city leaders strategic advice on how to turn potential EE opportunities into tangible benefits in a cost-effective manner.

This Guidance Note first summarizes the **main EE opportunities in municipal facilities,** briefly describes the **common barriers and challenges** encountered by city authorities in financing these opportunities, and outlines a range of **policy tools and instruments** available to overcome common barriers. Then, it provides specific guidance and empirical examples on **selecting and establishing the appropriate financing mechanism**.

THE OPPORTUNITIES

Energy costs generally represent a large portion of the municipal budget. Energy use in municipalities is usually rather inefficient because of the use of old, outdated equipment, inadequate maintenance, limited budgets for purchasing efficient equipment, and a lack of knowledge and awareness of options for efficiency improvement on the part of municipal facility managers and engineers. The main opportunities for improving energy efficiency in municipally owned buildings, facilities, and infrastructure can be grouped into the following types:[2]

- **Efficient indoor lighting.** Municipal office buildings and institutional facilities often have old and inefficient lighting systems. Substantial improvements can be achieved by replacing existing lamps and fixtures (luminaires) with efficient alternatives such as T-5, CFL, and LED lamps, and modern efficient luminaries. Experience with efficient lighting systems has demonstrated that efficient lamps and luminaires are readily available in most markets, have low up-front costs, and provide attractive payback periods (sometimes as short as one to two years). Municipalities may therefore find it feasible to invest their budgetary funds in improving energy efficiency in indoor lighting. However, as discussed below, lighting options are often best combined with other building energy efficiency options.
- **Building retrofits.** Many municipal buildings are characterized by inefficient building 'envelopes.' This is especially common in cold climate regions, where one often finds a lack of adequate insulation, inefficient windows and doors, and inefficient and poorly maintained energy-using equipment. Substantial efficiency improvements can be gained through efficient technologies for building envelope measures, heating and cooling equipment, HVAC systems, daylighting and passive solar design, etc. These measures require higher investment levels than lighting efficiency measures and have longer paybacks, but are nevertheless economically attractive.

Building retrofit options are often combined with indoor lighting options. The advantage is that by bundling them in a single project the transaction costs may be reduced and some building envelope options with longer paybacks can be implemented by combining them with the shorter payback periods associated with indoor lighting options to obtain an overall payback that is reasonable. The disadvantage of such bundling is that the increased investment needs may exceed available budgetary resources and require external financing.

- **Efficient public lighting.** Municipalities often use "first cost" as the sole determinant in their decisions to purchase public lighting equipment—such as street lighting, traffic lights, signage, and lighting in parks and recreational facilities. This often results in the acquisition of low-cost and low-efficiency lighting equipment such as mercury vapor lamps. Efficiency improvements of 30 to 60 percent can be obtained by replacing these with metal halide, high-pressure sodium vapor, or LED lamps, as well as redesigning lighting systems and installing automated controls. Efficient lighting technologies are readily available and can provide paybacks in the range of four to seven years.
- **Municipal utilities.** Municipal district heating facilities and water supply, treatment, and wastewater treatment and processing systems are often characterized by outdated pumping equipment, inefficient design, leaks, and losses. Efficiency improvements of 25 percent or more can be achieved with a range of technical options including efficient pumps, system optimization, and reduction of leaks and losses. These options may involve more complex technical solutions (e.g., system optimization), higher investments, and longer payback periods (e.g., replacement of leaky pipes) than lighting or building projects and may often require policy interventions (e.g., cost-recovery tariffs and consumption-based billing) to improve a utility's financial sustainability.

EE improvement projects also lead to other benefits for a municipality, including improved service quality, reduced emissions of pollutants and greenhouse gases, the creation of local jobs, and the availability of increased funds for social and other services.

BARRIERS AND CHALLENGES TO IMPROVING ENERGY EFFICIENCY IN MUNICIPAL FACILITIES

Given that many municipal energy EE projects are economically attractive, why are relatively few developed and implemented? There are many challenges related to implementation of municipal EE projects, which can be grouped into three broad areas, as illustrated in Figure 1.

- **A lack of awareness and incentives.** These challenges relate to whether municipal decision makers are aware of and have sufficient incentives to undertake EE projects. Municipal decision makers are generally unaware of the opportunities for improving energy efficiency, and there also tends to be inadequate information on "baseline" conditions (such as comfort levels in buildings, number of non-operating streetlights), overall energy use, and costs. Also, energy prices rarely reflect the true costs of environmental impacts and often are below the costs of supply. In many cases, these challenges need to be addressed by wider policy and regulatory measures which are outside the scope of any individual municipality, such as EE targets and mandates, EE equipment procurement, budget retention, and tariff reforms.
- **Insufficient implementation capacity.** These are constraints on the ability of municipalities to identify, design, and implement EE projects. They include restrictive public procurement policies, a lack of familiarity with EE technologies, and limited capacity for

Figure 1 | Challenges of Municipal Energy Efficiency Project Implementation

Awareness and Incentives	Implementation Capacity	Access to Financing
Limited awareness • Low priority attached to energy issues • Lack of awareness of EE potential • Inadequate information on energy use and costs **Incentive incompatibility** • Split incentives (between ownership and financing) • Energy prices below the costs of supply • Failure to price negative externalities of energy use • Uncertain regulatory framework	**Low levels of capacity** • Limited municipality technical capacity • Limited financier technical capacity • Lack of familiarity with EE technologies **Nature of municipal projects** • Restrictive public procurement rules • Need to work across multiple municipalities	**Restrictions on municipal funding** • Inadequate revenue base • Limited revenue-raising powers • Limited borrowing powers • Restriction on use of funds **Barriers to commercial financing** • Requirements for collateral and recourse • Assessing creditworthiness • Absence of 'hard' cash flows • High transaction costs

Source | Authors

the effective implementation of EE measures. Overcoming these challenges requires a focus on the development of effective delivery mechanisms, substantial training and capacity building, and/or the creation of centralized agencies to assist individual municipalities in undertaking EE projects.

- **Limited access to financing.** These are challenges related to the ability of municipalities to raise financing for EE projects.[3] Overcoming these financing challenges is the primary focus of this Guidance Note.

Each of these challenges may require a different set of interventions, each of which may entail a different time frame or set of complexities. For example, awareness gaps can be addressed relatively quickly through a series of communication and information campaigns. But efforts to create appropriate incentives can be much more difficult. Developing the implementation capacity of municipalities takes time and requires sustained efforts, such as the implementation of comprehensive and recurring training programs. Addressing issues related to access to financing is more complex and may require even greater time and effort. Overcoming the constraints related to creditworthiness and limited municipal borrowing capacity may entail substantial efforts requiring the buy-in of national policymakers. Such efforts may well go beyond energy efficiency and require municipalities to address broader municipal financing concerns.

Due to these challenges, although many EE projects make economic and environmental sense, municipalities have limited ability to finance and implement such projects themselves. This Guidance Note addresses the specific challenges related to access to financing for municipal EE projects. It should be noted, however, that all three sets of challenges must be addressed if municipal EE projects are to be scaled up.

LIMITATIONS ON MUNICIPAL FUNDING

One of the financing challenges facing municipalities, more often for smaller municipalities rather than larger ones, is the insufficient revenue base with which to fund EE projects (or, in many cases, other development projects). An insufficient revenue base, which may be the result of a small number of tax-paying commercial businesses and/or high-income residents, can reduce the availability of adequate funds for capital investments.

Municipalities depending on revenue transfers from regional or national governments often have limited revenue-raising powers. Such limitations imply that any decision to invest in an EE project either requires the municipality to reallocate funds or convince higher levels of government that the EE project is economically viable. This may often not be a simple task. Reliance on transfers from other levels of government also exposes municipalities to the risk that permitted levels and uses of funds may be affected by changes in national budgetary or political priorities. This introduces further uncertainties and makes commitment to multi-year programs of capital expenditures more difficult.

National governments often impose limits on borrowing by municipalities to prevent them getting into financial difficulties. These restrictions may take the form of limits on the use of loan funds and/or on the total amount that municipalities may borrow. In both cases, EE projects are likely to lose out, because they are not typical capital expenditure projects that can be readily assessed and approved by higher authorities. In addition, when debt ceilings are in place, EE projects, with relatively low public profiles, are likely to have a lower priority than other pressing or mandated needs.

In addition to limits on raising revenues and borrowing funds, municipalities often face restrictions on how they can deploy their available funds. Although such restrictions are intended to ensure that funds are not diverted from vital services, they may also constrain the amount of funds that can be allocated to financing EE and other capital expenditure projects.

ACCESS TO COMMERCIAL FINANCING

If a municipality is unable to raise investment funds, it can consider the alternative of borrowing from commercial financing sources and repaying the debt from the resulting cost savings. The ability of a municipality to access external financing may be influenced by relevant national legislation and the stage of fiscal decentralization. Limits on revenue-raising powers may also restrict the ability of a municipality to borrow commercial funds for EE projects. Lenders, concerned by the municipality's ability to cover the debt service payments by increasing taxes or user charges, will usually require appropriate collateral or recourse. Based on banking regulations and commercial lending practices and guidelines, assets purchased under an EE project are generally unlikely to be sufficient collateral for commercial loans. Many such assets are very location- and project-specific and cannot be readily sold for use elsewhere in the event that the borrower defaults on the loan. Lenders, therefore, tend to look for either security over municipal assets or for recourse to other funds, such as first call on transfers from other levels of government.

The constraints on municipalities over raising and using their own revenues, their dependence on transfers, and limits on pledging collateral and offering recourse to revenue flows all mean that municipalities—particularly the smaller ones—are likely to be perceived uncreditworthy by lenders. As such, municipalities may have to rely on new lenders who are likely to take an extended period of time to conduct due diligence and

may be unwilling to do so if the loan amounts involved are relatively small. However, larger municipalities with bigger revenue bases and sufficient borrowing capacity may be able to convince commercial lenders of their creditworthiness and thereby develop relationships to facilitate financing of EE projects.

Also, an EE project generates cost savings, instead of new revenues, relative to a baseline (the costs of energy use in the absence of the EE project). Banks may face challenges in defining a baseline, measuring and verifying the savings relative to the baseline, and assuring that EE savings are dedicated to debt service. These challenges may lead to banks being reluctant to lend to EE projects.

Transaction costs can also play a major role in constraining access to commercial financing for municipal EE projects, especially for smaller municipalities. Unless lenders are confident of being able to develop a portfolio of such projects with standardized due diligence and processing methodologies, they are likely to be reluctant to engage in financing of EE projects. This is particularly the case where lenders lack good knowledge and understanding of EE projects.

SOLUTIONS

The financing mechanisms typically used by municipalities around the world can be broadly grouped into four categories. These represent an increasing dependence on commercial as opposed to public sources of funding:

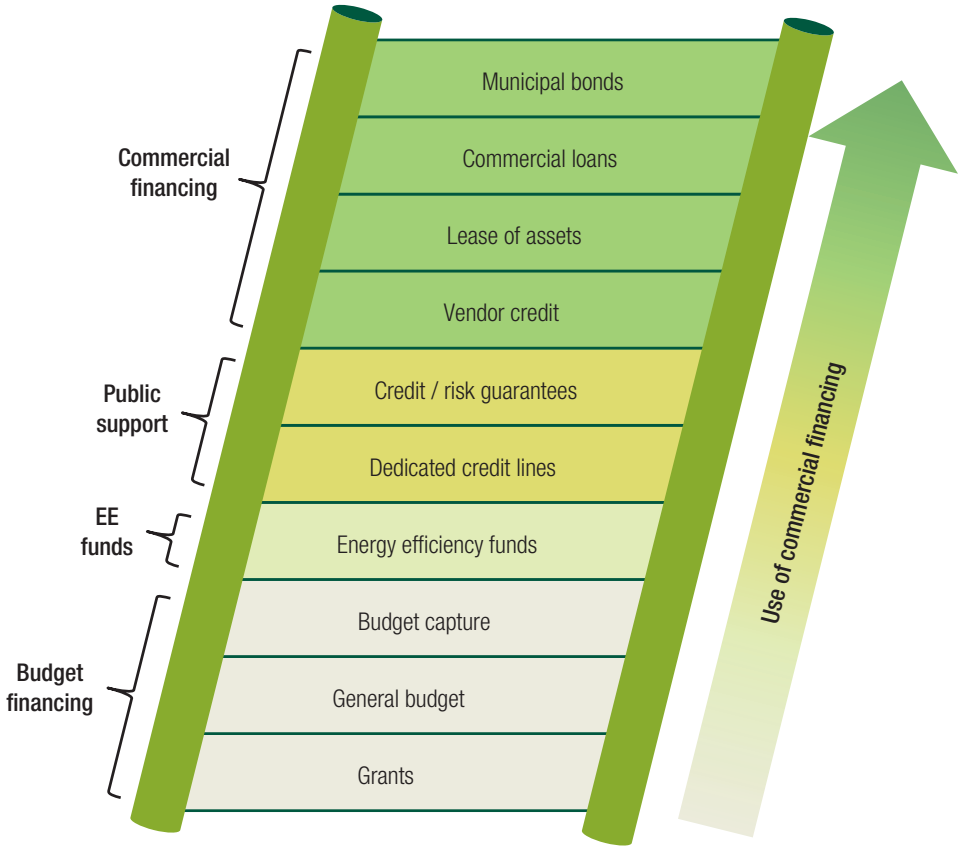
- **Budget financing.** Direct financing from municipal budgets, the use of external grants, and the use of budget capture mechanisms.
- **Funds developed specifically to address energy efficiency.** Revolving funds which, initially established from the general budget or donor funds, become self-sustaining.
- **Public support to leverage commercial financing.** Public sector financing mechanisms, provided by donors and/or national or regional governments to municipalities, to help support or leverage commercial financing.
- **Commercial financing.** Commercial loans from banks or funds raised by issuing municipal bonds.

This “financing ladder” is illustrated in Figure 2.

Municipalities may start off with smaller pilot EE projects using grants or budget transfers. However, given that budgetary funds and grants may be scarce, and are generally not sustainable, municipalities will need to increasingly access financing from the market in order to implement economically attractive EE projects they would not otherwise have the means to undertake. They, therefore, need to move up the ‘financing ladder.’ In order to do so, they will need to improve their technical capacity and ability to access financing.

Municipalities should recognize that there is not necessarily a correlation between the level of commercial financing and the extent to which the performance risk of an EE project is transferred to commercial financiers. For example, where a project is financed using commercial loans secured against the municipality’s own assets, the performance risk largely remains with the municipality. Transfers of risk to the lenders come at a cost. The financing costs to the municipality will generally rise (as the private sector needs to be compensated for its increased risk) while transactions costs may also increase. The advantages and limitations of various financing mechanisms are summarized in Table 1.

Figure 2 | The Financing Ladder



Source | Authors

It should be noted that there may be regional differences with respect to the financial mechanisms a municipality may access to fund EE measures. For example, Latin American countries often have public/municipal development banks (such as Banobras in Mexico, CAIXA in Brazil, and Findeter in Colombia) that can help finance municipal projects, including energy efficiency. But Eastern European and Central Asian countries tend not to have such organizations and, due to the legacy of the Soviet Union, also suffer from a lack of municipal autonomy and fiscal decentralization. This has led to more specialized EE financing mechanisms, such as EE funds and public ESCOs (in Armenia, Bulgaria, Croatia, Lithuania, Macedonia, Poland, and Romania). In India, efforts are underway to deploy urban development funds for municipal EE projects. In China, where there is already a strong presence of ESCOs, the financing and delivery mechanism of EE projects in the public sector is built on the energy savings performance contracting platform. Both the national and municipal governments provide financial incentives for energy savings performance contracts (ESPCs) based on the amount of energy savings achieved. Several Chinese banks already have lending products for ESCOs securitized on energy savings revenues.

Table 1 | The Main Financing Options

Mechanism	Main features	Advantages	Limitations	Performance Risk Allocation
BUDGET FINANCING				
Grants	Investment costs funded by grant(s) from donor or national government to municipality	Indefinite term No financing costs Can be applicable to all municipalities	Limited grant funding available May encourage non-viable projects Not sustainable or scalable	Donor or government providing the grant
General Budget	EE project investment costs funded from general municipal revenues	Can build market capacity No additional financing costs	Budget resources often limited Sustainability not assured	Municipality
Budget Capture	Financing to municipalities for EE projects from MoF, with repayment through savings from these projects	Makes viability clearer Builds market capacity Provides security to financiers	Can be difficult to ring-fence May require recourse to budget Sustainability not assured	Municipality or financier, depending on extent of recourse
ENERGY EFFICIENCY FUNDS				
Energy Efficiency Funds	Independent, publicly owned entity provides financing for EE to public clients, with repayments based on estimated energy cost savings	Financially self-sustaining Can finance municipalities that are not able to borrow Can leverage funds by pooling or bundling of projects and develop simple ESCO models	Recovering operating costs may be difficult in early fund years Reliance on good fund manager Needs municipal repayment mechanism	Fund in the first instance Ultimately, sponsors of the fund
PUBLIC SUPPORT FOR COMMERCIAL FINANCING				
Dedicated Credit Lines	'Soft' public loans to commercial institutions for on-lending to municipalities for EE projects	Allows municipalities to undertake own procurement/implementation Can be scalable Funds can revolve	Serves only creditworthy municipalities Requires strong and willing bank partners to develop project pipeline	Entity providing the credit line, commercial financier, and municipality, depending on sharing of losses
Credit and Risk Guarantees	Risk sharing guarantee from donor or national government that covers part of commercial lenders' loss from loan defaults	Allows leverage of public funds Addresses risk perception of commercial lenders regarding EE projects	Can serve only a limited number of municipalities Requires strong and willing bank partners to develop project pipeline	Guarantor for the covered part of the loan and commercial financier for the uncovered part

(continues on next page)

Table 1 | The Main Financing Options (*continued*)

Mechanism	Main features	Advantages	Limitations	Performance Risk Allocation
COMMERCIAL FINANCING				
Vendor Credit	Equipment vendor supplies EE equipment with payments spread over a period of time	Little or no requirement for collateral or recourse Mobilizes commercial financing Does not count against borrowing limit	Limits choice of equipment to that offered by vendor Financing only available for short terms	Vendor and/or municipality, depending on what collateral and recourse is provided
Lease of Assets	Financing of EE equipment under lease contract, usually with lease payments based on estimated energy savings	Provides a means of paying the costs of EE equipment over time Lease may not count against borrowing limit	Relies on local banks and leasing companies for reasonable cost financing and to assume credit risks Serves only creditworthy municipalities	Lessor and/or municipality, depending on what collateral and recourse is provided
Commercial Loans	Commercial financing institutions lend money to municipalities for EE projects either directly or through ESCOs using the ESPC mechanism	Mobilizes commercial financing Can be scalable and sustainable Full project cycle is financed With ESPC, risks are transferred to the ESCOs	Banks or ESCOs exposed to bear credit risk Creditworthy municipalities only High due diligence costs ESCO industry hard to develop	Commercial financier, municipality, or ESCO
Municipal Bonds	Municipality issues bonds to private parties and use proceeds to finance EE projects	Mobilizes commercial financing Allows municipalities to undertake own procurement/implementation Can be scalable and sustainable	Can have high transactions costs Requires a developed municipal bond market Limited to large and highly creditworthy municipalities	Commercial financier

Source | Authors

PART I: APPLICABILITY OF THE FINANCING MECHANISMS TO ENERGY EFFICIENCY OPTIONS

Table 2 provides an illustration of the applicability of the financing mechanisms to the four types of EE projects outlined above. The table provides an overview of the key characteristics of each of the four project types. In all cases, unless adequate internal resources (budget financing) are available, the workable external financing options are determined by the creditworthiness and borrowing capacity of a municipality.

Municipalities with weak credit and/or limited or no borrowing capacity will not be able to access commercial financing such as dedicated credit lines or other bank loans, or engage in vendor credit, leasing, or ESPC contracts. They may therefore be limited to relying on budget financing or EE funds established by governments and/or donors. Municipalities with stronger credit and borrowing capacity can avail of a larger number of financing options, including publicly supported commercial financing schemes (such as credit lines, risk guarantee programs and other types of commercial financing illustrated in the financing ladder).

Examples of selected financing mechanisms—revolving funds developed specifically to address energy efficiency, credit or risk guarantees, and commercial financing—are provided below.

Table 2 | Financing Mechanisms and Energy Efficiency Options

ILLUSTRATIVE MUNICIPAL ENERGY EFFICIENCY PROJECTS AND RELATED FINANCING OPTIONS						
		Project Characteristics			Potential Financing Options for Municipalities	
Type of Measure	Examples	Technical Complexity	Investment Needs	Paybacks	Weak Credit, Limited Borrowing Capacity	Strong Credit, Ample Borrowing Capacity
Indoor Lighting	T-5 lamps, CFLs, LEDs, Efficient Luminaires	Low	Low to Medium	Short	Budget Financing, EE Funds	Budget Financing, EE Funds, Public Support, Commercial Financing
Building Retrofit	Insulation, Efficient Chillers/ Boilers, EMS	Medium	Medium to High	Long		
Public Lighting	LED Lamps, Lighting Controls	Low to Medium	Medium to High	Medium		
Utilities	Loss Reduction, Efficient Pumps, System Optimization	Medium to High	Medium to High	Long		

Indicative Payback Periods: Short (<3 years), Medium (3-6 years), Long (>6 years)

Note | Indoor lighting EE measures, due to their low cost and short paybacks, may be implemented by municipalities using budgetary resources. However, often indoor lighting is combined with building retrofit options in a single project. Such bundling may reduce transaction costs and facilitate implementation of some of the longer payback building envelope and equipment options. However, it may require external financing due to the larger investment needs.

Source | Authors

REVOLVING ENERGY EFFICIENCY FUNDS

Dedicated EE funds can be established to provide long-term financing for municipal EE investments. They can also create centers of expertise. Under typical revolving EE funds, loans are provided to municipalities to cover the initial investment costs of EE projects. The savings are then used to repay the Fund until the original investment is recovered, plus interest and any fees or service charges. The repayments can then be utilized to finance additional investments, thereby leading to the revolving fund. Such funds can often offer lower cost financing with longer tenors and reduced security requirements than commercial loans, since both the borrower and lender are publicly owned.

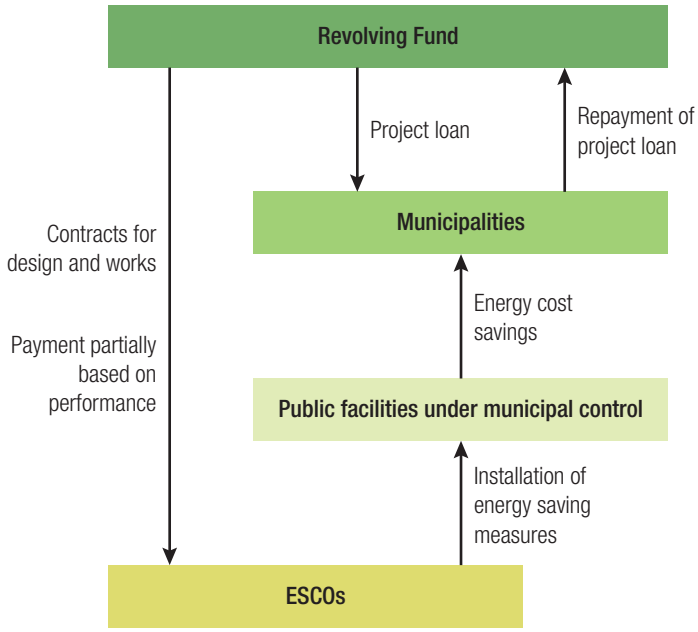
An EE fund can be established by municipal government, or more often, by regional or national government, sometimes supported by donor funds. Funding sources may include a municipality's own funds or government budget allocations (internal funds), or grant or loan funds from donors or other sources (external funds). While an initial capital

contribution is required—either through a budget transfer, loan, or grant—the fund can eventually become self-sustaining with the repaid capital being lent out for new projects and the fund's operating costs covered from interest income and service charges. An internal fund is limited to a single municipality, which provides the initial capital and may also manage the fund itself. An external fund will lend to multiple municipalities and is often managed by a fund manager, selected competitively with its compensation tied to the fund's performance. The external fund may also be managed by a utility or a specially created organization such as a public energy service companies or ESCO.

A simple illustration of a fund structure is shown in Figure 3. In this case, the fund is externally capitalized and managed and lends to several municipalities.[4] The fund contracts EE service providers, or ESCOs, to implement the projects for the borrowing municipalities, possibly with incentive payments linked to the achievement of expected savings. The municipality remains liable for repaying the loan, which it does out of the energy bill savings resulting from the project.

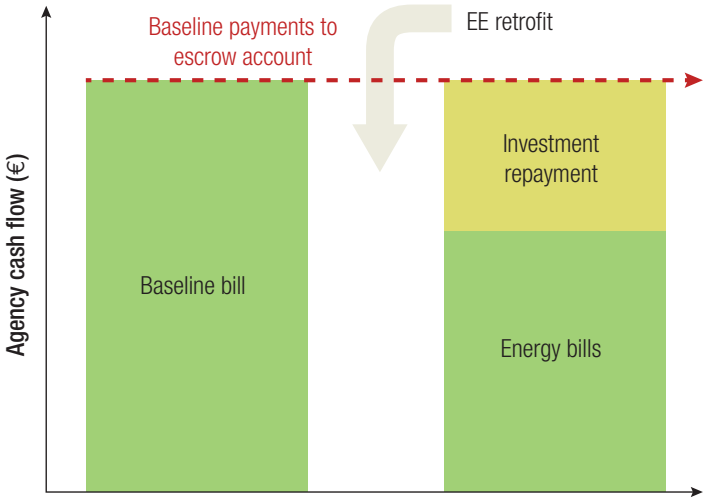
For municipalities that lack the capacity to effectively implement EE projects, the EE Fund may offer an option for signing an energy services agreement (ESA), under which it offers a full package of services to identify, finance, implement, and monitor EE projects for a municipality. The municipality is usually required to pay all, or a portion of, its baseline energy bill to cover the investment cost and associated fees during the contract period. ESA payments can also be bundled with a client's energy bills. Figure 4 illustrates the basic idea of a client's cash flows under the ESA, with payments equal to their baseline energy bill. In some cases, the contract duration is fixed; in others, the contract can be terminated after an agreed level of payment has been made which can offer a greater incentive for a client to save more energy. For municipal clients, ESAs generally do not count against municipal debt limits since they can be viewed as long term.

Figure 3 | Illustration of Revolving Energy Efficiency Fund



Source | Authors

Figure 4 | Payments under an Energy Services Agreement



Source | ESMAP 2014

With an internal EE Fund, a municipality can overcome the lack of readily available EE financing and demonstrate that the municipal government can play a leadership role in showcasing the value and benefits of EE to its citizens and communities. The Ann Arbor Municipal Energy Fund (US) is a sustainable model for financing municipal EE projects (see Box 1). The two critical components are an initial funding source and dedicated staff to support and coordinate the Fund and its investments and activities. The commercial nature of the Fund has allowed it to maintain and grow its capital base and become financially sustainable.

Box 1 | Ann Arbor Municipal Energy Fund

The municipality of Ann Arbor issued a 10-year bond in 1988 to fund a number of EE retrofits. Following the final payment on the bond in 1998, the municipality took the decision to redirect half of the budget allocated to servicing the bond over a five-year period to building up an initial energy fund (equivalent to an initial capital of US$ 0.5 million). This fund now operates as an internal revolving fund for EE projects in the municipality, to which departments and age ncies can apply for a loan to finance EE investments with the repayments being used to recapitalize the fund. Savings estimates for projects completed over the 10-year period 1998-2008 demonstrate that these projects have cumulatively resulted in almost US$ 0.86 million in energy cost reductions, 10.7 GWh in energy savings, and approximately 8,000 tonnes of CO_2e. These projects have also improved the comfort and appearance of city facilities.

Source | http://www.esmap.org/node/1299

CREDIT OR RISK GUARANTEES

Guarantees provide a means of transferring risk from a lender or financier to another entity that is better placed and willing either to manage or absorb the risk. For municipal

EE projects, loan guarantees typically are provided by donors. However, in some cases, a municipality or a higher level of government may provide the guarantee.

A credit guarantee may cover the loss from a loan default regardless of the cause of the loss, thereby covering all risks. A partial risk guarantee may only pay out if losses are due to particular causes, thereby covering against specific risks. Guarantees generally cover less than 100 percent of the loss from default on a guaranteed loan to preserve the incentives for the entity making the loan to conduct its own due diligence of the credit-worthiness of the borrower by requiring it to assume some part of the risk. The availability of guarantees may facilitate bank financing of municipal EE projects. Box 2 provides an example of a guarantee program.

Box 2 | Energy Efficiency Loan Guarantees in Bulgaria

The Bulgarian Energy Efficiency Fund (BEEF) was established with support from the World Bank and the Global Environment Facility (GEF), in cooperation with the Governments of Bulgaria and Austria, to support a large increase in EE investments in Bulgaria through development of self-sustaining, market-based financing mechanisms. BEEF offered Partial Credit Guarantees (PCG) to share in the credit risk of EE finance transactions and to improve loan terms for project sponsors. The PCG covered potential loan loss claims up to 70 percent of the outstanding loan principal (portfolio) of the financial institution, with individual guarantee commitments not to exceed US$ 500,000. During the five-year period 2005-10, BEEF entered into 31 guarantee agreements covering some US$ 2 million, triggering an investment volume of US$ 15 million. The resulting lifetime energy savings were 0.02 mtoe, and the greenhouse gas savings at 0.1 $mtCO_2e$.

Source | World Bank, 2010

PUBLIC-PRIVATE PARTNERSHIPS

Public-private partnerships (PPPs) are mechanisms that use public policies, regulations, or financing to leverage private-sector financing. The main characteristics of PPPs for financing EE projects include (IEA, 2011):

- a contractual relationship (or less formal agreement) between a public entity and a private organization;
- the allocation of risks between the public and private partners consistent with their willingness and ability to mitigate risks, in order to encourage the private partner to mobilize financing;
- the mobilization of increased financing for EE; and
- payments to the private sector for delivering services to the public sector.

An example of a PPP is where the private partner may operate and maintain energy systems or facilities, such as street lighting, under a service or lease agreement with a municipality, which serves as the public partner.

One type of PPP that has been used for municipal EE projects is the use of ESPCs, discussed in the following section.

ENERGY SAVINGS PERFORMANCE CONTRACTS

Many municipalities have limited technical capacity to design, develop, and implement viable EE projects. Without such capabilities, accessing commercial financing for EE projects can become even more challenging. In assessing potential financing mechanisms, municipalities should give consideration to how energy service providers, such as ESCOs, operating under energy savings performance contracts (ESPCs) can help in project implementation and provide access to financing. Box 3 presents an example of how the municipality of Emfuleni, South Africa, engaged an ESCO to achieve water and electricity savings.

ESCO services generally consist of three components: integration of a wide range of project services (e.g., audit, design, engineering, equipment procurement, construction and installation, measurement and verification of savings), facilitation of financing, and guarantee of project performance. An ESCO can also play an important role in bringing in skills, information, and knowledge.

While ESCOs may bring or help mobilize financing from local banks or financial institutions, their involvement cannot deliver financing that would otherwise be unavailable to a municipality. This is because most ESCOs have limited financial capacity and are unwilling to take on substantial debt on their balance sheets. An ESCO's ability to raise financing from lenders is dependent on the ultimate quality of its projects and the credit-

Box 3 | Using an ESPC for Water Loss Reduction and Energy Savings in Emfuleni, South Africa

The municipal water utility of Emfuleni, South Africa, distributes water to 70,000 households in part of the city. However, due to deteriorating infrastructure, about 80 percent of potable water was leaking through broken pipes and failed plumbing fixtures. A technical investigation determined that adopting advanced pressure management measures in the distribution network could cut water loss dramatically and also lower pumping costs.

The utility lacked the technical expertise to prepare and implement the project and was short of funds to finance the investment. A shared savings ESPC could help address both issues. The city government engaged an external technical advisor to help the utility design and prepare the project, as well as procure engineering services, and monitor and verify savings.

Through a competitive bidding process, the utility signed a water and energy performance contract with a local ESCO under a Build-Own-Operate-Transfer arrangement for a period of five years. The project was designed to operate for at least 20 years under the scheme. The ESCO provided turn-key services while underwriting all financial and performance risks. Third-party project financing was arranged by the ESCO from the Standard Bank of South Africa.

The project achieved impressive results of 7 to 8 million m^3 annual water savings and 14,250 MWh annual electricity savings. Monetary savings exceeded US$ 3.8 million per year. The ESCO recovered the capital cost of its investment in one year with a total return to the ESCO that represented four times the ESCO's initial investment. Nonetheless, the lion's share of the benefit stayed with Emfuleni Municipality.

Source | ESMAP, 2010 , Good Practices in City Energy Efficiency, http://www.esmap.org/esmap/node/231

worthiness of its clients. If a municipality is not sufficiently creditworthy to borrow commercially, an ESCO dependent on that municipality to pay its bills also may not be creditworthy. ESCOs should therefore be seen as complements to the financing mechanisms discussed above rather than a substitute for them. In some cases, public funding and support may be provided to municipalities via ESCOs who also bring the technical capacity to deliver projects. In others, municipalities may receive funding and contract ESCOs for help in project implementation.

Another interesting option for municipalities is the use of a **public ESCO**, which can work with a number of municipalities under simple energy services agreements to create pools of similar projects which can then be financed and implemented as a single or bundled project. By doing so, the transactions costs of individual projects can be reduced, and thus facilitates financing. This may be particularly useful for smaller municipalities, as the bundling of small projects among different municipalities can help in reduce transaction costs. A variant of the public ESCO is a **utility ESCO**, wherein an energy utility makes use of its greater scale, financing capacity, and familiarity with its customers to create its own ESCO. The utility ESCO may be able to recover loan repayments through its utility bills, thereby facilitating the collection process. Municipalities using their own budget funds can create an **internal ESCO** through which a municipal department acts as an in-house ESCO. This helps ensure that funds for EE projects are used effectively and efficiently (Singh et al, 2010).

More detail on the potential roles of ESCOs and ESPCs in delivering municipal EE projects and how to procure their services is available at: www.esmap.org/esmap/eeci.

DONOR FUNDING

International financial institutions (IFIs), referred to herein as "donors," often provide support to facilitate and promote EE projects. Municipalities should explore the availability of donor funding, either direct or indirect, for municipal EE projects. Such support is generally provided to national governments and not directly to specific municipalities and may consist of two main components:

- **Technical assistance** (TA) to overcome the challenges posed by limited: (i) awareness of EE opportunities; (ii) familiarity with EE technologies; (iii) capacity to develop projects; and (iv) implementation and operational capacity. TA may support pipeline development as well as program implementation. Limited TA may sometimes be provided by donors directly to municipalities to identify EE opportunities, conduct energy audits and/or develop EE plans.
- **Financing of EE projects**—via grants, loans, and credit lines etc.—through national programs to create an EE fund, a public ESCO, or a municipal financing facility.

In order to benefit from donor programs, municipalities need to obtain information on the availability of specific types of TA and financing assistance from such programs. They need to work with the national agencies responsible for managing and coordinating donor assistance to determine the eligibility conditions, application requirements, and other criteria necessary to develop proposals for TA and financing.

CARBON FINANCING

Carbon financing refers to revenues derived from the sale of reductions in greenhouse gas emissions that result from an EE project. Although revenues from carbon financing alone are not enough to develop an EE project, such revenues can supplement the cost savings arising from the project, thereby improving the project economics and potentially turning a marginally viable project into a viable one. The use of carbon financing to support EE projects has been very limited. As of August 2012, only 47 projects related to energy efficiency had been successfully registered under the Clean Development Mechanism (CDM) under the Kyoto Protocol, out of 4,986 projects in total.[5] There is substantial uncertainty over the future of these carbon-financing mechanisms as the market prices for sale of carbon credits have fallen substantially over the last several years.

PART II: SELECTING A FINANCING MECHANISM

There is no simple relationship between specific challenges faced and the selection of an appropriate financing mechanism. The suitability of different mechanisms depends on a municipality's financial strength and creditworthiness, predictability of revenues and budget transfers, local legal and regulatory frameworks, commercial financing environment, nature of an EE project, implementation capacity, and available delivery mechanisms. A municipality in a large metropolitan area is different from a small municipality in terms of population, density of development, and revenue base. The expenditure plans of large municipalities are generally more complex and require greater fiscal capacity. These variations, amongst other factors, mean that large municipalities face different sets of challenges than their smaller counterparts.

Table 3 illustrates a range of potential financing mechanisms that can be utilized by municipalities depending on the particular set of challenges they face. The list shows separate options for small and large municipalities. Table 3 is a simple indicative guide for municipal decision makers as to which mechanisms might most appropriately be used to address specific challenges they face in financing EE projects. It is not intended to be comprehensive or exhaustive but rather to help decision makers think through which mechanisms may best address specific constraints for examination in more detail. The mechanisms shown are not exclusive, and in many cases multiple mechanisms may be combined to address different sets of challenges.

Table 3 | Potential Financing Mechanisms Against Various Challenges

Challenges	Potential Finance Mechanism	
	Small Municipalities	Large Municipalities
A. RESTRICTIONS ON MUNICIPAL FUNDING		
Inadequate Revenue Base Limited Revenue-Raising Powers Limited Borrowing Powers Restrictions on Use of Funds	Budget financing Dedicated revolving EE funds PPPs	Municipal Funds (instead of more sector focused EE funds) Special Project Vehicle approach
B. BARRIERS TO COMMERCIAL FINANCING		
Requirement for Collateral and Recourse Assessing Creditworthiness Absence of Hard Cash Flows High Transaction Costs	Commercial financing through vendor credit, lease of assets, and risk guarantees. The government can provide guarantee to meet security requirements. ESPCs model implemented by an ESCOs Aggregation of smaller projects together under single program	Commercial bank debt financing ESPCs implemented by an ESCOs Public ESCOs Issuance of municipal bonds

Source | Authors

EFFECT OF MUNICIPAL CHARACTERISTICS ON SELECTION OF FINANCING MECHANISM

Small municipalities may have a greater need to rely on public financing mechanisms than large ones. Commercial financing mechanisms are likely to be more attractive and feasible with an increasing revenue base, borrowing capacity, and creditworthiness.

While the setting up of EE funds to overcome restrictions to municipality level barriers to financing EE projects may look like an attractive solution, it should be noted that IFIs often provide support to national governments to set up municipal funds for financing a range of infrastructure projects in areas such as water supply and waste management. Such general purpose municipal financing facilities may provide opportunities for financing EE projects, either as part of larger infrastructure projects or as stand-alone endeavours.

Leasing may also provide an interesting financing opportunity. A lease is a contractual arrangement in which a leasing company (lessor) gives a customer (lessee) the right to use its equipment for a specified length of time (lease term) and specified payment (usually monthly). Depending on the lease structure, at the end of the lease term the customer can purchase, return, or continue to lease the equipment. The use of leases is common with respect to various types of equipment, ranging from office equipment to vehicles. Many banks have leasing subsidiaries and there are many stand-alone leasing companies who may be willing to lease EE equipment to municipalities, subject to credit

considerations. While leasing companies can provide an important vehicle for the financing of energy efficiency projects, local tax or other laws and regulations may limit the ability of municipalities to utilize leasing options.

PREREQUISITES FOR FINANCING OF MUNICIPAL ENERGY EFFICIENCY PROJECTS

Certain important preconditions must exist before municipalities can finance EE projects. For example:

- Energy prices must not be heavily subsidized. If energy prices are much lower than the true cost of supplying energy, the energy savings resulting from EE projects will be too small to justify and to repay the cost of financing.
- A municipality's payments for energy use need to be based on actual consumption. If billing is not consumption-based (as is the case with some district heating systems), energy savings from EE projects will not yield any cost savings and thereby make financing difficult or impossible.
- The municipal budgeting process must allow a municipality to retain the cost savings resulting from EE projects. If the municipal budget is reduced when energy costs are lowered, the municipality would be unable to repay the financing costs of the EE projects.
- A municipality needs to have good baseline data on energy use and related service levels (such as hours and levels of indoor lighting, comfort levels for heating and cooling, and adequate light levels for public lighting). Without such baseline information, it is challenging to measure the energy and cost savings from EE projects.
- Any EE project will usually assure that basic levels of service are provided. If the service levels specified in the baseline conditions are inadequate, a municipality may find it difficult to finance the increased service levels provided by a new EE project.

PREREQUISITES FOR COMMERCIAL FINANCING

There are other preconditions that are critical for commercial financing. For example:

- There need to be commercial banks or financial institutions (lenders) who are interested and willing to finance municipal EE projects and who have the funds and financial products for municipal EE financing.
- A municipality needs to have a reasonable credit rating to be considered creditworthy by commercial lenders.
- In many countries, national governments impose borrowing limits on municipalities. To be eligible for commercial financing, a municipality needs to have sufficient borrowing capacity under such a limit to take on additional loans. Otherwise, it may need to consider commercial financing approaches that are not treated as debt and, therefore, do not count against borrowing capacity (for example, vendor finance or ESCO project financing).
- In addition to a good credit rating and sufficient borrowing capacity, a municipality may need to have collateral that is acceptable to commercial lenders.
- A municipality's procurement process must not be limited to selecting the least cost supplier and allow for certain types of agreements such as ESPCs.

SELECTING FINANCING MECHANISMS FOR SPECIFIC SITUATIONS

Figure 5 presents a flow chart showing how to select the most appropriate financing mechanisms to address specific situations faced by municipalities in financing EE projects. The flow chart is essentially a guide and is not intended to be comprehensive or exhaustive but rather illustrative, and the mechanisms shown are not exclusive. In many cases, multiple mechanisms may be combined to address different sets of challenges. Complementing Figure 5, Table 4 provides examples of the market conditions applicable to the effective use of the financing mechanisms illustrated in the financing ladder.

Figure 5 | Illustration of Financing Mechanisms Addressing Specific Situations

Situation		Issues/ Challenges	Action	Financing Mechanism
Does the municipality have sufficient resources to fund the project itself?	YES	Allocation of funds from budget	Establish budget line item for project	General budget financing
NO				
Are grants available from donors?	YES	Grants may not finance entire project	Prepare grant application	Partial budget financing and partial grant
NO				
Are funds available from national government	YES	Funds may provide only partial financing	Apply for national funds	Budget capture
NO				
Is there an energy efficiency fund?	YES	Eligibility criteria for the EE fund	Apply to the EE fund	EE fund
NO				
Are commercial banks willing to offer dedicated credit lines and/or risk sharing programs?	YES	Creditworthiness, collateral and borrowing capacity of municipality	Review eligibility for these mechanisms	Dedicated credit lines or risk guarantee programs
NO				
Is the municipality creditworthy and have borrowing capacity?	YES	Criteria used by commercial banks to assess creditworthiness	Access credit lines or risk sharing programs	Dedicated credit lines or risk guarantee programs
No options available for financing				
NO				
Are there active ESCOs in the local market?	YES	Developing ESPCs	Negotiate ESPC with ESCOs	Commercial financing with ESCOs
NO				
Are leasing or vendor financing programs available	YES	Eligibility criteria and terms of financing programs	Negotiate leasing or vendor financing agreements	Leasing or vendor finance
NO				
Does the municipality have the capacity to issue municipal bonds?	YES	Market for such bonds; transaction costs	Develop municipal bond program	Municipal bonds

Source | Authors

Table 4 | Examples of Financing Options and Related Market Conditions

Option	Description	Market Conditions	Examples
Grants	Investment costs funded by grant from donor or national government to municipality	No market capacity, need to pilot and demonstrate EE project benefits Availability of grant funds Limited creditworthiness	Armenia, Belarus, FYR Macedonia, Kazakhstan, Kosovo, Montenegro, Serbia
General Budget	EE project investment costs funded from general municipal revenues	Low market capacity, some co-financing is available Availability of some grant funds Limited creditworthiness of municipality	Bosnia & Herzegovina, FYR Macedonia, Lithuania, Montenegro, Poland, Serbia
Budget Capture	Financing to municipalities for EE projects from MoF, with repayment through savings from these projects	Underdeveloped municipal credit markets Limited equity among municipalities High commercial bank lending rates and low tenors Availability of budgetary space for MoF financing	Belarus, FYR Macedonia (MSIP), Hungary, Kosovo, Lithuania
EE Fund	Independent, publically owned entity provides financing for EE to public clients, with repayments based on estimated energy cost savings	Underdeveloped public/ municipal credit market Access to municipal budget or IFI loans/ grants to capitalize fund Credible and capable fund manager can be recruited Municipalities able to enter into multi-year obligations and retain energy cost savings	Armenia, Bulgaria, India, FYR Macedonia (proposed), Romania, Serbia (proposed), Uruguay

(continues on next page)

Table 4 | Examples of Financing Options and Related Market Conditions (*continued*)

Option	Description	Market Conditions	Examples
Dedicated Credit Lines	'Soft' public loans to commercial institutions for on-lending to municipalities for EE projects	Good banking partners willing to lend/assume risks Municipalities have ability and willingness to borrow Municipalities able to retain energy cost savings and pay for energy based on consumption Reasonable, competitive lending rates, reasonable tenors, collateral requirements	China, Germany, India, Poland, Serbia, Turkey, Tunisia
Credit and Risk Guarantees	Risk sharing guarantee from donor or national government that covers part of commercial lenders' loss from loan defaults	Good banking partners willing to lend/assume risks Municipalities must be marginally creditworthy and willing to borrow Municipalities able to retain energy cost savings and pay for energy based on consumption Reasonable, competitive lending rates	Bulgaria, CEEF (regional), China, FYR Macedonia, Hungary, Philippines, Poland, Tunisia
Vendor Credit	Equipment vendor supplies EE equipment with payments spread over a period of time	Large, credible local and/or international equipment vendors able and willing to finance municipal EE projects Local bank financing available for vendors Creditworthy municipalities	China, India, US

(continues on next page)

Table 4 | Examples of Financing Options and Related Market Conditions (*continued*)

Option	Description	Market Conditions	Examples
Lease of Assets	Financing of EE equipment under lease contract, usually with lease payments based on estimated energy savings	Large, credible local and/or international vendors able and willing to finance municipal EE projects Local bank financing available for vendor leasing Creditworthy municipalities able to sign long-term vendor contracts Municipalities able to retain energy cost savings and pay for energy based on consumption	China, EU, US
Commercial Loans	Commercial financing institutions lend money to municipalities for EE projects either directly or through ESCOs using the ESPC mechanism	Local bank financing available for direct lending to municipalities or ESCO lending Large, credible local and/or international ESCOs able and willing to finance and bid on municipal projects Creditworthy municipalities able to sign loan agreements with bank or long-term contracts w/ ESCOs Municipalities able to retain energy cost savings and pay for energy based on consumption Municipalities must have capacity to procure and negotiate complex ESPCs	Canada, Czech Republic, Germany, Hungary, India, Japan, South Korea, US

(continues on next page)

Table 4 | Examples of Financing Options and Related Market Conditions (*continued*)

Option	Description	Market Conditions	Examples
Commercial Financing, Bonds	Municipalities take commercial bank loans or issue bonds to finance EE investments	Requires well-developed municipal credit and rating systems Financiers willing and able to lend to public sector for EE projects Large municipalities with strong technical capacity willing to bundle many EE projects together	Bulgaria, Denmark, India, US

Source | Adapted from ESMAP, 2014 and Singh et al., 2010

CONCLUSION

A municipality's choice of a particular financing mechanism for its EE investments will depend on many factors such as its financial position, the nature of the EE projects, local legal and regulatory frameworks and the stage of fiscal decentralization, the commercial financing environment, its creditworthiness and borrowing capacity, implementation capacity, and available delivery mechanisms. This Guidance Note contains examples of illustrative financing mechanisms and where they are applicable. A fuller set of case studies developed by ESMAP can help identify and develop additional useful information for municipalities to select the suitable mechanisms for financing their EE projects.

Municipalities may start off with smaller pilot EE projects using grants or budget transfers. However, given that budgetary funds and grants may be scarce and are generally not sustainable, municipalities will need to increasingly access commercial financing to realize economically attractive investments that they would not otherwise have the means to undertake. They therefore need to move up the financing 'ladder' (see Figure 2)—and by improving their technical capacity and ability to access financing.

Moving up the ladder, sources of financing for municipal EE investments all require specific arrangements to ensure the repayment of the invested funds, generally through cash flows generated by the reduced energy costs, and thus require well defined and agreed upon procedures for verifying energy savings and retaining the cost savings.

Access to non-budgetary financing is critically linked to the delivery mechanism for municipal EE projects. The use of ESPCs is often required. Using reputable EE service providers who are able to guarantee energy savings can help secure repayment cash flows.

A piecemeal approach to municipal EE investment is likely to deter commercial financing because the transaction costs inherent in financing individual small projects are usually high relative to the project costs and investment returns. Municipalities should conduct small-scale pilots to verify financial viability before initiating large-scale EE investment programs. Small municipalities could form alliances or participate in regional or national programs to help scale up the total investment in EE projects.

One option that municipalities should consider is the bundling or aggregation of similar projects to take advantage of economies of scale and reduced transaction costs. Combining a number of similar projects—such as, for example, street lighting—across a number of municipalities can lead to greater competition among suppliers and larger procurements, both of which lead to lower costs. The aggregation of projects is also more likely to be attractive for financing by commercial banks.

ENDNOTES

[1] This Guidance Note uses the term municipality to designate an urban administrative or political jurisdiction with powers of self-government, such as a city, town, village, etc. This Guidance Note addresses the full range of such jurisdictions, from large cities to small villages.

[2] Public transport and solid waste management are not included in the discussion, but are nonetheless areas where municipal government can intervene on energy efficiency.

[3] Limited access to financing is not unique to EE projects but is an issue faced by municipalities in general.

[4] For example, see World Bank 2012.

[5] Registered projects in the energy demand sector, as listed on http://cdm.unfccc.int/.

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ACRONYMS AND ABBREVIATIONS

BEEF	Bulgarian Energy Efficiency Fund
CEEF	Central Energy Efficiency Fund
CFL	Compact fluorescent lamp
CO_2e	Carbon dioxide equivalent
EE	Energy efficiency
EMS	Energy management system
ESA	Energy service agreement
ESCO	Energy service company
ESPC	Energy savings performance contract
EU	European Union
GWh	Gigawatt hours
HVAC	Heating, ventilation, and air conditioning
IFI	International financial institution
LED	Light-emitting diode
m^3	Cubic meters
MoF	Ministry of Finance
MWh	Megawatt hour
PCG	Partial credit guarantees
PPP	Public-private partnership
US / USA	United States of America
US$	United States dollar (currency)

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