

The Philippines
Options for Financing Energy Efficiency
in Public Buildings



WORLD BANK GROUP

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A roundtable discussion was held on January 18, 2018 at the World Bank Manila Office to discuss the report’s findings and recommendations. Stakeholders from the Departments of Energy, Budget and Management, and Education were in attendance, along with several representatives from the private sector and civil society.

ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
CAPEX	Capital expenditure
CFL	Compact fluorescent lamp
DBM	Department of Budget and Management
DBP	Development Bank of the Philippines
DOE	Department of Energy
DOF	Department of Finance
EE	Energy efficiency
EE&C	Energy efficiency and conservation
EERF	Energy efficiency revolving fund
EOI	Expression of Interest
ESA	Energy service agreement
ESCO	Energy service company
ESPC	Energy saving performance contract
EU	European Union
FI	Financial Institution
FS	Feasibility study
FY	Financial year
GCF	Green Climate Fund
GEF	Global Environmental Facility
GEMP	Government Energy Management Program
GEMP IC	Government Energy Management Program Investment Component
GHG	Greenhouse gas
GOP	Government of the Philippines
GW	Gigawatt
IEA	International Energy Agency
IFC	International Finance Corporation
IFI	International financial institution
IFRS	International Financial Reporting Standards
JICA	Japan International Cooperation Agency
kgoe	Kilogram of oil equivalent
kWh	Kilowatt hour
LA	Loan Agreement

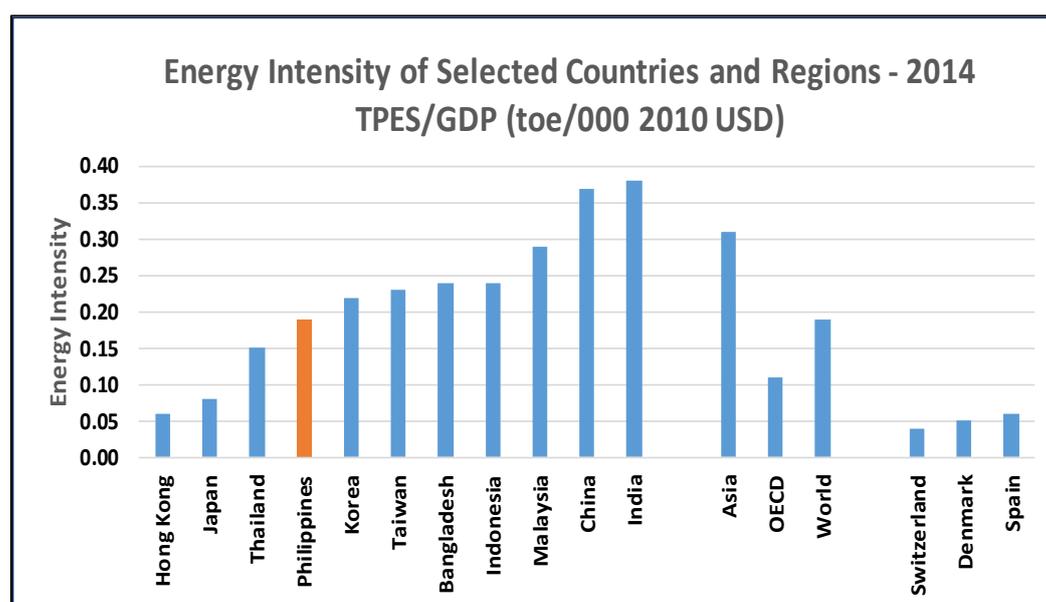
LED	Light-emitting diode
LFL	Linear fluorescent lamp
LGU	Local government unit
LGUGC	Local Government Unit Guarantee Corporation
MOA	Memorandum of understanding
mln	Million
M&V	Measurement and verification
MWh	Megawatt hour
MYOA	Multi-Year Obligational Authority
MYP	Multiyear project
NDC	Nationally determined contribution
NGA	National government agency
NPC	National Power Corporation
OECD	Organization for Economic Co-operation and Development
OPEX	Operational expenditure
PE2	Philippine Energy Efficiency Alliance
PEERF	Philippine Energy Efficiency Revolving Fund
PIU	Project implementation unit
PHP	Philippine peso
PNOC RC	Philippine National Oil Company Renewables Corporation
PPP	Public-private partnership
PSC	Program Steering Committee
PV	Photovoltaic
TA	Technical assistance
TFE	Technico-financial evaluation
TPES	Total primary energy supply
UNDP	United Nations Development Programme
UNIDO	United Nations Industrial Development Organization
USAID	U.S. Agency for International Development

1. INTRODUCTION: THE IMPORTANCE OF ENERGY EFFICIENCY IN THE PHILIPPINES

The Philippines has a rapidly growing electricity sector, but the country is starting from a low base. Since 2000, electricity consumption per capita has grown by 37 percent, and installed power generation capacity has increased from 15.6 GW in 2005 to 21.6 GW in mid-2017. The continued electrification of the country, together with its economic growth, will continue to drive the need for new power generation capacity, much of which is likely to be coal-fired (World Bank 2016). In order for the Philippines to sustain its economic growth at a reasonable cost while also meeting its global commitments to climate change mitigation and environmental sustainability, a focus on energy efficiency (EE) is therefore critical.

Figure 1.1 shows a comparison of the energy intensity¹ of the Philippines relative to many other Asian countries, as well as in comparison to Asian, OECD, and worldwide averages. At 190 kilograms of oil equivalent/1000 US\$ GDP, the energy intensity of the Philippines compares favorably with some of its neighboring countries, but it is considerably higher than the average of OECD countries (0.11), and more than three times higher than the level in European countries such as Denmark, Spain, and Switzerland (where it ranges from 0.04 - 0.06) (IEA 2016).²

Figure 1.1. Energy Intensity of the Philippines and Other Countries



Source: IEA 2016

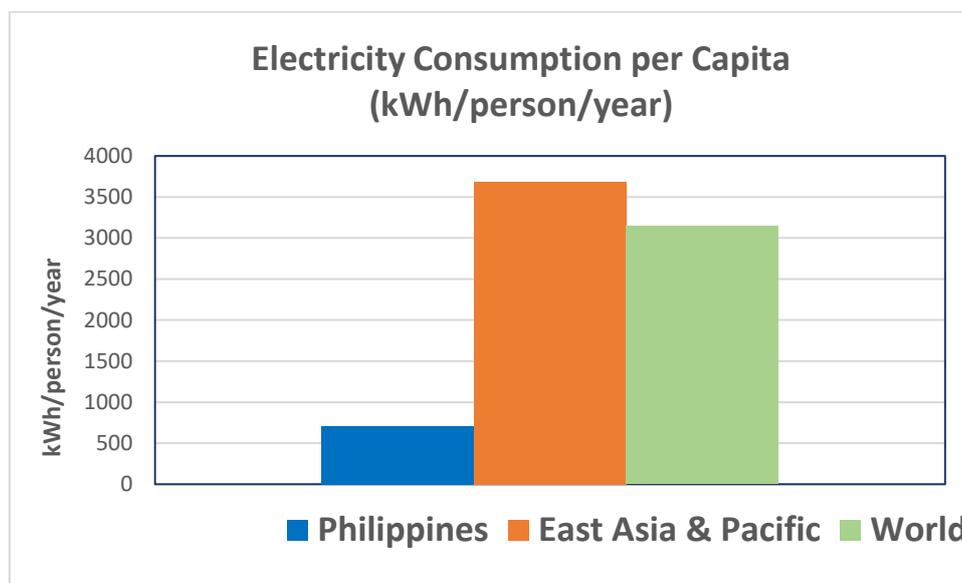
Figure 1.2 illustrates the current level of per capita annual electricity consumption. Per capita electricity use in the Philippines is only 706 kWh, substantially lower than the average of 3,682 kWh per capita for the East Asia and Pacific region, and the world average of 3,144 kWh per capita.³ However, as the economy of the Philippines grows, per capita electricity and other energy use will increase, leading to a higher level of energy intensity.

¹ Energy intensity is expressed as tons of primary energy supply divided by gross domestic product (GDP) in thousands of 2010 US dollars.

² Data is from the International Energy Agency, *Key World Energy Statistics*, 2016.

³ The World Bank, *The Little Green Data Book*, 2017.

Figure 1.2. Comparison of Electricity Consumption per Capita in the Philippines, East Asia & the Pacific, and Worldwide



Source: World Bank 2017

Initiatives of the Government of the Philippines to Increase Energy Efficiency

In view of the relatively high level of energy intensity in the Philippines; the potential increase in energy needs to support economic growth; and the need to reduce future coal consumption to help mitigate climate change, the government of the Philippines (GOP) has recognized the need to improve EE. Actions already taken by the GOP include:

- Creation of the Government Energy Management Program (GEMP)⁴
- Establishment of the Energy Utilization and Management Bureau within the Department of Energy (DOE)
- Creation of the National Energy Efficiency and Conservation Program (NEECP) of the DOE⁵
- Development of the Energy Efficiency Roadmap for the Philippines (supported by SWITCH-Asia)
- Development of the Energy Efficiency Action Plan for the Philippines (supported by SWITCH-Asia)
- Participation in a number of EE projects sponsored by multilateral donors such as the Asian Development Bank (ADB), the United Nations Development Programme (UNDP), UNIDO, the European Union (EU), the International Finance Corporation (IFC), and the World Bank, as well as bilateral ones, including USAID and JICA.
- The recent launch of the *Philippine Energy Efficiency and Conservation (EE&C) Roadmap for 2017-2040*.

In addition, a draft law on EE is under preparation. In July 2017, four Senate committees

⁴ <https://www.doe.gov.ph/government-energy-management-program>

⁵ <https://www.doe.gov.ph/national-energy-efficiency-and-conservation-program>

(Energy; Ways and Means; Public Services; and Finance) recommended a substitute bill, Senate Bill 1531, to consolidate Senate Bill 30 (a comprehensive EE&C bill) and Senate Bill 525 (a bill creating an interagency energy conservation committee).⁶

Energy Efficiency in the Public Sector

The public sector in the Philippines, which includes both the central government and local government buildings and facilities, is a large user of energy. The government has issued orders and circulars requiring government agencies to reduce energy consumption by at least 10 percent, and has established GEMP to assist them in accomplishing this goal.

There is limited data available on the total number of public sector buildings and facilities and their amount of energy consumption. Recent DOE efforts under GEMP have resulted in the development of data about building characteristics, energy use, and EE options for about 160 government buildings. (See Section 2 of this report for details.)

Two previous projects, the Philippine Efficient Lighting Market Transformation Project⁷ and the Philippine Energy Efficiency Project⁸ have addressed EE in the public sector, focusing primarily on efficient lighting in government buildings and facilities, as well as in street lighting, traffic lights, and other public lighting.

By implementing EE projects, the public sector can lead by example, while helping to catalyze markets for EE goods and services. Common ownership and public financing can facilitate the potential bundling of smaller projects, thus lowering purchasing and implementation costs, and allowing for implementing at a larger scale. A scaled-up public sector program can also create jobs, fostering a sustainable local energy service company industry, as has been seen in countries such as Canada, Germany, Japan, the Republic of Korea, and the United States (World Bank 2014b). Therefore, a nationwide program to improve EE in public buildings in the Philippines should be developed by the government to realize such benefits.

World Bank Experience with Public Sector Energy Efficiency

Since 2007, the World Bank Group has provided about US\$10 billion in financing for EE projects globally. Such projects have generally led to a 25-40 percent savings in energy costs, with simple payback periods of less than 8-10 years, substantial additional benefits (for example, the improvement of indoor comfort, better air quality, and health benefits), and increased public awareness. The repayment rates have been extremely good, with a demonstrated willingness of public building administrators to co-finance such investments.

Despite attractive payback periods and energy savings potential, EE financing in the public sector is plagued by a number of market barriers. Perhaps the most critical gaps are the lack of suitable and sustainable financing mechanisms, along with the kinds of supporting institutional structures that allow public building programs to be implemented at scale. The creation of a national-level program with access to financing, technical assistance (TA), specialized energy service company (ESCO) procurement schemes with standardized audit/contracts, specialized ESCO windows, and the like, could substantially unlock the EE potential of this sector (World

⁶ Personal communication, Alexander Ablaza, President, Philippine Energy Efficiency Alliance, Inc. August 2017.

⁷ GEF 2004

⁸ ADB 2015

Bank 2016).

Project Objectives

The primary objective of this project was to identify options for addressing barriers to financing, for the purpose of scaling up EE implementation in public buildings in the Philippines. Specifically, the project was designed to:

- Review existing information on energy consumption in public buildings and energy savings opportunities in the public sector in the Philippines;
- Identify the major barriers to EE financing in the public sector;
- Review the experiences other countries have had with financing options for public sector EE implementation;
- Identify attractive options for EE implementation in public buildings in the Philippines;
- Conduct a comparative assessment of the advantages and limitations of various options;
- Define the selection and implementation steps that need to be taken by the government.

Report Outline

Section 2 of this report provides a summary of the available data on public buildings, including the energy consumption characteristics of government buildings and facilities, estimates of the potential for energy savings, and investments needed.

Section 3 discusses some of the barriers to financing EE that has been seen in other countries, and summarizes such barriers in the public sector in the Philippines, including legal and regulatory barriers; lack of access to commercial financing; institutional barriers; and limited implementation capacity.

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

Section 5 identifies three options that are considered appropriate for implementation in the Philippines—budget financing, an EE revolving fund, and a public or super ESCO—and provides detailed information on each. It also presents information on the potential role of international financial institutions in providing complementary financial and technical assistance.

Section 6 summarizes the advantages and limitations of the three proposed financing options; presents the World Bank’s recommendations; and provides guidance on moving forward with the development of a national program.

2. ASSESSMENT OF THE COSTS AND BENEFITS OF EE INVESTMENTS IN PUBLIC BUILDING IN THE PHILIPPINES

This section presents estimates of the energy efficiency (EE) potential, the need for investment, and the economics of EE investments for two sets of public buildings in the Philippines: 158 buildings for which the Department of Energy (DOE) has recently collected data; and all national government administrative (NGA) office buildings⁹.

Due to a lack of reliable comprehensive information, estimates for all public buildings in the Philippines could not be made. However, the estimated results for these two sets of buildings are sufficiently representative, and will make a strong case for investing in EE improvements in public buildings nationwide.

Methodology

The DOE data for the 158 buildings were validated through a desk review, and the review was complemented by walk-through audits of 20 buildings. Data were processed by using an Excel-based Techno-Financial Evaluation (TFE) tool, and tallied separately for lighting and air conditioning. The TFE tool was used to compute energy consumption after EE investments; energy savings; investment costs; and the payback period.

The EE cost and benefit estimates for all NGA office buildings were made based on coefficients derived from the data set for the 158 buildings and the actual data for utility bills (both water and electricity) of office buildings for 2016¹⁰. The electricity share was conservatively estimated at 80 percent of the total bill.

It is worth noting that in addition to EE retrofitting of the lighting and air conditioning systems that were selected for illustrative purposes for this study, several other measures could and should be considered to further enhance the EE of public buildings, including the installation of new windows, window shading, green/white roofs, building control/energy management systems, and rooftop solar photovoltaic (PV) panels.

Results

The desk review of the energy data for the 158 buildings and walk-through audits of the 20 buildings confirmed the significant EE potential of public buildings that could be realized by investing in upgrading the lighting from compact fluorescent lamps (CFL) and linear fluorescent lamps (LFL) T12/T8¹¹ with magnetic ballast to LED bulbs and lamps, and switching to efficient modern air conditioning technologies such as inverters, variable refrigerant flow, and centralized chillers.

EE investments in the Philippines have proven to be financially attractive, with the average payback period for the total investment program less than three and half years. As shown in

⁹ This includes 87 buildings of central government offices and government-owned corporations, 48 academic buildings, and 23 hospital buildings.

¹⁰ The Department of Budget Management (DBM) Budget of Expenditures and Sources of Financing FY17 http://www.dbm.gov.ph/?page_id=16451

¹¹ The “T” designation in fluorescent lamps nomenclature stand for tubular – the shape of the lamp. The number immediately following the T, gives the diameter of the lamp in eighths of an inch.

Table 2.1, the required EE investments in the 158 buildings totaled PHP2,203 million. They will result in energy savings of 33 percent, which translates into an annual electricity savings of 85 million kWh; monetary savings of PHP705 million; and reductions in CO₂ emissions¹² of 60,200 tons.

Table 2.1. Estimated Costs and Benefits of EE Investments in 158 Public Buildings

	Electricity Cost	Electricity Consumption	Investment Cost	Annual Savings			Annual Emission Reductions	Simple Payback Period
	PHP million (mln)	kWh mln	PHP mln	%	PHP mln	kWh mln	CO ₂ ton	Years
Lighting	405	50	375	41%	166	21	14,700	2.3
Air Conditioning	1,795	215	1828	33%	539	65	45,500	3.4
Total	2,200	265	2,203	33%	705	85	60,200	3.1

Table 2.2 sums up the estimated costs and benefits from EE improvements in lighting and air conditioning in NGA office buildings. Investments of PHP13,023 million will result in an annual savings in electricity of 441 million kWh; monetary savings of PHP3,586 million; and reductions in CO₂ emissions of 308,000 tons.

Table 2.2. Estimated Costs and Benefits of EE Investments in Public Office Buildings in the Philippines

	Electricity Cost	Electricity Consumption	Investment Cost	Annual Savings			Annual Emission Reductions	Payback Period
	PHP mln	kWh mln	PHP mln	%	PHP mln	kWh mln	CO ₂ ton	Years
Lighting	2,091	257	2,209	43%	899	110	77,000	2.5
Air Conditioning	9,266	1,138	10,814	29%	2,687	330	231,000	4.0
Total	11,357	1,395	13,023	32%	3,586	441	308,000	3.6

¹² An estimated power grid emission factor for the Philippines is 0.7 tons of CO₂ per MWh.

3. BARRIERS TO FINANCING EE INVESTMENTS IN THE PUBLIC SECTOR

Lessons Learned in International Experience

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: lack of information on the potential benefits of EE; lack of trained personnel; limited incentives; high transaction costs; and scarcity of financing.

In addition, there are several barriers specific to the public sector that further hold back sustained improvements in EE. Among these are public accounting, budgeting, and procurement rules; financing constraints; very limited staff capacity; and very limited incentives for identifying and implementing EE measures. Furthermore, the public sector has very limited capacity to identify, develop, and implement EE projects. Figure 3.1 shows the barriers to EE in the public sector, based on experience in other countries.

Figure 3.1. International Experience with Barriers to EE in the Public Sector

Policy / Regulatory	Equipment/ Service Provider	End User	Financiers
<ul style="list-style-type: none"> • Energy pricing and collections • Public procurement and budgeting policies • Limitations on public financing, borrowing capacity • Limited and poor data • Import duties on EE equipment • Unclear or under-developed EE institutional framework • Lack of appliance standards and building EE codes, lack of testing, poor enforcement 	<ul style="list-style-type: none"> • High project development costs • Perceived risk of late/non-payment of public sector • Limited demand for EE goods/services • Diffuse/diverse markets • Limited experience with new contract mechanisms (e.g., ESCOs) • Limited technical, business, risk mgmt. skills • Limited access to financing/equity 	<ul style="list-style-type: none"> • Lack of credible data • Lack of awareness of EE opportunities • High upfront and project development costs • No discretionary budgets for special projects/upgrades and limited ability to borrow • Poor structural condition of public buildings/facilities • Ability/willingness to pay • Perceived risks of new technologies/ systems • Mixed/lack of incentives • Inability to collateralize public assets 	<ul style="list-style-type: none"> • New technologies and contractual mechanisms • Small sizes/widely dispersed → high transaction costs • High perceived risks, incl. public credit risks – not traditional asset-based financing • Other higher return, lower risk projects • Over-collateralization and restrictions on public assets as collaterals • Behavioral biases

Source: Adapted by the authors from World Bank 2013.

Barriers to Financing Public Sector EE in the Philippines

The main barriers to financing public sector EE projects in the Philippines are:

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

Policy and Regulatory Barriers

- *Budgetary and borrowing constraints.* Public agencies in the Philippines generally have limited availability of budgetary funds for capital investment (CAPEX) to be used for EE improvements. While the existing legal framework in the Philippines does permit both national government agencies (NGAs) and local government units (LGUs) to undertake loans, it is not practical for them to do so, because of their poor creditworthiness and borrowing capacity, and their inability to provide satisfactory collateral.
- *Restrictive budgetary procedures.* Existing budgetary rules generally do not allow public agencies to retain energy cost savings, since budgets are prepared annually, and each year's budget allocation is based on the previous year's expenditures (Switch Asia 2015). A reduction of budgetary spending for energy costs would lead to a decrease in allocation in the next budget cycle; and operating cost reductions usually cannot be reallocated to pay for capital expenditures. Therefore, government agencies do not have any incentives to undertake EE projects.
- *Multiyear contracts.* Public agencies need to secure approval for Multi-Year Obligational Authority (MYOA) from the Department of Budget and Management (DBM) for all multiyear projects (MYPs). In May 2017 the DBM updated this policy through a new National Budget Circular (No. 570).
- *Public procurement rules.* The Government Procurement Reform Act (Republic Act 9184) only allows for the procurement of "pure goods" and "pure services," thereby disallowing "hybrid" procurements such as ESCO performance contracts. The Technical Services Office of the Government Procurement Policy Board recently opined that as long as government funds are used for EE projects (whether they are to be financed from CAPEX or OPEX budgets), the procurement law fully applies, and therefore continues to disallow ESCO contracts.
- *Building codes and certification.* Existing building codes do not include any provisions for energy efficiency measures.

Barriers Related to Equipment and Service Providers

- *Limited demand and high development costs.* There is limited demand for EE goods and services in the public sector, and decision making can take time. Therefore, equipment and service providers need to devote substantial time and effort in order to develop EE projects, which leads to high project development costs.
- *Limited experience and capabilities.* Despite some 26 DOE-certified ESCOs in the market, only a few undertake energy performance contracts: therefore, they have yet to develop their technical, business development, and risk management skills and capabilities. (Most of their business involves simple equipment supply or service contracts.) The government-owned ESCO-PNOC Renewables Corporation (PNOC RC) has only recently started to develop its ESCO business and energy saving performance contracting (ESPC) in the public sector.
- *Lack of commercial financing.* Equipment suppliers and energy service providers have limited access to commercial financing, and cannot invest much of their own equity in EE projects. Also, innovative financing mechanisms such as leasing,

vendor financing, and off-balance-sheet equity investments for EE equipment are not very common in the Philippines.

Barriers Related to End Users

- *Limited budget capacity and incentives.* There are generally no discretionary budgets for special projects or efficiency upgrades in the Philippines. Also, public sector decision makers have no incentive to undertake EE projects, because all energy savings typically revert to the National Treasury as unutilized energy budgets.
- *Limited knowledge of EE options.* Public sector facility and energy managers (in both NGAs and LGUs) have limited knowledge and awareness of EE opportunities, technologies, costs, and implementation options.
- *Lack of sufficient, credible data.* There is only limited data on the number, characteristics, and energy use statistics of public buildings. There is also limited information available to public sector decision makers on the characteristics and benefits of EE technologies (except regarding LED lighting).

Lack of Access to Commercial Financing

- *Lack of interest and unattractive financing terms.* Commercial banks have limited or no interest in lending to the public sector. Most banks consider loans to public agencies riskier than loans to private companies, in part because budgets are allocated annually, and also because most agencies have no collateral. Commercial financing terms (interest rates, loan tenors, collateral requirements, and so on) are generally not attractive from the perspective of public agency decision makers.¹³
- *Collateralization.* Commercial banks typically require assets to be pledged as collateral for a loan. They are unwilling or unable to offer debt financing to public agencies, because it is very difficult or impossible to collateralize public assets for debt financing, and because of the banks' perception that public agency management has no financial interest in the collateral offered.¹⁴
- *High transaction costs.* The small size of public sector EE projects often leads to relatively high transaction costs, which makes financing such projects unattractive.

Implementation Capacity

- *Public agency decision makers.* Both central government agencies and municipalities have limited capacity for identifying EE opportunities, reviewing energy audit reports, preparing "bankable" project proposals, accessing financing, carrying out procurement for goods and services, and implementing EE projects.
- *Public agency implementers.* While DOE has implemented GEMP, there is limited capacity within DOE to assist public agencies with EE implementation, and limited monitoring and enforcement. Therefore, the institutional capabilities, roles, and expertise for EE are fragmented.
- *Inadequate delivery infrastructure.* There is only a very limited energy services

¹³ Based on communication with officials of Security Bank.

¹⁴ Based on communication with Security Bank officials.

delivery infrastructure for implementing EE projects in the public sector in the Philippines. The fragmented nature of the private sector, the small number of ESCOs in the local market, the lack of energy auditing and measurement and verification (M&V) experts, and their collective lack of experience with working in the public sector are all reasons that this market remains underdeveloped.

4. INTERNATIONAL EXPERIENCE IN FINANCING PUBLIC SECTOR EE PROJECTS¹⁵

Overview

Many governments of developing countries, with help from donor agencies, have financed pilot or demonstration EE projects using only grant or budget financing. However, recognizing that such financing is not sustainable in the long term, other countries have implemented a range of more sustainable financing and implementation options, to enhance the financial leverage of public funds and/or to better transition to commercial funding for public sector EE projects.

A review of approaches for financing public sector EE projects in other countries has led to the following ten options:

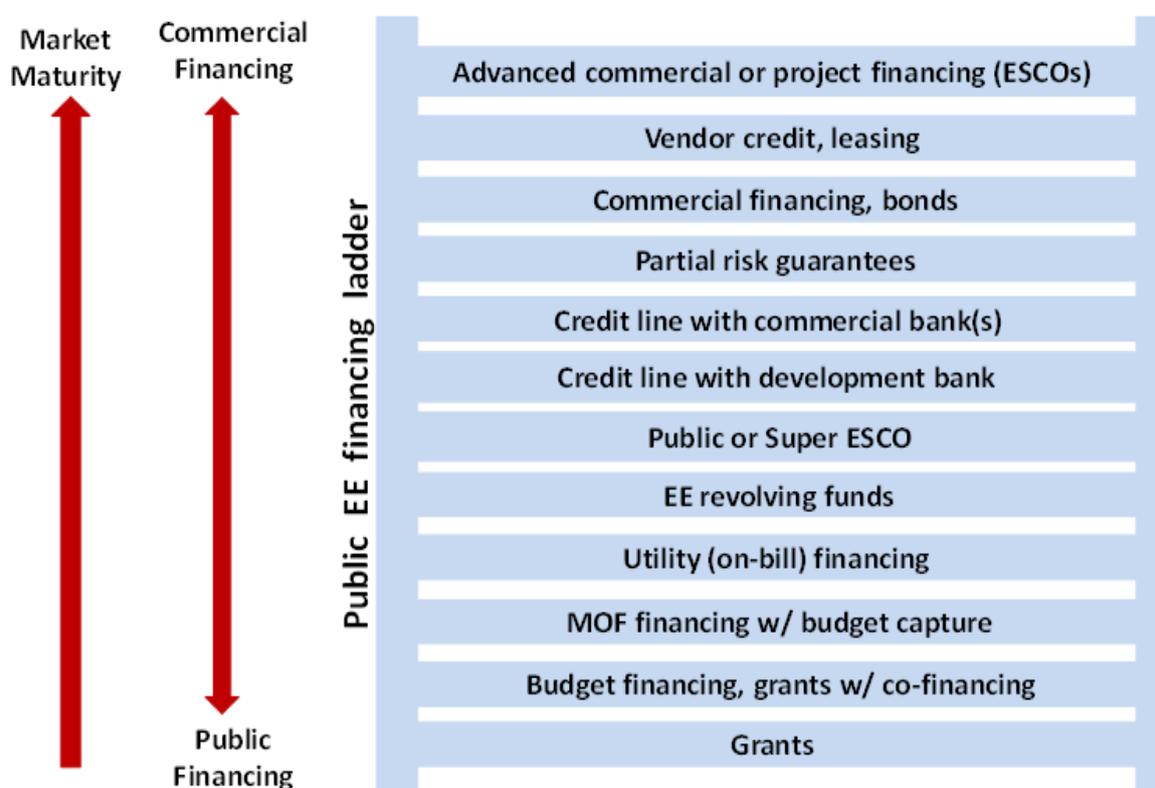
1. Budget financing with capital recovery (financing by DOF, or a parent budgeting agency using donor funds, with repayments in the form of reduced future budgetary outlays);
2. Utility on-bill financing;
3. Establishment of an EE revolving fund;
4. Establishment of a public or super ESCO;
5. Establishment of an EE credit line through a development bank;
6. Establishment of an EE credit line through a commercial bank;
7. Creation of a risk-sharing facility, such as a partial-risk guarantee program;
8. Commercial financing using bonds;
9. Vendor financing or leasing;
10. Leveraging commercial financing using ESCOs, under the ESPC approach.

Figure 4.1 illustrates these options in the form of a “financing ladder.” The ladder includes the 10 options above, plus the two non-sustainable options (grant financing and budget financing). At the bottom of the ladder are options that rely almost entirely on public financing, while the top of the ladder represents mostly private financing. Moving up the ladder leads to increasing levels of private financing.

A brief description of each of the ten options follows.

¹⁵ This section is extracted from previous World Bank studies of international experience with financing options for energy efficiency.

Figure 4.1. Illustrative Financing Ladder for Public Sector EE Projects



Source: Adapted by the authors, from World Bank 2013

Budget Financing with Capital Recovery

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

Utility On-Bill Financing

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

The utility on-bill financing approach is designed to overcome the first cost barrier: lack of

availability of internal funds for investment in EE. Using this approach, the utility provides or arranges for the financing needed for the project investment. The customer signs a loan agreement with the utility, and the utility collects the loan repayments from the customer through the customer's utility bills by adding a line item on the bill. In most cases, the loan repayments are arranged such that the amount of the repayment is smaller than the customer's cost reduction from the energy savings created by the EE equipment. This allows the customer to be "cash flow positive" throughout the life of the EE project.

Energy Efficiency Revolving Funds (EERFs)

An energy efficiency revolving fund (EERF) has been demonstrated to be a viable option for scaling up EE financing in the public sector. Under a typical EERF, which is created using budget funds and/or IFI loans, financing is provided to public agencies to cover the initial investment costs of EE projects; some of the resulting savings are then used to repay the EERF, plus interest and service charges, until the original investment is recovered. The repayments can then be used to finance additional projects, thereby allowing the capital to revolve, and creating a sustainable financing mechanism (World Bank 2014a).

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

Public or Super ESCOs

Several countries have taken a more active role in promoting EE projects, using the performance contracting approach, by creating a public or "super" ESCO established as a corporation wholly owned by the government (World Bank 2013). Often this has been done to promote ESCOs in general, for example in China (where pilot Energy Management Companies were created by the World Bank in Beijing, Shandong, and Liaoning); in Croatia (HEP ESCO); and in Poland (MPEC). Another example is the establishment of UkrESCO in Ukraine (World Bank 2014b). Such public ESCOs were typically formed when the local ESCO markets were nascent and some public effort was deemed necessary to catalyze them. The advantage of a public ESCO is that there is often no competitive tendering process required for project development, since in this case one public agency is simply contracting with another public entity.

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

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

Public Sector EE Credit Lines with Development or Commercial Banks

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

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

Risk-Sharing Facilities

One major barrier to the commercial financing of public EE projects is the perception by commercial banks that such projects are inherently riskier than traditional investments. A risk-sharing facility is designed to address this challenge by providing partial coverage of the risk involved in extending loans for EE projects. The “facility”—which is essentially a bilateral loss-sharing agreement—generally includes a subordinated recovery guarantee,¹⁶ and might also have a “first loss reserve”¹⁷ that can be used to absorb up to a specified amount of losses before the risk sharing occurs.

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

Commercial Financing, Bonds

Under this option, municipalities that are creditworthy and that have borrowing capacity can take out commercial bank loans, or issue bonds to finance EE investments. This option can help mobilize commercial financing, which can then deliver scale and be sustainable. Competition can help lower financing costs, address overcollateralization and short tenor issues, and allow public agencies to undertake their own procurement and implementation.

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

Vendor Credit and Leasing

A lease is a contractual arrangement in which a leasing company (a lessor) gives a customer (a lessee) the right to use its equipment for a specified length of time (a lease term) and a specified

¹⁶ In a *subordinated recovery guarantee*, the guarantor ranks behind other lenders in the recovery of the guarantee funds it pays out in case the borrower defaults on the loan. This allows lenders to offer better loan terms, such as lower interest rates, or longer tenors.

¹⁷ In the event of a loan default, a *first-loss reserve* pays for all losses incurred until the maximum first-loss reserve amount is exhausted. The lender incurs losses only if the total loan loss exceeds the first-loss amount.

payment (usually monthly). Depending on the lease structure, at the end of the lease term the customer can purchase, return, or continue to lease the equipment. Many different types of organizations—proprietorships, partnerships, corporations, government agencies, and religious and other nonprofit organizations—use leasing throughout the world. Suppliers of EE equipment can provide such equipment under a leasing arrangement, usually with lease payments based on estimated energy savings.

Traditionally, equipment leases have been broadly classified into two types: operating leases, and finance or capital leases (Lee 2003). In an operating lease, the lessor (or owner) transfers to the lessee only the right to use the property. At the end of the lease period, the lessee returns the property to the lessor. The new global accounting standard IFRS-16 now treats an operating lease the same way as a finance/capital lease—that is, all equipment assets have to be booked as assets of the host entity, and the liabilities need to capture outstanding lease payments, just as with a loan. These changes are likely to reduce the level of leasing because of this new accounting treatment.

Leveraging Commercial Financing with Private ESCOs

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

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

- A complete range of implementation services, including design, engineering, construction, commissioning, and maintenance of EE measures, and monitoring and verification (M&V) of the resulting energy and cost savings.
- The provision or arrangement of financing (often 100 percent), and the undertaking of “shared savings” or “guaranteed savings” contracts. Because of this, payments to the ESCO are less than the cost savings resulting from the project implementation.
- Specific performance guarantees for the entire project (as opposed to the individual equipment guarantees offered by equipment manufacturers or suppliers). ESCOs generally also guarantee a certain level of energy cost savings.
- Payments contingent upon demonstrated satisfaction of the performance guarantees.
- Most of the technical, financial, and maintenance risk is assumed by the ESCO, thereby substantially reducing the risks to the energy user.

Comparison of the Financing Options

Table 4.1 provides a comparative assessment of the key characteristics of the 10 finance and delivery models discussed above.

Table 4.1. Summary of Characteristics of Financing Options for Public Sector Energy Efficiency Projects

Financing Option	Conditions	Pros	Cons	Issues to be addressed	Examples
1. Budget financing with capital recovery	<ul style="list-style-type: none"> • Credit barrier is too high, underdeveloped LGU credit market, collateralization is difficult for public sector • Financing should target new and underdeveloped markets, programs must be efficiently administered, initial subproject results should be intensely disseminated, need cofinancing 	<ul style="list-style-type: none"> • Easy to implement • Can directly finance both local and central government agencies 	<ul style="list-style-type: none"> • Sustainability may be questionable, even if repayment is obtained through budget financing 	<ul style="list-style-type: none"> • Who will manage and administer the funds? • Is there sufficient implementation capacity in the DOF or other implementing agency? 	<ul style="list-style-type: none"> • Hungary • Lithuania • Belarus • FYR Macedonia • Montenegro • Serbia
2. Utility on-bill financing	<ul style="list-style-type: none"> • Requires regulations to facilitate utility participation • Utilities need to be willing and able, and have billing systems that can address such financing • Need strong financial position and financial management of utilities • Bill payments must be assured by public sector clients 	<ul style="list-style-type: none"> • Streamlined repayments; lower repayment risk if there is a risk of disconnection • Can take advantage of utility relationships and services • Can be done on a sustainable and scalable basis 	<ul style="list-style-type: none"> • Requires changes in utility regulations and billing systems • Creates potential for monopolistic behaviors • Financing may compete with local banks 	<ul style="list-style-type: none"> • Are utilities interested and willing? • Do they have capacity and billing systems for on-bill financing? • What regulatory changes may be needed? 	<ul style="list-style-type: none"> • Brazil • China • India • Mexico • Sri Lanka • Tunisia • U.S. • Vietnam
3. Energy efficiency revolving fund	<ul style="list-style-type: none"> • Insufficient liquidity in banking sector, major aversion to public sector risk among banks • Could use some grant funds as subordinated debt to help 	<ul style="list-style-type: none"> • Can be structured to address financing needs and evolving capacity of all public agencies (central 	<ul style="list-style-type: none"> • May require new legislation to create the fund • May be difficult to cover 	<ul style="list-style-type: none"> • Needs a strong and capable fund manager or management team 	<ul style="list-style-type: none"> • Armenia • Bulgaria • Jordan • Mexico • Romania

	<p>mobilize commercial cofinancing</p> <ul style="list-style-type: none"> • TA to disseminate information on EE subproject performance/financial data critical to sustainability • Need for professional, well-incentivized fund management team 	<p>agencies and local government units)</p> <ul style="list-style-type: none"> • Fund may provide many “windows” (financial products) • ESA option can be very useful for LGUs with poor credit and lack of capacity 	<p>administrative costs of the fund from its revenues</p>	<ul style="list-style-type: none"> • Needs supporting legislative framework for establishment 	<ul style="list-style-type: none"> • Sri Lanka • Thailand – ENCON Fund
<p>4. Dedicated credit line with development bank</p>	<ul style="list-style-type: none"> • Underdeveloped public/LGU credit market • High commercial bank lending rates and low tenors • Existence of a credible development bank willing to lend to public agencies for EE and assume repayment risks • Public agencies must have the ability and willingness to borrow • Public agencies need to be able to retain energy cost savings to repay debt 	<ul style="list-style-type: none"> • Builds commercial lending market by demonstrating that public agencies can repay • Allows public agencies to undertake their own procurement and implementation • Allows for lower interest rates • Funds can revolve, making it sustainable 	<ul style="list-style-type: none"> • Relies on strong banking partner with the incentive and ability to proactively develop project pipeline • Serves only creditworthy public agencies • Development bank may not conduct proper risk assessments and appraisals 	<ul style="list-style-type: none"> • Is there a suitable development bank? • How many public agencies have the capacity to borrow and are creditworthy? 	<ul style="list-style-type: none"> • Brazil • India (municipal infrastructure fund) • Mexico • Turkey
<p>5. Dedicated EE credit line with commercial financial institution(s)</p>	<ul style="list-style-type: none"> • Well-developed banking sector, willingness of banks to accept risks and public sector EE as line of business • Sufficient market activity to develop a project pipeline 	<ul style="list-style-type: none"> • Leveraging of private funds • Utilization of existing banking infrastructure for financing the public sector 	<ul style="list-style-type: none"> • Needs public agencies or ESCOs that have borrowing capacity (credit and collateral) 	<ul style="list-style-type: none"> • Will the participating financial institutions provide loans to municipal 	<ul style="list-style-type: none"> • China • Hungary • Serbia • Ukraine • Uzbekistan

	<ul style="list-style-type: none"> • Need for parallel TA to develop strong demand, and create sustained quality pipeline 		<ul style="list-style-type: none"> • Banks/FIs need to be willing to lend to the public sector 	<p>utilities & LGUs?</p> <ul style="list-style-type: none"> • How many public agencies are creditworthy and have borrowing capacity? 	
6. Risk-sharing program (such as partial credit guarantee)	<ul style="list-style-type: none"> • Well-developed banking sector, banks are liquid and willing to accept some risks but have a perception of high risk with respect to public sector EE projects • Sufficient market activity to develop project pipeline 	<ul style="list-style-type: none"> • Has worked well in some Central and Eastern European countries • May help scale up commercial financing 	<ul style="list-style-type: none"> • Needs a relatively mature banking sector and eligible borrowers • Poor experience of the World Bank and USAID in some countries with respect to public agencies 	<ul style="list-style-type: none"> • Is the banking sector mature enough? • How many public agencies are creditworthy? 	<ul style="list-style-type: none"> • India Partial Risk Sharing Fund (PRSF) • USAID DCA in FYR Macedonia, Bulgaria, and other countries • Bulgaria • CEEF Central & Eastern Europe), China, Croatia, Hungary, Poland
7. Public ESCO or Super ESCO	<ul style="list-style-type: none"> • Immature private sector ESCO industry, but interest/demand to develop ESCO industry • Contracting between public ESCO and public sector entities may be easier than with private sector ESCOs or other energy service providers 	<ul style="list-style-type: none"> • Can address financing issues and build ESCO capacity • Can achieve scale in the public sector 	<ul style="list-style-type: none"> • Need to create a new organization • Need to provide funding • Needs to operate efficiently and avoid acting as monopoly 	<ul style="list-style-type: none"> • Where will such a public ESCO be located? • Will donors be interested in funding such an entity? 	<ul style="list-style-type: none"> • Armenia • Croatia HEP ESCO (WB/GEF) • India - EESL • Sri Lanka • Ukraine Public ESCO (EBRD) • Uruguay
8. Commercial financing, bonds	<ul style="list-style-type: none"> • Requires well-developed public sector credit and rating systems 	<ul style="list-style-type: none"> • Mobilizes commercial financing, which can 	<ul style="list-style-type: none"> • Only makes sense for very 	<ul style="list-style-type: none"> • Are financiers willing and able 	<ul style="list-style-type: none"> • Bulgaria • Denmark

	<ul style="list-style-type: none"> • Financiers willing and able to lend to public sector or to ESCOs for EE projects • Large public entities with strong technical capacity willing to bundle many EE projects together 	<ul style="list-style-type: none"> • deliver scale and be sustainable • Elements of competition can help lower financing costs • Can help address overcollateralization and short tenor issues 	<ul style="list-style-type: none"> • large bundles of projects • Only highly creditworthy agencies can use these schemes • Relatively high transaction costs 	<ul style="list-style-type: none"> • to lend to the public sector? • How many public agencies are creditworthy and have borrowing capacity? 	<ul style="list-style-type: none"> • India • United States
9. Vendor credit, leasing	<ul style="list-style-type: none"> • Large, credible local and/or international vendors able and willing to finance public EE projects • Local bank financing available for vendor leasing • Creditworthy public agencies able to sign long-term vendor contracts • Public agencies able to retain energy cost savings 	<ul style="list-style-type: none"> • Mobilizes commercial financing, which can deliver scale and be sustainable • Can help address overcollateralization/short tenor issues • Financing and procurement in one contract • Lease may not count against public debt 	<ul style="list-style-type: none"> • Relies on local banks and leasing companies • Serves only very creditworthy public agencies • Vendors must assume substantial debt and offer long-term financing • Only some equipment suited for leasing (lighting, solar water heaters, boilers) 	<ul style="list-style-type: none"> • How many public agencies are creditworthy and have borrowing capacity? 	<ul style="list-style-type: none"> • China • European Union • United States
10. Leveraging commercial financing using private ESCOs/performance contracts	<ul style="list-style-type: none"> • Supportive policies and enabling environment • Introduction of simpler business models to facilitate energy services market development • Appropriate financing schemes 	<ul style="list-style-type: none"> • Mobilizes commercial financing, which can deliver scale and be sustainable 	<ul style="list-style-type: none"> • Needs local banks and ESCOs to provide reasonable cost financing and 	<ul style="list-style-type: none"> • Are there any capable private ESCOs in the market? • Are private ESCOs and/or 	<ul style="list-style-type: none"> • Canada • China • Czech Republic • Germany • Hungary • India

	<ul style="list-style-type: none"> • Early market development through public sector projects • Development of PPP models to kick-start market 	<ul style="list-style-type: none"> • Helps address overcollateralization, short tenor issues • ESPC may not count against public debt, public agency shifts technical risks to third party 	<p>assume credit risk</p> <ul style="list-style-type: none"> • Serves only very creditworthy public agencies • ESCO industry is difficult to develop • Public procurement issues difficult to address 	<p>public agencies creditworthy for commercial project financing?</p>	<ul style="list-style-type: none"> • Japan • South Korea • United States
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Source: Adapted by the authors from World Bank 2013

5. ASSESSMENT OF FINANCING AND IMPLEMENTATION OPTIONS FOR PUBLIC SECTOR EE IN THE PHILIPPINES

Characteristics of Financing Options in the Philippines

This section reviews the potential applicability of the financing options discussed in section 4 of this report, to the public sector in the Philippines. In assessing the suitability and benefits of these financing options, three distinct types of public sector entities are considered:

- I. Creditworthy public agencies (LGUs), or agencies/entities with their own budgets;
- II. Public agencies that do not have their own budgets and/or that have little or no capacity to borrow funds and/or to implement projects;
- III. Central government agencies.

The financing options have different applicability, advantages, and limitations depending on the type of public entity. ***Based on lessons learned in other countries, of the ten options described in section 4, four were removed from consideration:***

- ***Utility on-bill financing***, because the local distribution companies do not appear to have the regulatory authority, capacity, or interest in offering such services.
- ***Credit line with the Development Bank of the Philippines (DBP)***, because such a credit line, presumably funded by donors, will generally require shorter tenors, and collateral requirements that would be difficult for public agencies to satisfy. However, it should be noted that DBP could serve as the host agency for an EERF, as discussed below.
- ***Commercial financing and bonds***, because of the limited capacity of public agencies to issue bonds, and the lack of a market for such bonds.
- ***Vendor credit and leasing***, because of the immaturity of the existing market for these options.

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

Narrowing the Financing Options: Rationale and Results

As shown in Table 5.1, six EE financing options could be applicable to the Philippines, but they are not equally viable in terms of serving the needs of all public agencies. The comparison shows that three of the options do not appear to be suitable for the needs of all public sector entities in the short to medium term: that is, approximately the next five years.

- While ***dedicated public sector EE credit lines*** may be attractive and useful for financing projects using commercial lending, they are limited to serving only a few creditworthy public agencies that have sufficient borrowing capacity. These financing options will therefore not be able to serve the needs of the NGAs and many of the LGUs.
- Similarly, ***risk sharing or guarantee programs*** would be limited to creditworthy public agencies seeking commercial loans, and thus would not meet the needs of NGAs and LGUs.
- ***Commercial financing*** can be leveraged using performance contracting and private

ESCOs, but at present this financing option is likely to be limited to creditworthy public agencies or ESCOs with strong balance sheets and the capacity to borrow. However, with time, this option could become more feasible thanks to changes in the procurement and PPP rules and procedures, and increased access to off-balance-sheet financing for ESCOs that are being promoted by the government and the Philippine Energy Efficiency Alliance (PE2). In the near term, the existing ESCOs will not have the strong balance sheets and collaterals needed to access commercial financing, and most banks will likely be reluctant to provide debt financing to public agencies for the reasons discussed in Section 3. As this study has focused on near-term solutions to boost EE investments in a broad range of public buildings, this option was not further considered.

Table 5.1. Key Characteristics of the Public Sector Energy Efficiency Financing Options in The Philippines

Characteristics	Budget Financing with Capital Recovery	EE Revolving Fund	Dedicated Public Sector Credit Line	Risk Sharing Program	Public or Super ESCO	Private ESCOs & Performance Contracting
Type of Financing	Loans and TA; may include some grants	Loans, TA, energy service agreements	Loans, TA	Guarantees, TA	Loans	Loans
Public Entities Served*	I, II, and III	I, II, and III	I only	I only	I, II, and III	I and III
Management and Governance	Project implementation unit (PIU) within the DOF	Board of directors Fund management team	IFI, participating financial institutions	IFI, participating financial institutions	Board of directors	IFI, participating financial institutions
Project Development	By PIU	Fund management team	Participating financial institutions	Participating financial institutions	Management team of public or super ESCO	Private ESCOs
Project Implementation	By Type I public agencies and Type III central government entities PIU may implement for Type II & some Type III	Type I agencies Type III central govt. entities By Fund Mgmt. Team via ESA for Type II and some Type III	Type I agencies	Type I agencies	Management team of public or super ESCO	Private ESCOs
Advantages	<ul style="list-style-type: none"> • Easy to implement • Analogous to some existing models 	<ul style="list-style-type: none"> • Addresses needs of all three types • Multiple windows 	<ul style="list-style-type: none"> • Can leverage commercial financing 	<ul style="list-style-type: none"> • Can leverage commercial financing • Existing guarantee 	<ul style="list-style-type: none"> • Can address needs of all three types • Multiple windows to 	<ul style="list-style-type: none"> • Can address needs of all Type I and Type III agencies

The Philippines: Options for Financing Energy Efficiency in Public Buildings

	<ul style="list-style-type: none"> • Can address all three types 	(including ESA) to address financing needs and evolving capacity of central agencies and municipalities	<ul style="list-style-type: none"> • Existing credit lines provide experience 	programs provide some relevant experience	address financing needs and evolving capacity of local and central agencies <ul style="list-style-type: none"> • Existing PNOC RC public ESCO can be expanded 	<ul style="list-style-type: none"> • Can leverage commercial financing
Limitations	<ul style="list-style-type: none"> • Requires capable PIU • Sustainability not assured • Needs of some Type II agencies may not be easily met 	<ul style="list-style-type: none"> • Needs new legislation for implementation • Needs a strong and capable Fund Management Team 	<ul style="list-style-type: none"> • Cannot address the needs of Type II agencies • Only serves public agencies or ESCOs that have borrowing capacity 	<ul style="list-style-type: none"> • Cannot address the needs of Type II agencies • Only serves agencies or ESCOs that have borrowing capacity 	<ul style="list-style-type: none"> • Needs capable management team 	<ul style="list-style-type: none"> • Needs a mature ESCO industry • ESCOs need to have borrowing capacity • Not suitable for Type II agencies
Can be implemented under current regulations?	Yes	Yes, unless a new entity needs to be created.	Yes	Yes	Yes. PNOC RC already performing such functions	Yes

Source: Authors

* Types of public entities: I - Creditworthy municipalities or municipal entities with their own budgets; II - Municipal entities without their own budgets, with poor credit, and/or with little or no capacity to implement projects; III – Central government agencies. PIU = Project Implementation Unit

The three remaining options are discussed in detail below.

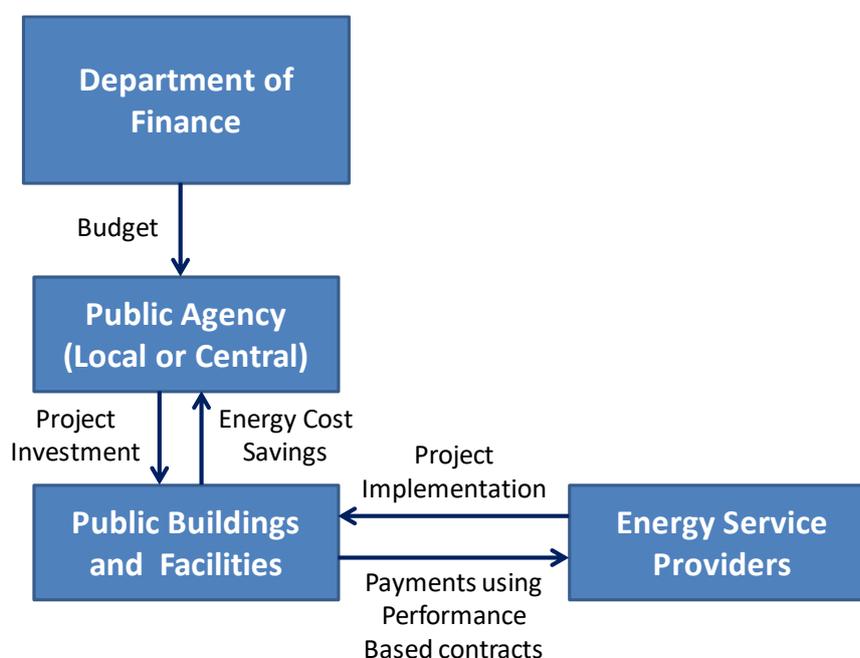
Budget Financing with Capital Recovery

Overview

This option involves actions by the DOF or DBM, with funding provided by budgets or donor agencies to establish a public agency EE financing facility to finance EE project investments in LGUs and NGAs that are funded from the national budget. The funds provided are used by these entities to make capital investments in EE projects that will result in energy cost savings.

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

Figure 5.1. Budget Financing for a Public Sector EE Improvement Project

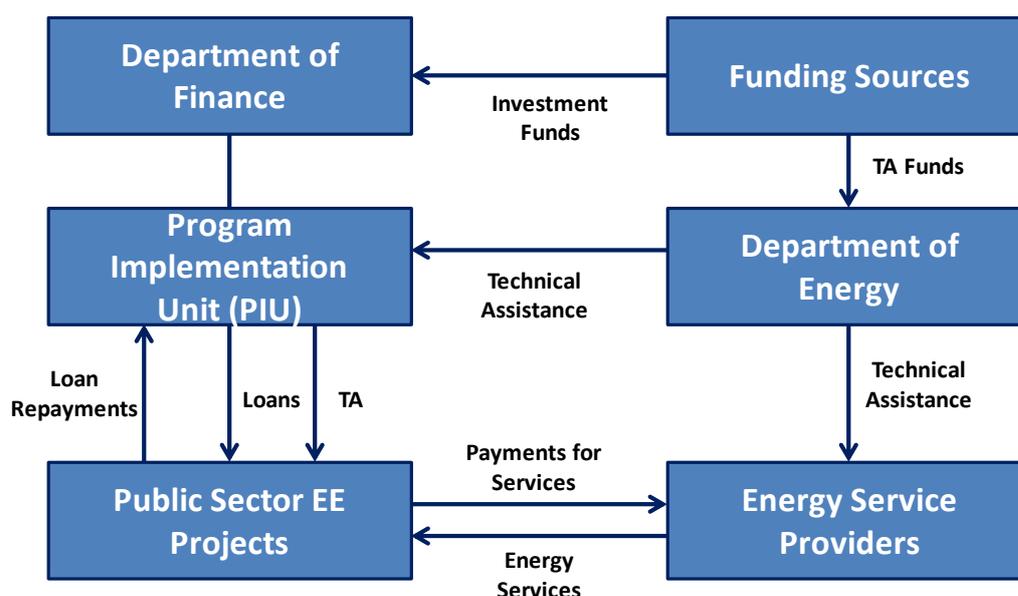


Funds Flow

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

Figure 5.2 illustrates how the funds flow.

Figure 5.2. Funds Flow, Public Agency EE Financing Facility



Implementation

A Project Implementation Unit (PIU) within the DOF or another suitable government agency (such as DBM or DOE), staffed with appointed specialists and consultants would be responsible for implementation. The PIU could carry out tasks such as project identification, review of applications, and monitoring and reporting, as well as assisting public entities with project preparation activities such as the review of feasibility studies, the preparation of detailed design and bidding documents, and supervision of construction activities.

This option requires the establishment of a PIU within the department, and training and capacity building of the PIU staff who will be undertaking the activities envisioned. Some TA could be provided by DOE, but DOF would have to assume responsibility for budget allocation and repayments.

The funds would be lent by DOF to public agencies by entering into loan agreements. The funds would be provided to central government agencies and public agencies that are able to manage the implementation of EE projects, and a demonstrated willingness to commit to repaying the loans from their energy savings.

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

Technical Assistance (TA)

Certain additional services may be provided to the borrowers by the PIU as TA. Such services may include conducting a preliminary screening to identify and define the general scope of the EE projects; providing standard bidding documents for services related to project implementation; and providing measurement and verification (M&V) protocols. The borrowers will be responsible for engaging energy service providers as needed; implementing the project; properly maintaining the systems; and repaying the loan in accordance with the terms of the loan agreement. The repayment installments will be designed to allow borrowers

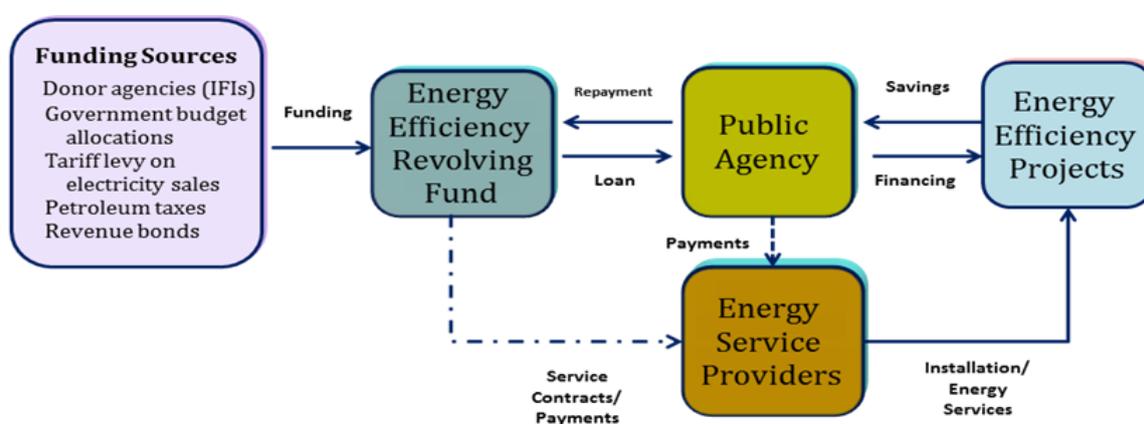
to repay the investment costs and, if applicable, the service fees, from the accrued energy cost savings.

TA may be provided by DOE with respect to energy audits, project implementation support, M&V protocols, and so on.

Energy Efficiency Revolving Funds (EERF)

The basic structure of an EE Revolving Fund (EERF) was described in Section 4. Figure 5.4 illustrates the structure of an EERF.

Figure 5.3. Structure of an EE Revolving Fund (EERF)



The key design elements that need to be considered to implement such a fund in the Philippines are discussed below.

Legal Framework

The establishment of an EERF is likely to require legislative action. The options for establishing an EERF include (i) creating the fund under DOE, another existing department, or a development bank; (ii) creating a new legal entity (an independent corporation or a new statutory agency); (iii) using a not-for-profit entity; or (iv) establishing a public-private partnership (PPP). The preferred option is generally the creation of a new independent corporation or a new statutory agency. If the government decides to establish the Philippine Energy Efficiency Revolving Fund (PEERF), the relevant legislation should specify its legal organization and ownership.

Fund Management and Governance

The key elements in the management and governance of PEERF include the following:

- Oversight arrangements;
- Choosing the fund manager;
- Monitoring and evaluation (M&E); and
- Reporting.

Oversight Arrangements

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

- In Thailand, the ENCON Fund was established under the oversight of the Department of Alternative Energy Development and Efficiency (DEDE);
- The Bulgarian Energy Efficiency Fund (BEEF) is overseen by a management board appointed by the national government;
- The Renewable Resources and Energy Efficiency Fund (R2E2 Fund) in Armenia is governed by a government-appointed board of trustees comprised of representatives from the government, the private sector, NGOs, and academia;
- The Romanian Energy Efficiency Fund (FREE) is governed by a government-appointed board of administration consisting of seven members, of whom five are private sector representatives; and
- Salix Finance in the United Kingdom has a three-person board, two of which are from the private sector.

If and when the Philippines establishes PEERF, it should be sure to have representation from both the public and private sectors.

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

Choosing the Fund Manager

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

Thailand's ENCON Fund was managed by DEDE. In Bulgaria, an independent fund management team that was competitively selected and included a consortium of three firms was appointed (World Bank 2010a).¹⁸ In the case of the Armenia R2E2 Fund, the government appointed an executive director and a supporting financial and technical staff to manage the fund (World Bank 2012a).

In the Philippines, one of the options for the fund manager is the Development Bank of the Philippines (DBP). DBP already has a Green Financing Program, and has the capacity to manage a revolving fund (DBP 2017). Another option would be a newly created independent

¹⁸The consortium includes an EE consultancy (Econoler International), a Foundation (Center for Energy Efficiency EnEffect), and a nonbanking financial institution (Elana Holding PLC).

agency analogous to those in Armenia or Bulgaria.

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

Debt Financing

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

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

Energy Services

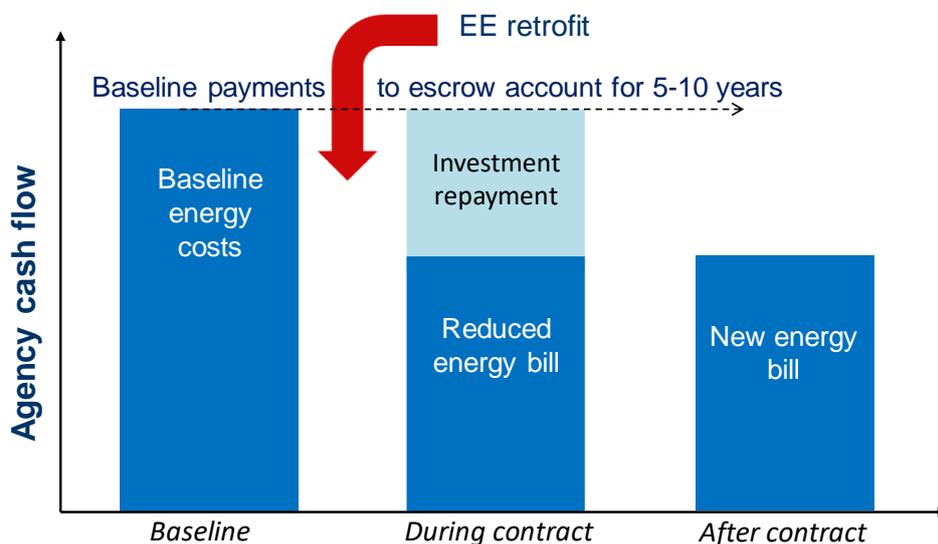
This is an innovative feature of EERFs that can be very effective for public agencies that lack the capacity to borrow funds or to effectively implement EE projects. An energy services agreement (ESA) can offer a full package of services to identify, finance, implement, and monitor EE projects. The public agency is usually required to pay some or all of its baseline energy bill into an EERF-established escrow account to cover the investment costs and associated fees during the contract period. Figure 5.5 illustrates the basic concept of a public agency's cash flows under an ESA, with payments equal to its baseline energy bill during the contract period.

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

In some cases, the contract duration is fixed; in other cases, the contract can be terminated after an agreed-upon number of payments have been made to the EERF, thereby offering a greater incentive for the agency to save more energy. Either way, one of the main advantages of the Energy Services Window model is that the ESA payments generally do not count as public debt: thus it allows public entities that are not allowed to borrow, or LGUs that do not have sufficient debt capacity, to implement EE measures. This model also helps public agencies use their limited budget and debt space for higher-priority investments while still being able to implement EE. In addition, the repayments to the EERF and energy payments

can be bundled together, providing some added leverage to the fund so they can cut off the energy supply should the public agency default on its repayment obligations.

Figure 5.4. The Energy Services Agreement Model



Source: World Bank 2013

Technical Assistance

An important feature for the success of PEERF is the TA that is provided. This could include the following:

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

- Developing the terms and conditions of the ESAs with public agencies, including establishing the baseline conditions, and identifying the changes in the baseline that require an adjustment of the fixed annual payments.

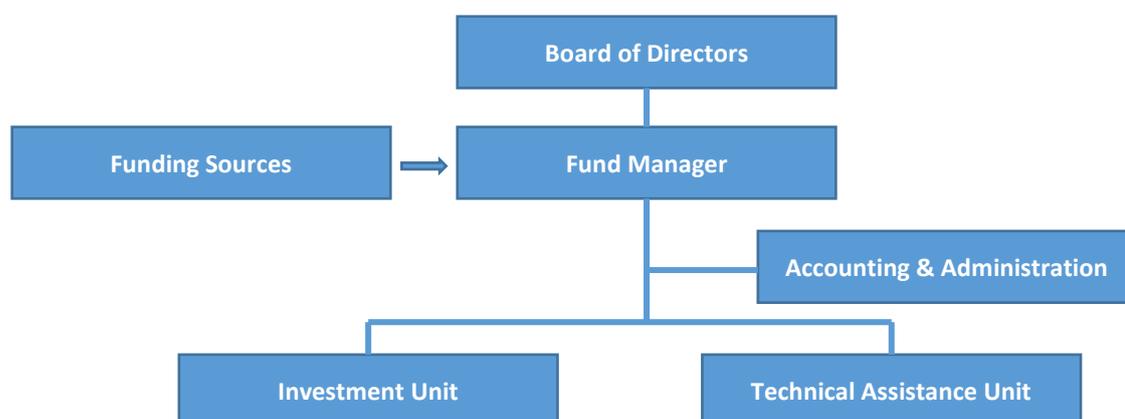
Procurement of Implementation Services

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

Organizational Structure

The organizational structure of PEERF could be developed as illustrated in Figure 5.6.

Figure 5.5. Organizational Structure, PEERF



Investment Models

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

Table 5.2. Implementation Steps for Fund Investment Models

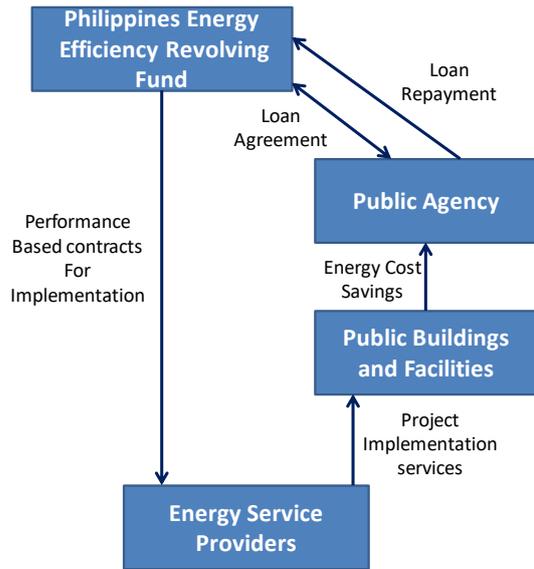
	Model 1: Loans	Model 2: Energy Services Agreements
Step 1	Fund manager prepares and announces the availability of loan funds for EE projects in municipalities and other public entities, and invites Expressions of Interest (EOIs) from municipalities and public facilities to borrow funds for projects.	Fund manager prepares and announces the availability of ESAs for public sector EE projects, and invites EOIs from municipalities and public facilities to participate in such agreements.
Step 2	Fund Manager receives applications from municipalities and public entities.	
Step 3	Fund Manager conducts preliminary screening of EOIs and selects promising candidates.	
Step 4	Fund Manager conducts preliminary assessment of energy savings opportunities, including a walk-through audit.	

Step 5	If the walk-through audit shows promising opportunities for energy savings, a project design is prepared by the borrower; the PIU may provide assistance in the preparation of the project design. The borrower needs to obtain approval from DOF for the loan. A Loan Agreement (LA) is then negotiated between the fund and the borrower. The LA specifies the responsibilities of the fund and the borrower; the EE measures to be implemented; the total project costs and the amount to be loaned by the fund; the 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 other important details. The LA also specifies the responsibilities of the borrower for conducting the project implementation activities; the services that are to be provided by the fund to assist the borrower with implementation; and the terms for payment for such services, if any.	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 95-100 percent of the baseline energy costs for a fixed period of time, as determined and agreed upon after a detailed assessment is conducted of the facility's baseline energy use, 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.
Step 6	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.
Step 7	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.
Step 8	The borrower approves the bidding documents, and the procurement of the service providers is conducted either by the borrower or by the fund, as specified in the LA. The contracts for the project implementation services are partly performance-based, as specified in the bidding documents.	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.
Step 9	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.
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 or the fund, based on the performance criteria.	Upon completion of the 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 the performance criteria.
Step 11	The borrower repays the loan over the term of the agreement from the savings achieved.	The fund receives the fixed payments as specified in the ESA (adjusted, if appropriate) for the specified time

		<p>period. The fund pays the facility’s energy bills and retains the remaining amount to cover its investment and service costs.</p>
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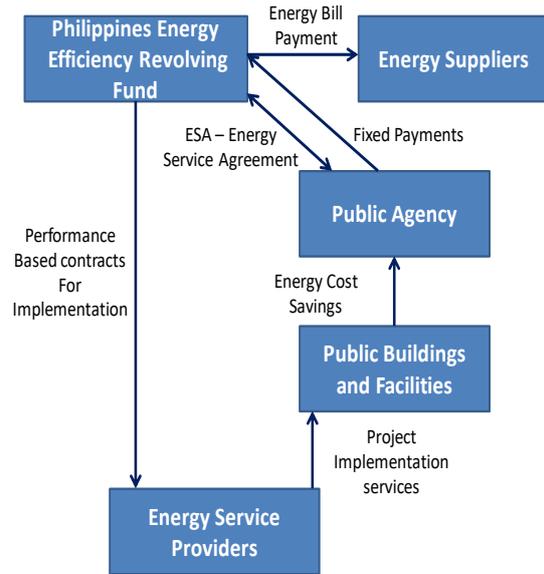
The investment models for the debt financing option and the ESA option are shown in Figures 5.7 and 5.8.

Figure 5.6. Investment Model – Debt



Source: Authors

Figure 5.7. Investment Model - ESA



How PEERF Can Address the Barriers to EE Implementation

Table 5.3 shows how PEERF can address the barriers to EE implementation that were discussed in Section 3.

Table 5.3. How PEERF Can Address EE Implementation Barriers

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

Source: Adapted by authors from World Bank 2014a

Public ESCOs

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

Limitations on the Growth of ESCOs in Developing Countries

The growth and development of the ESCO industry in developing countries has often been constrained by a number of barriers, most of which are also present in the Philippines:

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

Large-scale implementation of EE projects in the public sector in the Philippines is also constrained by a number of other barriers, as discussed earlier in this report:

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

The Public ESCO Model

The concept of a public ESCO has recently evolved as one of the mechanisms that can be used to overcome some of the limitations and barriers hindering the large-scale implementation of EE projects. A public ESCO (sometimes referred to as a super ESCO) is established by the government,¹⁹ and it functions as an ESCO for the public-sector market (hospitals, schools, municipalities, government buildings, and other public facilities). It also supports the capacity development and project development activities of existing private sector ESCOs, including helping to create new ESCOs (Limaye and Limaye 2011). Figure 5.9 illustrates the structure of a public ESCO.

A World Bank study of international experience in the public procurement of EE services has identified the public ESCO as a potentially viable model for developing countries (Singh 2010). A public ESCO can be uniquely positioned to overcome a number of the barriers faced by smaller ESCO companies. With its size and credibility as a public institution, it can support the growth of a nation's private domestic ESCO business, and can provide financing for EE projects.

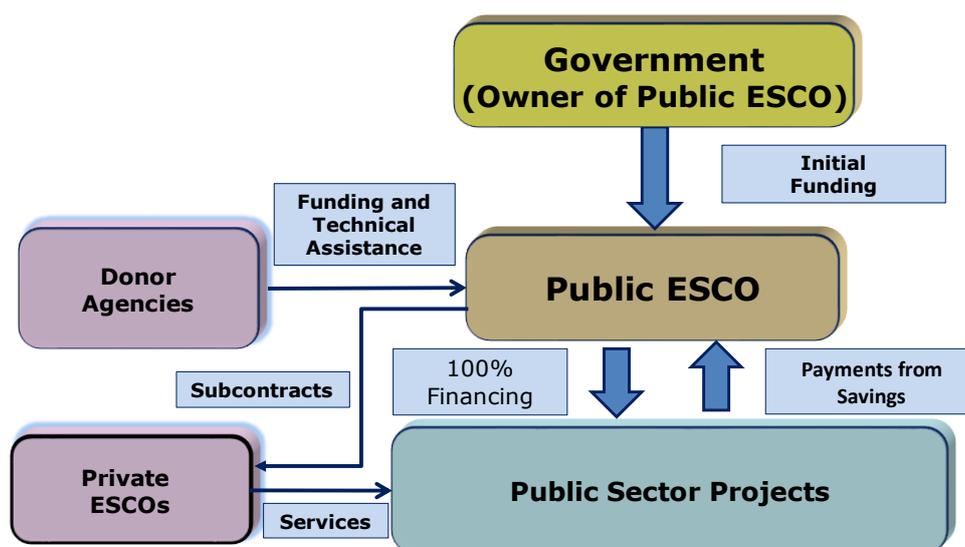
A public ESCO can also target the largely untapped EE market in the public sector. The EE potential in the public sector is generally substantial, but the implementation of energy savings programs is complicated by numerous factors, including a lack of commercial orientation within public agencies, limited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

The public ESCO should also be assigned responsibility for helping to build the capacity of the local private sector ESCOs, and to create a competitive private market for ESCO services.

¹⁹ A super ESCO may also be established by a private sector organization, an NGO, or as a PPP.

An appropriate role for the public ESCO is to engage private ESCOs as subcontractors for parts of the implementation (such as energy auditing, installation, commissioning, and performance monitoring), thereby helping to build their capacity. A public ESCO may also be able to arrange financing for small private ESCOs, to help them implement projects and build their capacity and credentials. Care should be taken to avoid crowding out the private sector by the public ESCO.

Figure 5.8. Typical Structure of a Public ESCO



Source: Adapted by the authors from Limaye 2013b

The payments from the public agency clients for the services provided by the public ESCO may need to be secured through a payment security mechanism such as an escrow account. For central government agencies, the public ESCO may sign a framework agreement with the DOF (or whatever department is responsible for the payment of energy bills) to secure payments from the energy savings generated by the EE projects.

EESL, a Public ESCO in India

Perhaps the most successful model of a public ESCO is Energy Efficiency Services Limited (EESL), India's super ESCO. This company was established by the government of India as a publicly owned super ESCO with the primary objective of implementing municipal energy efficiency projects, including public buildings and street lighting. EESL, in partnership with private ESCOs and EE equipment suppliers, provides turnkey performance-based implementation services to public agencies to mobilize private entrepreneurship and investment.

EESL has also undertaken substantial capacity building and training activities for the private sector energy service providers.

Some of EESL's major programs include:²⁰

- The National EE Street Lighting Program, which has installed 3.5 million LED street lights, saving 486 million kWh.
- The Residential EE Lighting Program, which has distributed 270 million LEDs, saving 7,000 MW and 35 billion kWh per year.
- Programs for improving EE in agriculture, municipal water pumping, and water treatment; and for installing solar pumps.

²⁰ Information from EESL web site: <https://www.eeslindia.org>, accessed on November 5, 2017.

How Does a Public ESCO Address EE Financing Barriers?

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

Table 5.4. How a Public ESCO Can Address Barriers to Implementation

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

Source: Adapted by the authors from Limaye and Limaye 2011

Public ESCOs in the Philippines

In the Philippines, the PNOC Renewables Corporation (PNOC RC) is functioning as a public ESCO. PNOC RC was established as a public ESCO by the Philippine National Oil Corporation (PNOC), and was provided with an initial capitalization of PHP500 million by PNOC. Its activities to date have included projects for central government agencies as well as LGUs.

Additional information on PNOC RC is provided in Annex A.

The Potential Role of International Financial Institutions and Donors

International financial institutions (IFIs) and donors can play a major role in the establishment and operation of all three of the shortlisted financing options in three ways: financial assistance; capacity building; and other technical assistance (TA).

Financial Assistance

Financial assistance may be provided in the form of loans, grants, and guarantees. The loans would have the structures and characteristics of typical IFI loans, with sovereign guarantees. IFIs may also provide or arrange for grant funds from sources such as the Global Environment

Facility (GEF) or the Green Climate Fund (GCF). Another financing option would be risk-sharing facilities, such as partial credit or risk guarantees to the PEERF, or to PNOC RC.

Capacity Building

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

- ***The PIU.*** The TA would address the training of PIU staff (or in the case of the public ESCO option, the PNOC RC staff) to build their capacity to manage the financing and implementation of EE projects. This would include training related to EE technologies and relevant implementation strategies; basic concepts and tools for performance-based contracts; guidelines and procedures for the measurement and verification (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 budget financing and PEERF, the capacity building might also include funding for the initial set-up, administration, and operation of the PIU, and for the purchase of equipment for auditing, data collection, and M&V. (This would not be needed for the public ESCO, since PNOC RC already has such capacity).
- ***Central government agencies.*** This TA would help facility managers and engineers to identify opportunities for EE implementation in their buildings; conduct energy audits; and develop EE action plans.
- ***LGUs.*** This would help mayors, city councils, utility executives, facility managers, and facility engineers understand the need for and the importance of EE implementation; obtain information on the technical options for energy efficiency in municipal utilities and public buildings and facilities; and conduct energy audits and develop EE action plans.
- ***Banks and financial institutions.*** TA would provide information on the characteristics of EE projects; implementation business models; financial and technical appraisal; M&V; and business opportunities in financing EE projects.
- ***Energy service providers.*** TA would help build capacity to develop projects; conduct energy audits; screen, design, evaluate, appraise, finance, implement, measure, and verify EE investments in the public sector; understand the perspectives of banks and financial institutions; develop M&V protocols; and prepare “bankable” project proposals.
- ***M&V agencies.*** TA to create the M&V infrastructure and provide protocols and supporting tools for conducting the M&V of EE projects.

Other Technical Assistance

IFIs and donors can also provide other types of TA designed to facilitate the scaling up of the financing of EE projects. This TA would complement ongoing TA projects in the Philippines that are being supported by IFIs and other development partners and may include the following:

- ***Building Energy Databases.*** A national inventory of public buildings can be developed, and a database containing information on the floor area and annual energy used by building type can be established. An analysis can then be conducted to develop

benchmarks, such as energy use per square meter, and to identify high and low energy users. The database can also be used to estimate EE potential and investment needs.

- **Public Sector EE Programs and Projects.** IFIs can help develop and document information on existing and planned public sector EE programs and their costs, as well as results and energy savings achieved.
- **Incentives and Recognition.** The creation of a mix of voluntary and mandatory measures to identify and publicize high and low energy performers (a “fame and shame” program) could also be done. Such a TA could also help to establish EE targets and reporting requirements. These activities can be designed to achieve long-term, sustainable cultural changes in the public sector.
- **Appliance Labeling and Standards.** There is a need to transform the market toward more efficient appliances and equipment. TA can be designed to:
 - Ensure that building materials and appliances are properly tested and certified;
 - Develop procedures to assure enforcement of the standards and labeling requirements;
 - Accelerate the implementation of building energy certificates; and
 - Develop an ESCO certification scheme.
- **Templates and Standard Contracts.** Other important areas of TA include:
 - Developing and publishing case studies of EE projects, and documenting the lessons learned;
 - Providing templates for conducting energy audits;
 - Preparing standard contract terms and conditions for ESPCs; and
 - Preparing M&V users guides.

6. MOVING FORWARD

Advantages and Limitations of the Three Options

Table 6.1 provides a summary of the advantages and limitations of the Budget Financing, PEERF, and Public ESCO options.

Table 6.1. Comparison of Public Sector Financing Options

Characteristics	Budget Financing	PEERF	Public ESCO
Types of Financing	Loans and TA; may include some grants	Loans, TA, energy service agreements	Loans, TA, energy service agreements
Governance and Management	PIU	Board of Directors	Board of Directors
		Fund management team	Management team of Public ESCO
Project Development	PIU	Fund management team	Management team of Public ESCO
Project Implementation	Public Agencies	Public Agencies (for debt financing)	Management team of Public ESCO
		Fund management team (for ESAs)	
Sustainability	Based on government decisions	Assured by revolving fund & fees to cover operating costs	Commercial operation that can also leverage private financing
Repayment Risk	None	Assumed by PEERF	Assumed by Public ESCO
Advantages	Easy to implement	Addresses needs of all agencies	Can address needs of all agencies
	Analogous to some existing models	Multiple windows to address financing needs and evolving capacity of public agencies	Multiple windows to address financing needs and evolving capacity of public agencies
	Can address all public agencies	ESA model useful for smaller and weaker public agencies	Can provide ESA option to smaller and weaker public agencies
	Does not require any investments from the public entities	Helps build local ESCO industry and introduce performance based contracts	Uses performance based contracts Can help build capacity of private sector ESCOs
Limitations	Requires active participation of the DOF	May need new legislation for implementation	Need to expand capacity of existing PNOC RC management team
	May need changes in budgeting procedures	Need a strong and capable Fund Management Team	
	Requires capable PIU	Need to develop payment security mechanism to assure payments	Need to develop payment security mechanism to assure payments
	Sustainability not assured		
Can be Implemented under Current Legislation/Regulations?	Yes	No, requires new legislation; may require creation of new entity	Yes. No need for new legislation or regulations. Can use PNOC-RC and expand its activities

Source: Authors

Moving Forward on the Public Sector EE Financing Agenda

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

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

The government should select one of the three options for implementation only after review and consultation with all relevant stakeholders, including government officials; LGU mayors and city councils; private sector representatives (including energy service providers); banks and financial institutions; and NGOs, consumer groups, and the IFI community.

The next step is detailed design and implementation planning for the selected option. Implementation can yield substantial results and generate lessons for the commercial financing options that the government and the Philippine Energy Efficiency Alliance (PE2) are planning to develop through changes in legislation, regulations, and budgeting procedures.

In view of the analysis in this report and discussions with a variety of stakeholders, *the World Bank recommends that the government update their Government Energy Management Program (GEMP) under DOE. The purpose would be to strengthen and clarify the obligations of the administrators of public facilities (both NGAs and LGUs) to conduct periodic energy audits (for example, every 4-5 years); and to implement all viable EE measures (those with a simple payback period of less than 10 years).*

To support the implementation requirement, the World Bank further recommends that the government select a sustainable financing mechanism from the options discussed in this report, and establish it as a dedicated investment component under GEMP (or GEMP IC).

Based on the options analyzed, the World Bank proposes two options for consideration by the government: (i) establish a PIU under DBM to administer a budget financing with capital recovery scheme; or (ii) assign the PNOC RC as the lead implementing agency of the investment component, serving as a super ESCO.

Both of these options would allow GEMP to launch the investment component (GEMP IC) in a relatively short period of time, as neither would require the creation of any new institutions or any major legislative changes. The GEMP IC could focus its initial efforts on NGA buildings in order to test the mechanisms and build experience, but could later be expanded to include LGU buildings as well as other public facilities, including street lighting, municipal water pumping, irrigation, and so on.

In addition, a Program Steering Committee (PSC) should be established. This would be made up of relevant government entities such as DOF, DBM, DOE, the Department of Environment and Natural Resources, the Department of Education, the Department of Health, the Department of the Interior, the Department of Science and Technology, and local governments, along with at least one or two nongovernmental organizations (from academia, the private sector, and/or civil society). The PSC would oversee GEMP IC, and would approve eligibility criteria, operating guidelines, and investment plans.

Under the first option, the PIU under DBM would report to the PSC for all activities

undertaken under GEMP IC, such as the development of investment plans, operation manuals, contract templates, and the like. Given the multidimensional aspects of the GEMP IC scheme, and the importance of both the energy and budget-saving benefits, it is proposed that the PIU be comanaged and staffed by DOE and DBM, but physically reside within DBM. (See Figure 5.1 and Figure 5.2 for the proposed schematic and flow of funds for this option).

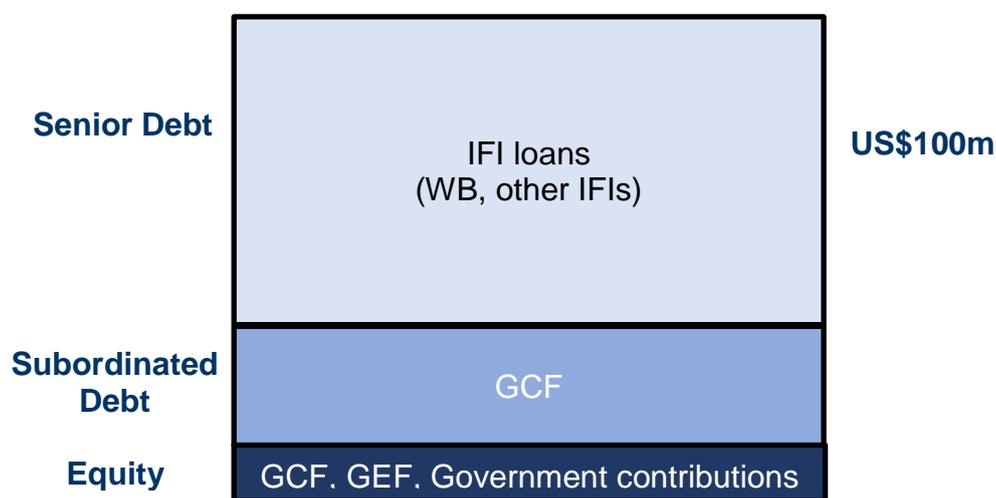
Under the second option, the PNOC RC would be free to undertake other business activities, as they do currently, but would have to report to the PSC for all activities undertaken under GEMP IC. (See 5.9 for the proposed schematic and benefits of this option). Under both options, the assigned organization would enter into contracts (ESAs or ESPCs) with eligible public entities to undertake EE investments, finance them, and then bundle projects for subcontracting to private ESCOs for implementation. This would fill a critical gap in public sector EE financing in the Philippines; lead to substantial budgetary and energy savings; and would help develop the local ESCO and EE market.

Proposed Funding Structure

A preliminary plan for the proposed funding structure of the GEMP Investment Component (GEMP IC) is summarized in Figure 6.1:

- GEMP IC could be capitalized with equity of US\$10 million. The equity sources could be the Green Climate Fund (GCF), the Global Environment Facility (GEF), government contributions, and other donors.
- GEMP IC could also be eligible for concessional debt financing of US\$40 million through a GCF loan.

Figure 6.1. Possible Funding Structure for GEMP Investment Component



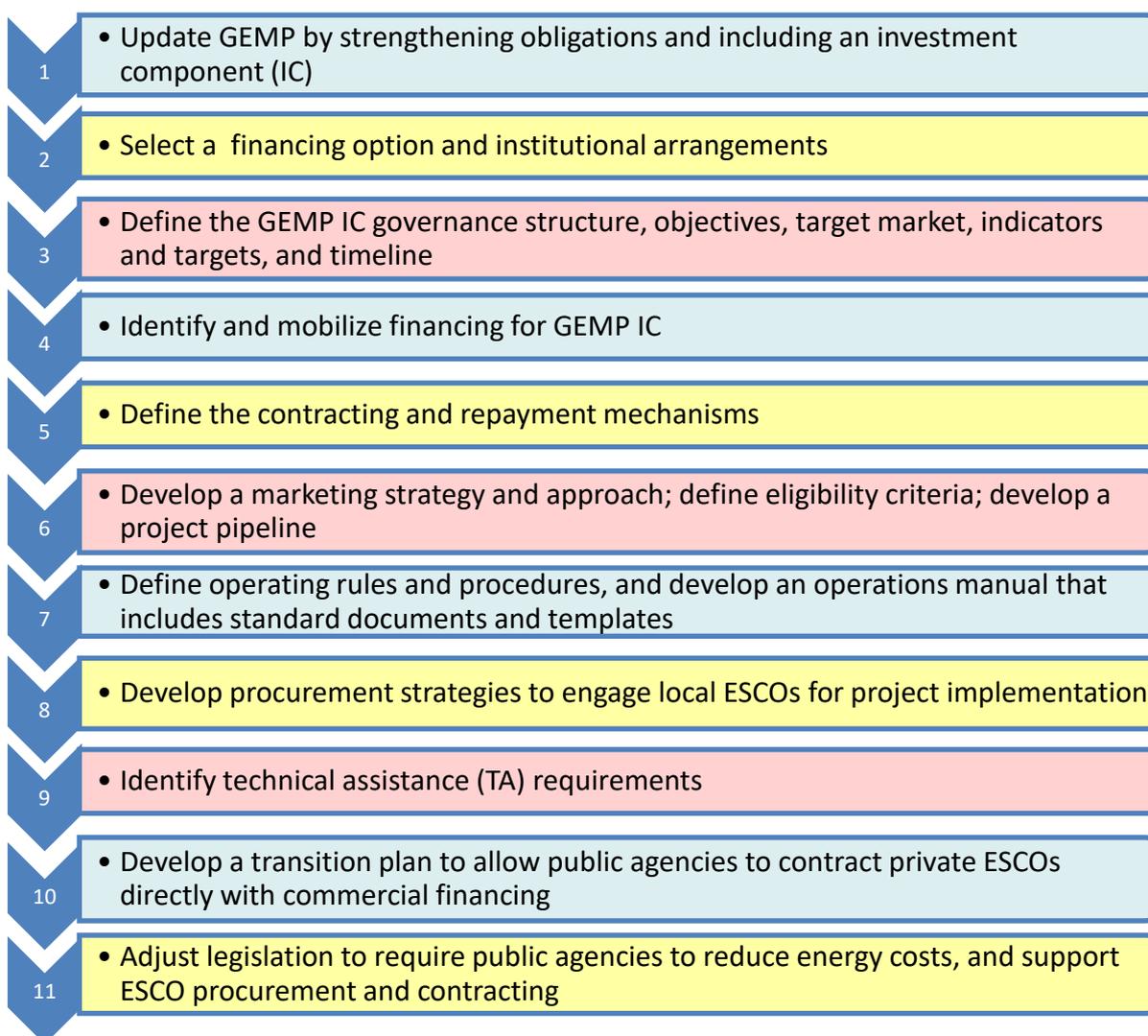
- Additional public debt of US\$100 million could be obtained from IFIs such as the World Bank.
- While the PIU within DBM or PNOC RC would be responsible for implementation of GEMP IC, the GEMP IC account would be owned by the government. All repaid capital would flow back to the GEMP IC account, allowing it to revolve over time.
- The fee structure to cover administrative and program-related overhead costs (energy audits, procurement, financing, supervision and oversight, program reporting, etc.) would be established and approved by the PSC under both options.

Additional resources for TA would also need to be mobilized, which could be managed by the PIU, DOE, or PNOC RC.

Roadmap for Developing the GEMP Investment Component

The major steps in developing GEMP IC in public facilities are shown in Figure 6.2.

Figure 6.2. Roadmap for Developing the GEMP Investment Component (GEMP IC)



Concluding Remarks

The GEMP IC for energy efficiency in public facilities could be initiated relatively quickly if implementation were assigned to an existing entity such as DBM or the PNOC RC acting as a super ESCO, while still allowing the government to own the assets under GEMP IC. If the GEMP IC and performance contracting mechanisms prove effective, it could later be extended to municipal (LGU) buildings and facilities. Should the government decide in future years to establish a new entity, such as an energy efficiency revolving fund (EERF), the GEMP IC account could be assigned to this new entity. This would allow GEMP to begin right away,

while still preserving the government's ability to establish a dedicated institution at a later date.

The creation of such a GEMP IC would help the government meet its national EE targets and directly contribute to the targets for EE public buildings; help meet the country's energy security goals; reduce public expenditures in energy, allowing for investment in other socioeconomic priorities; support its Nationally Determined Contributions (NDCs) under the Paris Agreement; and other policy objectives. GEMP IC will also provide significant co-benefits, including reduced energy imports and public energy costs; improved operations in public facilities; reduced maintenance and equipment replacement costs; creation of a local ESCO industry; new jobs; and reduced greenhouse gas (GHG) and local emissions.

GEMP will be sustainable, since no recurring government budget will be needed, and it could operate on a revolving basis for more than 20 years. It can also provide the basis for extension or replication to other municipal sectors (e.g., street lighting, water pumping, etc.). In addition, by implementing GEMP IC, the Philippines can become a regional leader on EE implementation in the public sector and foster a major local ESCO industry.

ANNEX A. THE ACTIVITIES OF PNOC RC

PNOC RC Activities

PNOC RC started its ESCO program for government buildings with the installation of rooftop solar photovoltaic (PV) panels. To date, they have installed 1.42 Megawatt peak in seven government agencies in eleven buildings in Metro Manila. The company continues to work with government agencies within Metro Manila as well as in the provinces for the installation of additional rooftop solar PVs.

PNOC RC has also initiated discussions with a number of central governmental agencies and LGUs to implement EE lighting projects along with their rooftop solar installations. The company is now also offering LED retrofitting projects for government buildings and offices. These projects are designed to replace conventional lighting systems such as fluorescent, incandescent, mercury, and metal halide lamps with LED lighting systems. The first such project is the replacement of 3,725 bulbs in the Philippine National Police Academy campus in Cavite. Another project, with the University of the Philippines, is for the retrofitting of more than 50,000 bulbs.

To complete its ESCO program for the government sector, PNOC RC plans to venture into installing high efficiency air conditioning units to replace the old and inefficient ones. Since this will be a capital-intensive project, PNOC RC is coordinating with local government banks to provide a credit facility for the project. Likewise, it is seeking grants or concession loans from international funding institutions

PNOC RC Business Model

PNOC RC implements EE projects at no upfront cost to the public agencies. The basic model is the “shared savings” business model, under which the government agency retains a share in the savings derived from the displaced energy resulting from these projects. PNOC RC finances the capital cost of the project, provides the technical services, and conducts the operations and maintenance (O&M); and the public agency pays PNOC RC a monthly fee based on an agreed-upon rate. PNOC RC ensures that the project is sustainable throughout the length of the arrangement by covering the project investment, O&M costs, and a reasonable rate of return. Since the financing is done by PNOC RC, the public agency has no direct contractual obligation to repay the lender if there is a loan; this obligation is held by PNOC RC.

The implementation of its ESCO program requires PNOC RC to present a proposal to the government agency; sell the concept; conduct contract negotiations; and push for project approval. Since different agencies and LGUs have different perspectives concerning EE, the entire sales process could become tedious and lengthy. To address this issue, PNOC RC has requested the Department of Energy (DOE) to issue a circular mandating all government departments and their attached agencies to implement EE and conservation measures, as well as demand-side management programs. They have also requested that PNOC RC be designated as the sole ESCO for the government sector.

While waiting for the department circular to be issued, PNOC RC has adopted a department-level contract negotiation approach that covers the entire department, including its attached agencies, in order to shorten the approval process.

Capacity Building of Private ESCOs

PNOC RC implements its EE and demand-side management projects through private ESCOs that function as its EPC (engineering procurement and construction) contractors, thereby contributing to the growth and development of the energy services infrastructure in the Philippines.

To create awareness and appreciation among the private sector energy service providers, PNOC RC undertakes information and education campaigns and conduct forums on energy efficiency and conservation. The company intends to provide energy audit consultancy services to both the commercial and industrial sectors in order to identify energy conservation opportunities that small ESCOs may want to consider as possible ESCO projects.

Scaling-Up Activities

PNOC RC has requested its parent company PNOC to provide additional capital infusion of PHP500 million. With this additional capitalization, PNOC RC intends to pursue projects that aim to replace old and inefficient air conditioning units with modern and efficient systems. Likewise, the company would implement its ESCO program on a nationwide scale and undertake simultaneous EE projects and installations.

The government, with the assistance of the World Bank and/or other donors, could provide additional capital to PNOC RC to further expand its activities for public sector ESPC projects, and to leverage commercial financing. A primary function of PNOC RC could be to facilitate access to project financing by developing relationships with local or international financial institutions. The company may also expand its financial products to provide credit or risk guarantees for ESCO projects, or act as a leasing or financing company to provide ESCOs and/or customers with EE equipment on lease or benefit-sharing terms.

List of Completed Projects

Government Agency	Location	Scope	Commissioning Date
Philippine Heart Center	Quezon City	100 kW	Dec. 1, 2015
Department of Science and Technology	Taguig City	100 kW	Feb 16, 2016
Department of Environment and Natural Resources (EMB)	Quezon City	100 kW	Sept. 24, 2016
Philippine Coconut Authority	Quezon City	80 kW	Feb 24, 2017
Commission on Audit – Gym	Quezon City	100 kW	Mar 24, 2017
Commission on Audit – Philippine Institute for Development Studies	Quezon City	100 kW	
University of the Philippines – Quezon Hall	Quezon City	40 kW	Mar 24, 2017
University of the Philippines – Melchor Hall	Quezon City	100 kW	

University of the Philippines – Palma Hall	Quezon City	100 kW	
Bangko Sentral ng Pilipinas	Manila	200 kW	Jul 25, 2017
Bangko Sentral ng Pilipinas	Quezon City	400 kW	Jul 25, 2017
Philippine Public Safety College – Philippine National Police Academy and NPC	Silang, Cavite	3,725 bulbs	Aug 2, 2017

Source: PNOC RC

Pipeline Projects

	Project	Location	Capacity (kW)	Number of Bulbs	Status
Solar Rooftops in Government Buildings					
1	Philippine International Convention Center	Manila	1,000		MOA Signing
2	University of the Philippines (Phase 1)	Quezon City	800		Ongoing MOA Negotiation
3	Laguna Lake Development Authority	Quezon City	80		Ongoing MOA Negotiation
4	Quezon Memorial Medical Center	Quezon City	100		Ongoing MOA Negotiation
5	BSP QC Mint Building	Quezon City	400		For site survey/ detailed FS
6	BSP Cebu	Cebu	100		For FS
7	BSP Tuguegarao	Cagayan	60		Ongoing MOA Negotiation
8	DOST Taguig	Taguig City	800		For detailed FS
9	Commission on Higher Education	Quezon City	85		For detailed FS
10	Philippine General Hospital	Manila	90		For detailed FS
Solar Rooftops and EELs in LGUs					
1	LGU Naga City Cebu	Cebu	100	3,921	MOA negotiation
2	LGU Taal, Batangas	Batangas	100	-	Completed site survey
3	LGU Malolos	Bulacan	250	-	Completed site survey

4	LGU Guiguinto	Bulacan	200	-	Completed site survey
5	LGU Paumbong	Bulacan	80	-	Completed site survey
6	LGU Pasig City	Pasig	380	-	Completed site survey
7	LGU Leyte	Leyte	555	-	Completed site survey
8	LGU Davao City	Davao City	100	500	For site survey
9	LGU Tagum City	Davao del Norte	100	500	For site survey
10	LGU Province of Davao Del Norte	Davao del Norte	100	9,912	For site survey
11	LGU Municipality of Makilala	North Cotabato	100	438	For site survey
12	LGU Kidapawan City	North Cotabato	100	1,547	For site survey
13	LGU General Santos City	General Santos	100	500	For site survey
14	LGU Koronadal	South Cotabato	100	500	For site survey
EEL in Government Buildings					
1	University of the Philippines - Los Banos	Laguna		26,680	MOA negotiation
2	University of the Philippines - Diliman	Quezon City		33,461	MOA negotiation
3	Technical Education and Skills Development Authority	Taguig City		5,000	MOA negotiation
4	Quirino Memorial Medical Center	Quezon City		4,400	MOA negotiation
5	Commission on Higher Education	Quezon City		1,562	MOA negotiation

Source: PNOC RC

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