Diagnostic Review and Analysis of Energy Efficiency Development in the Philippines

Final Report: 31 January 2022

Supported by: The Energy Transition Partnership (ETP)

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ACRONYMS

ADB	Asian Development Bank
ADB	Asian Development Bank
AFET	Alternative Fuels and Energy Technologies
AFETD	Alternative Fuels and Energy Technology Division
APEC	Asia-Pacific Economic Cooperation
ASEAN	Association of Southeast Asian Nations
ASEP	Access to Sustainable Energy Program
AEUR	Annual Energy Utilization Report
BAU	Business as Usual
BPS	Bureau of Product Standards
CAPEX	Capital Expenditure
CEA	Certified Energy Auditor
CECO	Certified Energy Conservation Officer
CEM	Certified Energy Manager
CES	Clean Energy Scenario
CFC	Chlorofluorocarbon
CHED	Commission on Higher Education
COA	Commission on Audit
COPE	Code of Practice for Energy Labeling of Products
DBM	Department of Budget Management
DE	Designated Establishment
DEA	Detailed Energy Audit
DENR	Department of Environmental and Natural Resources

DILG	Department of Interior Local Government
DOE	Department of Energy
DOF	Department of Finance
DOST	Department of Science and Technology
DOTR	Department of Transportation
DTI	Department and Trade and Industry
EAT	Energy Audit Team
ECP	Energy Consuming Product
EDGE	Enhancing Development and Growth through Energy
EE	Energy Efficiency
EEC	Energy Efficiency and Conservation
EECO	Energy Efficiency Conservation Office
EEP	Energy Efficiency Project
EnMS	Energy Management Standard
ENPAP	Energy Efficiency Practitioners Association of the Philippines
EPIRA	Electric Power Industry Reforms Act
EPMPD	EEC Program Management and Technology Promotion Division
EPRED	EEC Performance Regulation and Enforcement Division
EPSMD	EEC Public Sector Management Division
ER	Energy Regulation
ERC	Energy Regulatory Commission
ERTLS	Energy Research Testing and Laboratory Services
ESCO	Energy Service Company
ESG	Environmental, Social, and Governance

ESI	Energy Savings Insurance
ESP	Energy Secure Philippines
EU	European Union
EUMB	Energy Utilization Management Bureau
EV	Electric Vehicle
EVCS	Electric Vehicle Charging Station
GAs	Government Agencies
GEF	Global Environment Facility
GEMP	Government Energy Management Program
GHG	Greenhouse gas
GIS	Geographic Information System
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
GOCC	Government Owned and Controlled Corporations
HEV	Hybrid Electric Vehicles
IAEECC	Inter-Agency Energy Efficiency and Conservation Committee
IEC	Information, Education and Communication
IFC	International Finance Corporation
IGA	Investment Grade Audit
IIEE	Institute of Integrated Electrical Engineers
IRR	Implementing Rules and Regulations
ISO	International Organization for Standardization
IT	Information Technology
ITH	Income Tax Holiday
ITDI	Industrial Technology Development Institute

JICA	Japan International Cooperation Agency
LATD	Lighting and Appliances Testing Division
LCEP	Low Carbon Energy Programme
LGU	Local Government Unit
M&V	Monitoring and verification
MECR	Monthly Energy Consumption Report
MEPP	Minimum Energy Performance for Product
MEPS	Minimum Energy Performance Standard
MFCR	Monthly Fuel Consumption Report
NDC	Nationally Determined Contribution
NEDA	National Economic Development Authority
NGO	Non-governmental Organization
OPEX	Operating Expenses
PCG	Partial Credit Guarantee
PCIEERD	Philippine Council for Industry, Energy & Emerging Technology Research and Development
PE2	Philippine Energy Efficiency Alliance
PEEP	Philippine Energy Efficiency Project
PEESLP	Philippine Energy Efficiency Standards and Labeling Program
PELP	Philippine Energy Labeling Program
PIEEP	Philippine Industrial Energy Efficiency Project
PIEMPI	Philippine Institute of Energy Management Professionals
PSEF	Philippines Sustainable Energy Finance Program
PSME	Philippine Society of Mechanical Engineers

PUVMP	Public Utility Vehicle Modernization Plan
RA	Republic Act
RCOA	Retail Competition and Open Access
RE	Renewable Energy
REF	Reference Scenario
RES	Retail Electricity Suppliers
SDG	Sustainable Development Goals
SEC	Securities and Exchange Commission
TA	Technical Assistance
TESDA	Technical Education and Skills Development Authority
TPPD	Third Party Project Developer
UK	United Kingdom
UNIDO	United Nations Industrial Development Organization
USAID	United States Agency for International Development

UNITS AND CURRENCIES

GBP	British Pound Sterling
GWh	GigaWatt hour
kTOE	kilotonnes of oil equivalent
kW	kilowatt
kWh	kilowatt hour
$MTCO_2e$	Million Tons of CO_2 Equivalent
MTOE	MegaTonne of Oil Equivalent
PhP	Philippine Peso
USD	United States Dollar

EXECUTIVE SUMMARY

The Philippine Energy Market as a whole, including the energy efficiency (EE) market, is largely a private sector led and price-sensitive market. These conditions present a challenge to developing the local EE market with a relatively small domestic capital market dominated by small and medium sized enterprises (SMEs) adversely hit by the pandemic.

The campaigns for energy efficiency and conservation (EEC) have been steadily going on for decades in the Philippines. Despite these efforts and fact that the Philippines has the highest electric rates in Southeast Asia, *no meaningful EE has been or is being implemented in any of the its energy consuming sectors*. Simply stated, there is very little market demand for EE in the Philippines leaving the opportunity untapped because it faces most of the common barriers faced by many countries in Southeast Asia and around the world, plus a few additional ones that are unique to the Philippines.

However, unlike any other country in Southeast Asia, the Philippines enacted a wide-spread energy efficiency law in April 2019, Energy Efficiency and Conservation Republic Act 11285 (EEC Act), that provides a national mandate for EE in its government facilities and is an overarching national regulation that serves as the framework for policies that require the more efficient use of energy and EE technologies throughout the country. It also provides incentives for EEC projects and delineates responsibilities among Government Agencies (GAs) and private entities.

The EEC Act is the primary driver for the potential expansion of the EE market in the Philippines. The residential, commercial, and industrial sectors are the major electricity users. Setting Minimum Energy Performance Standards (MEPS) and Minimum Energy Performance for Projects (MEPP) and energy labeling has been the primary strategy to manage households' energy consumption. MEPP has been established for room air conditioners, refrigerators, lamps and ballasts. For the commercial and industrial sectors, the EEC Act defined the Designated Establishments (DEs), end-users consuming at least 500,000kWh annually, that are mandated to set annual energy savings targets and implement them.

The EEC Act also prescribes for the certification of EE practitioners to raise the professional standards of those engaged in energy management and energy auditing as well a registration and certification mechanism for ESCOs, all of which are not yet

fully implemented. It aims to address barriers to EEPs and the ESCO industry, but faces many challenges that include the following:

1. **Policy Implementation**. Some of the provisions of the EEC Act have not been fully developed or implemented yet. The Department of Energy (DOE) is still establishing the necessary structures and systems that will allow it to fully support the young EEC sector and to enforce the mandatory provisions. The focus is still at building awareness among Designated Establishments (DEs) on their energy saving responsibilities and not yet on the strict monitoring of regulatory compliance. Furthermore, DOE has limited resources and capability to fully enforce the energy savings monitoring systems and other provisions.

   DOE needs to be provided with various types of support to facilitate the development of department circulars, processes, and procedures to fast tract the implementation of the provisions under the EEC Act. DOE can benefit from technical advice and capacity building to enhance internal capabilities. Its Energy Utilization Management Bureau (EUMB) also needs support to establish infrastructures such as appliance/equipment testing laboratories and IT facility/online platform for the mandatory annual energy utilization reports mandated to be submitted by DEs.

2. **Inherent Government Sector Barriers:** The Government Energy Management Program (GEMP) was the first mandatory EE initiative intended for buildings and facilities owned by GAs. While the program resulted in energy savings, it also uncovered challenges in implementing public sector EEPs with private sector entities like ESCOs. GAs are unable to engage ESCOs or any other private-sector entities to implement EEPs in their facilities on a paid-from-savings basis because GAs cannot legally commit to a multi-year savings payment scheme, cannot retain multi-year savings in its budgets (zero-budgeting policy), and are required to use “lowest cost” instead of “best value” procurement method. The EEC Act contains general language to overcome these barriers but unfortunately, they still exist, because the required new procurement and paid-from-savings procedures are not included in the current GEMP Guidelines expected to be approved by the IAEECC within 2021 or in early 2022. Consequently, despite the EEC Act mandating GAs and LGUs to implement EE, they are severely hampered in being able to comply due to their inability to

access private-sector "paid-from-savings' funding and EE services that many of them do not have.

3. **Awareness and Capability.** The need to increase awareness on EE is evident across various stakeholders. Project hosts, specifically the owners and managers of energy-consuming facilities (Facility Owners), lack EE knowledge and do not prioritize EE in their operations/expenditures. Facility Owners will often prioritize investments related only to their core business. There is also a general lack of awareness and understanding of the mandated responsibilities of GAs and DEs as set forth in the EEC Act.

   The ESCO sector is at its infant stage, mostly composed of SMEs that have limited or no experience in developing 'bankable' EEPs. Specifically, there is limited or no local capability in conducting an Investment Grade Audit (IGA) or performing Measurement and Verification (M&V) on EEPs, and this is compounded by inadequate existing EE professional certifications. The EEC Act requires ESCO to be certified based on the having proven experience in implementing paid-from savings projects, which very few have.

   Local banks and Financial Institutions (LFIs) also lack an understanding of EEPs and the type of project-based financing that the market needs. Some LFIs have dedicated EE financing products but they are not attractive to Facility Owners and are not appropriate for ESCOs whose revenues are defined by energy savings. This gap stems from LFIs mostly having limited understanding of how EE technologies generate energy savings, the ability to measure and verify these savings, and identify and manage associated risks.

   A robust and aggressive capacity building and education campaign is necessary to reach all relevant EE stakeholders. DOE is continuously conducting regular awareness campaigns, but more targeted capacity building on developing 'bankable' EEPs and awareness should be done to engage the different stakeholders.

4. **Financing EEPs**. LFIs do not provide project-based EE financing in the Philippines. This financing gap is not caused by lack of available funds, but rather the inability of EEPs to access the existing funding programs of LFIs on commercially-attractive terms. Most LFIs are not equipped to understand and recognize the significant future cash flow generated from EEPs, and are not

confident that such cash flow can be relied upon to repay the loan. Consequently, LFIs generally assign no value to the future cash flow of EEPs and thus require Facility Owners and any other borrowers to finance them from their existing credit capacity, or provide additional collateral that most are unwilling or unable to provide.

A possible intervention is to set up de-risking financing mechanisms/products such as an Energy Savings Insurance (ESI) for EEPs. ESI overcomes the lack of confidence barrier many Facility Owners and LFIs have, as well as collateral barriers by mitigating the performance risks against any energy savings shortfall. It also establishes energy savings as a reliable future cash flow for LFIs to accept as a source of loan repayment, increased credit capacity and reduced collateral requirements of borrowers. A Partial Credit Guarantee (PCG) is also needed for EEPs even though the government-funded PhilGuarantee GA is set up to provide it for loans taken out from private commercial banks. The challenge is that PhilGuarantee has no prior experience with EEPs and is prohibited from providing guarantees to on financed by government-owned financial institutions. These de-risking mechanisms can facilitate EEPs' access to local financing.

Development of the EE market is still at the early stages but the level playing field for its development has been established by the regulatory framework with DOE providing the stable foundation for EEPs to begin flourishing in the short term.

Taking into consideration the EE Gaps identified in Section 5 and eliminating those covered by Donor programs in Section 4, to avoid duplication, the following EE interventions are recommended for the Philippines. They are prioritized from highest to lowest potential impact in being able to create EE demand and scale-up the implementation of EE in the Philippines. It should be noted that DOE, as the designated GA responsible for all EE in the Philippines, will be the lead counter-party agency with which all interventions are to be coordinated.

1. Support DOE's implementation of the EEC Act

2. Develop/Implement/Fund Private & Government Demonstration ESCO Projects

3. Develop Automated Annual Energy Consumption Reporting by DEs

4. Deliver EEP Development Capacity Building

5. Develop EE Finance De-Risking Products

6. Develop Cash Incentive Programs to Drive Private-Sector EE Demand

If they are implemented in conjunction with all major EE mandates in the EEC Act, the Philippines could realize the EE potential estimated in this report for the governmental and industrial sectors totaling an incredible annual savings of USD 1.5 billion and investment of USD 7.6 billion.

1. ENERGY EFFICIENCY (EE) MARKET

Urbanization and the rising dependence on electronic gadgets and appliances for social connections and for daily comfort underscore the importance of energy consciousness. Approximately 51% of the Philippines' 105 million people live in urban areas, with 21 million living in Metro Manila alone. In Region IV-A, the south suburban area of Metro Manila has a population of 16.1 million and 11.2 million live in Region 3, the north area of Metro Manila. The rest of the urban areas are spread on the islands of the Visayas Region and Mindanao. The country's growing economy also drives energy consumption, especially the services sector that has exhibited the most significant growth over the last ten years.

In 2019, prior to the COVID-19 global pandemic, the Philippines' total final energy consumption stood at 36 million TOE per year. The transport sector was the most energy-intensive sector, accounting for 35% of the total final energy consumption. The pandemic in 2020 dampened the economic activities reducing energy demand to 32 million TOE per year. The consumption profile shifted since most work and all school classes became home-based, resulting in the household sector becoming the largest share of the total final energy consumption at 31%[1]. While the pandemic resulted in a dip in demand, energy consumption is expected to rise as the country loosens quarantine/lockdown measures and economic recovery activities are implemented.

To manage energy demand and contribute to climate action, DOE's (DOE) Philippine Energy Plan defined a Clean Energy Scenario (CES) as an alternative to the Reference Scenario (REF) or the Business as Usual (BAU) case. The CES utilizes more renewable energy and promotes energy efficiency as a "way of life." The CES has a higher share

[1] DOE. 2020. Philippine Energy Plan 2018-2040.

of renewable energy in the energy mix and a slower growth of the total final energy consumption, compared to the BAU, at 4.4% annually. The CES' projected total energy requirement will be at about 87 million TOE per year in 2040, which is 9.3% lower than the 96 million TOE per year BAU.

1.1 Status and Potential

a) Status

Despite having the highest electric rates in Southeast Asia and a significant energy savings opportunity, the status quo is that ***no meaningful EE has been or is being implemented in any of the Philippines' energy consuming sectors***. Simply stated, there is very little market demand for EE in the Philippines leaving the opportunity untapped because it faces most of the common barriers faced by many countries in Southeast Asia and around the world, plus a few additional ones that are unique to the Philippines.

For 2020, Designated Establishments (DEs) reported PhP 15 billion (USD 300 million) of EE investments covering retrofits, equipment maintenance, and equipment acquisition that yielded energy savings of 120,464,478 kWh or PhP 1 billion (USD 20 million) per year. Also, investments reported for 2020 by newly registered ESCOs totaled PhP 689 million (USD 13.8 million) and yielded energy savings of PhP 209.8 million (USD 4.2 million). See the distribution of EE technologies deployed in the below Table 1.

Table 1. Reported EEPs, as of April 2021[2]

Project Name	Project Cost (Million PhP)	Energy Savings (kWh/year)
Office Building Air-Cooled Conversion	77	2,565,696
Chilled Water Plant Retrofit	47	1,939,798
Water-cooled Packaged A/C System Retrofit	101	2,674,736

[2] DOE. Philippine Energy Plan (2018-2040), Page 144

Replacement of Centrifugal Water-cooled Chiller	19	635,000
Chilled Water Plant and BMS Retrofit	258	5,212,000
Conversion of Air-cooled Chiller Plant to Water-cooled Chiller Plant	34	4,380,000
Industrial Refrigeration Retrofit	56	2,564,640
Replacement of Standard efficiency motors (SEM) with high efficiency motors (HEM)	82	3,010,200
Lighting System Retrofit	13	330,341
TOTAL (PhP)	689	23,312,411
Total (USD)*	**USD 13,780,000**	

Note: The above-mentioned sample EEPs were undertaken by ESCOs with the corresponding investment cost and equivalent energy savings.

* USD estimates not included in source material.

In 2021, DOE-EAT and others completed 90 energy audits of building showing a small total electricity savings of about 12 million kWhs or USD 2 million) per year. DOE also implemented a small demonstration EEP at one of its buildings containing the below two (2) energy savings measures that were estimated to save a total of 459,000 kWhs or USD 111,700 per year.

1. Replacement of existing fluorescent lamps with LEDs, estimated to reduce energy consumption by 65,000 kWhs and save DOE PhP 834,000 (USD 16,700) per year and with a project payback period of 2.82 years.

2. Replacement of existing non-inverter air conditioning units with inverter-type ones, estimated to reduce energy consumption by 394,000 kWhs equating to savings of PhP 4.7 million (USD 94,000) per year and with a project payback period of 4.75 years.

The good news is that the Philippines enacted an aggressive national energy efficiency law in April 2019, Energy Efficiency and Conservation Republic Act 11285 (EEC Act), that provides a national mandate for EE and is the overarching national regulation that serves as the framework for policies that require the more efficient use of energy and EE technologies. It also provides incentives for EEC projects and delineates responsibilities among government agencies (GAs) and private entities.

Prior to the EEC Act, EE activities were voluntary and driven by government's public awareness initiatives and labeling programs, as well as by technical assistance programs of development partners. The Government Energy Management Program (GEMP) mandated GAs and their offices to meet at least a 10% reduction in electricity consumption from the baseline average monthly consumption during the 1st trimester of 2004. Each GA had to reduce its fuel consumption by at least 10% benchmarked on the average monthly consumption during the 1st semester of 2005[3]. DOE created Energy Audit Teams (EAT) that oversee the public sector's compliance to this target. A certificate of savings is issued to GAs that have undergone the energy audit process and complied with the submission of Monthly Energy Consumption Reports (MECRs) and Monthly Fuel Consumption Report (MFCRs). The GEMP in the EEC Act is a mandatory EE program meant to achieve energy savings by shifting to more efficient technologies and being more judicious in energy use.

The initial Philippine Energy Efficiency Standards and Labeling Program (PEESLP) was the first EE labeling program undertaken jointly by DOE and the Department and Trade and Industry (DTI). It required appliances and lighting products to meet a prescribed minimum energy efficiency level and to carry an energy label at the point of sale. Labeling standards were implemented for room air-conditioners, household refrigerators and freezers, and lights and ballasts. The PEESLP is the precursor of the Philippine Energy Labeling Program (PELP) under the EEC Act, which increases the prescribed EE levels in the existing labeling standards and adds other equipment and vehicles to its scope.

The EEC Act is expected to significantly enhance the demand for and attract investments in EEC projects in the country. It is also expected to create a new EEC sector market, introduce new entrants, and new business models. This brings with it a potentially vast market in the product supply side: importation, distribution and

[3] DOE. 2008. Implementing Rules and Regulations Directing the Institutionalization of a Government Energy Management Program (GEMP).

production of more EE appliances, and equipment. It also is expected to create new professional skill sets or green jobs in the area of education, engineering, sciences and auditing, as well as a need for Energy Service Companies (ESCOs).

However, the true impact it will have on EE implementation in the Philippines depends solely on the efficacy of its implementation from both an operational and enforcement perspective.

b) Energy Saving Potential

There are no official energy savings projections released by DOE due in large part to the lack of reliable baseline energy consumption data from which to calculate the estimated savings. Under the EEC Act, all DEs will be required to start reporting their ongoing energy consumption and establish annual savings targets, but the overall national EE target has not yet been defined. The national target and any sectoral EE targets should be established in the National Energy Efficiency Conservation Program (NEECP), which is yet to be launched. There have been a few studies that estimated energy savings potential as follows:

- A DOE 2010-2030 energy saving forecast projection estimated an annual energy savings potential of 3,455 kTOE in the household, industrial, commercial, transport and agriculture sectors equating to a very small PhP122 million or USD 2.4 million per year[4]. This estimate was used to justify the passing of the EEC Act. It is notable that in the early versions of the EEC Bill, when it had not been legislated yet, there was a 1% annual energy savings requirement for DEs.

- Back in 2013, the EU's Switch Asia Program endeavored to define EE targets for the Philippines based on their assessment of achievable potential by 2030, which is shown in table below. Extrapolating from the above kTOE estimate, the 10,655 kTOE would also equate to a very small USD 7.5 million per year.

[4] T. Guingona III, Exploratory Note for Senate Bill 3325, Fifteenth Congress of the Republic of the Philippines, Third Regular Session (2012).

Sector	Implied annual % savings (total savings by 2030)	Annual energy saved by 2030 (kTOE)
Transport	1.9% (25%)	4,861
Industry	1.3% (15%)	3,088
Residential Buildings	1.2% (20%)	1,432
Commercial Buildings	1.9% (25%)	1,206
Agriculture	0.8% (10%)	78
Total	**1.6% (24%)**	**10,655**

Source: Switch Asia Program. 2013. An Energy Efficiency Roadmap for the Philippines 2014-30. Final Report.

Given the significantly understated potential energy savings reflected above, a rough estimate of the energy savings is calculated[5] below, based on 100,000 GWHs of electricity consumption shown in Figure 1, plus experience-based % savings and paybacks for the governmental and industrial sectors.

1. **Government Facilities:**

- ***Government-owned Facilities and SUCs*** (State-owned Universities and Colleges) - assumed ~5% of total electricity consumption in 2020[6], savings of 25% with an 8-year payback equates to potential annual savings of PhP 16 billion (USD 318 million) and investment of PhP 127 billion (USD 2.5 billion)

- ***Public Street Lighting*** assumed ~1.5% of total electricity consumption in 2020 , savings of 50% from LEDs with a 6-year payback equates to potential annual savings of PhP 10 billion of (USD 191 million) and investment of PhP 57 billion (USD 1.1 billion) investment.

[5] Calculated by Thomas K. Dreessen
[6] DOE 2020. Philippine Energy Plan 2018-2040: 100,000 GWhs

2. **Industrial Facilities:**

   Assumed ~19% of total energy consumption (per below Table 1), savings of 10% on electricity and thermal with a 4-year payback equates to PhP 49 billion of potential annual savings (USD 976 million) and investment of PhP 195 billion (USD 3.9 billion) investment.

The above EE opportunities in the governmental and industrial sectors total an incredible **annual savings potential** of **USD 1.5 billion** and **investment potential of USD 7.6 billion**, which is virtually untapped.

1.2 Primary Energy Consuming Sectors

The below table shows the changes in total final energy consumption of the different sectors by fuel type for 2020 versus 2019.

Table 2. Total Final Energy Consumption, by Sector and Fuel Type (in kTOE)

	2019	2020	Growth Rate
Industry	**7,306**	**6, 205**	**-15.1%**
Coal	2,217	1,494	-32.6%
Natural gas	62	37	-39.5%
Oil	1,381	1,557	12.7%
Biomass*	1,207	905	-25.0%
Biodiesel	15	13	-9.8%
Electricity	2,424	2,198	-9.3%
Transport	**12,697**	**9,843**	**-22.5%**
Oil	12,181	9,416	-22.7%
Biodiesel	127	97	-23.5%
Bioethanol	380	324	-14.8%

Electricity	9	7	-28.3%
Households	**9,711**	**10,028**	**3.3%**
Oil	1,312	1,238	-5.7%
Biomass**	5,772	5,842	1.2%
Electricity	2,627	2,949	12.2%
Services	**4,936**	**4,611**	**-6.6%**
Oil	2,360	2,467	4.5%
Biomass*	353	325	-7.8%
Biodiesel	33	37	12.6%
Electricity	2,191	1,782	-18.6%
Agriculture	**473**	**437**	**-7.7%**
Oil	229	211	-8.0%
Biodiesel	4	4	-6.5%
Electricity	240	222	-7.5%
Non-Energy Use	**1,137**	**1,263**	**11.2%**
Oil	996	1,126	13.1%
Coal	141	137	-2.7%
Total	**36,260**	**32,388**	**-10.7%**

* includes rice hull, fuelwood, bagasse, agri-waste and animal waste

**includes charcoal, fuelwood, and agri-waste

***includes rice hull, charcoal, and fuelwood

Source: DOE. 2020. Philippine Energy Plan 2018-2040.

As can be seen the contraction of economic activities due to COVID-19 resulted in a 10.7% reduction in total final energy consumption in 2020 versus 2019. The Transport sector was the most energy-intensive prior to the pandemic but bore the brunt of the travel restrictions and registered a sharp decline of 22.5%. The energy consumption in the Industry and Services sector dropped by 15.1% and 6.6% respectively, due to the strict quarantine restrictions that crippled businesses.

The 2021-2022 recovery programs are expected to increase energy demand by 4.7% in 2022. Recent improvements in transport infrastructures are expected to induce mobility and energy consumption to pick up by 6.4% in 2022. Recovery plans for the agriculture sector are geared toward modernization that expects to increase its energy utilization by 2.3% in 2022. The industrial sector is expected to recover with a 5.7% increase in its energy consumption in 2022, while the service sector is expecting a 5.5% growth. The energy consumption of households is still expected to increase by 1.9% in 2022 because many jobs are expected to remain remote/home-based.

Table 3. Covid-19 Recovery Plans Impact to Energy Demand

Sector	Levels (MTOE)					Growth Rates (%)		
	2018	2019	2020	2021	2022	19-20	20-21	21-22
Agriculture	0.44	0.47	0.47	0.48	0.49	0.3	2.0	2.3
Industry	7.52	7.39	6.98	7.38	7.80	-5.5	5.8	5.7
Services	4.67	4.91	4.42	4.66	4.91	-10.1	5.5	5.5
Residential	9.43	9.71	10.00	10.28	10.47	3.0	2.8	1.9
Transport	12.24	12.69	10.54	11.25	11.97	-16.9	6.7	6.4
Non-Energy	1.42	1.14	1.08	1.15	1.20	-5.1	6.9	4.5
Total	**35.72**	**36.31**	**33.49**	**35.21**	**36.85**	**-7.8**	**5.1**	**4.7**

Fuel	Levels (MTOE)					Growth Rates (%)		
	2018	2019	2020	2021	2022	19-20	20-21	21-22
Coal	2.57	2.36	2.25	2.49	2.71	-4.8	11.1	8.7
Natural Gas	0.06	0.06	0.03	0.00	0.00	-54.8	-100.0	-
Oil Products	18.17	18.51	16.10	17.11	18.09	-13.1	6.3	5.7
Biofuels	0.52	0.56	0.49	0.52	0.55	-12.7	6.4	5.4
Electricity	7.10	7.49	7.31	7.67	8.12	-2.4	4.9	5.9
Biomass	7.29	7.33	7.32	7.41	7.39	-0.1	1.2	-0.3
Total	**35.72**	**36.31**	**33.49**	**35.21**	**36.85**	**-7.8**	**5.1**	**4.7**

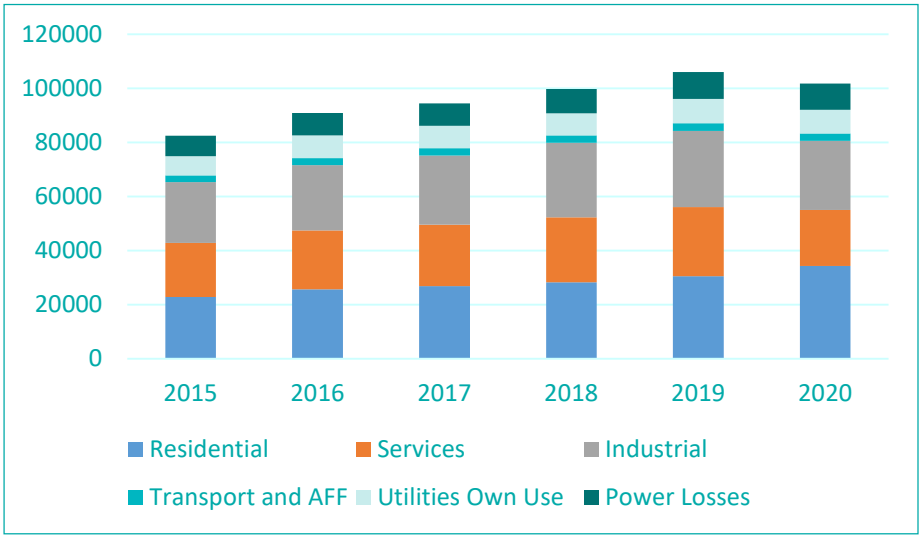
**red font: short term outlook*

Source: DOE. 2020. *Philippine Energy Plan 2018-2040.*

Prior the COVID-19 pandemic, the Philippines' electricity consumption was increasing at an average annual rate of 6.53% from 2015 – 2019[7]. The global pandemic negatively affected economic activities that resulted in a 2.4% decrease in electricity consumption between 2019 and 2020. The residential or household sector remains the largest consumer of electricity, with an average increase of 7.7% annually (2015-2019). The industrial and services sectors averaged annual increases in electricity consumption of 5.8% and 6.1%, respectively.

[7] DOE 2019. 2019 *Key Energy Statistics*. Manila, Philippines

Figure 1. Electricity Consumption by Sector 2015-2020 (GWh)



AFF = Agriculture, Forestry, Fishery

Data Source: DOE. 2020. *Philippine Energy Plan 2018-2040.*

As reflected in Figure 1, residential, industrial and services sectors are the top 3 energy-intensive sectors. For residential areas, EEC policies and programs on energy labeling of appliances have been formulated. Baseline market research on lighting and air conditioning appliances, the most commonly used in households, were prioritized. Studies on other equipment are continuing for high efficiency motors, chillers, and boilers. The EEC Act targets mainly the DEs, defined as those establishments in the Philippines consuming more than one million fuel oil equivalent liters of energy annually, in the industrial and services sectors, including government services.

1.3 Energy and Carbon Emission Reductions under BAU Scenario

The total greenhouse gas (GHG) emissions from energy-related activities reached 123.3 million tons of CO2 equivalent ($MTCO_2e$) per year in 2018, which is 4% higher than the previous year's emissions (118.5 $MTCO_2e$). Power generation contributed 51.7% of the emissions while transport's share was 27.9%. The growth in GHG emissions can be attributed in large part to the use of coal for power generation and oil in the transport sector.

The BAU and CES assumptions in the computation of the country's estimated GHG emission reductions are shown in the below Table 4.

Table 4. Business as Usual and Clean Energy Scenario Assumptions[8]

	Scenario Assumptions	
	Reference Scenario ***(Business as Usual)***	**Clean Energy Scenario** ***(Alternative Scenario)***
Energy Demand	• Supports an accelerated economic expansion post-COVID19 (i.e., High GDP scenario). • Maintains current blending schedule for biofuels (2.0 percent biodiesel and 10.0 percent bioethanol) until 2040. • 5.0 percent penetration rate of electric vehicles for road transport. (motorcycles, cars, jeepneys) by 2040. • Current efforts on energy efficiency and conservation (EEC) as a way of life continues until 2040.	• 10.0 percent penetration rate of electric vehicles for road transport (motorcycles, cars, jeepneys) by 2040. • 1.5 percent increase in aggregate natural gas consumption from the Transport and Industry sectors between 2020 and 2040. • 5.0 percent blending for biodiesel starting 2022. • Up to 5.0 percent energy savings on oil products and electricity by 2040.

The below Table 4 shows the calculated GHG emissions in the BAU and the CES, and the total estimated GHG reductions from 2020-2040.

[8] DOE Philippine Energy Plan (2018-2040), page 170.

Table 5. GHG Emissions and Avoidance of Highlight Years, in MTCO2e

	2010	2020	2025	2030	2035	2040	Total
BAU	**53.11**	**109.89**	**151.50**	**192.26**	**246.15**	**339.48**	**4,277.59**
Transformation	33.02	81.39	115.19	145.69	185.55	259.48	**3,241.16**
Industry	12.04	15.99	20.63	27.00	36.26	50.08	**612.53**
Others	8.05	12.51	15.67	19.56	24.34	29.93	**423.90**
CES	**53.11**	**107.19**	**147.74**	**182.03**	**206.99**	**246.75**	**3,751.99**
Transformation	33.02	79.82	113.71	138.89	150.97	172.47	**2,787.52**
Industry	12.04	15.20	19.24	25.01	33.67	46.89	**570.73**
Others	8.05	12.18	14.79	18.13	22.35	27.39	**393.74**
Total GHG Avoidance/Reduction	**-**	**2.71**	**3.76**	**10.22**	**39.16**	**92.73**	**525.59**
Unconditional Targets: GHG Avoidance / Reduction included in BAU and CES	**-**	**1.13**	**2.28**	**3.43**	**4.58**	**5.72**	**71.96**

Source: DOE Philippine Energy Plan 2018-2040

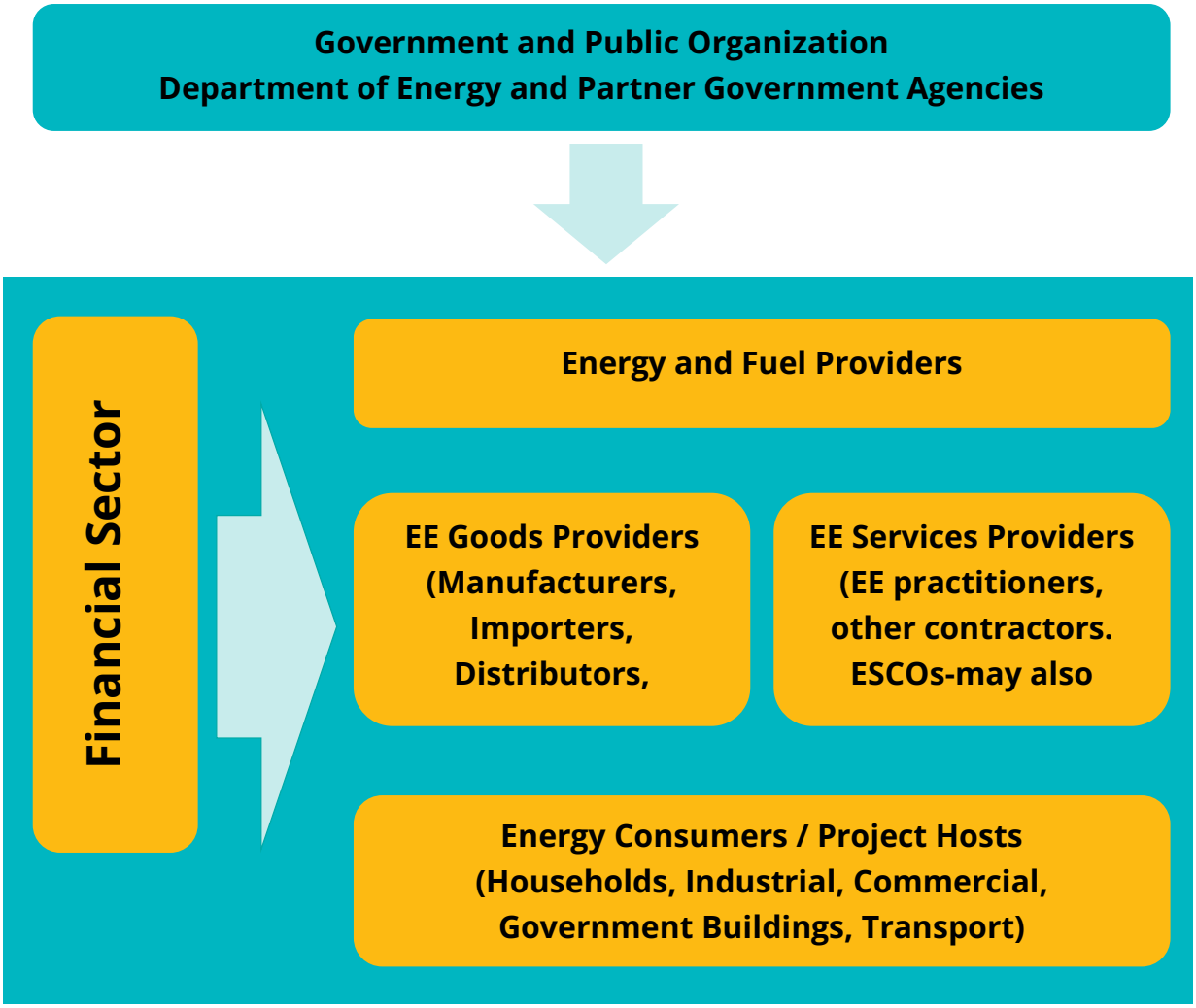
The BAU scenario incorporates existing policies and programs on renewable energy, alternative fuels, and EE. It also integrates the Asia-Pacific Economic Cooperation's (APEC) aspirational target to reduce aggregate energy intensity by 25% in 2030 to 45% by 2035 from the 2005 level. The BAU and CES scenarios cover unconditional NDC targets that the government will implement through all DOE programs including EE with an estimated annual reduction of 72 MTCO2e from 2020-2040, or an average of 3.43 $MTCO_2e$ per year.

The specific contribution of EE in GHG reduction is difficult to estimate since the projected energy savings from EE initiatives are not clearly defined. More robust evidence-based estimates could be derived, once the National Energy Conservation database, stipulated in the EEC law, is established. This database will track reports submitted to DOE by DEs over time. This database will become the source of

information about baseline energy consumption of energy intensive sectors and energy savings potentials therefrom.

1.4 EE Stakeholders

Figure 2. EE Stakeholder Map



Source: JICA, 2012

a) **DOE** is the lead **government agency** to implement the EEC Act. DOE works together with partner GAs through the Inter-Agency Energy Efficiency and Conservation Committee (IAEECC). Local government units (LGUs) must establish their respective Energy Efficiency Conservation Office (EECO) that will

assist DOE in monitoring the compliance of DEs with their obligations under the EEC Act. The EECO shall also develop and implement their respective local EEC plans and incorporate these to their local development plans.

DOE extends its collaborative efforts to partner GAs in support to the formulation and adoption of policies related to EE that include:

- Department of Transportation (DOTR) related to programs on low carbon transport and allied technologies and services
- Department of Science and Technology (DOST) for research and development matters
- Department of Trade and Industry (DTI) Bureau of Product Standards on the labeling of safety aspects of appliances and industrial equipment, roads and EVs, electric vehicle charging stations (EVCS), Safety Management Systems, Intelligent Transport Systems, Luminaries and Lampholders, Rotating Electrical Machines and household and similar electrical appliances, which may be used as reference in setting energy performance requirements for energy consuming products (ECP)
- Commission on Higher Education (CHED), Technical Education and Skills Development Authority (TESDA), and State Universities for training and Information, Education and Communication (IEC) activities

b) **EE Goods Providers** are the suppliers of EE appliances and equipment to energy consumers or end-users.

c) **EE Service Providers** comprise existing or potential Energy Service Companies, Energy Managers, or Energy Auditors who may belong to professional associations such as:

- PE2 (Philippine Energy Efficiency Alliance)
- ENPAP 4.0 (Energy Efficiency Practitioners Association of the Philippines)
- DOE registered and/or certified ESCOs, certified energy managers, certified energy auditors, certified energy conservation officer and other EE practitioners

- Architects, construction companies, property developers

d) **Financial Institutions** are also key stakeholders in the EE market. Some local banks have specific EE financing products that they offer to Facility Owners, ESCOs, project hosts, and the public sector. The banks in the Philippines currently providing EE financing are as follows:

1) Development Bank of the Philippines (DBP) is the primary Government Financing Institution (GFI) with a lending program specifically designed for energy efficiency projects called the Energy Efficiency Savings (E2SAVE) Financing Program which began in 2018. E2SAVE is designed to assist public and private firms enhance their productivity by adopting new and energy efficient technologies that will advance optimal power consumption in their energy-related projects (See Section 3 for details).

2) Landbank of the Philippines (Landbank) is another major GFI in the Philippines promoting EE financing through its 'GO Green' Financing Program designed for SMEs and LGUs.

3) Bank of the Philippine Islands (BPI) is a private bank that engaged the IFC in 2008 to develop its Sustainable Energy Finance (SEF) Program (see the below Section 2.5 f) designed to finance technologies that improve the efficiency of energy generation, energy distribution and energy use. According to BPI, its SEF program helped over 300 private companies, such as property developers, pursue more environment-friendly, cost-efficient projects. As of the end of 2018, it had disbursed PHP 52.6 billion (USD 1 Billion) for EE, RE, and climate resiliency projects, of which 20% were for Green Building projects.

4) Banco de Oro Unibank (BDO) is a private bank that also engaged the IFC from 2010-2016, to develop a SEF Program and to provide BDO with credit risk coverage under its risk-sharing facility (see the below Section 2.5 f). According to BDO, it has developed a "climate smart" portfolio of more than PHP 500 million (USD 10 million). In December 2017, BDO raised USD 150 million from the issuance of its first green bond, with IFC being the sole investor. The green bond funds are to be used exclusively to finance climate smart projects that include renewable energy, green buildings, and EE.

5) Philippine Guarantee Corporation (PHILGUARANTEE) is a government guarantee agency that has been newly reorganized to combine the government guarantees offered by the former Philippine Exim and Philippine Guarantee entities. It primarily provides credit guarantees to banks and financial institutions on their loans to private sector.

2. EE REGULATIONS

With the 2019 passing of the Republic Act (RA) No. 11285, "The Energy Efficiency and Conservation Act" or "EEC Act", promotes energy efficiency and conservation (EEC) to become a "way of life" for everyone in the Philippines. This is the direction that DOE has been echoing through their information, education, and awareness campaigns prior to the EEC Act. After almost three decades of voluntary practice, it has now become mandatory for energy intensive establishments to be more judicious with their energy consumption and consequently help make EEC become a major contributor to climate change mitigation and reduction of Greenhouse Gas (GHG) emissions.

In addition to ensuring the sufficient and stable supply of energy, the implementation of EEC will aid the country to fulfill its UN Sustainable Development Goals on clean energy (SDG 7) and climate action (SDG 13). It will also contribute to attaining the country's Nationally Determined Contribution (NDC) to the Paris Agreement, which is set at a 75% reduction in GHG emissions by 2030 relative to the 2010 business-as-usual scenario.

The EEC Act was approved in April 2019, and its Implementing Rules and Regulations (IRR) were subsequently approved/released in November 2019. In 2020, DOE issued the Memorandum Circular defining the DEs (defined in Section 2.5). In the months thereafter, DOE issued multiple Department Circulars required to implement the EEC Act, which included release of the Philippine Energy Labeling Program (PELP), Minimum Energy Performance for Products, Guidelines on ESCO Registration and Certification and Guidelines on Energy Conserving Building Designs. In less than two years, the supporting legal and administrative guidelines have been articulated and stipulated showing the importance of EEC in managing energy demand particularly in four main sectors, the industrial and commercial buildings sector, transport and residential sectors as shown in the below Figure 3.

Figure 3. EE Regulations and activities by sector

INDUSTRY

- Energy Audit
- Awareness Campaign (IEC)
- Energy consumption Monitoring
- ESCO Promotion Program

BUILDING

- Energy Audit
- Awareness Campaign (IEC)
- Energy consumption Monitoring
- ESCO Promotion Program
- Government Energy Management Program

TRANSPORT

- Standard and Labeling Program (Passenger Cars and Light Duty Vehicles)
- Electric Vehicle Charging Stations
- Awareness Campaign (IEC)
- Energy Consumption Monitoring

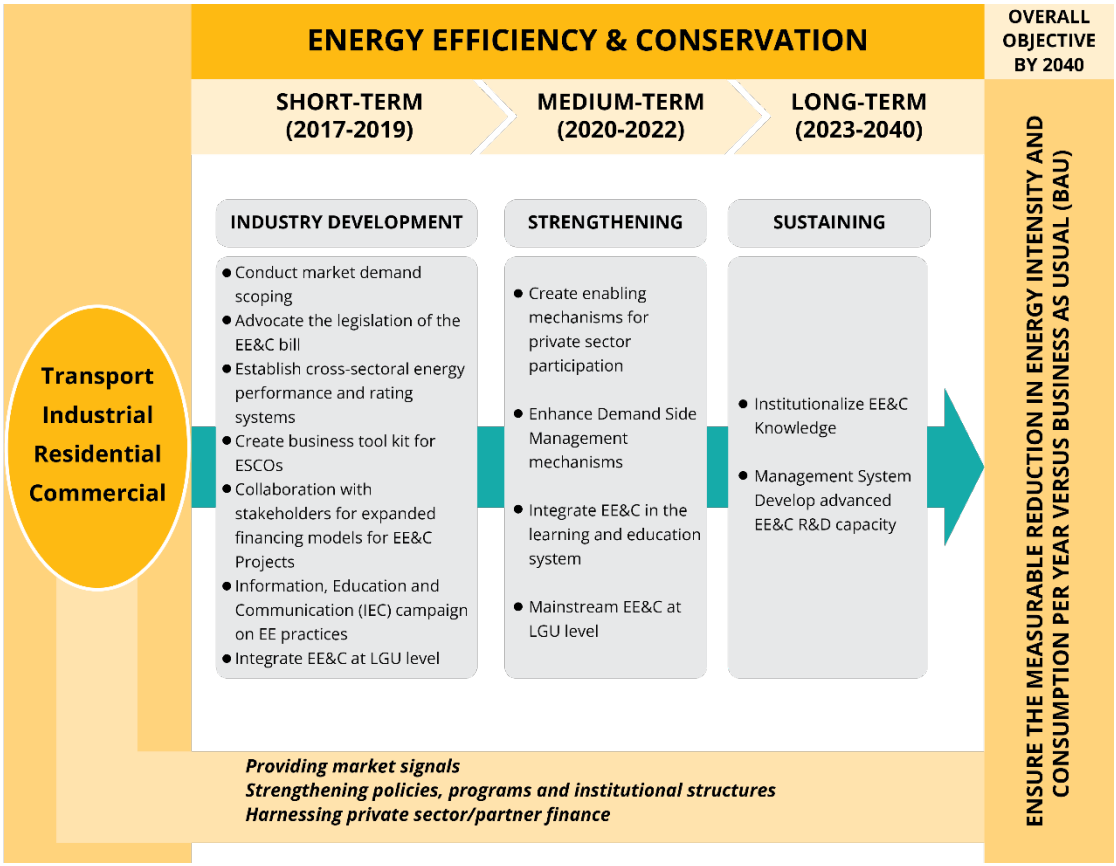
RESIDENTIAL

- Standard and Labeling Program (Household Appliances)
- Awareness Campaigns (IEC)
- Energy Consumption Monitoring

With EEC policies and measures in place, the government expects to see a more manageable growth in energy demand that could result in the deferment of additional power generation capacities and energy infrastructures and facilities for the on-grid market. Other benefits include environmental health due to reduced GHG emissions and creation of green jobs and investments for the economy.

DOE also developed an EEC Roadmap through 2040 which is shown below in Figure 4.

Figure 4. The EEC Roadmap, 2017-2040



Source: DOE, 2020. *Philippine Energy Plan 2018-2040*.

The following measures have been articulated in DOE's EEC Roadmap:

- Continue IEC activities on EEC policies, programs and best practices
- Mainstreaming and integrating EEC at the LGU Level: Continue targeted IEC campaigns for LGUs to enhance their understanding of their obligations under the EEC Act.
- Integrating EEC in the learning and education system and through mass media: Implement more programs that promote general awareness and public education on EEC as a way of life. Government-owned mass media channels including TV, radio, and publications may be tapped to echo principles of EEC.

- Strengthen support for the Commission on Higher Education (CHED) and Technical Education and Skills Development Authority (TESDA) faculty and instructors in the development of degree or non-degree courses or curriculum mainstreaming RE, EE, climate change, sustainability and sustainability reporting in the Colleges of Accounting, Architecture, Engineering, Finance, Mathematics, Sciences, as well as in skill-based (non-degree capacity building

- Enhance Demand Side Management Mechanism through the "Guidelines for the Endorsement of Energy Efficiency Projects to the BOI for Fiscal Incentives (DOE Department Circular 2021-05-0011 by providing to ESCOs and project hosts on proven EE technologies and systems applicable in local industries and establishments.

- Strengthening cross-sectoral energy consumption monitoring through data automation

- Developing energy efficiency program for air and sea transport

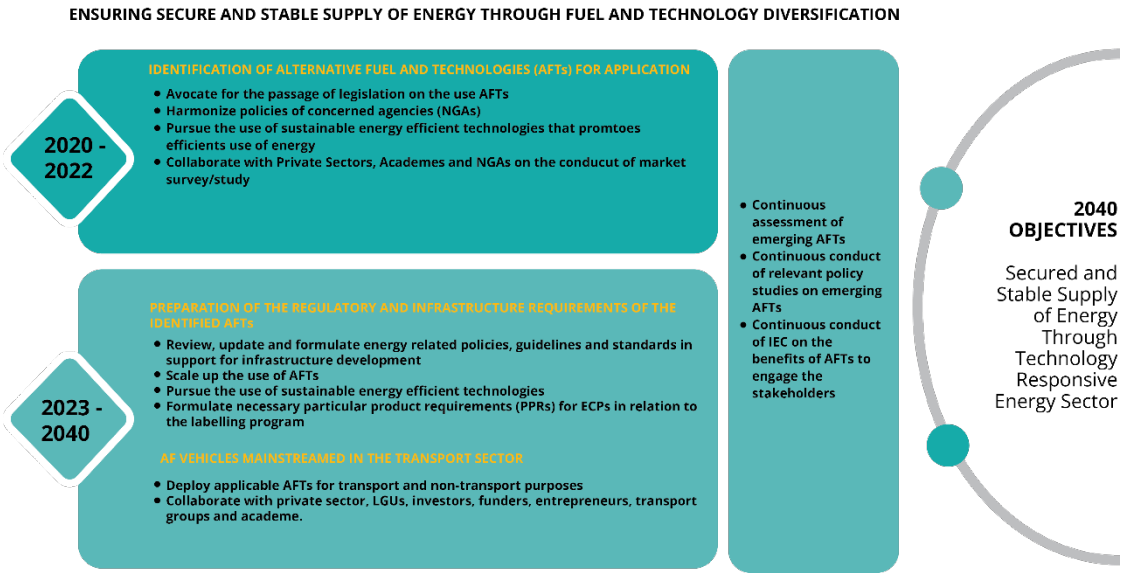
- Institutionalizing EEC Knowledge Management System

- Expand the list of accredited appliances and industrial equipment under the PELP to include electric motors, chillers, boilers, steamers, district cooling, etc.

- Ensuring energy security and weather-proofing of Power Line Distribution Systems and Facilities

Parallel IEC efforts for promoting EE in the transport sector are also being conducted by DOE. As shown in the alternative fuels and energy technologies (AFET) roadmap in Figure 5, policy development, public consultations, legislative advocacy and promotion of low carbon vehicles, fuel efficient technologies, EVs and HEVs are being pursued in collaboration with the DOTR and other partner GAs.

Figure 5. Alternative Fuels and Energy Technologies (AFET) Roadmap



One of the major programs with the DOTR in the Public Utility Vehicle Modernization Plan (PUVMP) which is expected to aid in creating demand for AFETs and ancillary components of the program. A past donor program developed the "Adoption of Test Standards for Electric Motors" report that recommended the minimum and high energy efficiency performance standards for electric motors. The report recommends the adoption of a MEPS and labeling program for induction motors.

DOE strongly supports and provides inputs and position papers for integration in these proposed legislations and policies in favor of ensuring a level playing field conducive fiscal and market environment for AFETs and assuring harmonized policies. DOE supports policies and programs that will contribute to the long-term infrastructure development on AFETs. DOE is also seeking possible areas of cooperation with other countries that have successfully adopted and mainstreamed the use of AFETs, EVs and HEVs and EV charging stations for technology transfer and best practices sharing.

A brief description of each regulation issued to-date under the EEC Act is provided below.

2.1 Energy Efficiency and Conservation Republic Act 11285 (EEC Act)

This Act was passed in April 2019, and it institutionalizes and mandates EEC as a "way of life" for Filipinos. It declares a national policy to:

- Institutionalize EEC towards the efficient and judicious use of energy by formulating, developing, and implementing EEC plans and programs
- Promote and encourage the development and use of efficient renewable energy technologies
- Reinforce related laws and other statutory provisions for a comprehensive approach to EE, conservation, sufficiency, and sustainability
- Ensure a market-driven approach to EE, conservation, sufficiency, and sustainability.

The mainstreaming of EEC programs in each energy consuming sector are guided by the different regulations and provisions as shown in Figure 3.

2.2 Implement Rules and Regulations of the EEC Act

The implementing rules and regulations, established under the issued Department Circular No. 2019-11-0014, define the framework for the implementation of the EEC Act. It delineates the responsibilities of various GAs and private entities in implementing energy efficiency pursuant to the EEC Act. It also lays the foundation for creating the EEC ecosystem by:

- Defining DEs according to their energy consumption;
- Requiring Certified Energy Conservation Officers in all DEs;
- Supporting Certified Energy Managers, Certified Energy Auditors and Energy Service Companies (ESCOs);
- Instituting a Code of Practice for Energy Labeling of Products (COPE) and establishing Minimum Energy Performance of key appliances and equipment;
- Requiring an EEC Coordinating Officer within each Local Government Unit (LGU);

- Establishing the National EEC Database on national energy consumption;
- Promoting the use of energy efficient and renewable energy technologies;
- Making available critical information for the evaluation, analysis and dissemination of EEC information, and
- Formulating the National EEC Plan which is a comprehensive framework and governance structure for defining the EEC national targets, strategies, monitoring and evaluation.

It mandates the EE Rating and Labeling System, the EE Rating and Labeling for Products and Equipment, the Energy Labeling for Transport Vehicles and the system and procedures for examination, testing and verification.

2.3 Inter Agency Energy Efficiency and Conservation Committee (IAEECC)

The IAEECC was organized under Department Circular 2020-01-0001 and its members comprise DOE, DOTR, Department of Interior Local Government (DILG), Department of Finance (DOF), Department of Science and Technology (DOST), Department of Public Works and Highways (DPWH), DTI, Department of Budget Management (DBM), and the National Economic Development Authority (NEDA).

The IAEECC directs the GEMP in the following GAs (GA): National GAs, State Universities and Colleges, Legislative Branch, Constitutional Commission, Government Owned and Controlled Corporations, Foreign Service Posts, Judicial Branch, Local Government Units.

The GEMP directs the conduct of Energy Audits and improvements to each GA's IAEECC-approved GEMP. LGUs will also serve as the local authorities' arm for implementing their respective GEMP within the LGU premises as well as the enforcer of the EEC Act at the LGU level.

2.4 Energy Utilization Management Bureau (EUMB) Authority

Issued Department Circular 2020-01-0002 operationalizes the EUMB to be able to effectively perform its many responsibilities for implementing the EEC Act.

2.5 Designated Establishments (DEs)

Issued Memorandum Circular 2020-05-0001 directs the submission of Annual Energy Utilization Reports (AEUR) from all industrial, commercial and transport Designated Establishments (DEs) consuming more than one million fuel oil equivalent liters of energy annually. There are two types of DEs:

- Type 1 DEs have annual energy consumption of 500,000 kWh to 4,000,000 kWh for the previous year
- Type 2 DEs have annual energy consumption of more than 4,000,000 kWh for the previous year.

The AEUR shall include energy consumption data, plans for energy monitoring, management and control, and energy efficiency improvements. DEs must conduct regular energy audits and prepare periodic reports on the results of their energy consumption and conservation programs.

It covers all existing DEs classified as energy intensive industries by an earlier memorandum circular in 1993.

2.6 Philippine Energy Labeling Program (PELP)

Issued Department Circular 2020-06-0015, contains the PELP of the Department of Trade and Industry for importers, manufacturers, distributors, dealers, and retailers and puts DOE as the lead agency for implementing this program. It establishes the technical requirements of appliances and devices to a set Minimum Energy Performance for Products (MEPP) and the means to systematically inspect, monitor and verify the corresponding appropriate energy labels of energy consuming products (ECPs).

The covered ECPs are room air conditioners, refrigeration units, television sets and lighting products. The inclusion of other ECPs in the future shall be subject to EUMB recommendation after public consultation with the Department of Environmental and Natural Resources (DENR) and the DOTR.

The PELP contains a new Code of Practice for Energy Labeling of Products (COPE) that supersedes a similar one in 2016. The COPE establishes the computation methodology for deriving the MEPP for each ECP, the registration and application

process for energy labeling and the reporting requirements for compliance by the ECP manufacturers and suppliers. It also stipulates the penalties and fees for violation or non-compliance.

The following DOE divisions and supporting units strengthen the role of the EUMB and its divisions in implementing the EEC Act, and give them the following functions:

a) **Alternative Fuels and Energy Technology Division (AFETD)** shall be responsible for the formulation, development and updating of the MEPP, COPE, fuel efficiency testing guidelines, fuel economy performance and other related policies in support of National Energy Efficiency Conservation Program.

b) **Energy Efficiency and Conservation Management Program and Technology Promotion Division (EPMPD)** shall be responsible for the promotion and IEC activities of the PELP.

c) **Energy Efficiency and Conservation Performance Regulation and Enforcement Division (EPRED)** shall be responsible for the development of guidelines for on-site inspections, conduct of monitoring, verification and enforcement activities, processing of applications such as Company Registration, Produce Registration, Energy Label Issuance in compliance with PELP.

d) **Energy Efficiency and Conservation Public Sector Management Division (EPSMD)** shall be responsible for the promotion and IEC activities for the public sector

e) **Energy Research Testing and Laboratory Services - Lighting and Appliances Testing Division (ERTLS-LATD)** assists in assessing the eligibility of testing laboratories and evaluates testing services for ECPs.

f) **Field Offices** refers to DOE offices in Luzon, Visayas Islands and Mindanao. They are responsible for enforcing and monitoring industry players' compliance to PELP, in coordination with LGUs, and submits reports to EUMB

g) **Information Technology Management Services supports to EPRED** in maintaining the National Energy Efficiency Conservation Program and the online PELP services

h) **Legal Services** – General Legal Services Division is responsible for the adjudication of violations under the EEC Act, the EEC-IRR and related department circulars and implementing guidelines

2.7 Minimum Energy Performance of Products (MEPP)

Established under Department Circular 2020-06-0016, the MEPP requires importers, manufacturers, distributors, dealers and retailers to meet minimum efficiency performance standards. It also binds DOE, in consultation with concerned GAs, LGUs, commercial, industrial and transport sectors and relevant stakeholders, to be the lead agency responsible for planning, formulating, developing, implementing and enforcing the energy efficiency rating and labeling system for products, equipment and transport vehicles, examination, testing and verification of efficiency ratings. DOE shall publish biannually an updated list of MEPP-compliant ECPs. It establishes Technical Working Groups that update the MEPP (one TWG for each ECP), subject to the approval of the EUMB. Adjustments to the MEPP should be directed towards increase in energy efficiency and improvement in energy performance.

2.8 ESCO Guidelines and Certification

Issued Department Circular 2020-09-0018 established guidelines for the application, evaluation, certification, and the classification of ESCOs into the following two categories:

1. **Registered ESCO** is an ESCO seeking accreditation of professional services for the first time that meets the minimum of requirements on legal and technical capacity. The Certificate of a Registered ESCO shall be valid for three (3) years.

2. **Certified ESCO** is an ESCO which, in addition to meeting the requirements of a Registered ESCO, also has proven performance or results-based projects savings experience and with proven customer experiences. This includes the ESCO having successfully completed a minimum of three (3) IGAs projects and a minimum of three (3) projects implemented within three (3) years. Penalties and fees for violation and non-compliance are also stipulated. The Certificate of a Certified ESCO shall be valid for five (5) years. Once certified, they must submit a report annually on their ongoing projects with the energy savings of completed energy efficiency projects.

2.9 Energy Conserving Design Guidelines of Buildings

Issued Department Circular 2020-12-0026 establishes the guidelines applicable to Type 1 and Type 2 DEs with more than 10,000 square meters of Total Gross Floor Area (TGFA) and at least 112.5 kVA of total connected electrical load. The guidelines consider the cost effectiveness, building function, health, safety and productivity of the occupants in relation to the building envelope, electrical systems and mechanical systems of the building. An important factor is the thermal performance of the building since cooling is energy intensive. It encourages the use of two methodologies for evaluating the solar heat gain of buildings: the Overall Thermal Transfer Value (OTTV) method, and the Prescriptive method.

It also encourages efficient tropics-friendly building designs to apply the use of shade and shading devices, cross ventilation, moisture, air pressure and distribution, and heat reflection of roofs, windows, and walls. Thus fans, refrigeration, lighting, air conditioning and ventilation are important considerations. For commercial and industrial buildings, the optimal combination of energy usage by heating and cooling equipment and motors are important inputs to EEC.

2.10 Transport Sector Fuel Economy and Related EEC Policies

Issued Department Circular 2020-10-2023 prescribes the "Policy Framework for the Development of the Fuel Economy Rating, Fuel Economy Performance, and Related Energy Efficiency and Conservation Polies for the Transport Sector and other Support Infrastructures". Under this program, the Electric Vehicle (EV) ecosystem of manufacturers, importers, distributors, and dealers of EVs and EV charging stations (EVCS) shall be structured to facilitate safe operation and growth, while ensuring non-discriminatory and open access for all. The circular also seeks to empower the consumers to choose fuel efficient transport vehicles, realize energy savings by reducing fuel consumption. It leads to the phase out of fuel-inefficient transport vehicles, and the reduction of GHG emissions.

2.11 Development, Establishment and Operation of EVCS Guidelines

Issued Department Circular 2021-07-0023 establishes the guidelines for the establishment, use, and operation of electric vehicle charging stations (EVCS). It harmonizes all existing issuances to ensure the safety, efficient operations, and

system reliability of EVs. It also aims to accelerate investments in EVCS in the country. DOE collaborates with partner GAs in supporting the formulation and adoption of related policies for the transport and EE sectors. These GAs are:

- **DTI Bureau of Product Standards (DTI-BPS)** leads the development of promulgations related to Safety of Roads and EVs, EVCS, Safety Management Systems, and Intelligent Transport Systems.

- **Department of Transportation (DOTR)** is the implementing agency of an inter-agency collaboration under the United Nations Development Program's (UNDP) technical assistance project "Determining Green Routes under the Local Public Transport Route (LPTRP)." It supports the country's Public Utility Vehicle Modernization Program (PUVMP). The LPTRP is instrumental to enabling low carbon transport, creating a planning and policy environment at the local government level, and potentially expanding the market for low carbon road vehicles such as EVs and hybrid EVs (HEVs). It also aims to improve public transport services and integrate it to land use strategies. The PUVMP stipulates the adoption of Euro 5 and 6 fuel standards for public vehicles.

- **Department of Science and Technology–Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD)** and the University of the Philippines Electrical and Electronics Engineering Institute – with whom DOE made a Memorandum of Agreement (Tripartite MOA) to establish a framework for research collaboration activities for the review, evaluation, monitoring and implementation of programs under the Science and Technology Application (STEA). They intend to identify appropriate emerging technologies for EVs that are aligned to the needs of the industry and EV Roadmap. With DOST-PCIEERD, DOE also studied the use of solar-assisted plug-in electric motor-powered boat.

- **DOST –Industrial Technology Development Institute (ITDI)** under the project called "Establishment of Fuel Research and Development and Testing Facility" will create an R&D facility dedicated for the conduct of performance and durability testing of various fuel cells technologies.

DOE is also actively collaborating with the above GAs, LGUs, academe and private sector industry groups on alternative fuels and energy efficient transport technologies in IEC activities even throughout the pandemic through virtual

platforms. The Senate Bill 1382, or the "Electric Vehicles and Charging Stations Act", was passed in May 2021. It is not yet enacted into law until the counterpart equivalent, House Bill 4075, is approved by the House of Congress.

2.12 Guidelines for Endorsement of EEPs to Board of Investment (BOI)

Issued Department Circular 2021-05-0011 establishes the rules and procedures on the endorsement of EEPs to the BOI for registration and grant of fiscal incentives to proponents such as income tax holiday and pioneer incentives. The entitlement to Income Tax Holiday (ITH) shall be determined according to the below Table 6.

Table 6. Income Tax Holiday Entitlements

Annual Energy Savings at the Project Boundary	ESCO or TPPD/Project SPV EE (Rate of ITH)	Self-Financed Amount of ITH
Less than 15%	0% but registration shall not be cancelled	None, but registration shall not be cancelled
15% to 20%	50%	30% of the cost of installed equipment system
20% and up to 25%	75%	40% of the cost of installed EE equipment or system
More than 25%	100%	50% of the cost of installed equipment or system

An EEP must be able to meet the minimum 15% energy savings at the project boundary and a minimum Project Investment Cost of PhP 10 million (USD 200,000). The 'project boundary' refers the energy savings computed based on comparing the energy consumption before and after implementation of the EEP when operated on its full commercial basis.

The income eligible for ITH of an ESCO, Third Party Project Developer (TPPD) or Project SPV shall be limited to the income of the entity directly attributable to the energy saving generated by the registered EEP. The rate of ITH shall begin from the start of operation of the EEP.

2.13 Energy Efficiency Excellence Award Guideline

Issued Department Circular 2021-09-0014) establishing the guidelines for GAs to win the annual GEMP Award. In 2020, the top 5 awardees were the: National Power Corporation, National Electrification Administration, Development Academy of the Philippines, Center for International Trade Expositions and Missions, and National Transmission Corporation.

2.14 LGU Energy Code

The LGU Energy Code aims to establish and integrate the national energy plans, programs, policies, and mechanisms into the local development plans, with respect to:

- Energy safety practices
- Energy efficiency and conservation
- Energy resiliency
- Energy planning, including energy access and resource development.

LGUs, through their Local Development Council, must activate the Energy Sector Committee to implement the Code. While most of the provisions are geared towards the identification and development of conventional and renewable energy potential, it also highlights the importance of incorporating EEC in the local development plans. The Code also mandates all LGUs to conduct IEC campaigns to disseminate and capacitate its concerned stakeholders and constituents on the four energy topics listed above, with support from DOE and DILG.

3. EE MARKET BARRIERS

Most of the following market barriers, common to developing countries in Asia, like Indonesia, Vietnam and Thailand, deter the widespread implementation of EE in the Philippines:

3.1 Lack of EE Knowledge and Facility Owner Demand

a) **Low awareness and low priority.** Despite decades of EEC campaigns by DOE, there remains an extremely low level of EE knowledge with most stakeholders in the Phillipines, especially with Facility Owners in the primary industrial, commercial and governmental energy consuming sectors. There is a general lack of market knowledge of EE technologies and solutions, the importance of EE for sustainability, ESCO business model and other types of implementation structures, contractual and financial arrangements. Particularly critical to the Philippines is the fact that the public is also not very aware of the EEC Act at this time.

Residential households are not totally aware of the purpose or benefits of energy labels, and since they tend to be price sensitive, they buy the cheaper, less energy-efficient appliances.

The industrial and commercial sectors may have a better understanding of EE technologies, but they do not understand their benefits and risks, leading to EE being a very low priority for their Facility Owners to invest capital or utilize their credit capacity to finance EEPs versus their core business activities. Most Facility Owners prioritize investments on production/income generation versus EE (savings generation), unless they can pass on the cost to their clients/tenants. The low priority for Facility Owners also emanates from a fundamental perception that EEPs are equipment infrastructure investments which only need to be made if and when they break, coupled with the fact that their investment and savings amounts are relatively limited. Also, EEPs have to compete with other capital expenditures; so even when they generate very attractive ROIs of 25-50%, they are typically unable to compete with the one-year internal hurdle rates of core business investments. This situation is further aggravated by the pandemic environment in which businesses tend to prioritize financial resources for expenditures that will support their core business operations and business recovery.

b) **Small scale transactions and perceived high complexity and risk of EEPs**. The average investment for EEPs is very small (less than USD 1 million), and most EEPs typically contain multiple energy savings technologies/measures each of which can require a separate M&V protocol. These very small transactions and

benefits, coupled with the perceived M&V complexities, make it challenging for Facility Owners and LFIs to want to focus on EE. They also create a perception with LFIs that the lending market potential is small, time consuming to access and will require high transaction costs. This results in an unwillingness by many LFIs to invest the time and resources to learn about EE or to develop the internal capacity needed to assess the risks and cash flow benefits from EEPs and create attractive financing structures.

c) **Lack of confidence in an EEP's estimated future savings being achieved or accurately measured and verified** by Facility Owners, LFIs and investors, caused by them not having sufficient knowledge to understand or believe the estimated future savings can be achieved and verified. This results in their unwillingness to fund the implementation of EEPs. Removing this barrier is critical to scaling up EE investment and financing in the Philippines. Another fundamental issue is that bank lending in the Philippines is still largely based on the borrower's financial condition and its ability to provide guarantees and/or collateral to fully securitize the loan. This makes it hard for SME project hosts or SME ESCOs to secure a loan even if the EEP is good.

d) **Lack of awareness and understanding of the requirements, processes and procedures to comply with the EEC Act** by GAs, private-sector Facility Owners, LFIs and mostly all EE stakeholders. In the financial sector, there is a fundamental lack of awareness of the existence of the EEC Act and a basic understanding of EEPs that would allow them to be conversant about the EE.

3.2 Limited Technical Capacity to Develop 'Bankable' EEPs

One of the most significant barriers to scaling up the implementation and financing of EE in the Philippines is the lack of knowledge and experience of EE services providers (i.e. ESCOs, energy consultants, etc.) to perform the following critical tasks uniquely required to develop a 'Bankable' EEP and build a EE pipeline:

a) **Preparation of an IGA** is the most critical thing for an EEP to be successfully implemented. An IGA is a much more detailed energy audit that typically includes one or more individual energy savings measures (technologies) at an energy consuming facility, and is the technical and economic foundation of a ready-to-implement EEP. The IGA contains all critical assumptions, facility-based measurements and calculations supporting the EEP's estimated savings

and capital cost (CAPEX), and includes 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.

b) **M&V of energy savings** is critical to documenting the actual achieved savings and the resulting IRR of an EE investment. M&V is the meter of an EEP, and it should follow the 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®). EVO's most current IPMVP October 2016 Core Concepts document, as well as its previous versions containing M&V application examples, can be found and downloaded for free on EVO's website at www.evo-world.org.

c) **Inadequate EE Professional Certifications**. The above IGA and M&V capacity gaps are compounded by the lack of internationally credible EE certifications that adequately test and verify the competency of professionals being able to prepare bankable IGAs and develop reliable M&V protocols for EEPs. Recognizing this gap, moving forward, the EEC Act is requiring new EE and ESCO certifications to be developed that will contain robust verification and testing of competencies to be met as a condition for issuing the certifications.

In addition, and very specific to the Philippines, the capabilities, organizational and physical infrastructure for DOE and other GAs to perform the required processes and procedures set forth in the EEC Act are inadequate and need further technical assistance and considerable enhancements.

While DOE has promoted the development of the ESCO industry and there are 29 registered ESCOs in the Philippines including foreign-owned ones, none is 'certified' yet because no standardized process exists to evaluate the competencies of ESCOs required for certification.

There are several professional organizations that are involved in developing EEPs such as the Philippine Society of Mechanical Engineers, Institute of Integrated Electrical Engineers, PE2, ENPAP 4.0, and Philippine Institute of Energy Management Professionals. However, there are no standardized training and certification programs developed for the missing IGA and M&V skills needed to prepare 'Bankable'

EEPs. Consequently, there is a huge need for professionals who can develop 'bankable' EEPs for DEs to implement measures to reduce energy consumption as required by the EEC Act.

3.3 No Paid-From-Savings EEPs in Government Facilities

ESCOs and other private sector entities are not able to implement and/or finance EEPs in government facilities on a paid-from-savings basis (as stated in the EEC Act) because GAs:

- Cannot legally commit/make multi-year Savings Payments;
- Cannot retain multi-year Savings in its Budgets, and
- Are required to use ***'lowest cost'*** versus ***'best value'*** procurement method.

The DBP LFI stated it experienced the procurement barrier in its failed attempt in 2020 to provide a loan to a LGU on a streetlighting EEP. DBP was unable to make the loan because:

- Contracting and procurement rules required the LGU to select the lowest bidder versus the most efficient technologies and would have resulted in cheaper inefficient technologies being implemented, and
- Accounting and auditing rules that do not recognize the ESCO Energy Savings Performance Contracting (ESPC) scheme.

The EEC Act was specifically designed to overcome these barriers by containing the following overarching language:

"IAEECC shall include savings-based services and payments as through additional modality *for pursuing GEEPs* and shall *adopt relevant guidelines*, in coordination with relevant government agencies and stakeholders, for this purpose." **AND FURTHER**:

"Such modalities shall include GAs and LGUs *being able to repay ESCOs* undertaking energy efficiency projects through applicable repayment schemes *based on the cost savings* to be *generated from the* projects and other sources, in accordance with the guidelines issued by the DBM on multi-year contracts and other applicable laws."

However, the barriers still exist, because the new procurement and other required paid-from-savings procedures are not included in the current GEMP Guidelines

expected to be approved by the IAEECC within 2021 or in early 2022. Consequently, despite the EEC Act mandating GAs and LGUs to implement EE, they are severely hampered in being able to comply due to their inability to access the private-sector financing and EE services that most do not possess.

A very brief overview of current government regulations that preclude ESCO or paid-from-savings EEP financing is as follows:

- Government Procurement Law applicable to GAs only allows them to engage in capital intensive projects through the General Appropriations Act. They may propose budgets for simple EEPs like replacement of lamps or air conditioning units every year. For projects that might require multi-year disbursements, GAs are required to seek a Multi-Year Obligational Authority (MYOA) from the Department of Budget and Management (DBM) prior to entering into contracts to cover the total project costs of multi-year programs, activities and projects (whether locally funded or foreign-assisted projects). The MYOA to be issued by the DBM is currently the only basis or reference for the Approved Budget for the Contract referred to under Section 5 of R.A. No. 9184 (Government Procurement Reform Act).

- Capital expenditure-intensive projects, like EEPs, are bid out and must satisfy least cost criteria and the zero-budgeting process. Under the zero-budgeting scheme, government procurement does not allow savings as a criterion for pursuing a project. Likewise, government cannot commit on savings beyond one (1) year since at the end of each year, all savings generated are reverted to the National Treasury due to its zero-budgeting policy. This presents a serious limitation for GAs to use a Guaranteed Savings or a Shared Savings type of contractual arrangement with an ESCO.

3.4 Limited EE Implementation Capacity of Nascent ESCO Industry

DOE has been continuously supporting the capacity building of EE practitioners through tie-ups with DOE-recognized training institutions in the country and with the help of various donor programs. DOE has a database of 1,982 EE practitioners preparing to or have become certified energy managers (CEMs), certified energy conservation officers (CECOs), and certified energy auditors (CEAs) from those programs. Considering that the Philippines has 1,488 municipalities as of June 30, 2021, each of which must have a CEM and a CECO, a continuous build-up of EE professionals is needed to support the growth of the EE market.

As of November 2021, there are 43 DOE-registered ESCOs, 29 of which are certified under the old scheme that did not require any proof of IGA or EEP paid-from-savings competency or prior experience. Consequently, there are no ESCOs that are certified under the new EEC Act requirements, which will verify their competency to develop, finance and implement EEPs on a paid-from-savings basis through an evaluation of their past implemented ESPC type of EEPs. Despite the ESCO industry in the Philippines becoming a national priority, it is still very nascent due to the fact that most ESCOs are small and medium sized enterprise (SME) companies with limited credit history and insufficient capital resources needed to develop, finance and implement savings-based EEPs on a scalable basis. They also do not have the capacity to provide the equity or collateral required to secure debt from LFIs for financing their EEPs. This is compounded by the market-wide lack of demand for EE/ESCO services caused by the many EE market barriers described earlier. Consequently, only a few ESCOs are operating in the Philippines who have limited experience, competencies, resources and the ability to access project financing.

3.5 No Commercially-Attractive EEP Finance

One of the most significant global barriers that exists in the Philippines 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 their current lending structure. There is a "*disconnect*" between the traditional lending practices of LFIs and the project-based financing structure 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 will lend to a maximum of 70% to 80% of the EEP's CAPEX, but more critically requires 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 new future 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 secure them with

marketable asset collateral or repayment guarantees, both of which are very unattractive to the borrower.

To date, most LFIs have not recognized the future cash flow generated from EEPs, and they do not believe that such cash flow can be relied upon to repay a related loan. Consequently, except for the Development Bank of the Philippines (DBP), LFIs generally assign no value to the future cash flow of EEPs and consequently require borrowers to finance them from their existing credit capacity or to securitize the loan with marketable collateral of guarantees equal to the EEP loan amount. This disconnect results in most LFIs not being willing to structure EEP loans that consider the future cash flow as the primary source of loan repayment and is caused mostly 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.

Before the pandemic, most LFIs offered interest loans (> 4% pa) which is not attractive to would-be EEP implementors. The collateral requirements for EE loan applications have been a long-standing barrier for most borrowers and especially for ESCOs, who are mostly SMEs with minimal assets. The only LFI offer project financing for EEPs is the DBP under its E2SAVE program which accepts an assignment of receivables from energy savings for a portion of the collateral needed from EE borrowers.

3.6 Limited Enforcement of Regulatory EE Mandates

The EEC Act is relatively new, having been passed into Law in 2019. While the implementing rules and regulations and EE mechanism guidelines, such as those listed in Chapter 2, have been formulated, there is still limited enforcement of the mandatory provisions. DOE is building its capability and resources to enable the full enforcement of EE regulatory mandates. However, it is currently focusing on building the awareness of DEs on their responsibilities under the EEC Act, as well as enhancing capabilities of EE practitioners to support DEs. As such, the focus is not yet on

enforcement but in building the EE ecosystem to enable end-users to comply. The on-going pandemic has also slowed down EE efforts with a focus on recovery.

4. CURRENT AND PAST DONOR EE INITIATIVES

4.1 Current Donor EE Initiatives

The following donor EE initiatives are currently active in the Philippines.

a. **USAID – Energy Secure Philippines (ESP) Project** is a 5-year program that aims to contribute to the achievement of the Philippines Energy Sector Strategic Directions 2017-2040 and to the goals of the U.S. Government's Asia Enhancing Development and Growth through Energy (EDGE) Initiative, particularly in pursuing enhanced energy security through a transparent, market-driven, and resilient energy sector. Asia EDGE aims to expand access to affordable, reliable energy, including highly efficient conventional fuels, nuclear, and renewables, which reduce poverty, foster inclusive economic growth, and promote sustained prosperity.

   The ESP Project began in 2020 and it targets two market sectors: i) electric utilities and ii) LGUs. For electric utilities, ESP activities are planned to:

   - Introduce methodologies, tools, cutting-edge analytic systems, and other technology applications to upgrade performance standards, improve operational efficiencies, and strengthen the financial and operational position of power distribution utilities.
   - Promote integrated resource and resilience planning with comprehensive risk and vulnerability assessments, including a focus on countering cyber security threats.
   - Supports the operationalization of existing laws, regulations, and policies that support the extensive use of advanced energy systems, which will result in a more efficient and affordable electricity market with a variety of products and services.
   - Works to broaden the number of market participants to balance large firm dominance and lower the threshold for retail competition to reach the household level.

- Supports the adoption of a minimum set of standards for quality equipment and services and to enforce transparent, competitive procurement processes to level the playing field for all vendors, suppliers, and service providers in the energy sector. Doing so enhances the benefits of competition and reduces electricity costs for consumers.

For LGUs a grant component targets ESCOs and LGUs to work together on innovative EEC projects which will:

- Design, implement, and document an innovative EEC model that harmonizes policy, technology, financing, procurement, and capacity building in LGUs. Applicants will evaluate the EEC policies in their proposed LGU and from there determine needs and gaps. Such policies can include a Local Energy Code, a Local Energy Plan, or a Local Energy Efficiency and Conservation Plan. These will be based on national policies particularly the EEC Act. From these policies and plans, the Applicant will develop an EEC road map in cooperation with the LGU using methodologies and templates from DOE. From this road map, a detailed EEC transition plan or a scale-up plan will be prepared by the Applicant and will serve as the anchor of the actual EEC model. The Applicant will then flesh out the transition or scale-up plan by providing appropriate and cost-effective support which may include technical assistance, technology, equipment, systems development, capacity building, and viable financing mechanisms that takes into account government procurement requirements.

- Financing options will also include the careful study and consideration of other funding mechanisms including but is not limited to the Energy Regulation 1-94 or ER 1-94 fund, National Wealth Tax, municipal and green bonds, and other applicable funding options. The EEC transition plan may include the buildings and premises, commercial establishments, and other energy intensive facilities that is under the management of the LGU. The Applicant will carefully document all processes and will establish a baseline, progress milestones, and project life targets in terms of energy consumption. Finally, the Applicant will develop a sustainability plan and will be expected to continue the EEC service provision within the same LGU. In this regard, a long-term performance contract between the ESCO and partner LGU is anticipated.

- Study, compare, and present different options for EEC technology applications and prepare a menu of solutions applicable to LGUs. In the course of

developing and documenting the EEC model, the Applicant will develop a matrix of solutions or a menu for EEC initiatives that would be useful for LGUs. This menu of solutions is expected to feature the elements stated above including indicative costs and savings and will be graduated from entry level to full-scale implementation to accommodate different levels of LGU capacity for EEC transition. These options will be prepared into a user-friendly material that can be available in print and online.

- Recommend policies and/or policy enhancements that can improve the adoption of EEC in LGUs. In the process of developing and implementing the EEC model, the Applicant will observe, document, and report on how pertinent policies are either facilitating or hindering the promotion and adoption of EEC. In the interest of enhancing these policies or formulating new ones, the Applicant will also prepare detailed recommendations to further establish or strengthen policies that enable the implementation of EECs.

- Develop and deploy communication and marketing strategies and materials that promote EEC adoption in LGUs. Finally, the Applicant in close cooperation with the USAID ESP Communications Team will conduct audience / stakeholder analyses, formulate IEC strategies and approaches, and conduct events and activities that will promote EEC adoption in LGUs.

This grant prioritizes ESCOs in need of support and who are registered or are about to register with DOE. Applicant ESCOs are required to partner with at least one LGU. Energy innovators, technology providers, enterprises, civil society organizations, community-based organizations, businesses, commercial establishments, academic institutions, and research institutions can also apply as long as they have a formal and active partnership with an ESCO.

b. **UK 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 the Philippines supports DOE in developing guidelines, procedures and processes to guide the implementation of the mandates of the EEC Act. The major completed and ongoing EE activities provided to DOE are the following:

- Developed the process and criteria for the Registration and Certification of ESCOs, as well as assisting DOE in drafting of the enacted Department Circular 2020-09-0018.

- Provided draft GEMP Guideline language to DOE for the finalization and submittal to the IAEECC for its approval expected in Dec-2021/Jan-2022). LCEP's draft language included creating the new regulatory procedures needed for GAs to use in applying the new financing and ESCO modalities in the EEC Act targeted to remove the GAs' private sector engagement barriers in the Section 3. LCEP's draft language included the modification of existing and creation of new regulations to revise GA's budgeting and procurement procedures to accommodate the following unique aspects of paid-from-savings EEPs:

  - Procurement based on '***value for money***' versus lowest upfront CAPEX

  - Use cost savings in existing operating budgets;

  - Defined and transparent savings M&V (meter of EEP);

  - Allowance for cost-effective creative options to be provided from private sector, and

  - Elimination of 'non-applicable' processes performed by GAs.

  - Regrettably, to minimize potential resistance from the IAEECC in approving the GEMP Guidelines, LCEP's draft language was deleted.

- Providing EE Capacity Building that include:

  - Recently conducted an EEP finance training to PhilGuarantee;

  - Conducting a future IGA and M&V training to DOE staff, and

  - Conduction a future training to DOE staff on becoming evaluators for ESCO certification and EEPs, and on other EEP related tasks required of DOE in GEMP Guidelines.

- Supported the promotion of more commercially-attractive EEP-based financing to LFIs that will enhance access by ESCOs and project hosts by:

  - Presenting de-risking products to DOE for possible future development that include Energy Savings Insurance (ESI) and Partial Credit Risk Guarantee (PCG) products

  - Evaluating existing EE finance programs of the Development Bank of Philippines and Landbank to determine gaps versus what prospective EE borrowers desire/need

- Updating the National Energy Efficiency and Conservation Program 2020-2040 that was drafted in 2013-2014 with the TA support of another donor program. The goal is to include the activities and programs supporting the mandates of the EEC Act and estimating project implementation targets and investments in the short and medium term.

- Developing an Energy Efficiency Accelerator tool which aims to introduce SME stakeholders in the Food and Beverage sector opportunities for energy efficiency and guide them at different stages of their energy management journey.

c. **Japan International Cooperation Agency (JICA)** launched, in conjunction with the National Electrification Administration (NEA), the implementation of a smart-grid distribution automation system technology that will help improve the distribution system reliability of electric cooperatives (ECs) in the country. The project is working with the private sector to disseminate Japanese technologies for electricity distribution system and management in the Philippines. The Batangas II Electric Cooperative, Inc. (BATELEC II) was selected as the pilot site to demonstrate the effectiveness of smart-grid technology, designed to reduce the duration of power outage and improve the distribution system reliability through automation. This technology from Japan is hoped to effectively address specific technological challenges of ECs that affect their operational efficiency, more particularly the distribution system reliability.

   JICA also supported project from 2009-2012 entitled “Developmental Study of Energy Efficiency and Conservation in the Philippines” (implemented which provided support for an organizational framework on energy efficiency and conservation promotion and assisting the design of an energy efficiency and conservation bill.

4.2 Past Donor EE Initiatives

Prior to the EEC Act, the voluntary National Energy Efficiency Program of DOE in conjunction with renewable energy initiatives have been assisted by the following programs:

a. **European Union-Access to Sustainable Energy Program (EU-ASEP)** supported EE initiatives in the Philippines from 2014 to 2020 through its Access to Sustainable Energy Program (ASEP), which was jointly implemented by the Philippines' DOE and the EU Delegation. The overall objective of ASEP is to assist the Philippine government in expanding its sustainable energy generation to meet the growing economic needs and provide energy access to the poor. The specific objective is to generate more electricity from renewable energy, increase EE use, and increase access for the poor to affordable, disaster-resilient energy systems.

   ASEP had three (3) components one of which is the Technical Assistance focused on RE and EE. On EE, feasibility Studies were conducted in several generation facilities of the National Power Corporation-Small Power Utilities Group aimed to determine opportunities for improving the efficiency of operation of the generation facilities currently using conventional fuels. Sample Electric Cooperatives were likewise studied for the same purpose. Losses from poorly constructed and maintained distribution lines were looked into. Specific recommendations to improve efficiency of operation were provided.

   ASEP led DOE's initiative to develop the Guidelines for Energy Conserving Design in Buildings which is now a document officially adopted by stakeholders in the building sector.

b. **International Finance Corporation (IFC):** The IFC provided its Sustainable Energy Finance (SEF) Program in the Philippines from 2009 to 2016 via advisory services under its risk-sharing facility (RSF) to BPI and BDO banks. The IFC sought to increase local sources of sustainable energy financing to stimulate private sector investment through IFC's partner banks and reduce GHG emissions. A summary of the results is as follows:

   - Both banks followed their own business-as-usual terms in providing SEF loans;

- The RSF loss product provided by IFC to BPI included 50% loan losses covered by IFC and 50% by BPI with IFC covering 10% of first losses from its 50%.
- BPI's SEF loans were mostly provided to existing mid-size commercial and industrial corporate clients, larger clients where infrastructure project finance was provided, and some SMEs with solar rooftops.
- BDO's SEF loans were provided to large grid-connected RE Projects with Power Purchase Agreements to Special Project Companies owned by existing customers.
- Both banks required collateral, but since BPI's loans were primarily provided to existing customers, it already had all of their assets secured. BDO required the typical total collateral and guarantee coverage from the new Special Purpose Companies, supported by power purchase agreements with the grid-connected RE projects.
- BPI provided PHP 35 billion (USD 700 million) of SEF loans on 260 total projects (148 EE and 112 RE). Its RSF covered PHP 3 billion (USD 60 million) SEF loans.
- BDO provided PHP 12 billion (USD 240 million) of SEF loans, representing 2% of its total loan portfolio.

The major benefits both BPI and BDO felt they received from the IFC program were project evaluation capability, capacity building, and access to IFC's global experts at little to no cost.

c. **United Nations Industrial Development Organization (UNIDO)** funded an industrial EE program in cooperation with DOE and the Department of Trade and Industry (DTI), called "Philippine Industrial Energy Efficiency Project (PIEEP)", which was completed in March 2019. PIEEP's aim was to introduce the ISO 50001 Energy Management Standard along with system optimization approaches for the improvement of industrial EE in the Philippines. It trained local experts in the optimization of steam, compressed air and pumping systems and energy management, and introduced these concepts to participating industrial enterprises for possible project implementation. The project had three components:

i. **Energy Management.** The purpose of this component was to provide an enabling environment to encourage the industrial sector adopt energy management standards (ISO 50001) compliant energy management systems;

ii. **Systems Optimization.** The purpose of this component was to build the capacity of the industrial sector to implement the optimization of its process systems;

iii. **Enhancement of Financing Capacity.** The purpose of this component was to train financial institutions on the financial aspects and appraisals of industrial EEPs.

d. **World Bank (WB)** recently completed the project ***"Options for Energy Financing in Public Buildings in the Philippines"*** with the aim of identifying options for addressing barriers to financing, and for scaling up EE implementation in public buildings in the Philippines.

   The WB also implemented a Chiller EEP in the Philippines from June 2010 to January 2017 that was aimed at reducing greenhouse gas (GHG) emissions by replacing old inefficient chillers that included the retrofit of both Chlorofluorocarbon (CFC)-based chillers and non-CFC-based chillers.

e. **Asian Development Bank (ADB**) implemented the Philippine Energy Efficiency Project (PEEP) from 2009 to 2014 with the Asian Clean Energy Fund. It was a USD 35 million program supplying 13 million compact fluorescent lamps to homeowners and businesses, retrofitting government office buildings and public lighting systems with efficient lighting and establishing a "super ESCO" to provide financial and technical support to firms planning to cut on their energy consumption;

   ADB also implemented an Electric Tricycle Project. This market transformation through the introduction of "Energy Efficient Electric Vehicles (E-Trike) Project" replaced 100,000 gasoline-burning tricycles in the Philippines with clean, energy efficient e-trikes in Metro Manila and other urbanized and urbanizing centers. Tricycles are motorcycles with passenger sidecars that serve as short-distance taxis in the country

f. **GIZ** implemented the "Eco-Industrial Development of Philippine Economic Zones" project in 2009 to provide a management framework for planning and operating clustered or networked industries in 2 economic zones. Its purpose was to reduce environmental impact and enhance business competitiveness (such as closed-loop models for energy and material recycling, recovery and re-use).

5. EE MARKET GAPS

In terms of regulatory, administrative and policy support from the government, DOE is on track to fulfill its EEC Roadmap shown in Figure 4. However, although the government support and EEC Act are in their early stages, even when implemented, they will not overcome most of the EE market barriers in Section 3. Furthermore, despite several donor programs having addressed some of the EE barriers, several major gaps remain that need to be filled in order for EE to be widely implemented throughout the Philippines as needed to meet it targets, which are summarized below.

5.1 Limited Programs to Create Private-Sector EE Awareness and Demand

a) **EE Awareness**. DOE conducts the following 3 levels of IEC activities to create EE awareness:

- *#EPower* Mo - provides the basic know-how on energy utilization and covers *#ESafety, #ESecure and #EDiskarte*;
- *#Energy Ability* - which is a call or invitation to make energy efficiency and RE as a 'way of life', and
- *#Enerhiyang Atin* - which points to the goal of energy security, self-sufficiency and accountability from energy users and industry players.

DOE also has IEC activities and programs to integrate EEC at the LGU level and in the Learning and Education System. In addition, LCEP's initiative to provide pro-bono energy audits to SMEs in the food and beverage sector has the potential to provide an understanding and appreciation by Facility Owners on the opportunities and potential benefits from EEPs. Despite these initiatives,

much more effort and programs are needed to disseminate EEC information and overcome most barriers that include the following:

- Lack of awareness of the EEC Act, its mandates and key stakeholders' responsibilities/roles;
- Extremely low level of EE knowledge with most stakeholders in the Phillipines, including its sustainability benefits among engineers, architects, auditors, finance professionals, etc.;
- Limited knowledge of EE technologies, EE business models like ESCOs and other relevant contractual and financial solutions and arrangements leading to EE being a very low priority for private sector Facility Owners to invest capital or utilize their credit capacity to finance EEPs versus their core business activities;
- Lack of household awareness of the purpose or benefits of energy labels on appliances to convince them to purchase the more expensive EE products with good paybacks;
- Lack of in-house technical capabilities for most DEs – EE Officers are typically part of a small group within an establishment, and
- Unwillingness of SMEs to prioritize EE over their operational/business investment needs.

b) **EE Demand**. There is very low demand for EE products or services and no meaningful financial incentive programs exist to create EE demand for the private sector beyond the Income Tax Holiday scheme, which provides a relatively minor benefit. Financial incentives (carrot) are needed to offset the cost of the more expensive EE appliances, equipment and services and to motivate end-use consumers to purchase them. The carrot incentives are also needed to offset the penalties (stick) that can be impin the EEC Act for non-compliance.

5.2 Insufficient EE Capacity Building Programs

DOE has relentlessly pursued capacity building initiatives for LGUs to have their own CECOs, CEMs and CEAs. However, these neither cover the private sector nor contain

the missing upgraded IGA and M&V training content needed for professionals of ESCOs and EE Service providers to prepare 'bankable' IGAs with reliable M&V Plans.

Other Capacity Building needs include:

- Training LFIs on how to evaluate the benefits and risks of EEPs and structure project-based financing that mitigates the risks for financiers and provides attractive terms to Facility Owners;
- Developing ESCO industry ESPC templates and tools;
- Expanding the capabilities of testing laboratory staff and facilities to expedite the development of product standards on common equipment like chillers and boilers, and
- Expanding the capacities of LGUs to implement simple EEPs in their own buildings, such as retrofitting their current CFL lighting to LEDs, old air conditioning units to inverter types, etc.

5.3 Inability of Gas to Apply EE Financing Modalities in EEC Act

As explained in Section 3, despite the EEC Act mandating GAs and LGUs to implement EE, they are severely hampered in being able to comply due to their inability to access the private-sector "paid-from-savings' financing and EE services they desperately need and do not have. This is caused by new EEP procurement and paid-from-savings procedures not being included in the current GEMP Guidelines expected to be approved by the IAEECC within 2021 or in early 2022.

5.4 Limitations of DOE to Implement the EEC Act

There are some major challenges in DOE's infrastructure not being able to implement the EEC Act, despite the enacted regulations already being in place. The EUMB is understaffed relative to the activities that it needs to carry out, and its laboratory/testing capabilities and designated test centers need to be enhanced. DOE's IT infrastructure is inadequate to receive, build up and support the EE energy consumption database among other relevant information, reporting and auditing requirements in the EEC Act. Manual processing of huge data input that will be coming from DEs on their annual energy consumption is not an option for this recurring activity.

- EE Stakeholders look to EUMB for technical advice. Examples include:
- LFIs requiring that ESCO loan applications be accredited by DOE.
- The new DC prescribing ESCOs to be either Registered or Certified and not just accredited has tasked DOE to evaluate ESCOs to be either Registered or Certified. EUMB must have the capacity (which it currently does not have) to implement the more rigorous certification process which requires the evaluation of past EEPs completed by the applicant ESCO.
- DOE needing to endorse EEPs to the BOI that qualify for incentives requiring DOE to have the technical and financial capability to evaluate the EEPs.

All these increased tasks and responsibilities in carrying out the mandates of the EEC Act require additional experienced, trained personnel to be hired. Unfortunately, these new personnel, even if coming from other bureaus and divisions within DOE, need capacity building training to get them up to speed in performing the tasks of EUMB. Outside donor support is critically needed to train current and new inexperienced staff and to cover reduced operating budgets caused by COVID.

5.5 No Commercially-Attractive EE Finance

EE Risk-Mitigation Financing Products are critically needed to overcome the huge collateral and confidence barriers of financing EEPs by LFIs, Facility Owners, ESCOs and other EEPs developers. While DBP's E2SAVE offers several attractive features, it has only disbursed USD 1 million to-date, due in large part to the above EE market barriers. DBP believes having access to new credit enhancement (de-risking) financing products is the primary solution to overcoming their barriers, especially the major one related to their difficult collateral requirements. The de-risking products needed are a Partial Credit Guarantee (PCG) and Energy Savings Insurance (ESI). There is a PCG in the market place being offered by PhilGuarantee, a GA, to private-sector LFIs on loans taken out by the private sector companies. However, PhilGuarantee has no prior experience with EEPs and his limited by being prohibited from providing guarantees to loans for GAs or by government-owned financial institutions.

5.6 Limited ESCO Experience and Market Credibility

DOE has been strongly supportive of the emerging ESCO industry by involving it in policy development and multi-stakeholder consultations before issuing guidelines and circulars. DOE also created business toolkits for ESCOs improving their competencies to make feasibility studies on EEPs and participate in capacity building of CEMs and CECOs. However, these budding ESCOs lack knowledge and experience on preparing the much more detailed IGAs and M&V plans as well as on implementing paid-from-savings EEPs. Since the ESCO applying the 'shared savings' and 'guaranteed savings' models in government EEPs is still not possible, ESCOs need support to create the EEP capacity and templates until such time as they are developed with the regulatory revisions needed for GAs to be able to access their paid-from-savings services.

New capacity building programs for IGAs, M&V and ESCO project development and financing need to be developed and offered to ESCOs and all other key EE service providers in the Philippines market

5.7 Environmental, Social and Governance (ESG) Compliance

Currently there is no common ESG framework for the private sector. Common indicators must be put in place for the assessment of EE impacts. Currently, about 90% of publicly listed companies submit sustainability reports annually on a comply-or-explain basis. DOE may work with the Securities and Exchange Commission (SEC) in terms of targeting publicly listed companies who are already undertaking sustainability reporting so that they would consider RE and EEPs to mitigate GHG emissions.

6. RECOMMENDED INTERVENTIONS

Taking into consideration the EE Gaps identified in Section 5 and eliminating those covered by Donor programs in Section 4 to avoid duplication, the below EE interventions are recommended for the Philippines. They are prioritized from highest to lowest potential impact in being able to create EE demand and scale-up the implementation of EE in the Philippines. It should be noted that DOE, as the designated GA responsible for all EE in the Philippines, will be the lead counter-party agency with which all interventions are to be coordinated and approved.

6.1 Support DOE's Implementation of the EEC Act

Provide various types of support to EUMB staff to facilitate its development of Department Circulars, processes, procedures, etc. as needed to perform its implementation requirements under the EEC Act. Strengthening the technical capacity of DOE's EUMB personnel is needed to allow them to effectively perform their tasks and enforce the mandates of the EEC Act.

It would also include assisting DOE in automating its reporting requirements, receipt of energy consumption data, processing the data, establishing baselines and analyses for setting up targets for energy savings. DOE needs IT infrastructure and personnel dedicated for this purpose. Streamlining the reporting process and being able to feedback to Designated Establishments on their compliance or non-compliance to submitting reports on time may entice more end-users to comply with the reporting requirements.

The support in this intervention is a top priority to enable DOE to perform its many new tasks in the EEC Act direly needed for its effective implementation and dissemination.

6.2 Develop/Implement/Fund Demonstration EE/ESCO Projects

Demonstration projects are desperately needed to illustrate to all EE stakeholders in the Philippines how to successfully apply global best-practices in the development, implementation and financing of EEPs in both the governmental and private sector.

Since the GEMP Guidelines will not enable GAs to access the needed ESCO "paid-from-savings' funding and EE services, an alternative suggestion from DOE is to develop and implement demonstration projects that create/apply the new ESCO procurement and paid-from-savings procedures needed to overcome the ESCO barriers to implement EEPs with GAs. It is thus recommended that the first one be a demonstration Street Lighting Project with a LGU, due to its size and easy replicability to many other LGUs. In addition to templates, new procurement and budgeting processes, the demonstration projects may also:

- Enable use of energy savings (or energy OPEX budgets) as basis to procure ESCO contracts or EE improvements in government facilities

- Develop a scheme that will manage risks associated with ESCO/EE multi-year contracts
- Develop public-private partnership business models
- Develop or promote joint venture agreements with government-owned and controlled corporations (GOCCs) and water districts

In addition, this intervention would also 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;
- Prepare an M&V plan that would include obtaining, analyse data and perform initial M&V of savings from each Demonstration EEP;
- Prepare a project-based financing structure and presenting it to LFIs for consideration of a project-based loan;
- Prepare performance-based procurement procedures for selection of a local contractor or ESCO to implement each Demonstration EEP, and
- Perform project management services to oversee the selected contractor or ESCO's implementation of each Demonstration EEP

This intervention would include the creation of a relatively small fund (~USD 10-20 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 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.

6.3 Develop Automated Annual Energy Consumption Reporting by DEs

At this point, compliance by DEs to submit reports on their annual energy consumption data to DOE as mandated by the EEC Act is low. One of the possible reasons is the manual procedure for data submission. While there is a prescribed template to use in providing the data required by DOE, transmittal is by email. Even with the small volume of data so far collected by DOE, the agency is struggling with its manual data processing. Also, there is lack of uniformity in "annual" coverage of data. Some establishments use their fiscal year for data coverage while some use the calendar year. The lack of data uniformity has resulted in problems on data interpretation and difficulty in establishing baselines.

The recommendation is to have an automated system for data collection and a software for data processing allowing quick analysis of different parameters that will provide baseline energy consumption data and basis for future policies and programs. This intervention is a priority because of the urgent need for DOE to collect and analyze the tremendous amount of energy consuming data coming from the DEs to establish baselines, targets, and potential investments needed.

6.4 Deliver EEP Development Capacity Building

Work with DOE to implement a national EE Capacity Building Program (EECBP) that would train and certify the competency of individual professionals to develop 'bankable' EEPs for implementation in public and private energy-consuming facilities in the Philippines. It would also train bankers how to evaluate and structure commercially-attractive EEP Loans. It is important to certify the individuals, and not just the company, and then require that those certified personnel personally certify the results of a study/investigation.

Existing local and international best-practice training and certification materials will be modified to comply with the requirements of DOE and other GAs. The EECBP will provide the new EE knowledge/skills needed to prepare detailed IGAs containing reliable savings and CAPEX estimates and M&V plans, as follows:

a) **Certified Energy Manager (CEM):** Applies local existing training materials and certification process certifying those individuals who demonstrate their

knowledge/ability to analyze energy consumption, identify significant energy users, and establish an energy management system according to ISO 50001.

b) **Certified Energy Auditor (CEA):** Applies local existing training materials and certification process, certifying those individuals who demonstrate their knowledge/ability to audit energy-consuming facilities and identify preliminary EEPs with estimated savings.

c) **Certified Investment Grade Auditor (CIGA):** Applies existing global IGA training materials and TÜV NORD's Exam. TÜV NORD will certify as CIGA those CEAs who demonstrate their competence to prepare IGAs in compliance with generally accepted EE engineering practices.

The CIGA program teaches existing CEAs to prepare 'bankable' IGAs on EEPs for 'Decision Makers' and addresses the current market gap for CEAs to be able to develop ready-to-implement EEPs with reliable estimated CAPEX and energy savings based on measurements, supporting calculations including a M&V plan. The 4-day curriculum includes an exam requiring candidates to prepare an actual IGA. The CIGA exam will be conducted online according to international certification standards as outlined in TÜV NORD's procedures.

d) **Certified Energy Saving Verifier (CESV):** Applies existing M&V training materials and Exam from Efficiency Valuation Organization (EVO). EVO will certify as CESVs those CIGAs who demonstrate their competence to certify an EEP's estimated/achieved savings and M&V plans. The CESV program teaches existing CIGAs to prepare M&V plans that comply with generally accepted M&V principles and calculate the interdependency effect on estimated savings from bundling multiple technologies into a single EEP. CESVs will address the Philippines' current 'low confidence in EE savings' market gap by providing high-grade EE engineers with certified skills to verify estimated savings and M&V plans in IGA reports. The 7-day curriculum includes 3 days of teaching M&V fundamentals needed due to the market-wide M&V knowledge void and an exam requiring the evaluation of an existing IGA.

e) **EEP Finance Professional (EEPFP)** is a training workshop that teaches staff of financial Institutions and ESCOs how to evaluate the benefits and risks of EEPs and structure project-based financing that mitigates risks for financiers and yet is attractive to Facility Owners.

f) **ESCO Project Development Professional** is a training workshop that teaches staff of current and prospective ESCOs how to develop, finance, implement and mitigate risks of EEPs under an ESPC.

This intervention addresses a critical EEP development gap that needs to be overcome in order for the development of bankable EEPs and meaningful pipeline that can be implemented to deliver the Philippines' EE targets. It will likely require a relatively large amount of effort and time to coordinate the programs with the EEC Act's current training and certification programs and also to persuade DOE and the local certifying bodes to accept new international-based programs.

6.5 Develop EE Finance De-Risking Products

a) Develop an Energy Savings Insurance (ESI) product which is critically needed to overcome the huge collateral and confidence barriers of financing EEPs by LFIs, Facility Owners, ESCOs and other EEPs developers. The ESI mitigates the performance risk against any shortfalls in an EEP's savings versus its debt service payments to LFIs and/or investment returns to Facility Owners. It instills confidence with both Facility Owners and LFIs that the estimated future cash flow savings from an EEP will be realized. It also establishes energy savings as a reliable new future cash flow for LFIs to accept as a source of loan repayment, increased credit capacity and reduced collateral requirements of borrowers. The ESI product will be provided by a locally-respected insurance company (**Insurer**) that would pay the shortfall in an EEP's actual savings versus its related debt service payment to a LFI. Its design follows Chubb's 100% financial coverage successfully implemented in US 20+ years ago versus the partial product-warranty coverage of the Inter-American Development Bank's ESI program. The ESI will be structured as a "zero loss" insurance product with fees charged to the EEPs that cover the long-term losses in order to ensure sustainability. A first-loss fund will be included to share initial losses with the Insurer until such time as an experience ratio is determined.

b) Work with PhilGuarantee to have its Partial Credit Risk (PCG) product extended to loans taken out from the GFIs. As it is, PhilGuarantee' PCG program is accessible only by loans taken out from private commercial banks.

This intervention addresses a critical EEP financing gap that needs to be overcome in order for the scaled-up implementation of EEPs and meaningful pipeline that can be

implemented to deliver the Philippines' EE targets. It will very likely require a large amount of effort and time to work with the many stakeholders to get the ESI product designed/accepted by the local market and implemented with support of international donors and other entities. This would include but not be limited to DOE, bank regulators, insurance regulators and providers, LFIs, and private sector EE vendors and service providers, etc.

6.6 Develop Cash Incentive Programs to Drive Private-Sector EE Demand

The EE energy market in the Philippines is private sector led. Thus, its EE market development must be directed towards providing economically viable solutions supportive of SMEs and their growth or recovery from the negative effects of the pandemic. Increased demand for EE in the industrial and services sectors is needed to enhance the relatively high energy rates. It is thus recommended to create and implement two types of EE Cash Payment programs that will provide private end-use energy consumers with an attractive enough incentive to shift their behavior to purchasing more EE Products and implementing EEPs. They will be designed to provide private end-use energy consumers with an attractive enough incentive to shift their behavior to purchasing more EE Products and implementing EE Projects. A brief summary of each one is as follows:

a) **EE Product Incentives** that reflect a cash rebate paid to private purchasers of retail products that minimally 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 with the amount based on the actual kWh and thermal reductions calculated pursuant to generally accepted M&V principles like the IPMVP and verified by CESVs.

The potential positive impact of these cash incentives on creating a large EE demand in the Philippines can be significant to delivering its national EE targets. However, it is a lower priority because of the significant effort and time anticipated to work with the many stakeholders to get EE Product and EE Project cash incentive products designed/accepted by the local market and to secure an acceptable funding scheme. It also is not as critical due to the relatively high electric rates in the market place,

which already provide attractive investment returns. The stakeholders would include not be limited to DOE. DBM, DENR, DOE, DOF, DOST, DTI and also key NGOs and trade associations that include PE2, and private sector DEs, EE vendors and service providers and potential international donors.

EXHIBIT A: DEFINITIONS[9]

1. **Certified Energy Conservation Officer (CECO)** refers to a professional who obtains a certification as a CECO after demonstrating high levels of experience, competence, proficiency, and ethical fitness in the energy management profession, and who shall be responsible for the supervision and maintenance of the facilities of Type 1 DEs for the proper management of energy consumption and such other functions deemed necessary for the efficient and judicious utilization of energy under the EEC Act

2. **Certified Energy Manager (CEM)** refers to a licensed engineer who obtains a certification as a CEM after demonstrating high levels of experience, competence, proficiency, and ethical fitness in the energy management profession, and who shall be chosen by Type 2 DEs to plan, lead, manage, coordinate, monitor, and evaluate the implementation of sustainable energy management within their organizations

3. **Designated Establishment** refers to a private or public entity in the commercial, industrial, transport, power, agriculture, public works, and other sectors identified by DOE as energy intensive industries based on their annual energy consumption in the previous year or an equivalent annual index; the amount of consumption is indicated in the EEC Act and subject to adjustment by DOE as it deems necessary

4. **Distribution utility** refers to any electric cooperative, private corporation, government-owned utility, or existing local government unit (LGU) which has an exclusive franchise to operate a distribution system including those whose franchise covers economic zones

[9] Source: Republic Act No. 11285, "An Act Institutionalizing Energy Efficiency and Conservation, Enhancing the Efficient Use of Energy, and Granting Incentives to Energy Efficiency and Conservation Projects".

5. **Department of Energy (DOE)** refers to the agency created through Republic Act No. 7638, otherwise known as the "Department of Energy Act of 1992", and whose functions were expanded by Republic Act No. 9.136, otherwise known as the "Electric Power Industry Reform Act of 2001"

6. **Energy** refers to all types of energy available commercially including natural gas (liquid natural gas and liquid oil gas), all heating and cooling fuels (including district heating and district cooling), coal, transport fuels, and renewable energy sources

7. **Energy audit** refers to the evaluation of energy consumption and review of current energy cost to determine appropriate intervention measures and efficiency projects in which energy can be judiciously and efficiently used to achieve savings. It may refer to a walk-through audit, a preliminary audit, or a detailed audit

8. **Energy auditor** refers to individuals or entities certified by DOE who have proven credibility and competence to conduct an energy audit, subject to the guidelines in the certification of energy auditors developed by DOE upon consultation with stakeholders

9. **Energy conservation** refers to the reduction of losses and wastage in various energy stages from energy production to energy consumption through the adoption of appropriate measures that are technologically feasible, economically sound, environmentally-friendly, and socially affordable

10. **Energy Utilization Report (EUR)** refers to the periodic report submitted to DOE by Type 1 and Type 2 DEs, distribution utilities, and the transmission utility with regard to the National Energy Efficiency and Conservation Plan containing, among others, energy consumption, energy loss, and status of energy use. The comprehensive contents of the report are specified by DOE

11. **Energy efficiency** refers to the way of managing and restraining the growth in energy consumption resulting in the delivery of more services for the same energy input or the same services for less energy input

12. **Energy Efficiency and Conservation Office (EECO)** refers to the office to be established in each LGU mandated to oversee and monitor the implementation

of their respective Local Energy Efficiency and Conservation Plan (LEECP), which may be part of the planning and development office

13. **Energy Efficiency and Conservation Officer (EEC Officer)** refers to the head of the EECO responsible for overseeing the implementation of the Local Energy Efficiency and Conservation Plan (LEECP) at the local government level, who may be designated from the existing personnel of the LGU

14. **Energy efficiency projects** refer to projects designed to reduce energy consumption and costs by any improvement, repair, alteration, or betterment of any building or facility, or any equipment, fixture, or furnishing to be added to or used in any building, facility, or vehicle including the manufacturing and provision of services related thereto. Such projects shall be cost-effective and shall lead to lower energy or utility costs during operation and maintenance

15. **Energy end user** refers to all individuals and entities which consume energy to include households, industrial and commercial customers, power plants, distribution utilities, and transmission utilities

16. **Energy labeling** refers to the Philippine Energy Standards and Labeling Program (PESLP) which requires manufacturers to attach an energy label on their products to inform consumers about the energy performance and efficiency of the product

17. **Energy management** refers to the process of designing and implementing an optimal program of purchasing, generating, and consuming various types of energy based on the end user's overall short-term and long-term management program, with due consideration of factors including costs, availability, economics, and environmental impact

18. **Energy Service Company (ESCO)** refers to a legal entity that offers multi-technology services and goods towards developing and designing energy efficiency projects, delivering and guaranteeing energy savings, and ensuring cost-effective and optimal performance. Their services include energy supply and management, energy financing, technical engineering expertise and consultancy, equipment supply, installation, operation, maintenance and upgrade, and monitoring and verification of performance and savings. Their goods include lighting, motors, drives, heating, ventilation, air conditioning

systems, building envelope improvements, and waste heat recovery, cooling, heating, or other usable forms of energy control systems

19. **Government energy efficiency projects** refer to energy efficiency projects carried out by all government departments, government-owned and-controlled corporations (GOCCs), state universities and colleges, hospitals, and other instrumentalities of the government which have been evaluated and endorsed by DOE for approval of the Inter-Agency Energy Efficiency and Conservation Committee (IAEECC) created under the EEC Act

20. **Government Energy Management Program (GEMP)** refers to the government-wide program to reduce the government's monthly consumption of electricity and petroleum products through electricity efficiency and conservation, and efficiency and conservation in fuel use of government vehicles, among others

21. **Local Energy Efficiency and Conservation Plan (LEECP)** refers to a collaborative and multi-stakeholder comprehensive framework, governance structure, and programs prepared by the LGU for local energy efficiency and conservation with defined targets, feasible strategies, and regular monitoring and evaluation., which shall be aligned with the EEC Act and the NEECP.

22. **Local government units (LGUs)** refer to the government units created through Republic Act No. 7160, otherwise known as the "Local Government Code of 1991"

23. **Minimum Energy Performance (MEP)** refers to a performance standard which prescribes a minimum level of energy performance for the commercial, industrial, and transport sectors, and energy-consuming products including appliances, lighting, electrical equipment, machinery, and transport vehicles that must be met or exceeded before they can be offered for sale or used for residential, commercial, transport, and industrial purposes

24. **National Energy Efficiency and Conservation Coordinating Officer (NEECCO)** refers to the person appointed by the Department of the Interior and Local Government (DILG) upon the recommendation of the league of LGUs from among all the EEC Officers of different local governments, who shall be responsible for integrating all the LEECPs

25. **National Energy Efficiency and Conservation Database (NEECD)** refers to a centralized, comprehensive, and unified database on national energy consumption, the application and use of energy efficient and renewable energy technologies, and other critical and relevant information to be used for evaluation, analysis, and dissemination of data and information related to energy efficiency and conservation

26. **National Energy Efficiency and Conservation Plan (NEECP)** refers to the national comprehensive framework, governance structure, and programs for energy efficiency and conservation with defined national targets, feasible strategies, and regular monitoring and evaluation, which shall be aligned with the EEC Act and shall be a result of a collaborative and multi-stakeholder consultative process. It shall be regularly reviewed and revised as determined by DOE

27. **Transport vehicle** refers to land, air, or sea vehicles conveying cargo or passengers, regardless of size or weight classification

28. **Specific energy consumption** refers to the energy consumption volume required per unit, such as production volume, sales amount, transportation kilometer, transportation tonne-kilometer, floor space, and such other indicators relevant to energy consumption; and

29. **Transmission utility** refers to any private corporation or government-owned utility which has an exclusive franchise to operate the system of wires for the conveyance of electricity through a high voltage backbone line.