Diagnostic Review and Analysis of Energy Efficiency Development in Indonesia

Final Report: 31 January 2022

Supported by: The Energy Transition Partnership (ETP)

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ENERGY TRANSITION PARTNERSHIP

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ACRONYMS

ADB	Asian Development Bank
AFD	Agence Francaise de Developement (French Development Agency)
APBN	Anggaran Pendapatan dan Belanja Negara
APERLINDO	Asosiasi Industri Perlampuan Listrik Indonesia
API	Asosiasi Pertekstilan Indonesia
APKENINDO	Asosiasi Perusahaan Pendukung Konservasi Energi Indonesia
APKI	Asosiasi Pulp dan Kertas Indonesia
APPI	Asosiasi Produsen Pupuk Indonesia
ASEAN	Association of South East Asian Nations
BAPPENAS	Badan Perencanaan Pembangunan Nasional
BAU	Business As Usual
BKF	Badan Kebijakan Fiskal
BOE	Barrels of Oil Equivalent
BPDLH	Badan Pengeloka Dana Lingkungan Hidup
BPHN	Badan Pembina Hukum Nasional
BPS	Badan Pusat Statistik
BSN	Badan Standardisasi Nasional
BUMN	Badan Usaha Milik Negara
BUMD	Badan Usaha Milik Daerah
CEA	Certified Energy Auditor
CEM	Certified Energy Manager
CESV	Certified Energy Savings Verifier

CIGA	Certified Investment Grade Auditor
CPI	Climate Policy Innitiative
DEA	Danish Energy Agency
DEN	Dewan Energi Nasional
DFI	Development Finance Institutions
EBRD	European Bank for Reconstruction and Development
EBT	Energi Baru Terbarukan
ECCJ	Energy Conservation Centre Japan
EE	Energy Efficiency
EEP	Energy Efficiency Project
EEPFP	EE Project Finance Professional
EF	Environmental Funding
ESCO	Energy Service Company
ESI	Energy Saving Insurance
ESM	Energy Saving Measures
ESPC	Energy Saving Performance Contracting
ETC	Energy Transition Council
ETP	Energy Transition Partnership
ETS	Emission Trading Scheme
EU	European Union
EV	Electric Vehicle
EVO	Efficiency Valuation Organization
FX	Foreign Exchange
GA	Government Agency

GABEL	Gabungan Perusahaan Industri Elektronik dan Alat -alat Listrik Rumah Tangga Indonesia
GAMATRINDO	Gabungan Industri Manufaktur Lampu Terpadu Indonesia
GBCI	Green Building Council Indonesia
GCF	Green Climate Fund
GDP	Gross Domestic Product
GGGI	Global Green Growth Institute
GHG	Greenhouse Gas
GIZ	Deutshce Gessellschaft fur Internationale Zusammenarbeit (German Society for International Cooperation)
GoI	Government of Indonesia
HAKE	Himpunan Ahli Konservasi Energi
IEA	International Energy Agency
IESR	Institute for Essential Reform
IFC	International Finance Corporation
IGA	Investment Grade Audit
IIEE	Indonesian Institute for Energy Economics
IIGF	Indonesia Infrastructure Guarantee Fund
IKE	Intensitas Konsumsi Energi
IPMVP	International Performance Measurement and Verification Protocol
IRR	Internal Rate of Return
JICA	Japan International Cooperation Agency
KEN	Kebijakan Energi National

KLHK	Kementerian Lingkungan Hidup dan Kehutanan
KfW	German Development Bank
LFI	Local Financial Institution
LKPP	Lembaga Kebijakan Pengadaan Barang/Jasa Pemerintah
M&V	Measurement & Verification
MASKEEI	Masyarakat Konservasi dan Efisiensi Energi Indonesia
MEPS	Minimum Energy Performance Standard
MTRE3	Market Transformation through Design and Implementation of Appropriate Mitigation Action in Energy Sector
NDC	Nationally Determined Contribution
NGO	Non-Governmental Organization
OJK	Otoritas Jasa Keuangan
P3TKEBTKE	Pusat Penelitian dan Pengembangan Teknologi Ketenagalistrikan, Energi Baru Terbarukan dan Konservasi Energi
PCG	Partial Credit Risk Guarantee
PDF	Project Development Facility
PLN	Perusahaan Listrik Negara
PP	Peraturan Pemerintah
PPP	Public Private Partnership
PPSDM	Pusat Pengembangan Sumber Daya Manusia
QA	Quality Assurance
RE	Renewable energy
RIKEN	Rencanq Induk Konservasi Energi Nasional
SINAR	Sustainable Energy For Indonesia's Advancing Resilience

SKKNI	Standard Kompetensi Kerja Nasional Indonesia
SOE	State Owned Enterprise
TA	Technical Assistance
TOE	Ton Oil Equivalent
UK PACT	United Kingdom Partnering for Accelerated Climate Transitions
UN	United Nations
UN ESCAP	UN Economic and Social Commission for Asia and The Pacific
UNIDO	United Nations Industrial Development Organization
UNOPS	United Nations Office for Project Services
USAID	US Agency for International Development
VGF	Viability Gap Fund
WB	World Bank
WHR	Waste Heat Recovery

UNITS AND CURRENCIES

GBP	British Pound Sterling
kWh	kiloWatt hour
MTCO$_2$e	Million Tons of CO_2 Equivalent
MTOE	MegaTonne of Oil Equivalent
IDR	Indonesia Rupiah
USD	United States Dollar

EXECUTIVE SUMMARY

Indonesia's economy turned negative in the second quarter of 2020 due to COVID, but turned the corner and became positive again in the second quarter of 2021. Its 2021/2020 year-on-year GDP growth is now estimated to be around 3.5% versus a previous estimate of 2.5% to 3.5%.

Figure 1. Indonesia's GDP Actual Growth per Quarter

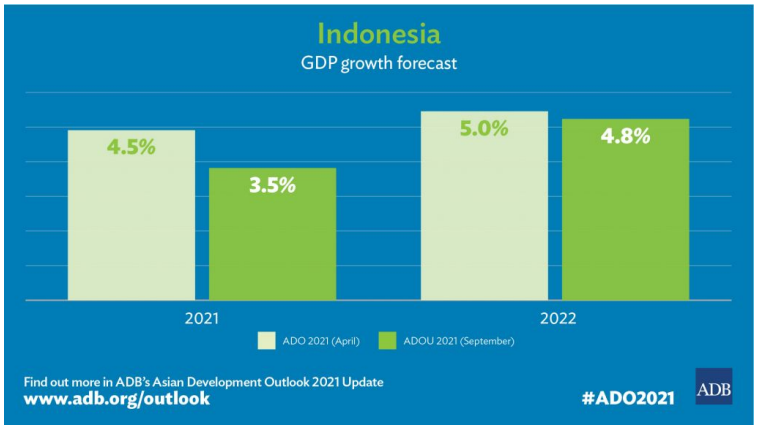
Indonesia's Gross Domestic Product Growth per Quarter (annual % change):

Quarter	2016	2017	2018	2019	2020	2021
Q1	4,94	5,01	5,06	5,06	2,97	-0,17
Q2	5,21	5,01	5,27	5,05	-5,32	7,07
Q3	5,03	5,06	5,17	5,01	-3,49	3,51
Q4	4,94	5,19	5,18	4,96	-2,19	
Full-Year	**5,03**	**5,07**	**5,17**	**5,02**	**-2,07**	**(3,24)**

Source: Badan Pusat Statistik (BPS)

According to ADB's below chart, Indonesia's GDP is estimated grow in 2022 by around 5%.

Figure 2. Indonesia's GDP 2021-2022 Growth Forecast



Now that the economy is growing again Indonesia's energy needs will start increasing again as well. The Government of Indonesia (GoI) has set ambitious target to reduce its energy consumption by 17.4% in all sectors by 2025. This is based on potential energy savings of 15-35% for the transportation and household subsectors and 10-30%for the industrial and commercial subsectors.[1] These savings are estimated to translate to 96.3 million tons of CO2 emission reductions, contributing around 30% to Indonesia's reduction target from the energy sector.[2]

Unfortunately, the status is that ***virtually no Energy Efficiency (EE) has been or is being implemented in any of Indonesia's sectors***. Simply stated, there is very little current market demand for EE leaving the opportunity untapped because it faces the same common barriers faced by many countries in Southeast Asia and other developing countries around the world, plus the additional one of low electric rates. In addition, it currently has no enforceable regulation or policies that contain any incentives, mandates or other features that will drive demand or overcome the significant EE barriers currently facing Indonesia. However, there are some interventions underway by MEMR with respect to the Governmental sector and donors for the private sector, that if completed as planned remove most the key EE barriers. The most significant donor program is from UK Pact which recently completed a competitive call for proposals for its funding of up to GBP 2.7 million of EE interventions in Indonesia over the next 3 years with a schedule start date in March 2022.

Taking into consideration the EE Gaps identified in Section 5 and eliminating those gaps that are expected to be covered by Donor programs in Section 4, to avoid duplication, the following EE interventions are recommended for Indonesia, listed in order of priority:

1. Develop/Implement/Fund Private Sector Demonstrations EEPs
2. Deliver EEP Development Capacity Building
3. Establish a Robust ESCO Association
4. Provide First Loss Fund for a new Energy Saving Insurance (ESI) Product

[1] National Energy Masterplan (MEMR, 2017)
[2] MEMR, 2019

If all of UK Pact's interventions are implemented, MEMR's PP70 revisions are passed by GoI that include the PPP changes required to remove the ESCO barriers in the government sector, and the recommended interventions in this report, Indonesia could realize EE potential annual savings of USD 1.5 billion for an investment of USD 7.4 billion for the governmental and industrial sectors as shown in the below table.

Table 1. Indonesia's Potential EE Market Savings and Investment

Sector	%	USD Million		Simple Payback
		Savings	Investment	
Industry	10%	$ 1,120	$ 4,480	4
Gov't-Owned Facilities	25%	225	1,800	8
Public Street Lighting	50%	190	1,138	6
		$ 1,535	**$ 7,419**	

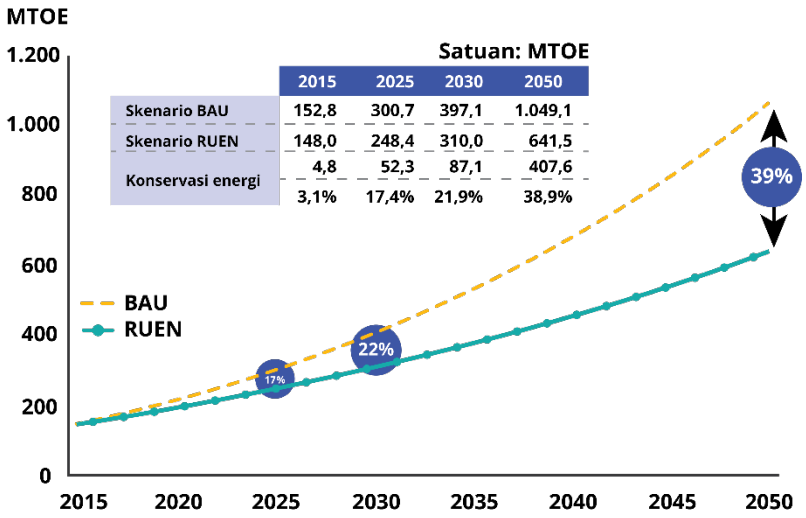
It also worth mentioning that commonly-recommended EE fund intervention is not being currently recommended, but could be a possibility in the long term (2-3 years out). The reason for this delay is the need to allow the current interventions being implemented to first overcome the many EE market barriers in Indonesia so there is a sufficient level of 'bankable' EEPs to fund. The primary problem in Indonesia is an inability to build a pipeline of EEPs, which must first be done before creating a fund to finance them.

1. ENERGY EFFICIENCY ("EE") MARKET

1.1 Status

Energy needs in Indonesia will continue to increase as a result of economic activity and population growth. Based on calculations in the National Energy General Plan (RUEN), with a business as usual (BAU) scenario, Indonesia's energy needs will increase nearly 8 times from 159 MTOE in 2015 to 1050 MTOE in 2050. With energy conservation, energy demand could be 39% lower to 642 MTOE in 2050.

Figure 3. Indonesia's Energy Needs Scenario



Source: 2017 RUEN

Indonesia is the largest producer and consumer of energy in the Southeast Asian region. Using 26% of the total primary energy in the region, Indonesia's energy consumption is equivalent to the combined use of primary energy from Thailand, Myanmar and Singapore. In 2016, Indonesia also was the third largest oil importer and user of oil and the tenth largest electricity generator in the world (IEA, 2016).

With the size of the economy and the largest population in Southeast Asia, Indonesia's energy needs are expected to continue to increase in the future along with increased economic activity and the level of prosperity of its citizens. Moreover, at present Indonesia's average per capita primary energy is still very low at 0.9 toe/capita, compared to Thailand which has reached 2 toe/capita.

As a consequence of increased energy consumption, Indonesia's greenhouse gas emissions from the energy sector have increased. Indonesia is currently the eighth largest emitter in the world, and accounts for 4% of total annual global emissions. GHG emissions increased from 134 million CO2 in 1990 to 496 million CO2 in 2017 (IEA). Indonesia has also committed to reduce GHG emissions by 29% on its own capacity and 41% with international assistance by 2030 as stated in the ratification of the Paris Agreement through Law No. 16/2016.

The growth of Indonesia's energy consumption in the 10-year period (2008-2018) led to an increase of 270 million Barrels of Oil Equivalent (BOE), which was contributed by the transportation, industrial, commercial and household sectors. However, the

rapid growth of energy consumption was not offset by any recognizable EE in any energy user sectors, and thus Indonesia's energy savings target of 17.4% by 2025 is very unlikely to be achieved.

Despite a significant energy savings opportunity, supported by McKinsey's widely-publicized study back in 2015 claiming EE is the most cost effective climate change mitigation measure in Indonesia, the status quo is that ***virtually no EE has been or is being implemented in any of Indonesia's sectors.*** Simply stated, there is very little market demand for EE leaving the opportunity untapped because it faces the same common barriers faced by many countries in Southeast Asia and other developing countries around the world, plus a few additional ones that are unique to Indonesia.

1.2 EE Savings and Investment Market Potential

Since the rapid growth of energy consumption from 2008-2018 was not followed by efforts to improve energy efficiency in various sectors, the energy saving opportunities in both the industrial sector and the building, commercial and governmental sectors in Indonesia remain very large. As can be seen in the below Table 1, the Transportation sector is the biggest energy consumer (43% in 2020), followed by Industrial (34%), Household (17%) Commercial (5%) and Others.

Table 2. 2020 Energy Consumption, Savings Potential and 2025 Targets

SECTOR	2020 Energy Consumption*		Energy Savings Potential**	National 2025 Target***
	MBOE	%		
Transportation	364	43%	15-35%	3%
Industry	288	34%	10-30%	10%
Households	142	17%	15-30%	3%
Commercial	40	5%	10-30%	1%
Other ****	10	1%	10-30%	0.03%
Total *****	**844**	**100%**	**21%**	**17%**

* 2020 Handbook of Energy & Economic Statistics of Indonesia, KESDM
** MEMR Multiple Presentations
*** RIKEN 2011
**** Includes Agriculture, Construction & Mining sectors
***** Excludes Biomass and Non Energy Use

For several years, MEMR has estimated the energy savings potential to be between 15-35% for the Transportation and Household sectors and 10-30% for Industrial and Commercial. Based on these estimates, the calculated % energy reduction that needs to be achieved for each sector by 2025 in order to meet the national 17% target is shown in 'National 2025 Target' column in Table 1 reflecting that the Industrial sector is expected to achieve the largest reduction at 10% of its 2020 Energy Consumption.

The calculated estimate of total ***annual savings and investment*** potential for the sectors of Industry, Government-Owned Facilities and Public Streetlight is shown in the below table to be ***USD 1.5 billion*** and ***USD 7.4 billion***, respectively.

Table 3. Indonesia's EE Market Potential Savings and Investment

Sector	%	USD Million		Simple Payback
		Savings	Investment	
Industry	10%	$ 1,120	$ 4,480	4
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Public Street Lighting	50%	190	1,138	6
		$ 1,535	**$ 7,419**	

a. Industry. The ***Industrial sector*** estimates are based on it consuming 30% of PLN's total electricity generated in 2020[3] and assuming a 10% total savings is achieved with a 4-year payback, the estimated ***annual savings*** is calculated to be ***USD 1.1 billion*** for an investment of ***USD 4.5 billion***.[4]

The primary energy efficiency opportunities in the industrial sector are those that generate thermal savings because of the higher global fossil fuel rates resulting in much better paybacks versus electric savings (based on relatively low ~$0.08/kWh rates). This especially applies to motor retrofits where paybacks on new motors often exceed 10 years and on chiller retrofits exceed 7 years.

[3] Statistics PLN 2019
[4] Calculated estimate by Thomas K. Dreessen

There is no known reliable market data which identifies the major EE technologies and their respective volumes being implemented in the industrial sector in Indonesia. However, based on the consultant team's experience in reviewing numerous industrial energy audits and proposals of local industrial ESCO activity in Indonesia, there are three energy savings measures (ESMs) that consistently show up as the most cost-effective technologies based on estimated savings from reducing the consumption of coal (the primary fuel for producing heat and steam in Indonesia). The three most common industrial ESMs are:

1) Retrofit of boiler systems;

2) Installation of new Waste Heat Recovery (WHR) economizers; and

3) Installation of new industrial Process Control Systems.

b. Government. Many countries (like Australia, UK, US and Canada) have learned and successfully experienced the reality that the best way to accelerate EE in their country is for the government to lead by example by implementing comprehensive Energy Efficiency Projects **(EEPs)** in their own buildings. Doing this not only demonstrates the government's confidence in EE work producing new jobs and reduced energy cost savings to its citizens, but also creates awareness that leads to reduced risk perception, new EE market demand, with national models and structures that can be replicated for implementation and financing of EEPs in private facilities by Facility Owners, ESCOs and local banks and financial institutions **(LFIs)**.

The Governmental sector mostly consumes electricity (not coal or fuel oil), and its consumption levels are included in the Commercial sector's 2020 Energy Consumption 40 MBTOE in the above Table 1. Indonesia's state-owned electric utility, Perusahaan Listrik Negara **(PLN)** reported that **government-owned offices, hospitals and schools** consumed ~5.2% of its electricity in 2020[2], which based on a 25% consumption reduction and an 8-year payback could deliver potential annual **savings of USD 225 million** for a total **investment of USD 1.8 billion**.[3]

PLN also reported that government public **street lighting** sector consumed ~1.5% of its total generated electricity in 2020[2], which based on a 50% savings

from LED retrofits with a 6-year payback could result in potential annual **savings of USD 190 million** for a total **investment of USD 1.1 billion**[3]. One of the unique benefits of LED streetlighting retrofits is its single, low-risk technology that is ideal for replication and scalability on a national basis.

While the EE Governmental sector is virtually untapped, major regulatory barriers currently exist for Government Agencies **(GAs)** to implement much energy efficiency due to their inability to engage private sector companies like Energy Services Companies (ESCOs) and third-party financiers to develop, implement and/or finance EEPs from savings. Existing regulations preclude GAs from being able to: 1) legally make multi-year savings payments, 2) retain savings in budgets, and 3) procure EEPs, equipment and service on **'life cycle benefit'** versus **'lowest cost'** basis, all of which is needed to accessing the private sector resources in order to have EE implemented in government facilities on a scalable basis.

The above EE opportunities in the governmental and industrial sectors total an incredible **annual savings potential of USD 1.6 billion** and **investment potential of USD 7.8 billion**, which is virtually untapped.

1.3 Current EE Financing in Indonesia

EE funding in the governmental sector mostly comes from the government budget (APBN) or use of international aid funds (grants). EE funding in the private-sector industrial and commercial sector generally comes from Facility Owners, financial institutions, both banking or non-banking such as multilateral institutions, as well established by the government. The current situation in Indonesia is that LFIs are reluctant to finance EEPs on a project basis, because of their perceived high risk, small transaction size, small market potential, high transaction costs and a lack of the internal evaluation capacity needed to assess the risks and cash flow benefits generated from EEPs.

From an Indonesian banking point of view, the legal basis for considering energy conservation in credit quality assessment is based on Bank Indonesia Regulation (PBI) No. 14/15/2012 concerning Asset Quality Rating for Commercial Banks. One of the credit quality assessments is the efforts made by the debtor in order to preserve the environment (for debtors who are required to carry out environmental management efforts in accordance with applicable laws and regulations). This shows

that there is a close relationship between investment in energy efficiency that can reduce external environmental impacts (with environmental management). In almost all cases, successful EEPs directly reduce GHG emissions, proportionately.

Related to financing EEPs, the private sector still uses conventional loan schemes through banks, which are regulated by Decree (SK) of the Board of Directors of Bank Indonesia Number 27/162/KEP/DIR concerning Obligations for the Compilation and Implementation of Bank Credit Policy for Commercial Banks (PPKPB), Bank Indonesia Regulation (PBI) Number 14/15/PBI/2012, Regulation of the Financial Services Authority (POJK) Number 42/POJK.03/2017 concerning the obligation to prepare Credit Policy or Bank Financing for Commercial Banks and POJK Number 16/POJK 03/2014 and Bank Indonesia Circular Letter Number 13/6/DPNP/2011 Regarding Calculation of Risk Weighted Assets for Credit Risk Using the Standard Approach. These regulations serve as a guide for bankers to feel confident about the quality of their loan portfolio assets, demand deposit liabilities and equity coverage.

All projects that utilize bank support under the conventional loan model are constrained by the requirement for additional collateral in the form of assets in addition to the project assets. This provision becomes an insurmountable obstacle to the scalable implementation of EEPs by ESCOs in Indonesia. Likewise, most business entities, especially small and medium sized enterprises (SMEs) and others with limited capital who want to undertake EEPs, are constrained from accessing bank financing that imposes relatively high interest rates and the application of conventional valuation methods.

There are only the following five (5) schemes focused on financing EEPs in Indonesia:

1) Funding Through government-owned PT Sarana Multi Infrastruktur **(SMI)**. All of its below potential EEP loan products contain the barriers described in Section 3.6.

    - Subordinated Loan Facility, together with the appointed Bank, in which SMI can provide loans to another bank as part of a larger loan;

    - Equity Investment Scheme with a project owner or ESCO collaborating with SMI to obtain working capital, while subsequent capital deficiency is obtained from other banks, and

- SMI Sharia Funding provides several funding options including Muntahiya Bittamlik (financial lease), Murabahah (instalment sale) and Musyarakah Muntaqisa (diminishing partnership).

2) Commercial Banking. OJK has a green financing program through OJK Regulation Number 51 Year 2017 concerning Sustainable Finance, which requires financial institutions to allocate a portion of their credit portfolios to finance green projects, one of which is EEPs. Green financing is expected to be a low interest loan solution for EBT electricity generation and energy efficiency project developers. In comparison, in South Korea, the EBT project will get lower interest rates than other projects, around 1.5 to 3.37 percent. However, the average interest rate of banks abroad for projects that have a positive impact on the environment, for example improving environmental quality, reducing pollution or reducing greenhouse gas emissions by 5%. To-date this has not provided any known opportunities for commercially-attractive financing of EEPs in Indonesia.

3) ESCO Financing. While ESCOs can help facility owners to finance EEPs, they will only do this under its common business model to be paid over time from energy savings. ESCOs can facilitate access to commercial finance by taking advantage of reduced energy bills but in Indonesia and most other Southeast Asia countries, ESCOs are too small to be able to secure financing on their own. The ESCO have the potential to play a role as a market aggregator by allowing fund providers to support a portfolio of EEPs. In developed countries, such as the United States, Germany, France, Japan, Canada, Finland and Denmark, ESCOs have carried out Energy Savings Performance Contacting (ESPC) projects to improve EE, guarantee cost savings, and use the annual savings generated from the EEPs to pay off initial investment without an upfront cost from the end user.

4) Public Private Partnership (PPP) for government entities. PPP is a collaboration between the government and private sector entities for providing infrastructure investments and services in the public interest. PPP applies the specifications that have been set previously by the Minister/Head of Institution/Regional Head/BUMN/BUMD, which partially or wholly use the resources of a private sector business entity by taking into account the risk sharing between the parties. While the PPP scheme can be applied in theory

to EEPs and provide a private sector financing option for the government sector in its retrofitting of Government/Local Government office buildings and street lighting, in reality it is designed for large revenue-based infrastructure investments versus small savings-based EEPs. Thus, it contains regulated procedures for developing, funding and operating infrastructure projects in government facilities by private sector companies designed for large ***greenfield***, ***revenue-based*** projects (i.e. toll roads) that require significant time and costs to be incurred by an implementing Government Agency (GA). To be used for financing the much smaller ***brownfield savings-based*** EEPs, the current PPP development (Planning & Preparation) regulated procedures need to be streamlined to accommodate EEPs. This is needed to interest GAs in using PPP to finance EEPs by significantly reducing their internal resources and costs through the exemption of PPP procedures that are not applicable to EEPs (e.g. the acquisition of land, etc.).

1.4 Energy and Carbon Emission Reductions Achieved under BAU Scenario

Despite the many EE limitations and obstacles facing the GoI, it reported that energy savings through December 2020 were 5.7% (preliminary data) of total energy consumption in the Business as Usual (BaU) scenario. This equated to approximately 56.6 million BOE of energy savings from all sectors (i.e. transportation, industry, households and commercial). For 2021, the total energy savings target is 63.3 million BOE for all sectors under the BaU scenario's savings target of 6.1% (MEMR, 2021)[5] and energy consumption of 1,037 million BOE.

The GoI's KEN and RUEN targets are to save a cumulative 11,300 PJ (petajoules) of source energy by 2025 in the BaU scenario. If these targets are achieved, GoI believes it can reduce the need for developing 20 new coal-fired power plants worth around USD 10 billion and reduce greenhouse gas (GHG) emissions by 341 million tons of CO2 equivalent (MtCO2e). This will strengthen GoI's commitment to fulfill its National Determined Contribution (NDC) under Paris Agreement, in which Government commits an emission reduction of 29% by 2030 (IEA, 2019). It also clearly demonstrates the direct potential of EE implementation to significantly reduce Indonesia's GHG emissions in the long term.

[5] MEMR's Press release No 018.Pers/04/SJI/2021

1.5 EE Stakeholders

A brief description of the primary EE stakeholders beyond the obvious EEP providers and beneficiaries (i.e., Facility Owners, ESCOs, EE Product and Service companies/consultants, LFIs, etc.) is provided below.

NATIONAL GOVERNMENT AGENCIES:

a. Ministry of Energy and Mineral Resources (MEMR) is the primary GoI agency to coordinate all energy-related interventions through the following related agencies:

- ***Directorate of Energy Conservation*** is the focal point for all EE stakeholders, as it has the task of carrying out the formulation and implementation of policies, preparation of norms, standard, procedures, and criteria, providing technical guidance and supervision, evaluation, reporting, conducting promotions, and monitoring the achievements of programs as well as overall control and supervision in the field of energy efficiency.

- ***Centre for Research and Technology Development on Electricity***, New Renewable Energy and Energy Conservation (P3TKEBTKE) is responsible for undertaking research and development in the field of oil and gas, electricity, mineral and coal, new, renewable energy and energy conservation, and as such can facilitate the promotion of EE technologies.

- ***Centre for Education and Training for Electricity, New Renewable Energy and Energy Conservation (PPSDM)*** has the main task to improve the capacity of human resources.

b. Coordinating Ministry of Maritime and Investment is the national coordinator of several ministries, including MEMR, and thus plays a critical role in formulating any national EE policy/ regulations and programs.

c. Ministry of National Development Planning/National Development Planning Agency (BAPPENAS) oversees the national development planning to assist the President in organizing the national government with the following agencies that can impact EE:

- ***Directorate of Electricity, Telecommunications and Informatics*** is the primary Directorate to support and encourage the ESCO market development in Indonesia, as well as support ESCOs to involve in PPP – EEP.

- ***Directorate of Innovative Funding Engagem***ent is responsible for carrying out the formulation and implementation of policies, preparation of norms, standard, procedures, and criteria, providing technical guidance and supervision, evaluation and reporting as well as control and supervision of PPP scheme, so any EE infrastructure project using PPP scheme will be through this directorate.

d. Ministry of Finance (MOF) is responsible for the nation's finance and state assets, which includes controlling all government spending, budgeting and approving any EE incentives and it includes the following key agencies:

   - ***Fiscal Policy Agency (BKF***) provides support in preparing technical policy, analysis plans and programs in terms of fiscal policy on EE, and further implementing analyses and providing recommendations on fiscal EE policy.

   - ***PPP Units (Direktorat PDPPI)*** coordinates the provision of financial support to facilities and government agencies, such as Project Development Facility (PDF), Viability Gap Fund (VGF), and infrastructure guarantee (through IIGF) for any EEP under the PPP regulatory scheme.

e. Ministry of Manpower plays an important role in approving the National Personnel Competence Standard (SKKNI) for energy auditors, energy managers, and other future EE professionals such as the Certified Investment Grade Auditor (CIGA) and Certified Energy Saving Verifier (CESV) that will be certified with a combined national/international certification scheme.

f. Ministry of Law and Human Right, especially BPHN (National Legal Development Agency), plays important role in the process of forming national laws and regulation as part of establishment of national legal system. So, all EE related laws and regulation will be reviewed and evaluated through PBHN.

g. Financial Services Authority (OJK) regulates and supervises the financial services sector and can play an important role to support national policy formulation on EE financing through its sustainable and green finance initiatives.

h. Ministry of Home Affair (MOHA), especially for Directorate of Regional Revenue, plays a critical important role in the formulation and implementation of policies, preparation of norms, standard, procedures, and criteria, providing technical guidance and supervision, evaluation and reporting as well as controlling and approving all local government Availability Payments for EEP under the PPP regulation.

i. Ministry of Industry (MoI) coordinates/synchronizes the formulation, determination, and execution of policies in industry as well the execution of technical guidance and supervision of policy implementation in industry. It plays an important role for targeting and promoting any EE programs in the industrial sectors.

j. Ministry of Transportation is responsible for the governance and regulation of transportation in Indonesia and can play an important EE role in the transportation sector by setting Fuel Economy standards, developing EE programs targeting reduced energy use.

k. Ministry of Trade directs the formulation of policies to the development of trade in Indonesia and can help to support EE programs on Minimum Energy Performance Standards (MEPS) and Labeling, to ensure that all imported electrical appliances regulated in MEPS meet the minimum levels.

l. Ministry of Environment and Forestry (KLHK) is responsible for managing and conserving that national's forests and can play an important role in working together with MEMR for EE programs that target emission reductions. Also, KLHK has national “PROPER” programs to ensure industries comply with environmental regulations and meet sustainability requirements, where energy efficiency is one of important criteria of compliance.

m. National Energy Council (DEN) was established by the GoI in 2007 is responsible to design and formulate national energy policy for approval by the Parliament, and can play a role in the rolling out of any new EE policies.

n. The Environmental Fund Management Agency (BPDHL) was officially formed in October 2019 to bring multiple sources of funding together to be deployed through a variety of instruments across a number of different sectors (including forestry, energy and mineral resources, carbon trading, environmental services,

industry, transport, agriculture, marine and fisheries). BPDLH is an environmental funding (EF) mechanism for channeling and distributing environmental and climate funds to support Indonesia's vision to preserve the functions of the environment and prevent environmental pollution and degradation. This includes efforts to achieve Indonesia's commitment to reduce Indonesia's GHG emissions and to meet the Sustainable Development Goals (SDGs). BPDHL could play important role for supporting EE programs, for example on cash incentives

o. National Research and Innovation Agency/BRIN (Badan Riset dan Inovasi Nasional) was formed by the Indonesian government in 2019 originally as a new agency of the Ministry of Research and Technology and was controversially separated and established as a new cabinet-level government agency on 24 August 2021 and is now the sole national research agency of Indonesia. It can play an important role in the development of new MEPS as well as evaluations and research of EE technologies, to include their maximum utilization and outputs, testing of EE equipment and providing technical EE experts on EE assessments, EE education and technical training, etc.

p. National Standard Agency (BSN) is a government institution, but not an agency or a ministry, having the responsibility for standardization, conformity assessment, accreditation and metrology activities in Indonesia. The Agency took over the function and duty of the Standardization Council of Indonesia and now plays an important role in development of National Standard for supporting EE policy and programs, such as in SNI for testing energy efficient appliances, adoption of the international standard for national standard such as SNI ISO/IEC.

q. National Public Procurement Agency (LKPP) is responsible for all government procurement activity in Indonesia, including the formulation ofP all government procurement policy and regulations and provision of public procurement-related technical guidance and advocacy. It plays a critical role in the contemplated new PP70 policy and regulation for specific EEP Procurements under the PPP regulatory scheme.

OTHER KEY EE STAKEHOLDERS:

r. Local Governments around Indonesia are partners in implementing EEP, especially for targeting the energy consumption reduction in government facilities.

s. MASKEEI is a national non-profit Indonesian Energy Conservation and Efficiency Society is comprised of individual and organizational members, and has as its mission to achieve national energy security and resilience for sustainable growth in Indonesia through implementation and practice of energy conservation measures.

t. Other Non-Governmental Agencies (NGOs) and Non-Profit Organizations/Associations that include: APKENINDO (Indonesia's ESCO Association), Chamber of Commerce of Indonesia, GBCI (Green Building Council Indonesia), IIEE (Indonesian Institute for Energy Economics), IESR (Institute for Essential Services Reform), CPI (Climate Policy Initiative), HAKE, GABEL, GAMATRINDO (Lamps Association), APERLINDO, Association of Textile (API), Association of Fertilizer Producers (APPI), Association of Pulp and Paper Indonesia (APKI), etc.

u. Energy Management System Certification Bodies such as TUV Nord, Sucofindo, DQS Certification, NQA Indonesia, PT BSI group, PT Bureau Veritas, TUV Rheinland Indonesia, TUV Sud, PT SGS, PT Lyod's Register, PT URS Services

v. Universities also plays important roles in EE, as they are educating future EE professionals, EE policy makers, and other professional supporting EE programs.

w. Test Laboratories include both Government ones like P3Tek KEBTKE, B4T, SOE such as Sucofindo, private ones such as from Qualis, Polytron, Panasonic, etc. Test laboratories play important roles in supporting MEPS and labeling program to conduct independent testing ensuring that energy consuming appliance meet MEPS's level.

x. Product Certification Bodies for Energy Conservation such as TUV Nord, Sucofindo, PT Qualis, PT BSI Group, BISBY.

y. Donors/International Agencies listed in Section 4 such as ADB, DANIDA, USAID, IFC, UNDP, UNIDO, etc. that play an important role for giving EE technical assistance.

2. EE REGULATIONS AND POLICIES

2.1 Summary of Indonesia Regulations

The main Energy Conservation and Energy Efficiency regulations issued by the Government of Indonesia **(GOI)** are depicted in the below chart.

Figure 4. Indonesia's EC and EE Regulations

As the chart shows:

- The initial regulation was Presidential Instruction No. 9, issued in **1982**, concerning Guidelines for the Implementation of Energy Conservation.
- **In 1991**, Presidential Decree No. 43 was enacted, which mandated relevant government ministries and agencies to issue coordinated government rulings and programs within their respective jurisdictions and regulatory roles, to promote and encourage energy conservation.
- **In 2007**, Government Law No. 30 was enacted with the primary aim to significantly reduce the economy's dependence on imported refined oil while boosting the use of other energy sources, including natural gas, biofuels and geothermal resources and a reference to energy conservation.
- **In 2009**, Government Regulation No. 70 was issued which was the first meaningful regulation concerning energy conservation and discussed in more detail in Section 2.2 below.
- **In 2012**, MEMR issued its ministerial Regulation No. 14 concerning Energy Management.

- **In 2014**, the GoI issued policies and targets to reduce energy consumption through Government Regulation No. 79 concerning the National Energy Policy (KEN).

- **In 2017**, Presidential Regulation No.22 was issued regarding the General National Energy Plan (RUEN) which includes a target to reduce energy intensity by 1% per year until 2025 and total energy consumption by 17 % by 2025.

MEMR has also implemented a couple of minor programs and activities over the last 5 years to promote EE that included:

a. Providing Energy Audits and training/certification of Energy Auditors and Energy Managers;

b. Replacing Street Lighting with LED lamps and Solar PV;

c. Developing MEPS and labels and national standard (SNI) for mostly appliances and some other energy consuming equipment, and

d. Promoting the "Potong 10 %" (Cut 10 %) Campaign program.

2.2 PP 70/2009 EE Regulation

PP 70/2009 (PP70) represents Indonesia's only national Energy Conservation Regulation containing mandatory EE requirements of owners of industrial facilities that consume more than 6,000 TOE **(Ton Oil Equivalent)** per year. The requirements include them submitting energy consumption reports, conducting energy management and energy audits, and implementing EEPs identified in the audits or face government penalties that include negative publicity, fines and cutting off of electricity. The problem is that few of the over 6,000 TOE industrial companies complied with PP70's requirements and no enforcement or allowed penalties were imposed.

PP70 also provided the following incentives for industry:

- Tax reductions for EE equipment;

- Import duty reductions for EE equipment;

- Low interest-rate funds for EE investments in accordance with the legislation; and/or
- Energy audit funding by the government.

Unfortunately, none of the above PP70's tax incentives were implemented and the disincentive mechanisms were not enforced allegedly because of a lack of coordination between MEMR and the Ministry of Finance (MoF). Apparently MEMR only has the authority to provide incentives but the authority to give the tax reductions and investment subsidies is under the MoF. Also, the required policy/regulations and guidelines for imposing the penalties or cutting off of energy supply were not issued by MEMR.

In an attempt to meet EE potential and its national targets, MEMR is revising PP 70 to try to establish strategies and actions to conserve energy as needed to enable the country to achieve its 17% in the National Energy Policy. Potential revisions being considered are:

- Increasing mandatory requirements to include all facilities using more than 4,000 TOE, including transport sector (new);
- Mandatory energy consumption reductions in government facilities;
- New private sector incentives and disincentives, and
- New regulatory language to remove barriers for GAs to engage ESCOs by streamlining PPP processes and creating guidelines for the smaller EEP transactions.

Unfortunately, the likelihood of PP70 revisions having any significant impact on accelerating the implementation of EE in Indonesia in the near term is relatively low. This pessimism is based on the fact that the previous mandated energy reductions and penalties in place for the last 11 years have never been enforced. This lack of enforcement by the GoI coupled with the possibility that PP70 may not be revised since MEMR has been saying it is going to do so for the last 3 years leads to the expectation that it may not happen. Also, it is not clear if the final revisions will contain the required PPP regulatory changes or mandated EE targets to open up the government or contain sufficient substance to make a meaningful difference.

3. EE MARKET BARRIERS in INDONESIA

Indonesia faces most of the same barriers as many other countries in Southeast Asia and in other developing markets, plus a few additional ones that are unique to Indonesia (i.e., low electric rates), are summarized below.

3.1 Lack of EE Knowledge and Demand from Facility Owners

There is an extremely low level of EE knowledge with most stakeholders in Indonesia, especially with owners of energy consuming facilities (Facility Owners) in the industrial, commercial and governmental sectors. In fact, there is virtually no knowledge about EE technologies, benefits and risks emanating from the Indonesians having been told for many years to ignore EE due to its low savings and payback opportunity caused in large part by the country's historically heavily-subsidized and low electricity rates. The very low EE knowledge in Indonesia has led to the following major market barriers, which are described in more detail in this report:

- A general lack of understanding and confidence with Facility Owners, LFIs and investors in the estimated future EE savings being achieved and verified, which has led to their unwillingness to fund or implement EEPs and fundamental lack of EE market demand;
- Lack of EEP development skills and technical capacity with local engineers, vendors, consultants and staff of ESCOs resulting in energy audits that identify EE opportunities which are not ready to implement and are not 'bankable' due to unreliable savings estimates caused by insufficient data, supporting calculations, baseline and Measurement & Verification (M&V) plans;
- Lack of national EE regulations that: i) mandate EE implementation and MEPS, or ii) remove existing regulatory barriers for GAs to engage ESCOs to implement and finance EEPs, and
- No commercially-attractive financing offered by LFIs.

3.2 Indonesia's Low Electric Rates

Indonesia has historically heavily-subsidized its energy costs resulting in very low electric rates that materially reduce EE savings that can be realized by facility owners

from more energy-efficient electric technologies. This results in unacceptably long paybacks and a low internal rate of return (IRR) on any such investments.

3.3 Low Government Sector EE Priority and Regulatory Barriers

- Due to the much larger market potential in Indonesia for Renewable Energy (RE) and its replicability/scalability appeal to large energy companies and financial institutions, RE gets most of the public attention for clean or green energy in Indonesia. Consequently, RE is a much larger focus for the government versus implementing much smaller, fragmented and relatively complex EEPs in its own facilities. This has resulted in GAs having very limited knowledge and resources (technical and financial) to implement EEPs

- In addition, GAs are unable to engage private sector ESCOs due to existing regulations not allowing or being compatible with how EEPs are developed, implemented and financed on a paid-from-savings basis by ESCOs and the private sector. Existing regulations result in the below three (3) common barriers in Indonesia, that also exist in the Philippines, Thailand and Vietnam, which preclude GAs from being able to engage the private sector to commercially develop, implement and finance EE Projects in their government facilities on a paid-from-savings basis:

    1) ***GAs cannot legally commit/make multi-year Savings Payments***. While Indonesia's Presidential Regulation No.38/2015 introduced the capability for GAs to make Availability Payments under the PPP regulatory scheme to private sector entities in contracts over multiple years, it does not specify that savings payments are included in such payments.

    2) ***GAs cannot retain multi-year Savings in its Budgets***. Indonesia's budgeting of energy costs for its government-owned facilities is typical of most other governments around the world. The energy budget for a facility is typically allocated from a 'Utilities' (or similarly-named) line item in the 'General Fund' to the specific GA responsible for operating the applicable facility. The annual budgeted amount is usually based on the prior year actual costs adjusted for consumer price index, or known facility changes. When an EE Project is implemented that reduces energy costs, the GA's subsequent year's energy budget allocation from

the General Fund is reduced accordingly. Consequently, there is no budget funding available for the GA to be able to make any payments out of future savings.

3) ***GAs must use 'lowest upfront cost' procurement method***. Procurement procedures in current government regulations are designed to purchase equipment and services on a competitive lowest upfront cost basis. With respect to EE, this results in less energy-efficient, lower quality and shorter life products having to be purchased. It also requires all specifications and costs of the equipment/services being purchased in EE Projects to be identified upfront in very specific detail to make sure that all bids can be evaluated on the same basis. Unfortunately, this type of detail is not available for an EE Project until after a relatively expensive and time-consuming Investment Grade Audit (IGA) has been completed, which contains the final design and all other shovel-ready details needed to implement the EE Project. ESCOs (or any entity) are rightfully unwilling to perform an IGA until they are selected due to the risk of them losing not only their cost to perform the IGA, but their design ideas being made available for public consumption. Therefore, different procurement procedures specific to ESCOs' project concept approach need to be applied in order for them to be willing to submit proposals and be selected on competitive processes that have been developed, adopted and are being widely used in many markets.

3.4 Limited Technical Capacity to Develop 'Bankable' EEPs

One of the most significant barriers to scaling up the implementation and financing of EE in Indonesia is the limited experience and capabilities of most EE services providers (i.e. ESCOs and EE consultants) to prepare IGAs and perform other critical development tasks required for a '**Bankable'** EEP. This is illustrated by the 28 IGAs that were prepared by local consultants for MEMR from 2014-2018 in 19 Industries and 9 Buildings and virtually none of the EE Projects identified in them have been implemented to-date. EPS Capital Corp evaluated 22 of the IGAs and found incorrect estimates of the energy savings and capital cost **(CAPEX)** to implement the EE Projects in them caused in large part by deficiencies in them not being based on detailed measurements and data related to the actual baseline and operation of the related facilities. There was also a clear gap in the knowledge and experience of local

energy auditors in preparing IGAs and Measurement and Verification (M&V) plans according to the following:

- An IGA contains the core information needed for an EEP to be successfully implemented. It is a much more detailed energy audit that reflects one or more individual energy savings measures (technologies) at an energy consuming facility, containing all critical assumptions, facility-based measurements and calculations supporting the estimated savings and CAPEX, and a M&V plan for each energy savings measure bundled into an EEP. It must contain all information required for a Facility Owner, developer, LFI and/or investor to be able to understand/evaluate the technical and economic feasibility of the proposed EEP.

- The M&V of energy savings from an EEP is critical to documenting the actual achieved savings and the resulting IRR of the investment. M&V is the meter of an EEP, and it should follow generally accepted and best-practice M&V principles contained in globally published documents like the International Performance Measurement and Verification Protocol (**IPMVP®**), owned by the Efficiency Valuation Organization (**EVO**) and available for free download at www.evo-world.org.

3.5 Small Scale, Complexity and Perceived High Risk of EEPs

The global average investment for bundled EEPs, with multiple EE technologies, is very small (less than USD 1 million), and they typically contain multiple energy savings measures each of which can require a separate M&V protocol to measure the savings return on its investment. These very small transactions and benefits, coupled with the perceived M&V complexities make it challenging for Facility Owners to want to focus on EE investments. They also create a perception with LFIs that the potential EE lending market is small, time consuming and will require high transaction costs, making them unwillingness to invest the time and resources to develop the internal capacity needed to understand or assess the risks and benefits of lending to EEPs.

3.6 No Commercially-Viable EE Financing

The primary EEP financing options for a Facility Owner are through an ESCO or self-financing. The major consideration in choosing the financing type is based on the assumed risks and desired benefits of the Facility Owner. Generally, ESCOs are

desired because the CAPEX investment costs for implementing EEPs are high and the technologies used are unknown to Facility Owners. Large companies with EE knowledge and financing capacity tend to finance their own EEP investments. On the other hand, small and medium-sized (**SME**) companies who tend to have limited financing and difficulties in getting loans, will tend to choose financing through an ESCO. The feasibility of choosing the ESCO financing model is not only based on facility owner needs but also on access to EEP financing.

Irrespective of who finances an EEP, one of the most significant global barriers (gaps) that exists in Indonesia is a lack of commercially-attractive EE financing, which needs to be 'project-based' in order to be 'attractive'. This financing gap is not caused by a lack of available funds, but rather the inability of EEPs to access the existing funding capacity of LFIs on commercially-attractive terms. There is a "disconnect" between the traditional lending practices of LFIs and the project-based financing needed by Facility Owners, ESCOs and other developers of EEPs. LFIs typically apply their traditional "asset-based" corporate lending approach for EEPs that limits the amount they lend to a maximum of 70% to 80% of the EEP CAPEX and require full collateral on the entire loan amount. Unfortunately, there is very little collateral value in EE equipment after being retrofitted in a facility; rather, its value is limited to the ongoing cash flow that it can generate over its useful life of 10 to 25 years. The disconnect occurs from LFIs not recognizing the significant future cash flow generated from EEPs because they do not believe or are not satisfactorily assured that such cash flow can be relied upon to repay the related loan. Consequently, LFIs generally assign no value to the future cash flow of EEPs, which requires borrowers (e.g. Facility Owners, ESCOs, etc.) to finance them from their existing credit capacity or collateralized by additional marketable asset collateral or repayment guarantees, all of which is very unattractive to the borrower.

This disconnect results in LFIs not being willing to structure EE loans that consider the future EEP's cash flow as the primary source of loan repayment due in large part by LFIs:

- Not being familiar or comfortable with the EE technologies generating the savings, nor with an ability to measure and verify the savings;
- Not knowing how to properly evaluate the risks and benefits of EEPs; and

- Not knowing how to structure low-risk EEP loans that are attractive to Facility Owners, ESCOs and other project developers.

The current financing options in Indonesia are summarized in Section 1.3. All of them reflect the fact that LFIs are reluctant to finance EEPs because of a perceived high risk, small transaction size, small market potential, high transaction costs and a lack of the internal evaluation capacity needed to assess the risks and cash flow benefits generated from EEPs. Given the questionable loan market size, LFIs are reluctant to acquire new EE technical capacity and are unwilling to invest the time or resources to learn about EE on their own.

Since LFIs assign little or no value to the EEP's future cash flow and do not consider it as increased credit capacity from EEPs in their loan structures, Facility Owners interested to implement EEPs are required to use their existing core business credit capacity and/or provide additional marketable collateral or guarantees to secure EE loans with LFIs. This requirement coupled with a lack of confidence in savings being achieved, has resulted in a significant barrier for Indonesia to tap into the huge EE opportunity of its industrial and commercial sectors. Most private companies have not even begun to look at or consider implementing EEPs in their facilities, which is why EE opportunities are so abundant for the most fundamental of EE technologies.

3.7 Limited Enforcement of Regulatory EE Mandates

There have been several problems in implementing the legal mandates in the PP70 Energy Conservation Government Regulation that include, but are not limited to the following:

- The obligation to carry out conservation for users of energy sources and energy users greater or equal to 6,000 (six thousand) equivalent tons of oil per year cannot be implemented.

- Providing incentives (fiscal and financial) to those who want to carry out energy efficiency investment activities and have not shown any success in unregulated energy conservation.

- The authority of the Government and regional government is not based on the location, user approach; benefits and impacts, and efficiency according to Law No. 23 of 2014 concerning Regional Government.

- There is no regulation regarding administrative sanctions.
- Energy Conservation management content material, which includes activities: energy supply, energy exploitation, energy utilization, and conservation of energy resources, is still unclear so that the content needs to be enriched.
- Some provisions on incentives cannot be implemented because there is no delegation of regulations to the level of Minister of Finance Regulation.
- The regulation of the authority to implement energy conservation in the Government is not cross-sectoral, even though energy conservation is in the cross-sector, such as the Ministry of Public Works and Public Housing, the Ministry of Industry, the Ministry of Finance, the Ministry of Transportation so that in addition to general norms, it is also necessary to implement regulations at the Ministry/Institution level.
- Management of energy conservation through utilization only focuses on energy management.
- Energy conservation arrangements do not yet accommodate various legal needs in the community, institutional energy conservation trust agencies, ESCOs, and green building arrangements, green banks, green investments, green industries.

3.8 Limited Implementation Capacity (Nascent ESCO Industry)

The ESCO industry in Indonesia began in 2011with formation of a trade association called APPKENINDO that was not organized on a sustainable basis and thus quickly became dormant. While becoming a national priority, has remained very nascent and is currently not successful. ESCOs are mostly SMEs with limited credit history and capital resources needed to develop and implement savings-based EEPs on a scalable basis. The primary reason for not being successful is the lack of overall EE market demand caused by the many barriers described in Section 3. Consequently, there are only about five (5) known ESCOs by ESDM operating in Indonesia, most of whom have limited experience, competencies, resources and ability to access project financing.

An ESCO can be defined as a service-based commercial business that ***turn-key*** identifies, develops, implements and finances EE Projects in energy consuming

facilities on a 'performance' basis. The ESCO's primary performance requirement is that some or all of its payments are directly dependent on the savings from its EEP being realized.

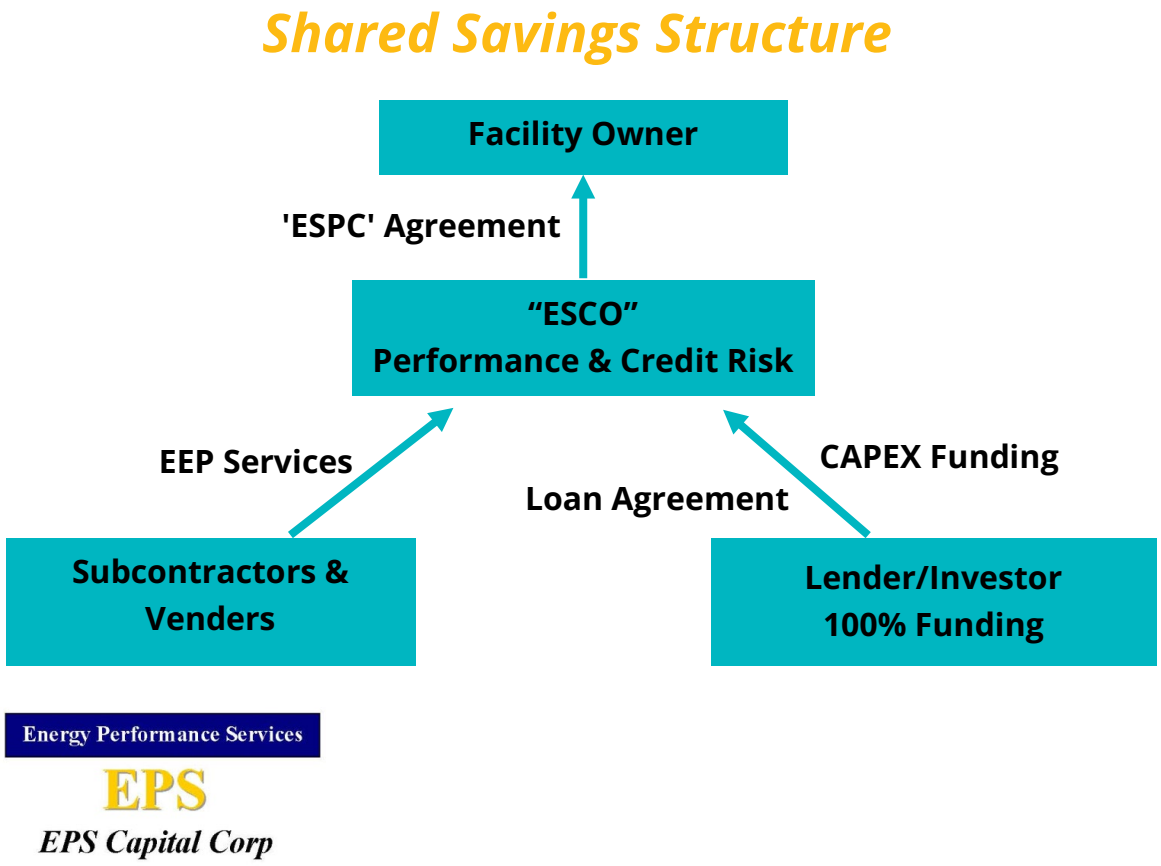
An ESCO's specialty is its ability to provide complete and comprehensive performance-based EE solutions to facility owners. ESCOs are sophisticated EEP developers who assume responsibility for an unusually wide spectrum of tasks which includes performing rigorous M&V on the energy savings over the project's financing repayment term in order to manage its risk for the savings to be sufficient to repay the investment.

Two performance-based financing structures have emerged globally as the most common ones used by ESCOs: "***Shared Savings***" and "***Guaranteed Savings***". Guaranteed Savings is the predominate structure used in mature markets like the United States, China and the EU while Shared Savings is the predominant one used in most developing markets (like Indonesia). A brief description of each is provided below and a brief list of the key elements that should be included in an ESPC are in Exhibit B.

a. ***Shared Savings*** is an arrangement whereby the ESCO (as opposed to the Facility Owner) finances the total upfront CAPEX of the project and is totally responsible to repay the Lender. The Facility Owner pays a fixed percentage or amount of its realized savings from the project to the ESCO which is large enough for the ESCO to repay its debt service to the Lender, cover M&V costs, and compensation to ESCO for performing its ongoing EEP services. Under this structure (versus Guaranteed Savings), the Facility Owner has no contractual obligation to repay the Lender; but the ESCO does. It should be noted that this structure creates a lot more risk for the ESCO because it not only assumes the project performance risk, but also Facility Owner credit risk. The Shared Savings approach typically requires an equity investment, which in combination with the higher risk assumed by the ESCO, carries a much higher CAPEX (interest rate) than the Guaranteed Savings structure (see below diagram)[6].

[6] Thomas K. Dreessen Presentations

Figure 5. Shared Savings ESCO Structure

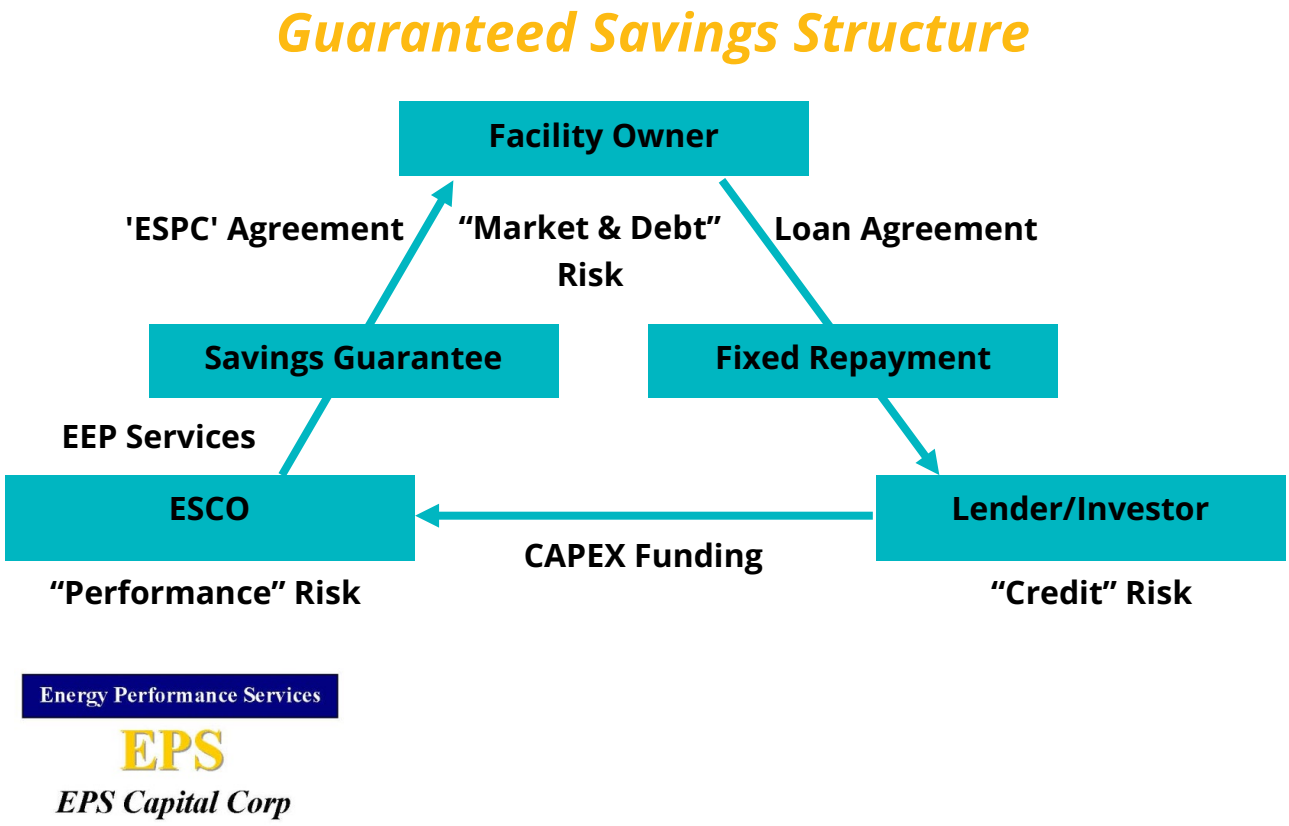


The Shared Savings Structure is a typical introductory structure for developing markets like Indonesia because Facility Owners, with low knowledge and confidence in EEPs and ESCOs, do not want to risk their core capital or credit capacity on EEP investments. ESCOs (mostly SMEs) are forced to try to raise substantial amounts of equity for their EEPs in order to grow, resulting in balance sheets that more resemble banks and leasing companies than what they are, service companies. However, it should be noted that even ESCOs with relatively large balance sheets (e.g. Siemens and Honeywell) are unwilling to assume the Facility Owner credit risk required in this structure. Consequently, the Shared Savings Structure limits long-term market growth for ESCOs and LFIs.

b. **Guaranteed Savings** is an arrangement whereby the Facility Owner finances the EEP directly with a third-party entity **("Lender")** in exchange for the ESCO providing a guarantee to the Facility Owner it will realize sufficient savings to cover its debt service payments to the Lender. If the realized savings fall short

of the debt service payments, the ESCO will reimburse the Facility Owner for the shortfall. If the realized savings exceed debt service, the ESCO typically shares a portion of the excess, usually expressed as a % share with the amount depending on the risk taken and the extent of ongoing services provided by the ESCO. It should be noted that under the Guaranteed Savings approach the ESCO bears no direct contractual obligation to repay the Lender, but that the Facility Owner does. In other words, the ESCO's guarantee is not a guarantee of payment to the Lender; but is a guarantee of energy savings to the Facility Owner (see below diagram)[3].

Figure 6. Guaranteed Saving ESCO Structure



The Guaranteed Savings structure is typically viable only in countries with a high degree of familiarity and confidence with EE technologies, local implementation expertise and the availability of commercially attractive financing. The Guaranteed Savings concept is difficult to initiate in markets where EE is not well known or the ESCO concept is being introduced because it requires Facility Owners to assume investment repayment risk of the EEPs based on the savings performance of

unknown EE technologies. This structure fosters the long-term growth of the ESCO and finance industries because it enables ESCOs, mostly SMEs, with limited credit history and capital resources, to develop and implement savings based EEPs. Guaranteed Savings evolved in the U.S. from the initial Shared Savings structure in response to government Facility Owners, who could access low-cost, tax-exempt financing and desired to significantly reduce interest costs. It was embraced by smaller ESCOs and financial institutions to allow them to grow their respective industries. The primary benefit of this structure is that it reduces financing cost and enables a lot more investment in the EEPs to be made for the same debt service level. The public sector normally prefers this structure in order to maximize the amount of infrastructure investment made in its facilities that can be repaid from utility costs in its operating budget.

A few ESCOs in Indonesia have implemented some small EEPs under the ***Shared Savings Structure***, which is appealing to Facility Owners because they have virtually no risk related to the development, implementation or funding of the EEP. Only the Shared Savings model has worked because the ESCO provides all the upfront CAPEX for the EEPs and the Facility Owner only pays a majority of the savings to the ESCO over a period of up to 10 years. Unfortunately, the Shared Savings model is very limiting for the ESCO industry's growth versus the Guaranteed Savings structure, whereby the Facility Owner finances the upfront cost for the EEPs and the ESCO guarantees to the Facility Owner that the savings will be sufficient cover its financing repayment.

4. CURRENT, POTENTIAL AND PAST DONOR EE INITIATIVES

4.1 Current Donor EE Initiatives

The following donor EE initiatives are currently active in Indonesia:

1. **ASEAN Low Carbon Energy Programme (LCEP)** is a 3-year GBP 18 million TA program provided by the UK Prosperity fund to implement Green Finance and EE interventions in 6 southeast Asia countries (Philippines, Indonesia, Thailand, Vietnam, Malaysia and Myanmar) that ends in March 2022. The ongoing TA program in Indonesia is the development EEP Loan Product for SMI, for the Loan Product Manual is the only part expected to be completed by 31 March 2022.

2. **SINAR is a 5-year USAID Program**. Below is a summary of EPS Capital's confidential scope of work being provided to MEMR in first quarter of 2022, which reflects the only agreed EE work in the SINAR program.

   i. Capacity Building for the implementation of Government Initiative PPPs and Business Entity Initiatives (Solicited PPP and Unsolicited PPP):

      - Preparation of an 'Academic' Technical Study explaining the justification for MEMR's preparation of a new Regulation on PPP Procedures for Implementing Government Cooperation with Business Entities in the Provision of Energy Efficiency Infrastructure EEPs.

      - Development of a new PPP project proposal documents (solicited and unsolicited) that reflect new EEP processes and procedures which synchronize those in the existing PPP regulation for Streetlighting and other EEPs

   ii. Stakeholder consultation forum on PPP business model and potential development of Demonstration Projects for Energy Efficiency in Government Facilities

   iii. Development of 'Academic' technical study to support the justification for a new MEMR's Regulation on ESCO

   iv. Development of an 'Academic' technical study to support the justification for revision of MEMR's Regulation No/ 14/2012 on Energy Management.

   v. Development of revised SKKNI (National Personnel Competence Standard) for energy managers, energy auditors for Energy Efficiency, which linked to the Development of syllabus and curriculum for Energy Management

   vi. Development of Indonesia Nasional Standard (SNI) for several equipment so that it can be referred to in the MEPS especially for SNI Performance which is not yet adopted (e.g. Boilers, etc.)

   vii. MEPS Development for Boilers

viii. Sharing lessons learned in Carbon Trading and Economy including training/certification for SNI 14064

3. **AFD** has and is providing the following support:

   a. Funded an IGA for industry via ADB

   b. Supported the development of masterplan for Smart City Lighting for Bogor and Mataram Municipal. This was accomplished together with SMI who provided a feasibility study on financing, legal, contract and environment, whereas ADF provided technical analysis.

   c. Working with Bappenas, AFD is conducting a mapping of EE in industrial sector by synchronizing the database of Ministry of Energy, Ministry of Industry and Central Bureau of Statistics (BPS) on the consumption of energy in industry sector.

   d. Smart streetlighting with potential CAPEX savings of 30-40% and energy savings of 30-50% in Bogor and Mataram to be done in 2022.

   e. Preparing for EE in buildings. Indonesia is encouraged to support EE for housing (financing to BTN for both landed and vertical housing). From the policy side, it has been endorsed my Min of Energy and Min of Public Works. Early stage - mobilize the BEEP program to facilitate MEMR 2023 based on GCF proposal from AFD. Preliminary stage trying to assess the base case, potential gains, BTN's appetite for this since it was initiated by AFD, who was introduced by BEEP

   f. Providing EURO ~20-30 million TA funds to SMI for RE/EEP development – original 100 million.

4. **Danish Energy Agency (DEA)** through Danish Embassy provided technical assistance in EE.

   a. Providing Capacity Building for DKI's Jakarta Building Inspectors (completed in August 2019).

   b. Providing EE measures at Banten 2 Labuan OMU and Banten 3 Lontar OMU Coal Fire power plants (completed in 2021)

c. Mapping/ benchmark for Energy Intensive Industry to Documents EE Saving potentials

d. Capacity Building and Study Trip to Denmark

e. Assistance for Development of Net Zero Building with Potential project is Terminal 4 of Jakarta's Soekarno Hatta International Airport

f. Energy Management Training and Certification for Public and Commercial Buildings

g. Energy Saving Scenario and Update EE target in National EE framework.

h. Roadmap for EE in Building

5. **UNDP through MTRE3** has provided some EE programs which are listed below; however, those in blue were identified in their original conceptual plan and with no known activity to-date are questionable as to whether they will be completed within its program timeline.

   a. Renewable Energy Survey of PV Rooftop

   b. Energy Consumption Benchmark Index: 273 Commercial Building in Riau, Jambi, NTT, West Sulawesi, Jakarta, Medan, Surabaya, and Bandung

   c. IGAs: Menara Ravindo, Transmart Pekan Baru, EBTKE Building, Mall Ratu Indah, RS Karyadi Semarang, and Pullman Bali

   d. Implementation and Certification of ISO 50001 for EBTKE's Building

   e. Energy Management System (EnMS) for Angkasa Pura 1 (Ngurah Rai Airport) and 2 (Soekarno Hatta Airport) and Pertamina RU 4.

   f. Mitigation action to be registered in National Registration System for EBTKE and Ravindo Building, along with the development of MRV report emission reduction for Energy Efficiency in Building

   g. Seek for Investment for Mall Ratu Indah and Pullman Bali Hotel

   h. Facilitate ESCO/ ESPC for Graha Niaga Tata Utama, with M&V documents completed and now in the process of discussion for implementation

between Facility Owner and vendor using Device as Service/ Leasing scheme.

i. Green Airport Banyuwangi (Certification target with "Gold" achievement) which is expected to complete by December 2021

j. Support Solar PV of Angkasa Pura project

k. Develop methodology to calculate GHG reduction in Building under EE Activities

l. Develop methodology to calculate GHG reduction in Powerplant, which have been completed for PLTS with kWh export/ import and PLT POME biogas (on-grid)

m. Gender responsive action: Training for Woman's Energy Managers and Auditors which was completed in October 2021.

n. Support online reporting system for mitigation action on Powerplant (APPLE-GATRIK).

6. **UNDP through ADLIGHT programme** has also provided some ongoing EE programs listed below; however, those in blue were identified in their original conceptual plan and with no known activity to-date are questionable as to whether they will be completed within its program timeline.

   a. Improving Local LED's quality, energy efficiency and affordability through MEPS

   b. Energy labelling for LED indoor and outdoor lamps

   c. Establishing knowledge center and system to help manufacturers and training programs for laboratories

   d. Strengthened regulatory and policy framework and MVE to improve fair market competition for EE lamps by policy and guidelines for LED Public procurement (including street lighting)

   e. Developing pilot EEPs in 3 different entities covering a Commercial Building, Government-owned facility and SOE facility.

f. Providing a small incentive or support for lamps, for example by providing LED lamps as samples

g. Developing EE finance Guideline for banks

h. Conducting EE Training for banks on EE and LED Finance

7. **IEA** supported MEMR on the following EE activities:

   a. Developing indicator and benchmark on EE Policy

   b. Conducting survey and analysis of cooling and road map of building sector

   c. Developing new POME (reporting of Energy Use by Energy Users- 6000 TOE) as required by PP 70/2009 along with website business information system (website sinergi)

   d. Developing a modeling and roadmap for Energy Conservation for land transport

   e. Developing a road map for low carbon building and construction in line with Global Alliance for Building and Construction methodology and a pilot project for smart building.

   f. Developing indicator and benchmark on EE policy

   g. Identification of companies consuming energy higher or equal to 4000 TOE per year in Industrial and Transport Sectors

   h. Developing a policy package for textile industry

   i. Delivering an online EE indicators course for all sectors plus benchmarking analysis workshops for pulp & paper and textiles

   j. Providing support for the development of a land-based transport roadmap using policy package framework

   k. Providing support Indonesia's EV Strategy

      - Technical analysis of battery swapping for electric two wheelers.

- Technical analysis of the development, implementation and use of electric two wheelers in Indonesia.
- Deliver transport indicators training

8. **CLASP** gave technical support to MEMR on the following EE activities:
   a. Conducting survey and study on End -Use Market survey.
   b. Conducting a market study for 4 Appliances (Rice cooker, Lighting, Refrigerator and Fan)
   c. Study of Monitoring and compliance to Lighting and AC for MEPS Regulation
   d. Providing support for regulation formulation and data development
   e. Supporting the socialization of implemented 4 MEPS and Labelling for AC, Refrigerator, Rice Cooker, and Fan
   f. Conducting a Market Study on Refrigerated Display Cases (RDC)
   g. Capacity Building on Testing facilities for refrigerator and rice cooker
   h. Market Study for chiller
   i. Market study for transformer distribution
   j. Market and outreach to Producers and consumers (Super-Efficient AC Marketing Campaign)
   k. Development of tools for assessment of high-risk products
9. **World Bank** in conjunction with the IFC is currently piloting a sustainable housing development program with Ministry of Public Works who wants its support to develop technical guidance on the implementation of green building principle in the national housing program.
   - Embedding green building principle (energy efficiency included) in the national housing program regulation

- Currently in the loan preparation phase.

10. **OECD** is giving support in the following areas:
    - Development of Clean Energy Finance and Investment Policy
    - Pilot Project in Industry (Identifying Industry)
    - Technical support on the Emission Trading Scheme (ETS)
    - Clean Energy Finance Training and Program in Indonesia
    - Technical Support to OJK on Development of Sustainable Green Taxonomy
    - Facilitate knowledge sharing on EE Activities / stakeholder dialogues
    - Support industrial decarbonization strategies and assess the financing needs of Industry decarbonization developing economies
11. **UN ESCAP** also gives support on EE specifically on Cooling Demand Assessment for modelling process and intervention scenarios in the following sectors such as building space cooling, food cold chain, mobile-air conditioning, healthcare cold chain, and process cooling.

4.2 Potential UK PACT Indonesia Interventions (2022-2024)

The UK Pact recently issued a call for proposals for its funding of up to GBP 2.7 million of EE interventions over the next 3 years. Competitive proposals were submitted on 30 November 2021 and announcement of a winner for each of 3 separate TORs is scheduled to be on 19 January 2022. A summary of each TOR and EPS Capital's proposal for 2 of them (provided herein on a confidential basis) is provided below, which if selected could overcome the identified EE Capacity, Incentives and Financing gaps.

1) **TOR:** ***"Capacity building & institutional strengthening*** - Support the Ministry of Energy and Mineral Resources and other relevant actors to have increased capacity to prepare, implement and monitor energy efficiency projects both in the public and private sectors"

- EPS Capital proposed over 50 EE technical trainings and certifications over the next 3 years via the below list of existing local and international best-practice programs that provide new EE knowledge/skills needed to prepare detailed IGAs containing reliable savings and CAPEX estimates and M&V plans.

    i. Local Certified Energy Manager (CEM)

    ii. Local Certified Energy Auditor (CEA)

    iii. International Certified Assessors for Energy Manager

    iv. International Certified Investment Grade Auditor **(CIGA)**

    v. International Certified Energy Saving Verifier **(CESV)**

2) **TOR:** ***"Energy efficiency fiscal & financial policies*** - Support the Ministry of Energy and Mineral Resources to have additional, credible policy options to increase fiscal and financial incentives for energy efficiency projects and the ability to implement them."

- EPS Capital proposed to create the following **EE Cash Incentive Programs** and **EE Finance De-Risking Products**:

    1) **EE Cash Incentives:** two types of EE cash payments that provide private end-use energy consumers with an attractive enough incentive to shift their behavior to purchasing more EE Products and implementing EEPs:

        a. EE Product Incentives that reflect a cash rebate paid to private purchasers of retail products that offsets the higher cost for household consumers to buy the more expensive EE appliances instead of the less expensive inefficient ones.

        b. EEP Incentives that reflect a cash payment to private facility owners, ESCOs and other developers who implement EEPs based on the actual kWh and thermal reductions calculated pursuant to generally accepted M&V principles like the IPMVP and verified by CESVs.

2) **EE Finance De-Risking Products:** Energy Savings Insurance **(ESI)** and Partial Credit Risk Guarantee **(PCG)** product that will overcome the huge collateral and confidence barriers of financing EEPs by LFIs, facility owners, ESCOs and other EEPs developers.

3) ***"TOR: Energy efficiency in buildings*** - Support the Ministry of Energy and Mineral Resources and other relevant actors to have increased capacity in implementing energy efficiency measures in existing buildings including government offices and existing transport infrastructure buildings such as ports and airports, and where relevant, to set ambitions towards net-zero buildings." No proposal submitted by EPS Capital.

4.3 Past Donor EE Initiatives

A summary of the EE initiatives previously provided and completed by Donors to Indonesia is as follows:

a) **ADB** has provided a lot of EE Technical Assistance (TA) to Indonesia over the last 10 years that includes the following programs in which EPS Capital was the primary consultant:

1) Completed TA (4/30/2021) on Scaling Up Energy Efficiency that:

- Developed MEPS for 4 Residential Appliances included in the recently-passed MEPS regulation
- Created a microsite of MEPS program and a system which will support and enable MEMR to monitor the MEPS and Labelling program through producers/importers, test laboratory, and local certifying LSP.
- Drafted language in MEMR's planned revisions to its PP70/2009 regulation that removes barriers for private-sector implementation of EE in Government facilities through the streamlining of existing PPP processes
- Initiated development of Denpasar Streetlighting Demonstration Project that applies existing PPP processes

- Developed baseline of Denpasar's Street Lighting's PPP Project intended to be a demo project linked to the revision of MEMR's PP 70/2009 that removes barriers for private-sector implementation of EE in Government facilities through streamlining the existing PPP process, which EPS Capital had provided the Draft Language of PP 70/2009 revision.

2) Completed TA (September 2016) on Indonesia EE Accelerator Programs that supported MEMR and other Local EE Stakeholder with the following activities:

   - Creating template for accelerating the implementation and financing of LED street lighting retrofits at municipalities by ESCOs, based on international best practice procurement specifications, commissioning and M&V methodologies.

   - Developing a Government ESCO Regulator Roadmap. Created a Roadmap of modifications to existing PPP regulations to overcome government procurement, budget and contracting barriers.

   - Evaluating 9 IGAs performed by 2 local consultants for MEMR, including site visits and providing feedback to MEMR and local consultants on how to improve the IGAs:

   - Upgrading one Industrial IGA for MEMR to make publicly available as a reference Case Study on its website.

   - Conducting a Pre-IGA workshop to teach newly formed ESCOs how to develop savings based EEPs under the typical ESCO process and bundling of multiple measures into an integrated EEP.

3) Completed TA (May, 2016) on Municipal Street Lighting and PLN's substation lighting retrofits, that implemented municipal LED Street Lighting pilot projects at Semarang and Batang Municipalities, which gave valuable lesson learns. More importantly, this TA had addressed the void of LED's Street Lighting standard by providing an LED's technical specifications suitable to be implemented in National, Provincial and Local Road in Batang and Semarang. As a result, the technical specification, and the requirement for an independent test for LED Street Lighting were the

adopted in The Minister of Transportation's Regulation No 27/2018 on Street Lighting. The lesson learned and experience from the pilot projects have become a valuable reference, especially on the baseline development, for EEP in LED Street Lighting Retrofits, including one project with another ADB's TA on Scaling Up Energy Efficiency supporting Denpasar Street Lighting Demonstration Project under PPP scheme with status in planning stage, but the TA was just ended in April 2021.

4) Completed TA (2016) that aimed to Facilitate the implementation of EEPs in Indonesia's ***industrial export/import companies*** by developing new loan products, a pipeline of EEPs and delivering capacity building to enable IEB to fund EEP loans with its $30 million EE loan from ADB, along with the following activities:

   - Conducting Assessment of the EE potential in Indonesia's industrial sector and developed new EE financing products in line with the EE market demand and IEB's business development strategy.
   - Designing savings-based EE Loan and guarantee products for IEB to offer to existing customers.
   - Developing a US$ 30 million pipeline of EEPs and secured EEP Loans by IEB on US$ 8 million funding from a ADB loan to IEB.
   - Preparing 20 Project Concepts and 5 IGAs on industrial EEPs and structured project-based financing for IEB with its new EE Loan product
   - Creating materials and conducting 15 EE Finance trainings to all IEB loan-related staff on how to evaluate and finance EEPs, and multiple Awareness Seminars to all EE stakeholders and a workshop on IEB's new EEP Loan and Insurance products

b) **UNIDO** funded by GEF had a program on "Promoting Industrial EE through system optimization and energy management standard in Indonesia" with four component covering Introduction of energy a management system and capacity building, capacity building on system optimization, financial capacity development to support EEP in Industry and implementation of energy management and system optimization project, completed in 2017. This project had helped established the national professionals with competence standard

for energy managers (ISO 50001) and energy auditors (50002) to give confidence to market of the experts' skills. In addition, the ISO 50001 and ISO 50002 had been adopted to SKKNI (national personnel competence standard). Capacity development to support EEP in Industry was done together with OJK and MEMR, by giving training to bankers on EE and development of Guideline Book on "EE financing in Industry for Financial Institution".

c) **Cooperation with Association of South East Asian Nations (ASEAN)** Countries had several programs as follows

   1) ASEAN Standards Harmonization Initiative for EE (ASEAN Shine) specifically for household appliances in ASEAN

   2) Participation in ASEAN Energy Awards

   3) Training and Certification of AEMAS (ASEAN Energy Management Scheme)

   4) Participate in ASEAN -Japan Energy Efficiency Partnership (AJEEP)

d) **Energy Conservation Centre Japan (ECCJ)** had supported on the development of Energy Consumption Intensity (IKE) and Energy Management System Guideline (EnMS Guideline)

e) **Ministry of Economy, Trade and Industry (METI)** Japan had provided training on Zero Energy Building

f) **Energy Conservation Centre Japan (ECCJ)** supported the development of IKE (Energy Consumption Intensity) and EnMS (Energy Management System) guidelines.

5. EE MARKET GAPS

The current regulatory, administrative and policy support from the government has been in large part not effective, and thus has not assisted in overcoming the EE Barriers in Section 3. However, there are some interventions underway by MEMR with respect to the Governmental sector and donors for the private sector, that if completed as planned could have a significant positive impact on removing some of the key EE barriers. A summary of these interventions to be completed and the

remaining gaps that need to be filled in order for EE to be widely implemented throughout Indonesia is provided below.

5.1 No Incentives or Mandates to Drive Private-Sector EE Demand

Financial incentives for EE products and services are needed to create interest and new demand for them from private sector Facility Owners. Current EE demand is currently very low due to their very limited knowledge/interest in EE, low return on investment (i.e. low electric rates) and higher price of EE products. Incentives are need that are quickly realized and significant enough to get the attention of business owners and their Chief Financial Officers. The good news is that UK Pact's outstanding call for EE proposals (see Section 4.2) is scheduled to announce a winner on 19 January 2022 that could help fill this gap by providing two types of **EE Cash Incentives** that could be provided to private end-use energy consumers with an attractive enough incentive to shift their behavior to purchasing more EE Products and implementing EEPs:

1) EE Product Incentives will reflect a cash rebate paid to private purchasers of retail products (commonly used globally by many utilities) that minimally offsets the higher cost for household consumers to buy the more expensive EE appliances instead of the less expensive inefficient ones.

2) EEP Incentives will reflect a cash payment to private facility owners, ESCOs and other developers who implement EEPs based on the actual kWh and thermal reductions calculated Other Capacity Building needs.

5.2 Government EE Barriers and Lack of Demand

The inability of ESCOs and other private sector entities to implement paid-from-savings EEPs in government facilities still remains as one of the major EE market barriers. However, this barrier will be substantially removed when the following interventions currently underway are completed:

a) MEMR revises and gets the GoI to enact PP70 to include the following:

   i. Stating that Availability Payments include Savings payments

   ii. Referring to creation of new ESCOs and EEP procedural guidelines

iii. Mandates all GAs to reduce their energy consumption by 10% by 2025.

b) After PP70 is enacted, MEMR creates and enacts the new ESCO and EEP guidelines

c) USAID's SINAR program develops new PPP solicited and unsolicited EEP proposal documents that reflect new ESCO processes and procedures

5.3 No Commercially-Attractive EE Finance

EE risk-mitigation financing products are critically needed to overcome the huge collateral and confidence barriers of financing EE Projects by LFIs, facility owners, ESCOs and other EEPs developers. LCEP's ongoing TA program in Indonesia for the development of an EEP Loan Product at SMI, to be completed on 31 March 2022, is not likely to provide a scalable solution to this major EE financing gap. However, the UK Pact's announcement of a winner on 19 January 2022 could fill this gap through the development of the Partial Credit Guarantee (PCG) and Energy Savings Insurance (ESI) EE Risk-Mitigation Financing Products.

5.4 Insufficient EE Capacity Building

a) Technical capacity to develop 'bankable' EEPs for professionals of ESCOs and EE Service providers to prepare 'bankable' IGAs with reliable M&V Plans. Good news is that UK Pact's outstanding call for proposal is scheduled to announce a winner on 19 January 2022, which could fill this gap by providing a significant number of the following EE trainings and certifications over the next 3 years:

1) Local Certified Energy Manager (CEM)

2) Local Certified Energy Auditor (CEA)

3) International Certified Assessors for Energy Manager

4) International Certified Investment Grade Auditor (CIGA)

5) International Certified Energy Saving Verifier (CESV)

b) Other EE Trainings. Other EE awareness and trainings are needed for LFIs, ESCOs and other stakeholders to become aware and knowledgeable of EE technologies, financing and development procedures.

5.5 Limited ESCO Implementation Capability

The nascent ESCOs lack knowledge and experience on preparing IGAs) and M&V plans as well as on implementing paid-from-savings EEPs. Since the ESCO business model, applying the 'shared savings' and 'guaranteed savings' approaches for government EEPs, is still not possible, ESCOs need support to have the regulatory revisions made to be able to offer their services to GAs.

New capacity building programs for IGAs, M&V and ESCO project development and financing need to be developed and offered in the Indonesian market.

6. RECOMMENDED INTERVENTIONS

Taking into consideration the EE Gaps identified in Section 5 and eliminating those that are likely to be filled by Donor programs in Section 4 to avoid duplication, the below EE interventions are recommended for Indonesia. They are prioritized from highest to lowest potential impact in being able to create EE demand and scale-up the implementation of EE in Indonesia.

6.1 Develop/Implement/Fund Private Sector Demonstration EEPs

Demonstration projects are desperately needed to illustrate to all EE stakeholders in Indonesia how to successfully apply global best-practices in the development, implementation and financing of EEPs in both the private and governmental sector. Since implementation of EEPs in government facilities is not possible until MEMR's PP70 revisions and ESCO/EEP Guidelines are enacted so that the PPP financing scheme can be applied to remove the 3 existing regulatory barriers, it is recommended to pursue EEP demonstration projects in private energy-consuming facilities.

This intervention would include identifying/securing EEPs with private-sector facility owners for an international deeply-experienced EE team to develop, finance and manage the implementation of EEPs that (i) apply 'global best practices' and (ii) bundle multiple 'proven' technologies to maximize the level of EE savings and ensure targeted savings are achieved. The support would be turnkey in nature and include but not be limited to the following tasks for each Demonstration EEP:

- Prepare a 'bankable' IGA and the included M&V Plant;

- Implement the M&V plan by obtaining, analyzing data and performing initial M&V of savings;
- Prepare proposed EEP financing materials and presenting them to LFIs for consideration of a project-based loan;
- Prepare performance-based procurement procedures and facilitate the selection of a local contractor or ESCO to implement the EEP, and
- Project manage the selected contractor or ESCO's implementation of the EEP.

This intervention would also include the establishment of a relatively small fund (~USD 10 million) that would fund the development and implementation of several EEPs in different industries to facilitate development of the private sector EE and ESCO market. This intervention is critically needed to create EE demand, especially in a market with low electric rates, by unlocking the current knowledge, technical and financial gaps on how to successfully develop, implement and finance an EEP in a cost-effective and low-risk manner.

6.2 Deliver EEP Development Capacity Building

Capacity building is still needed that includes the following programs currently being offered by "**MASKEEI**", Indonesia's non-profit national Energy Conservation and Efficiency Society through its existing Energy Efficiency Training & Certification (EETC) program

a) EE Market Awareness is a Seminar that presents the benefits and risks of implementing EE Projects to all stakeholders along an overview of the Indonesia EE market opportunity, barriers and possible solutions.

b) ESCO Project Development Professional is a training workshop that teaches staff of ESCOs (or prospective ESCOs) how to develop, finance, implement and mitigate risks of EE Projects under an Energy Savings Performance Contract (ESPC).

c) EE Project Finance Professional (EEPFP) is a training workshop that teaches staff of LFIs, and ESCOs how to evaluate the benefits and risks of EE Projects and structure project-based financing that mitigates risks for financiers and yet is attractive to facility owners.

This intervention can have the long-term effect of increasing demand for EE products by providing the needed increased knowledge for ESCOs on how to develop performance-based EEPs and project-based EEP financing for LFIs. It should be able to be implemented with relative ease since it does not require any government intervention or support.

6.3 Develop a Robust ESCO Association

The ESCO association can play a key role in creating market credibility by bridging collaboration between key stakeholders including government, private companies, ESCOs, financial institutions, donor agencies, and academics to encourage the improvement of implemented energy efficiency projects' portfolio under the ESCO scheme. The current ESCO association, APKENINDO, has been dormant for nearly 10 years and needs to be reorganized with competent staff so that it becomes a platform for discussion, development of EEPs and ESCO policy in Indonesia. The support needed should also include the establishment of a certification program similar to the 2-step process in Philippines where ESCOs are first registered and then 'certified' after successfully implementing a few ESPC EEPs.

This intervention should be able to be implemented with relative ease since it does not require any government intervention or support.

6.4 Provide First Loss Fund for New ESI Product

The UK Pact TA support is scheduled to develop an ESI product with an insurance company **(Insurer)** that will mitigate the performance risk for LFIs against any shortfalls in savings versus the debt service payment levels to be made to them. However, it does not provide for the first-loss fund of about USD 5-10 million that will very likely need to be provided to share initial losses with the Insurer until such time as an experience ratio is determined.

This intervention logically should not be vigorously pursued until sufficient demand is created for EE and ESCO services, which may not occur until many of the interventions being performed by other donors and herein have been implemented. It should be able to be implemented with relative ease since it does not require any government intervention or support.

EXHIBIT A: DEFINITIONS

Below are key EE definitions published and or officially used in Indonesia.

1) **Energy** is the capacity to do work, and may occur in the form of heat, light, mechanical, chemical, and electromagnetic[7]

2) **Energy Conservation** means systematic, planned and integrated actions in order to conserve domestic energy resources and improve the efficiency of energy utilization through Energy Efficiency.[8]

3) **Energy Conservation Services** are activities related to the planning, implementation, operation, and maintenance as well as measurement and verification in the field of Energy Conservation.[9]

4) **Energy Efficiency (EE)** means the effort to use energy efficiently and appropriately without compromising comfort, safety, and productivity.[9]

5) **Energy Efficiency Project (EEP)** is the implementation of one or a number of energy savings measures in the system, facilities, and processes of users of energy and energy resources.[3]

6) **ESCO** is an Energy Conservation Services Company is a company incorporated under Republic of Indonesia's law that implements Energy Conservation/Energy Efficiency Services based on Energy Saving Performance Contract.[9]

7) **Energy Savings** means the reduction of energy consumption to produce the same output, and /or to increase the productivity with the same energy consumption.[6]

8) **Energy Savings Measure (ESM)** means a single Cost Saving technology of method in an EEP that provides Energy saving.[10]

[7] PP 70/2009
[8] Proposed Revision of PP 70/2009
[9] Cancelled ESCO regulation No 14/2016 proposed by MASKEEI to be put back into PP 70/2009 revisions
[10] Draft MOHA Guideline on PPP-ESCO

9) **Energy Saving Performance Contract (ESPC)** is an agreement between the Service User and the Company (ESCO) where the payment in the agreement is made periodically based on Energy Saving performance.[8]

10) **Energy Audit** is the evaluation of an Energy User's process of energy utilization and identification of opportunities to save energy as well as recommendation of improving efficiency for energy users in the context of Energy Conservation.[7]

11) **Energy Users** are individuals, enterprises, permanent establishment, government agencies and non-governmental organization, which utilize energy and/or energy resources to produce products and/or services.[7]

12) **Energy Utilization** is an activity to utilize energy either directly or indirectly from energy sources.[7]

13) **Investment Grade Audit (IGA)** is a more detailed Energy Audit activity with the purpose to understand and evaluate specific energy saving measures for the implementation at Energy User facilities, with estimated implementation cost and energy saving supported by measurement, detailed calculations, assumption, and a measurement and verification plan to provide a better understanding to the owners of the energy user.[8]

14) **Measurement and Verification (M&V)** of Energy Saving Performance is the process of measuring and verification of the energy savings by means of comparing the amount of energy use before and after the commissioning of an Energy Efficiency Project and during the duration of an Energy Saving Performance Contract.[8]

15) **Government Facilities** are facilities controlled by the government financed by government budget (APBN) or regional budget (APBD), under the management of government institution in broad scope, which is not including goods or assets owned by State Owned Company/ Local Government Owned Company, which its implementation aims specifically for activities of the state and government administration.[8]

16) **Badan Layanan Umum (BLU)** is government agency that is developed to provide services to public in the form of goods and/ or services without prioritizing of profit seeking and based on efficiency and productivity on its activity's implementation.[8]

17) **Availability Payment (AP)** means a periodic payment made by a GCA in accordance with the quality and/or other criteria specified in the PPP agreement (i.e., ESPC) and shall also have the same meaning as "ESPC Payment" herein.[9]

18) **Minister** is the minister who carries out government affairs in the field of energy.[7]