2nd Clean Energy Finance and Investment Consultation Workshop

"Unlocking finance and investment for clean energy in the Philippines"
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Improving the investment climate for energy efficiency

With the passage of the energy efficiency and conservation law of 2019, the Philippines has been taking important steps to create a comprehensive policy and regulatory framework for energy efficiency in the country. In particular, the law mandates *the implementation or/and upgrade of minimum energy performance standards (MEPS), the Philippines Energy Labelling Programme (PELP), strengthening of Energy Service Companies (ESCOs), provision of incentives to energy efficiency projects, professionalism of those engaged in energy efficiency* and requires designated end-users to submit energy consumption reduction plan and report on progress.

As the Philippines continues efforts to accelerate energy efficiency deployment, stakeholders consulted in the first Workshop and other stakeholder consultations, highlighted a number of challenges and barriers to unlock energy efficiency investment.

First, current MEPS and PELP were highlighted to be important measures to nudge consumers towards more efficient equipment/appliances; however, while a step in the right direction, gradually increasing stringency will be important. Indeed, there is still very few energy efficient products in the market (e.g., window residential air-conditioners remain ubiquitous in the Philippines compared to other ASEAN countries) and there is a shortage of relevant laboratories to test efficient cooling appliances as well as lack of clarity regarding responsibility over those between the DoE and Department of Trade and Industry. MEPS requirements are also believed to be too low at present, particularly when compared to other ASEAN nations.

The investment (often seen as an expense by end users) in more energy efficient equipment or lighting, in theory, are justified by the potential savings (as payoffs) that could be achieved by end-users. Without the means to reliably measure such savings, the expected payoffs tend to be considered notional that are either ignored or unverifiable. This ambiguity opens end users to performance claims by suppliers or service providers that offer scope for divergent interpretations of the energy system's efficacy.

Equally, protection against "fly-by-night" technologies -- e.g., in the form of seal of approval for novel technologies, inventor-to-end-user matching mechanisms, minimum service or product standards, or employing digital technologies for performance verification -- was also flagged as key to overcome technology risks or unfounded suppliers' claims. The absence of the enforceability of consumer protection laws, similar to those that exist in Europe or the United States (e.g., a basis for a resolution), leaves a legal vacuum in providing an accepted process for establishing vendors' obligations.

Stakeholders also highlighted that there remains an important need for incentives to support energy efficiency project development. In this regard, current efforts to make fiscal incentives available for energy efficiency projects under the Board of Investment (BOI) are welcome. Additional measures such as the implementation of a carbon tax or certification mechanisms such as the definition of a state carbon-neutral building certification were mentioned as other possible solutions to explore.

Last, it appeared clear that more efforts are needed to accelerate energy efficiency in public building (including street lighting), particularly under the Government Energy Management Program (GEMP) – as well as develop an ESCO market. These issues are discussed in more detail in the third part of this background paper.

Two important considerations were referred to but were not fully discussed, which may need to be re-examined more fully. Specifically:

1. Green certification of compliant buildings is extolled for their environmental benefits, and energy savings.
2. Green certified buildings are promoted for their value enhancement that are claimed to increase the resale price of units (vs its acquisition price) in excess of market related price increases.

While digitalisation is not yet a ubiquitous feature in Philippine real estate, fintech methodologies may provide the means to reliably verify the environmental benefits, as well as energy saved (relative to similar buildings that are uncertified). A regular register of real estate transactions may be considered to monitor relative price changes among different categories of real estate.

Accelerating LGUs' uptake of energy efficiency services

The Philippines has set itself an aspirational target to reduce by 3% economy-wide energy intensity (or a 183 million Tonnes of Oil Equivalent/Mtoe reduction in energy consumption) by 2040. As energy demand is projected to close to triple by that time, attaining this target would help defer the development or upgrade of roughly 46 GW of power capacity over that period[1].

Energy efficiency improvement in the public sector is a central pillar of the Philippines' strategy to reach targets and represents an important source of energy savings in the country. According to analysis from the World Bank (2018)[2] based on energy data of 178 public buildings[3], upgrading lighting and air conditioning of those buildings could help generate PHP 705 million of annual savings (equivalent to a 33% reduction in annual electricity consumption or 85 million kWh). This also represents an investment cost of PHP 2.2 billion with an average payback period of 3.5 years. Actual energy savings in the public sector are certainly much greater still, as this only represents a subset of all existing public buildings. Creating the right enabling conditions is thus crucial to reap the benefits of that potential. This background note highlights some potential solutions (focussing on business and financing models) to help support investment in energy efficiency in the public sector, which will subsequently be discussed during the Roadmap's second Workshop.

Improving conditions to accelerate energy efficiency improvements in public buildings is paramount

The Philippines has taken action to harness the energy efficiency potential of its public sector – most notably, through the Government Energy Management Programme (or GEMP). Mandated by the 2019 EE&C law, the GEMP requires all government offices including Local Government Units (LGUs) to reduce

[1] MAP Webinar (2021), MAP Webinar on ENERGY EFFICIENCY AND BUSINESS: What you need to know about RA 11285, https://youtu.be/lzq_e6rt6Zo

[2] World Bank (2018), The Philippines: Options for Financing Energy Efficiency in Public Buildings; https://openknowledge.worldbank.org/handle/10986/29615

[3] This covers: 158 public buildings for which the Department of Energy (DOE) had collected data as well as the walk-through audits of 20 buildings.

monthly electricity and petroleum products consumption by 10%. This in turn, is hoped to help kick-start the energy efficiency market in the country, which so far remains in its infancy. Yet, current compliance with the GEMP remains low, as only around 6.6% of government entities are compliant. To overcome this issue, awareness raising campaigns, capacity building and further incentive were highlighted during several stakeholder consultations as key efforts to support LGUs in adopting energy efficiency solutions and thereby achieve GEMP objectives. Still other barriers also prevent compliance with the GEMP.

First, public procurement of energy efficiency services has been particularly challenging[2]. Multiyear contracting is legally possible, but, in practice, has proven particularly difficult. This, in turn, affects the financial viability of energy efficiency projects whose payback period more than often exceeds a year. Other public procurement rules also make it difficult for LGUs to make energy efficiency improvements. A notable example is the Government Procurement Reform Act (Republic Act 9184) that only allows for the procurement of "pure goods" and "pure services" thereby disabling the procurement of mixed contracts such as energy performance contracts (EPCs).

To recall, the "payoffs" from energy efficiency systems take the forms of savings that are difficult to validate, much less verify for public audit or budgetary purposes. Hence, to avoid that uncertainty (and be on the "safe side"), LGU personnel serving in the bids-and-awards committee (BAC) sometimes choose to defer decisions on approving energy efficiency systems procurement.

Second, the country's LGUs often face significant budgetary and borrowing constraints. This is compounded by the low creditworthiness of certain LGUs, and the absence of a robust credit rating system for LGUs, further limiting their access to finance. Similarly, as is the case in numerous jurisdictions, existing budgetary rules generally disallow the ownership of energy savings. Indeed, as budgets are prepared annually, and each annual budget allocation is based on the previous year's expenditures, any reduction in operating expenditures (i.e., from energy savings) would lead to a decrease in budget allocation the following year. This creates a split incentive wherein the implementing LGUs do not retain the benefits of energy savings (i.e., increase budget availability) and hence, have little to no incentive to make energy efficiency improvements. Also, and quite importantly, reductions in operating expenditures usually cannot be reallocated to pay for capital expenditures, making it difficult to repay loans (or leases) from realised energy savings.

The adoption of the "Mandanas ruling" in 2018 could address some of these concerns. Indeed, adopted in 2018, the Mandanas ruling intends to increase the share of the Internal Revenue Allocation (i.e., part of the central budget) transferred to LGUs as well as to devolve several public services once performed by the central government to LGUs. However, as (part of this) "extra" budget is also intended to allow LGUs to perform additional services, it is not yet clear how much additional funds will be made available for new projects, among which are energy efficiency initiatives.

Considering these issues, the following sections explore different business models and financing tools the Philippines could potentially consider helping LGUs scale up uptake of energy efficiency while meeting the GEMP objectives.

Business and procurement models for energy efficiency in the public sector

EPC models

EPCs are contract models by way of which a range of services (from project design to operation and maintenance/O&M) related to energy efficiency and conservation are provided to an end-user / its associated facilities. The EPC provider, often referred to as ESCO, can, in certain EPC models, provide financing so that the host facility must disburse little to no capital upfront. In this kind of model, the capital is re-paid directly from energy savings, and hence is contingent on the performance of the project/equipment.

EPCs features several key advantages, which have made them particularly attractive and could help overcome some of the obstacles posed under public procurement constraining energy efficiency in the Philippines' public sector. Among other things, EPC models can[4]:

- help reduce transaction cost, bundling all of the various steps typically required to implement an energy efficiency project into one contract, thereby facilitating public procurement.
- transfer technical/technology risks away from public end users and financiers by providing project/equipment performance guarantees and offer O&M services to ensure that the installed equipment continues to perform at appropriate levels.
- facilitate access to external capital and offer more flexible financing options for projects, thereby alleviating some of the budgetary constraints that public agencies typically face.

Different EPC models exist globally, of which the two most prevalent are the shared-saving and guaranteed saving models, as part of which the ESCO performs most services from design to O&M. In the case of the shared-saving EPC model, the ESCO also provides financing, which it reimburses from a percentage of realised energy savings. In the guaranteed model, the ESCO guarantees a minimum level of performance but, in turn, the end-user must obtain financing from a third-party, effectively taking on the financing risk. Preference between shared and guarantees savings vary across countries and regions, often due to different national policy and accounting rules. According to the International Energy Agency[5], the Asian market is the most diverse: Japan and the Philippines use the shared savings model for over 75% of their contracts, while other Asian countries use guaranteed savings for over 80% of their performance contracts. In North American, European, African, Middle Eastern, and Australian markets, guaranteed savings EPCs are heavily utilised. South American ESCOs, specifically in Chile, show a 60/40% split in favour of shared savings.

Still, a broader range of EPC models exist and have been used globally. The experience of China (one of the world's largest ESCO market) shows that the variety of models used evolve as the energy efficiency market matures. Indeed, in 2012, guaranteed and shared savings represented more than 85% of the EPC market against 45% in 2019, the remainder being other forms of EPC models[6].

Box 1. Examples of EPC models

Shared-saving EPC: The ESCO designs, finances, and implements the project, verifies energy savings and shares an agreed percentage of the actual energy savings over a fixed period with the customer.

End-Use Outsourcing (also known as "Chauffage") model: The ESCO takes over operations and maintenance of the equipment and sells the output (e.g., steam, heating/cooling, lighting) to the customer at an agreed price. Costs for all equipment upgrades, repairs, and so on, are borne by the ESCO, but ownership typically remains with the customer.

Guaranteed Saving EPC: The ESCO designs and implements the project but does not finance it, although it may arrange for or facilitate financing. The ESCO guarantees that the energy savings will be sufficient to cover debt service payments.

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[4] World Bank(2010), Public Procurement of Energy Efficiency Services: Lessons from International Experience, https://openknowledge.worldbank.org/bitstream/handle/10986/13540/52456.pdf?sequence=1&isAllowed=y

[5] https://www.iea.org/reports/energy-service-companies-escos-2/esco-contracts

[6] https://c2e2.unepccc.org/wp-content/uploads/sites/3/2021/01/business-models-for-energy-efficiency-energy-performance-contracting.pdf

ESCO Variable Term Contract: This is similar to the shared saving EPC contract, except that the contract term can vary based on actual savings. If actual savings are less than expected, the contract can be extended to allow the ESCO to recover its agreed payment. A variation is the "first-out" model, in which the ESCO takes all the energy savings benefits until it has received its agreed payment.

Equipment Supplier Credit: The equipment supplier designs and commissions the project, verifying that the performance/energy savings matches expectations. Payment can either be made on a lump-sum basis after commissioning or over time (typically from the estimated energy savings). Ownership of the equipment is transferred to the customer immediately.

Equipment Leasing: Similar to supplier credit, the supplier receives fixed payments from the estimated energy savings. However, in this case the supplier owns the equipment until all the lease payments, and any transfer payments, are completed.

Technical Consultant (with Performance-Based Payments): The ESCO conducts an audit and assists with project implementation. The ESCO and customer agree on a performance-based fee, which can include penalties for lower energy savings and bonuses for higher savings. Technical Consultant (with Fixed Payments): The ESCO conducts an audit, designs the project, and either assists the customer with implementing the project or simply advises the customer for a fixed, lump-sum fee.

Adapted from World Bank (2010), Public Procurement of Energy Efficiency Services: Lessons from International Experience

While the Philippines' ESCO market remains in its infancy, there has been efforts to accelerate its development. In 2020, the Department of Energy (DoE) issued a Department Circular 2020-09-0018 providing "Guidelines in the Administration Classification and Certification of ESCOs" in a bid to improve clarity and set standards for ESCOs. As per the circular, to be classified as an ESCO, a firm must be registered by DoE, which is conditioned to meeting a set of basic criteria. Registered firms can also obtain certification, which guarantees a certain level of business (historical) performance. As of June 2022,[7], there were 36 ESCOs in the country -- a five-fold increase compared to 2015 --, of which only 7 were certified. While this is an encouraging trend, in reality, only a few ESCOs actually undertake EPCs, which means these are still to develop their technical, business development, and risk management skills and capabilities. Over 2019-21, ESCOs represented 15% over total energy efficiency investment (roughly current USD 317 million) – most of which occurred in commercial buildings.

Notwithstanding, ESCOs continue to face a number of issues in the Philippines. As highlighted in consultations, demand for energy efficiency remains overall low compared to the country's energy potential – this is also the case for LGUs as shown by the low compliance rate in the GEMP. As discussed in the first section, continued efforts to encourage energy efficiency adoption will be paramount to increase compliance rate with the GEMP and ultimately, spur demand for energy efficiency more generally.

Equally, ESCOs' access to affordable finance remains a well-known challenge in the Philippines. Indeed, energy efficiency projects are often perceived as too small or/and risky by financial institutions, often leading them to require high level of collateral. Project finance is also largely unavailable, forcing ESCOs to take debt on their (oft small) balance sheets, thereby constraining their borrowing capacity and hence their ability to develop projects. While some banks have adopted dedicated financing programmes for which energy efficiency projects are eligible, energy efficiency practitioners consulted as part of the roadmap process continued to highlight difficulties in accessing finance.

Last, the ability to reliably verify energy savings, and attribute such savings to the energy efficiency project is also a critical aspect to increase LGUs/costumers' and investor confidence. Hence, ensuring the development of reliable verification systems and protocols (including from third party) is important to ensure

[7] https://www.doe.gov.ph/energy-efficiency/list-esco-accredited-companies-june-2022

bankability of investment-grade audits/EPC and avoid claims and counterclaims (at times leading to litigations).

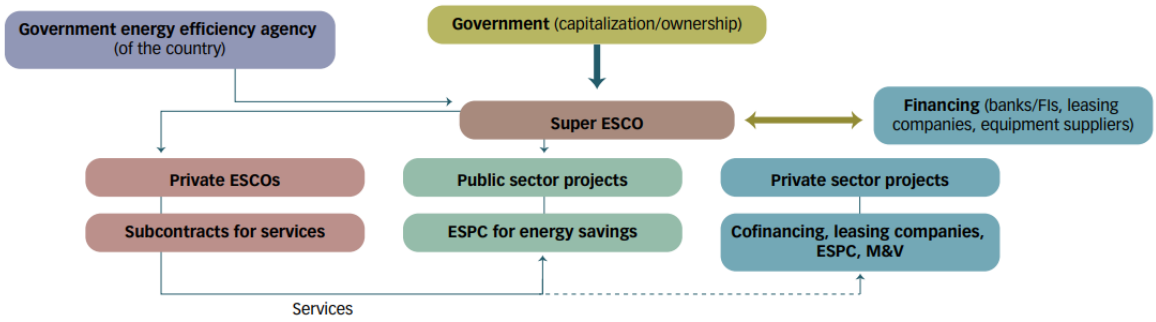
Public ESCO models

While the aforementioned EPC services can help to fast-track energy efficiency adoption in the public sector, ensuring these can be procured in an efficient and competitive way is paramount.

International experience provides interesting insights into how other countries have worked around some of these well-known public procurement restrictions, and which could be adapted if not replicated in the Philippines' context. One notorious example is the public ESCO model – also known as "Super" ESCO.

The Super ESCO model has been adopted by numerous countries, typically to kickstart the nascent, local energy efficiency market (see Figure 1). Indeed, by supporting the adoption of energy efficiency solution in the public sector (e.g., hospitals, schools, municipal utilities, government buildings, and other public facilities), these have supported the capacity development and project development activities of existing private ESCOs (e.g., subcontracting, reducing transaction costs, provision of financing etc.). A key advantage of a public ESCO resides in the fact that these very often do not have to go through a (oft cumbersome) public procurement/tendering process for project development, since in this case one public agency is simply contracting with another public entity. Equally, another advantage of such a model is that the super ESCO often has an easier access to finance (as benefitting from a greater creditworthiness).

Figure 1. Illustration of typical activities of a Super ESCO



Note: ESCOs = energy service companies; ESPC = energy savings performance contract; FIs = financial institutions; M&V = measurement and verification.
Source: The World Bank (2018), Transforming Energy Efficiency Markets in Developing Countries: The Emerging Possibilities of Super ESCO, https://openknowledge.worldbank.org/bitstream/handle/10986/30385/129781-BRI-PUBLIC-VC-ADD-SERIES-6-9-2018-12-9-31-LWLJfinalOKR.pdf?sequence=1&isAllowed=y

As for EPC models, there exists variations in the way Super ESCOs operate globally. In China, for instance, state-owned ESCOs (also known as energy management companies) were established to act as for-profit ESCOs whose initial role was to support the development of the country's energy efficiency market, focussing largely on the industry sector.

In Croatia, a Super ESCO was established within the country's public power utility to support local government institutions' uptake of energy efficiency projects. In other countries, the Super ESCO has had a more traditional role, acting as the main (if not the sole) responsible for energy efficiency project implementation in public facilities, subcontracting work to private ESCOs (e.g., in Saudi Arabia or United Arab Emirates). In India, for instance, the Energy Efficiency Services Limited – or EESL, the country's super ESCO – has played a key role in facilitating energy efficiency project development in the public and

residential sectors, including through providing financing and transaction cost reducing actions. Global examples of Super ESCOs are highlighted in Box 2.

Box 2. Some global examples of super/Public ESCO models

- **China's Energy Management Companies (EMCs)** were initially created by the Government, with support from the World Bank and the Green Environment Facility, in three municipalities. These EMCs first targeted the most energy-intensive industries, such as cement and iron and steel, to maximise their energy-saving benefits. They also implemented EPC in the public sector. In the face of their early success, other state-owned ESCOs emerged, helping grow the energy efficiency market in China. The creation of the EMC Association in 2003 further helped accelerate the ESCO market development including through industry self-regulation (e.g., document standardisation, etc.), capacity building, knowledge sharing and fostering business collaboration.
- The **HEP ESCO** in Croatia was established in 2003, with support from the World Bank and the Global Environment Facility, within the country's national power utility, Hrvatska Elektroprivreda d.d. (HEP) with the objective of developing, financing, and implementing energy efficiency projects on a commercial basis, tapping local business and expertise to deliver projects. The HEP ESCO has had a particular focus on public buildings of local authorities. According to World Bank's analysis, the HEP ESCO experience, highlights several upsides and downsides. On the positive side, the HEP ESCO benefitted from the utility's corporate image and strong credit worthiness. It could also gain access to HEP's customer database. A major drawback, however, was the need to apply HEP's human resources and compensation policies, which were not well suited to the company's needs for experienced staff.
- **India's Energy Efficiency Services Limited (EESL)** was established in 2009 as a state-owned ESCO, a joint venture of four public enterprises under the Ministry of Power, to finance and deliver energy efficiency solutions, especially in the residential and public sectors. In the residential sector, EESL designed and implemented the UJALA programme to make energy-efficient household lighting systems affordable for all. Using an original approach consisting in aggregating demand for and bulk procurement of appliances and equipment as well as providing innovative up-front payment options to consumers (e.g., on-bill financing), EESL managed to reduce LEDs price to $0.56 in 2017 down from $4.60 per bulb in 2014. This subsequently led to a similar decrease in the retail market (from $8.20 to $2.20) during the same period). In the public sector, EESL has run the Street Lighting National Program (SLNP), consisting in the roll-out of LEDs in public street lighting. Under the programme, the entire up-front investment for streetlights is made by EESL and recovered from the energy savings of municipalities over the project duration, using the deemed savings M&V approach. Using this approach notably helped demonstrate its viability as the basis for EPC used by private ESCOs. Similar to the UJALA programme, the procurement of large volumes from a variety of suppliers that meet strong technical standards also helped spur development of manufacturing capacity in India and lowering the price of energy efficiency measures. In total, over 6 million streetlights have been deployed so far.
- **Saudi Arabia's National Energy Services Company (NESCO), also known as Tarshid, was** created in 2017 by the Public Investment Fund with an initial capitalization of over $500 million, to increase energy efficiency uptake by the public sector. This was complemented by a royal decree obligating all government bodies to exclusively contract with Tarshid. In turn, Tarshid has set up a framework for competitively procuring the services of private ESCOs through EPCs

to deliver energy efficiency projects while also helping build local ESCO capacity. Equally, Tarshid has supported the development of transaction tools and EPC templates as well as guidelines for the measurement and verification of energy savings as per international benchmarks. This Super ESCO is intending to cover 70 percent of all projects in the country's energy efficiency sector, estimated to be an over $11 billion market.

Source: The World Bank (2018), Transforming Energy Efficiency Markets in Developing Countries: The Emerging Possibilities of Super ESCO; IEA (2021), Evolving Energy Service Companies in China.

There have been efforts already to establish a public ESCO through the state-owned Philippines National Oil Corporation (PNOC). Indeed, in 2008, the PNOC established a subsidiary (the Renewable Corporation, thereafter "PNOC RC") to virtually function as a public ESCO. Using a shared-saving model, PNOC RC provides financing, technical services, and conducts the O&M for the public agency, in exchange for an agreed-upon monthly fee. To implement its energy efficiency and demand-side management projects, PNOC RC subcontracts private ESCOs in a bid to help develop the ESCO market. It also undertakes information and education campaigns and conduct forums on energy efficiency and conservation.

While these efforts are welcome, PNOC RC has so far implemented very few energy efficiency projects (excluding solar rooftops -- mostly at the exploratory or feasibility stage). One reason, according to the World Bank is that "s*ince different agencies and LGUs have different perspectives concerning [energy efficiency], the entire sales process could become tedious and lengthy*". To overcome this issue, there has been talks of issuing a Department Circular obligating LGUs to implement energy efficiency measures as well as exclusively contract with the PNOC RC. However, such a circular has not been released.

Public-Private Partnership (PPP) models

Another potential option to procure (and finance) energy efficiency projects in the Philippines is through PPPs, which has been widely used globally to fund large infrastructure projects, such as airports, toll roads or power plants. PPPs are contracts entailing a long-term contractual agreement between the government and a private sector partner. The private party is often responsible for the design, construction, financing, operation, management, and delivery of the service for a pre-determined period, receiving its compensation from fixed unitary payments (i.e., availability payment) or user-fees.

PPP models have been successfully implemented in the Philippines, with several airports, dam and toll road projects having been developed[8,9]. This was greatly aided by a comprehensive legal framework for PPP, notably enshrined in the B-O-T Law passed in 1987. Notwithstanding, PPPs have been largely untapped in the renewable and energy efficiency sectors. This is explained by, first, the lack of familiarity with clean energy projects of LGUs as well as, in certain cases, their limited experience in undertaking complex contractual arrangements. Equally, the fact that current PPP documents and procedures are still geared towards traditional, large-scale infrastructure projects makes it difficult to design PPP models adapted to the size and characteristics of energy efficiency projects. Still, while these issues are common globally, some countries have already attempted to develop PPP models for energy efficiency, with promising results. This is notably the case of Indonesia, which implemented a pilot project in Surakarta city (see Box 3).

[8] OECD(2016), OVERVIEW OF THE PHILIPPINES' PPP FRAMEWORK AND PROGRAMME Meeting of the South East Asia Regional Policy Network on PPP, Infrastructure and Connectivity - https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=GOV/PGC/SBO(2016)1&docLanguage=En

[9] https://ppp.gov.ph/list-of-projects/

A number of LGUs are more advanced in developing their own sub-national PPPs with its own set of requirements from the proponents. In a number of LGUs, Batangas having pioneered their PPP programme, are offering a streamlined and simplified approval process that complies with national policy and guidance. At this point in time, this is more the exception rather than the rule. Nonetheless, the LGU ordinance is a product of consultations with national government agencies, as well investors that they consult prior to promulgating the rules.

Box 3. Indonesia's Street Lighting PPP project in the municipality of Surakarta

The Surakarta's Street lighting project was initiated by the municipality of Surakarta on Java Island in 2018 in a bid to revamp and extend previous public street lighting infrastructure covering around 976 km (of which, 335 km of strategic roads). The project was undertaken following a 2016 survey showing both qualitative and quantitative shortcomings of previous public lighting infrastructure. On the one hand, the survey showed that numerous lamps and poles were non-compliant with national standards and that significant savings could be achieved through replacing lamp points with more energy-efficient LED lamps. On the other hand, the survey highlighted that previous lighting infrastructure did not satisfy actual needs estimated at around 31,890 lamp points (against 21,222 in 2016).

The project is being prepared under PPP arrangements (following presidential regulation 38/2015) with the municipality of Surakarta as the Government Contracting Agency. The municipality completed and submitted a final business case to prospective developers in mid-2020. Following a prequalification process held in end of 2020, three consortia of local and international companies are expected to bid for the 17-year concession. The winning bidder will be responsible for building, financing, operating, and maintaining Surakarta's public street. The project's forecasted internal rate of return was estimated at 13.24% over 17 years, which is lower than rates observed for energy efficiency in Singapore and the Philippines, often in the upper teens. The project's indicative financial information is summarised in the table below:

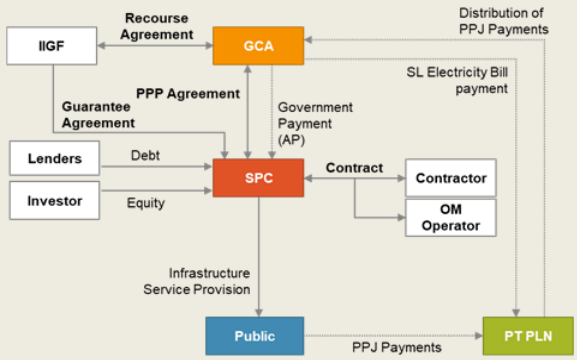
Surakarta's street lighting PPP project financials

Estimated project cost	USD 25.7 million (17 years)
Debt level	70%
Equity level	30%
Project IRR	13.24%
Equity IRR	15%

Note: IRR= Internal Rate of Return. The internal rate of return is a financial metric used to estimate the profitability of potential investments. The internal rate of return is a discount rate that makes the net present value of all cash flows equal to zero in a discounted cash flow analysis.*

The project will benefit from MoF assistance under its Project Development Facility and is expected to reach financial close in late 2022. The project will also benefit from a government payment guarantee administered by the IIGF to guarantee availability payment* by the Municipality.

Financing structure of the Surakarta public street lighting project



**AP=Availability Payments. GCA=Government Contracting Agency. OM= Operation and Maintenance. PPJ= Pajak Penerangan Jalan or Street Lighting Tax.SL= Street Lighting. SPC=Special Purpose Company.*

Adapted from OECE(2021), Clean Energy Finance and Investment Policy Review of Indonesia, https://www.oecd-ilibrary.org/docserver/0007dd9den.pdf?expires=1661866803&id=id&accname=ocid84004878&checksum=589DD9719ACB704A17D8D6C473AC2658

Financing tools for energy efficiency

While overcoming challenges for the procurement of energy efficiency service is important, ensuring availability of financial resources to cover energy efficiency investment cost, particular when the financing risk is borne by LGUs.

Drawing from global experiences and building on World Bank (2018)[1]'s list of available financing tools, this section highlights examples of financing and de-risking tools that could be used by LGUs to facilitate finance and investment in energy efficiency projects.

Government budget financing

Public budget is likely going to be an important source of funding for energy efficiency projects in the public sector. This includes the provision of incentives, grants, or subsidies (among others), which are delivered to help kickstart the market (see Box 3 on Thailand's direct subsidies mechanisms). Yet, given budget constraints, using government funding **with cost recovery** could be a cost-efficient way to support energy efficiency. Indeed, through this approach, the government covers the cost of energy efficiency projects and recovers its investment from energy savings. To cover the cost, funding can come from a mix of central and local government budgets as well as international development finance. EESL's Street Lighting National Programme provides an interesting example of how government funding can be recovered through savings (i.e., cost recovery) – which was done through on-bill financing (see Box 2 and section below for discussion on on-bill financing).

This type of financing could particularly help in the early stages of the energy efficiency market development in order to prove concept and bolster investor confidence. Equally, it could be a potential way to overcome the "split incentive" challenge (wherein the LGUs do not retain full ownership – if at all -- of energy savings).

Green (municipal) bonds

The global green bond market has grown substantially over the last years. Taking advantage of this opportunity, the Philippines has issued several green bonds, the proceeds of which were used to fund energy projects. Still, most of the country's issuances came from the private sector, contrasting, for

instance, with neighbouring Indonesia (another leading regional green bond issuer) whose green bonds were mostly issued by the government. Yet, green bond issuances could be a potential avenue to fund both central and local government's energy efficiency related investment, particularly as global investors' appetite for green products is higher than ever before.

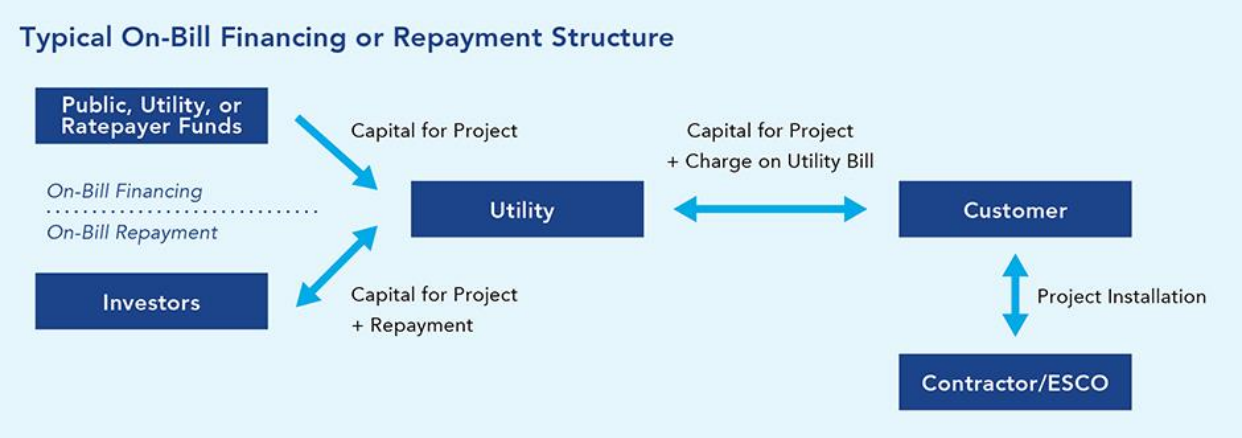
In particular, municipal green bonds could be an interesting source of financing for LGUs to consider, once the "vanilla" municipal bond market – still under development – reaches a more mature stage. Doing that, would notably require developing a reliable municipal credit rating system to help build investor confidence as well as enhance LGUs' technical capacity to both raise funds in capital markets and bundle energy efficiency projects together[10].

Mexico City offers interesting insights into the potential for municipalities to tap the local or international green bond market. Indeed, the city is one of the very few municipalities of emerging economies to have issued a municipal green bond in 2017to fund energy-efficient streetlighting, railway transit as well as other sustainable sectors. The 1-billion Mexican peso bond (with a five-year tenor) was rated triple A and was largely over-subscribed; it also received a second opinion from Sustainalytics [11,12].

On-bill financing

While the previous financing solutions often imply that the LGU funds energy efficiency improvements, on-bill financing provides a means to work around that issue, particularly in light of limited public budget. Indeed, under such arrangement, an entity (typically, an energy utility) funds energy efficiency improvements (typically through an ESCO) and recovers its investment through an additional charge on consumers' (i.e., LGUs') energy bills (see Figure 2; see discussion on EESL Street Lighting Programme in Box 3).

Figure 2. Typical on-bill financing arrangement



Source: US Department of Energy – Better Building Initiative's webpage: https://betterbuildingssolutioncenter.energy.gov/financing-navigator/option/bill-financingrepayment

[10] World Bank (2018), The Philippines: Options for Financing Energy Efficiency in Public Buildings, https://openknowledge.worldbank.org/handle/10986/29615?show=full

[11] https://www.environmental-finance.com/content/awards/green-bond-awards-2017/winners/bond-of-the-year-municipal-mexico-city.html

[12] https://www.greenbiz.com/article/lessons-learned-mexico-citys-first-green-bond

Energy efficiency revolving funds

An energy efficiency revolving fund typically provides debt (and sometimes equity) financing to a government agency or private company to cover the investment cost of energy efficiency projects, which is then paid back from energy savings. Repayments (which often includes top-up charges in the form of interest or dividend payments) are then used to finance additional projects, thereby allowing the capital to "revolve". Energy efficiency revolving funds are typically capitalised using budget funds and/or international development finance. A key advantage of such funds is that they often offer lower rates than commercial bank loans while allowing a more efficient use of public money thanks to the fund's returns. In addition, the fund can be an effective way to demonstrate the viability of energy efficiency projects and help support market development.

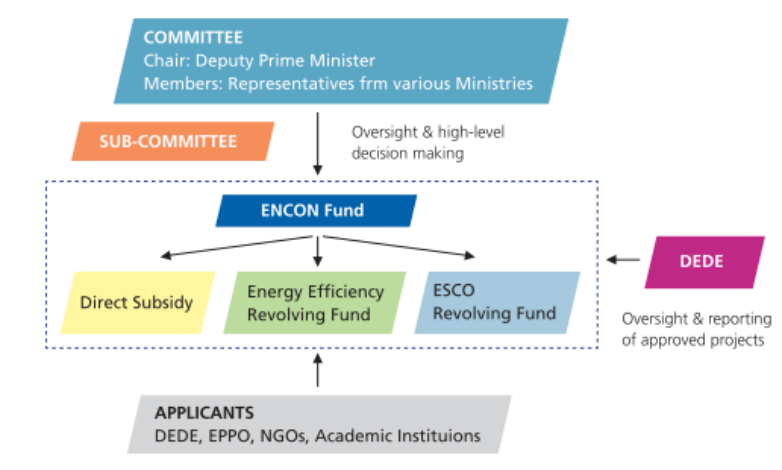
Energy efficiency revolving funds have been successfully used in several jurisdictions. This is notably the case of the energy efficiency and ESCO revolving funds in neighbouring Thailand. In particular, the ESCO revolving fund offers both access to a revolving credit line as well as equity financing to projects. The provision of equity funding is especially important to help facilitate ESCOs' access to finance and increase their borrowing capacity (see Box 4).

Box 4. Thailand's energy efficiency and ESCO revolving funds

Overview of Thailand's energy conservation funding mechanisms

In 1992, Thailand established its energy conservation (ENCON) fund to facilitate access to finance for energy efficiency and renewable energy projects. The fund mainly channels funding through three different mechanisms, namely direct subsidies; the energy efficiency revolving fund; as well as the ESCO revolving fund. The fund's budget stems from a levy on petroleum products and, in 2017, had a total capital of USD 1.1 billion.

The fund's governance structure includes a committee, chaired by the Prime Minister and with members from various ministries, with decision-making authority and working-level sub-committees. The Ministry of Energy is responsible for monitoring and reporting on the performance of approved projects.



Direct subsidies

Direct subsidies can be provided to cover part of energy efficiency equipment cost. These can go to up to 20% (mainly for large industrial facilities), 30% for MSMEs, and 40% for unproven/new technologies. In any case, maximum funding amount is THB 6 million (or around current USD 165,000).

Energy efficiency revolving fund

The energy efficiency revolving fund was established in 2003 to help familiarise financial institutions with energy efficiency and renewable energy projects. The fund provides a 0%-interest credit lines to financial institutions who then on-lends it to projects, which are assessed against a set of eligibility criteria. The fund was allocated in different phases. Phases 1-5 support 295 projects (60% of which were energy efficiency) for a total amount of USD 216 million. Phases 6 & 6+ supported around 160 projects as of 2019, mainly energy efficiency, and had a total budget of USD 126.3 million.

ESCO revolving fund

The ESCO revolving fund was established in 2008 to help mobilise investment in both energy efficiency and renewable energy projects while supporting the development of an ESCO market in Thailand. Unlike the energy efficiency revolving fund (managed by the ENCON fund), the ESCO revolving fund is managed by two independent fund managers with respective technical expertise in energy efficiency and renewable energy.

The ESCO fund can support projects through three mechanisms i.e.:

- **Project equity financing**, whose size can be as low as 10% to as high as 50% of the projects, with an absolute limit of USD 1.5 million. The ESCO revolving shall also not the single majority shareholder. Investment period should be less than seven years with an exit price fixed 4% share dividend cumulated and paid out upon exit.
- **Equipment leasing**, allow the leasing of equipment (up to 100% cost and no more than USD 600,000). Repayment duration should be less than five years and a flat interest rate of 3.5% per annuum is applied.
- **ESCO venture capital**, through which the ESCO revolving fund enter into a joint venture with ESCO companies to raise capital for investment in energy efficiency projects. In that case, the fund can take a stake of 10-30% max of the registered capital – investment period and exit price are the same for project equity financing.

In addition, the fund also offers further support services to ESCOs. Most notably, it operates a credit guarantee facility through which it can provide projects with a credit guarantee to support access to finance, limited to THB 10 million (roughly current USD 234 thousand). It also provides technical assistance to ESCOs in key areas (including through GHG project facility).

As of 2019, the ESCO revolving has invested a total USD 32 million and mobilised USD 155 million of investment in 145 EPC projects.

Source: ACE (2019), Energy efficiency financing guidelines in Thailand: https://aseanenergy.org/energy-efficiency-financing-guideline-in-thailand/ ; Thailand's ESCO Revolving Fund's official webpage: http://www.efe.or.th/escofund.php?task=&sessid=&lang=en

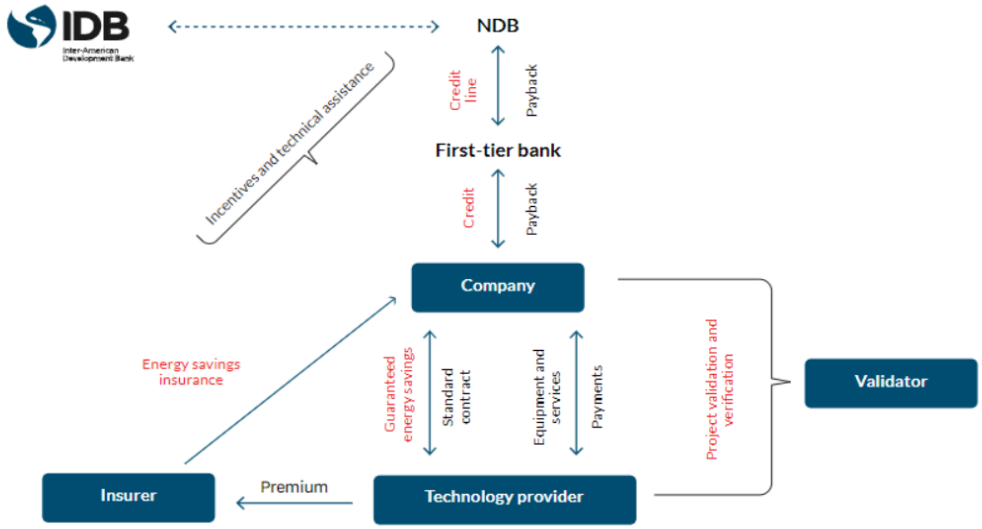
Risk-sharing facilities and energy saving insurance (ESI)

A risk-sharing facility can help overcome the high perceived risk of energy efficiency projects. Acting as a guarantee, such facility can help backstop a variety of risks, particularly those related to credit risks or energy savings. Such a facility can help lower the cost of financing of LGUs and project proponents. It can take the form of, for instance, a partial credit guarantee or a first-loss mechanisms (wherein the guarantor

absorbs losses until a certain maximum amount). India's Partial Credit Risk Sharing Facility for energy efficiency is a good example. This facility provides partial default risk coverage to 14 partner financial institutions on loans to energy efficiency projects implemented by 18 approved ESCOs via energy savings performance contracts; also provides technical assistance and capacity building to ESCOs[13]. Thailand's credit guarantee facility (discussed in Box 4) under its ESCO revolving fund is another good illustration.

In the same fashion, the ESI model is another option to help guarantee energy savings through an insurance policy (usually covering a period sufficient to recover the investment). The ESI model was first pioneered by the Inter-American Development Bank (IDB)[14] in Colombia and, due to its success, is now being replicated to Brazil, Chile, Mexico, and other Latin American countries, usually in cooperation with National Development Banks (see Figure 3). While IDB's targeted MSMEs, such model could potentially also usefully be adapted for LGUs.

Figure 3. IDB's ESI model



Source: IDB(2020), Energy Savings Insurance: Advances and Opportunities for Funding Small- and Medium-Sized Energy Efficiency and Distributed Generation Projects in Chile, https://publications.iadb.org/en/energy-savings-insurance-advances-and-opportunities-funding-small-and-medium-sized-energy

Possible Next Steps

Energy efficiency investment, and its attributes as a cost-effective means to reduce environmental impact, is conceptually well established. However, realising and scaling up such investment requires a number of important actions. Specifically:

1. Developing robust verification and validation system and protocols is important to reliably quantify *a priori* and validate *a postriori* energy savings.
2. Given finance access constraints, developing a "proof of concept" may prove useful. This means, however, that the source of funding may at first rely principally on budgetary allocations from

[13] OECD (forthcoming), Clean Energy Finance and Investment Roadmap of India.

[14] IDB(2020), Energy Savings Insurance: Advances and Opportunities for Funding Small- and Medium-Sized Energy Efficiency and Distributed Generation Projects in Chile, https://publications.iadb.org/en/energy-savings-insurance-advances-and-opportunities-funding-small-and-medium-sized-energy

national as well as local government entities. As a silver lining, a fully funded project by government may simplify the need for a strict measurement of energy savings. The consideration in this case may focus more on testing the feasibility of certain project structures, while experimenting with a number of methodologies that reliably measure the magnitude of energy savings.

3. A “coalition of willing” LGUs could be identified as pilot investments with adequate support from national government to ensure the financial viability of the initial test projects.
4. Lessons are extracted from other countries, adapted as needed, and codified to inform future ventures.
5. An “idea to project” funnel may be introduced in order to provide a structured approach to maturing prospects into opportunities that could be monetised.

In highlighting these initial views, partly informed by discussions from Workshop 1 and experiences of other countries, participants of Workshop 2 are encouraged to provide a range of tangible approaches for possible adoption by DoE as a programmatic intervention, as appropriate.