

# **Independent Terminal Evaluation**

## **GEF UNIDO Industrial energy efficiency in the Philippines (PIEEP)**

UNIDO SAP ID: 103049

GEF Project ID: 3601



UNITED NATIONS  
INDUSTRIAL DEVELOPMENT ORGANIZATION



**UNIDO INDEPENDENT EVALUATION DIVISION**

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Mr. Roland Wong, Team Leader and International Evaluation Consultant

Mr. Job Jacob Gonzales, National Evaluation Consultant

## Abbreviations and acronyms

ADB	Asian Development Bank
APEC	Asia Pacific Economic Cooperation
ASEAN	Association of Southeast Asian Nations
AWP	Annual Work Plan
BPI	Bank of the Philippine Islands
BPS	Bureau of Philippine Standards (f.k.a. Bureau of Products and Standards)
CEO ER	CEO Endorsement Request form
CASO	Compressed air system optimization
CC	Climate change
CCO	Climate Change Office
CEM	Certified Energy Manager
CHED	Commission on Higher Education
CO <sub>2</sub>	Carbon dioxide
CDM	Clean Development Mechanism
DBP	Development Bank of Philippines
DENR	Department of Environment and Natural Resources
DOE	Department of Energy
DoST	Department of Science and Technology
DTI	Department of Trade and Industry
ECCP	European Chamber of Commerce
ECO	Energy Conservation Officers
EE	Energy efficiency
EE&C	Energy efficiency and conservation
EECA	Energy Efficiency and Conservation Act of 2017
EECD	Energy Efficiency and Conservation Division
EMS	Environment Management Standard (ISO)
EnMS	Energy Management Standard (ISO)
ENPAP	Energy Efficiency Practitioners Association of the Philippines
EU	European Union
EUMB	Energy Utilization Management Bureau
ERA	Energy Reform Agenda
ESCO	Energy service company
FSP	GEF full-sized project



GW	Gigawatt, 1000 MW
GWh	Gigawatt-hours
GEF	Global Environment Facility
GEF CEO	GEF Chief Executive Officer
GHG	Greenhouse gas
GoP	Government of the Philippines
HQ	Headquarters
IEC	International Electrotechnical Commission
IEE	Industrial energy efficiency
IIEE	Institute of Integrated Electrical Engineers of the Philippines
ISO	International Organization for Standardization
HL	Highly Likely
HS	Highly Satisfactory
HU	Highly Unsatisfactory
IMS	Integrated management standard
IEE	industrial energy efficiency
ktoe	kiloton of oil equivalent
kW	kilowatt
kWh	kilowatt-hour
LGU	Local government unit
M&E	Monitoring and Evaluation
MEPS	Minimum energy performance standard
ML	Moderately Likely
MS	Moderately Satisfactory
Mtoe	million tons of oil equivalent
MTR	Mid-Term Review
MU	Moderately Unlikely
MU	Moderately Unsatisfactory
MW	megawatt (million Watt)
NE	National expert
NEECP	National Energy Efficiency and Conservation Program
NGO	Non-Government Organization
NPC	National Project Coordinator
NPD	National Project Director
P2P	peer-to-peer

PA	Project Assistant
PAWD	Philippines Association of Water Districts
PDB	Philippines Development Bank
PEEP	Philippine Energy Efficiency Project (ADB supported)
PEP	Philippine Energy Plan
PEZA	Philippine Economic Zone Authority
PIEEP	Philippine Industrial Energy Efficiency Project
PIEMP	Philippine Institute of Energy Management Professionals
PIR	Project Implementation Review
PHP	Philippine peso (1 USD $\approx$ PHP 50)
PMU	Project Management Unit
PPG	GEF project preparation grant
PRF	Project Results Framework
PSC	Project Steering Committee
PSEF	IFC-backed Philippines Sustainable Finance Program
PSO	Pump system optimization
RCE	Request for CEO Endorsement
ROtI	Review of Outcomes to Impacts
SE4All	UN Sustainable Energy for All
SEC	Specific energy consumption
SMART	Specific, Measurable, Achievable, Realistic and Time-Bound
SME	Small-to-Medium Enterprise
SO	System optimization
SSO	Steam system optimization
tCO <sub>2</sub>	tons of carbon dioxide (equivalent)
TESDA	Technical Education and Skills Development Authority
ToC	Theory of Change
ToR	Terms of reference
UNIDO	United Nations Industrial Development Organization
UP-NEC	University of the Philippines, National Engineering Center
USD	United States dollar

## Glossary of evaluation-related terms

Term	Definition
Baseline	The situation, prior to an intervention, against which progress can be assessed.
Effect	Intended or unintended change directly or indirectly due to an intervention.
Effectiveness	The extent to which the development intervention's objectives were achieved or are expected to be achieved.
Efficiency	A measure of how economically resources/inputs (funds, expertise, time, etc.) are converted to results.
Impact	Positive & negative, intended & non-intended, directly & indirectly, long term effects that represent fundamental durable change in the condition of institutions, people & their environment brought about by the Project.
Indicator	Quantitative or qualitative factors that provide a means to measure the changes caused by an intervention.
Intermediate States	The transitional conditions between the Project's outcomes & impacts which must be achieved in order to deliver the intended impacts.
Lessons learned	Generalizations based on evaluation experiences that abstract from the specific circumstances to broader situations.
Logframe (logical framework approach)	Management tool drawing on results-based management principles used to facilitate the planning, implementation and evaluation of an intervention. It involves identifying strategic elements (activities, outputs, outcomes, impacts) and their causal relationships, indicators, and assumptions that may affect project success or failure. The logframe is also referred to in the report as the Project Results Framework (PRF)
Outcomes	The likely or achieved short- to medium-term behavioural or systemic effects to which the Project contributes, which help to achieve its impacts.
Outputs	The products, capital goods, and services that an intervention must deliver to achieve its outcomes.
Relevance	The extent to which an intervention's objectives are consistent with beneficiaries' requirements, country needs, global priorities and partners' and donor's policies.
Risks	Factors, normally outside the scope of an intervention, which may affect the achievement of an intervention's objectives.
Sustainability	The continuation of benefits from an intervention, after the development assistance has been completed.
Target groups	Specific entities for whose benefit an intervention is undertaken.

# Executive Summary

## Evaluation Background and Methodology

An independent terminal evaluation (TE) of the UNIDO-GEF Project in the Philippines entitled “Industrial Energy Efficiency” (hereafter, PIEEP or Project) was carried out during the period of January-March 2019. PIEEP was launched in Manila on 23 March 2012 at an Inception Workshop by UNIDO with the Department of Energy (DOE), and the Bureau of Philippine Standards under the Department of Trade and Industry (DTI-BPS) as executing partners. The terminal date of PIEEP was scheduled for 22 September 2017, a period of 5.5 years of implementation; this was re-scheduled to 31 March 2019. This TE follows UNIDO Evaluation Policy and GEF Monitoring & Evaluation Policy. To deliver an evidence-based evaluation, data and information was sourced from key project documentation, desk studies, literature reviews, meetings with individuals and focus groups, and direct observations. The evaluation employed a participatory approach where key stakeholders were kept informed and consulted throughout the process.

This TE was conducted 2 months prior to the completion of the Project. The primary challenge of this TE was not being able to visit all pilot project sites, a minor limitation considering the pilot projects visited were indicative of the interest catalysed by the Project in EE investments in the Philippines industrial sector (Para 11). Another challenge was the effort required by the Project team to obtain information related to the energy savings from participating industrial entities that is considered by many to be proprietary (Para 10).

## Summary of the Main Evaluation Findings

### Impact

Project results are summarized in Table A against intended outcomes of the Project Results Framework and the Theory of Change for the Philippines Industrial Energy Efficiency Project.

**Table A: Comparison of Intended Project Outcomes from the Inception Report to Actual Outcomes**

<b>Intended Outcomes in Project Results Framework of March 2011 and Theory of Change (see Figure 2)</b>	<b>Actual Outcomes as of January 2019</b>
<b>Objective:</b> Introduce ISO 50001 energy management standard along with system optimization approach for improvement of industrial energy efficiency of the Philippines.	<b>Actual impact toward objective:</b> A March 2019 survey of industrial partners of PIEEP revealed estimated annual energy savings of 2,053,046 GJ/year and 114,181 MWh/yr from no less than 57 enterprises against the cumulative energy savings targets of 1,143,149 GJ and 359,877 KWh respectively. There is a strong likelihood that these targets have been exceeded. This same survey also estimates 322,618 tons of <u>annual</u> CO <sub>2</sub> reductions exceeding the cumulative direct target of 261,754 tons of CO <sub>2</sub> over project duration. See Table 7 and Paras 56-57.
<b>Outcome 1:</b> Energy management standard promulgated nationally.	<b>Actual Outcome 1:</b> The new EE and EC Law has been passed by both the Senate and Congress of the GoP, and signed by the President on 12 April 2019 as Republic Act 11285: An Act Institutionalizing Energy Efficiency and Conservation, Enhancing the Efficient Use of Energy and Granting Incentives to Energy Efficiency and Conservation Projects (Paras 34, 79 and 88).
<b>Outcome 2:</b> Capacity of industry and industry support organizations developed to	<b>Actual Outcome 2:</b> The capacity of industry and industry support organizations has been developed for implementing ISO compliant energy management system, as reflected in the 44 trained National EnMS experts, most of whom are

Intended Outcomes in Project Results Framework of March 2011 and Theory of Change (see Figure 2)	Actual Outcomes as of January 2019
implement ISO compliant energy management systems.	working for the 22 companies implementing ISO 50001 systems (Paras 64, 65, 82 and 88).
<b>Outcome 3:</b> Increased adoption of energy management standards by industry.	<b>Actual Outcome 3:</b> Increased adoption is reflected in the total of 18 companies that have adopted ISO 50001 standards to date against a target of 40 companies (see Paras 65 and 82).
<b>Outcome 4:</b> Capacity of industry and industry support organizations developed to implement systems optimization.	<b>Actual Outcome 4:</b> Capacity has been developed on systems optimization with PIEEP meeting all its targets of this outcome including 90 Filipino engineers trained (target 40), and 1,172 factory personnel familiar with SO (target 400) out of which 424 were trained (target 150) on UNIDO tools (see Paras 71, 72 and 74).
<b>Outcome 5:</b> Increased adoption of system optimization energy efficiency projects by industry	<b>Actual Outcome 5:</b> Increased adoption of SO projects reflected in the 163 completed SO projects against a target of 40 (see Para 73).
<b>Outcome 6:</b> Increased availability of financial capacity and support for industrial energy efficiency projects	<b>Actual Outcome 6:</b> Capacity has been enhanced for key financial institutions enabling participating financing institutions to appraise risks of IEE investments, likely at a time when these industrial SMEs move towards EECA compliance (Para 79).

## Project Design

The overall design for PIEEP is *moderately satisfactory* with outcome and output descriptions generally meeting most SMART criteria in Project Results Framework (PRF), and, most importantly, assisting PIEEP implementers in managing the Project (see Para 42). Furthermore, the PIEEP design was a result of extensive consultations with DOE and selected industrial stakeholders that provided a project design they could implement (see Para 38).

## Relevance

The relevance of PIEEP was *highly satisfactory* as it is pertinent to energy efficiency and conservation, a priority of the Government of Philippines through a number of laws, plans, programmes and roadmaps that includes the recently promulgated Energy Efficiency and Conservation Act (Paras 49-51). The Project also supports *GEF-4 Climate Change Strategic Program 2: Promoting energy efficiency in the industrial sector* (Para 52), and UNIDO's mandate, competences, and strategy for inclusive and sustainable industrial development (Para 53).

## Effectiveness

Project effectiveness was *satisfactory* considering the exceedance of the GHG emission reduction targets (Para 57) and the positive feedback from all who participated on the PIEEP training for EnMS and SO (Para 67 and 82). In addition, the feedback from the PIEEP training for financial officers has brought them to a state of readiness to financially assist industrial entities in the Philippines on energy efficiency investments (Para 79).

## Efficiency

Project efficiency was *satisfactory* considering the entire US\$3.316 million GEF grant has been efficiently utilized for training purposes over the 8-year duration of PIEEP, the level of adoption of

EnMS by all industrial participants, and the level of interest generated from PIEEP's training activities, notably in EnMS (Para 82).

### **Sustainability of Benefits**

Sustainability of the Project is only *moderately likely* primarily due to the recent promulgation of the new Energy Efficiency and Conservation Act, the capacity challenges that exist for DOE to implement this legislation, possible issues engaging Type I Designated Establishments (those consuming around 500 MWh per year) in financing IEE investments (see Para 84 and 85) and fractured communications between industrial establishments to share best practices for IEE that may be an impediment to an acceleration of IEE adoption (see Para 83).

### **Monitoring and Evaluation (M & E)**

M&E for the Project was *satisfactory*. The presence of SMART indicators with measurable and achievable targets at the output level made monitoring of the progress towards the targets more clear, allowing the PMU to propose and undertake adaptive management measures to meet these targets, such as approaching institutional and industry associations to scale-up awareness raising and number of industries participating and potentially adopting EnMS and SO (see Para 96).

### **Quality at Entry/Preparation and Readiness**

Project preparations undertaken between August 2009 and December 2010 were led by a Project Manager from UNIDO HQ highlighted by a survey to collect data and information on energy related information and consumptive patterns from different industrial sectors, and two workshops to gauge the willingness of the industrial sectors to make IEE investments. These activities, however, did not include industrial associations or institutional partners who were engaged by PIEEP after 2015 that had the impact of scaling up adoption of IEE. As such, the quality of entry and the preparation and readiness was assessed as *moderately satisfactory* (Para 102).

### **Implementation Approach**

The implementation approach of the Project was *satisfactory* due to its emphasis on raising awareness and training of personnel from large industrial establishments on EnMS and systems optimization, deemed sufficient in convincing these entities of adopting efforts towards energy efficiency in their operations given the cost savings and additional profitability that could be realized (see Para 114).

### **UNIDO Backstopping**

UNIDO supervision and backstopping for this project resulted in achievement of most of the objective level targets and intended outcomes (Para 109). In addition, the participation of UNIDO on this Project was highly valued by all stakeholders (Para 110).

### **Conclusions**

The overall Project was assessed as *satisfactory* as it was a significant contributor in catalysing interest in industrial energy efficiency in the Philippines, with PIEEP achieving most of its intended targets, and by extension most of its intended outcomes. This included PIEEP exceeding its GHG emission reduction targets (Para 57), and the feedback from participants that PIEEP EnMS and systems optimization trainings were very popular (Para 125).

In addition, PIEEP outreach to industrial associations and institutional partners, after 2015 or 3 years

into the Project, to promote and provide training on EnMS and systems optimization, only served to scale-up interest in IEE (Para 126). At the conclusion of PIEEP, these organizations were positioned to assist DOE in implementing the newly promulgated EECA, notably the enforcement of targets and future MEPS of various industrial sectors as set by the DOE (Paras 126-127). However, there are several challenges that lie ahead for the DOE and DTI-BPS in implementing the EECA, most notably of which would be the shortage of staff and a critical number of national experts who could be dedicated to assist to DOE in a strategic approach to implementing the EECA (Para 128).

## **Summary of Lessons Learned and Recommendations**

***Lesson #1:** Activities related to market transformation can benefit from the early involvement of institutional organizations or special interest associations as partners (Para 129).*

***Lesson #2:** Start-up of an industrial energy efficiency program should involve larger and better resourced industrial establishments where the probability is higher for successfully implementing EE projects and quickly demonstrating the benefits (Para 130).*

***Recommendation #1 (to the DOE and DTI-BPS):** Prepare a detailed profile of the Philippines industrial sector that will provide DOE a basis for identifying future IEE programmes (Para 131).*

***Recommendation #2 (to DOE and DTI-BPS):** Identify strategic needs for facilitating “industrial sectoral” implementation of the EECA (Para 132).*

***Recommendation #3 (to DOE and DTI-BPS):** During initial phase of industrial sectoral implementation of EECA, focus on developing “process MEPS” to facilitate use of best EE technologies and equipment (Para 133).*

***Recommendation #4 (to DOE and DTI-BPS):** Sustain strengthened linkages with institutional partners built under PIEEP including LGUs, water districts, electric cooperatives, hospital associations, and PEZA under a green city initiative (Para 134).*

***Recommendation #5 (to DOE and DTI-BPS):** Immediately undertake actions to form an EnMS experts association (Para 135).*

***Recommendation #6 (to DOE and DTI-BPS):** Strengthen linkages with universities and technical colleges to include EnMS and systems optimization in their curriculum (Para 136).*

***Recommendation #7 (to DOE and DTI-BPS):** Seek donor funding from bilateral sources to bridge the period between the end of PIEEP (31 March 2019) and the commencement of the subsequent project in energy efficiency (para 137).*

***Recommendation #8 (to UNIDO):** If possible and with DOE consent, expand scope of IEE to include RE solutions in subsequent programming with the Philippines to reduce operational costs and improve competitiveness of industrial sector (Para 138).*

***Recommendation #9 (to UNIDO):** Assist DOE to strengthen linkage with banks with SME lending windows (Para 139).*

***Recommendation #10 (to UNIDO):** Assist DOE to intensify PEZA involvement in developing and mainstreaming industrial parks in the Philippines to Eco-Industrial Zones or Parks (EIPs) (Para 140).*

# 1 Evaluation Objectives, Methodology, Process

## 1.1 Introduction and Background on the Terminal Evaluation

1. An independent terminal evaluation of the UNIDO Project entitled “the Philippines Industrial Energy Efficiency Project” (hereafter, “PIEEP” or the “Project”) was included as a part of the Project design of 2011. Following UNIDO Evaluation Policy and GEF Monitoring & Evaluation Policy, this report has been prepared as the Terminal Evaluation (TE) for PIEEP, carried out during the period of January to March 2019 by an independent team including an international consultant (Mr. Roland Wong), who also acted as the team leader, and a national consultant (Mr. Job Jacob Gonzales).
2. PIEEP was launched in the Philippines on 23 March 2012 by UNIDO, and executed by the Department of Energy (DOE), and Bureau of Philippine Standards under the Department of Trade and Industry (BPS-DTI) as executing partners. The PIEEP Project is to be completed on 31 March 2019 over a period of just under 8 years.

## 1.2 Objectives and Scope of the Terminal Evaluation

3. Guided by Terms of Reference given provided UNIDO’s Independent Evaluation Division (as provided in Annex 1), this TE had 3 objectives:
  - Assess Project performance in terms of relevance, effectiveness, efficiency, sustainability of benefits, and progress to impact;
  - Drawing lessons and developing recommendations for UNIDO and the GEF that may help for improving the selection, enhancing the design and implementation of similar future projects and activities in the country and on a global scale upon Project completion;
  - Develop findings, lessons, and recommendations that could be used to enhance the design of new projects and implementation of ongoing projects of UNIDO.
4. This TE covers the Project’s duration from its start on 23 March 2012 until 31 January 2019, which included several no-cost extensions.
5. In terms of scope, the TE assessed the extent to which the Project achieved its objective of “introducing ISO 50001 energy management standard along with system optimization approach for improvement of industrial energy efficiency of the Philippines”. In this context, this TE considered the extent to which the technical assistance of PIEEP was effective and assessed the likelihood of sustainability of Project results in achieving 6 intended outcomes: i) energy management standard promulgated nationally; ii) capacity of industry and industry support organizations developed to implement ISO compliant energy management systems; iii) increased adoption of energy management standards by industry; iv) capacity of industry and industry support organizations developed to implement systems optimization; v) increased adoption of system optimization energy efficiency projects by industry; and vi) increased availability of financial capacity and support for industrial energy efficiency projects.

## 1.3 Evaluation Methodology

6. The TE was carried out by an independent team in accordance with the required guidance<sup>1</sup>

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<sup>1</sup> UNIDO’s 2015 Evaluation Policy, UNIDO’s 2006 Guidelines for the Technical Cooperation Project and Project Cycle, GEF Guidelines for GEF Agencies in Conducting Terminal Evaluations, GEF Monitoring and Evaluation Policy, and GEF Minimum Fiduciary Standards for GEF Implementing and Executing Agencies.



following criteria elaborated in the evaluation's ToR, which were rated using UNIDO's 6-point scale, with justifications elaborated through the Report's main body and findings.

7. This TE employed a participatory approach where key stakeholders were kept informed and consulted throughout the process. The TE team liaised with UNIDO's Independent Evaluation Division regarding methodological issues and the conduct of the evaluation. A full list of persons met during the Evaluation mission is provided in Annex 3.
8. To deliver evidence-based qualitative and quantitative information, the collection of data and information was sourced from key Project documentation, desk studies, literature reviews, meetings with individuals and focus groups, surveys and direct observations. Documentation was provided by the UNIDO Project Manager based in Vienna, and the Project Management Unit (PMU) housed within the DOE in Manila that included information from owners and managers who implemented the EE investments identified through ISO 50001 Energy Management Systems (EnMS) and Systems Optimization (SO) trainings provided by the Project. Most of this information was accessible and made available in a timely manner to the Evaluation team. During the 14-24 January 2019 mission to Manila and 28-29 January 2019 visit to Vienna, more than 10 interviews were conducted with a range of key stakeholders from the ministries of the Government of the Philippines (GoP), the PMU in Manila, UNIDO staff in Vienna, to the owners and managers of the various industrial establishments implementing EE measures that were identified through adoption of the ISO50001 with assistance from EnMS and SO experts trained by the Project.
9. The evaluation methodology consisted of:
  - a review of project documents;
  - a re-examination of the Project Results Framework (PRF) through a Theory of Change (ToC) analysis and a Review of Outcomes to Impacts (ROtI), the indicators and targets of which Project performance is evaluated;
  - Skype discussions in early January 2019 with PIEEP personnel located in UNIDO HQ in Vienna prior to mission travel to Manila;
  - interviews with the PMU in Manila, country focal points from key ministries of the GoP, national experts, and industrial personnel during field visits to various industrial facilities that had made EE investments identified through EnMS and SO training, all done during the 14-23 January 2019 period;
  - de-briefing with PMU staff and key government stakeholders in Manila on 24 January 2019;
  - de-briefing with UNIDO HQ in Vienna on preliminary mission findings on 28-29 January 2019;
  - follow-up phone conversations, emails and reporting writing from home bases during February 2019; and
  - a period of additional information gathering, validation of findings and editing of draft report to reflect factual accuracy of the findings.
10. Steps were undertaken to enhance stakeholder engagement and the quality of consultation: i) interviewees were informed about the TE's aims and guided in their input through a semi-structured protocol; ii) well-formulated, open-ended questions and further probes were used to promote balanced reflection, generate new insights, and yield higher quality information (as opposed to yes/no questions or an "audit" approach), as it was considered that input to this TE

required contextualisation, complex description, and explanation; iii) interviewees were assured of the anonymity and confidentiality of their input whenever deemed appropriate, notably industrial entities, many of who considered that any information disclosed was considered proprietary or sensitive.

## 1.4 Challenges and Limitations

11. At the time of this Evaluation, PIEEP was scheduled for completion on 31 March 2019. As such, the TE was conducted within the time period recommended by GEF and UNIDO Evaluation Guidelines for an evaluation. The Evaluation Team spent a total of 10 calendar days in the Philippines, making efforts to see as many industrial stakeholders and government partners as possible. Most of the industrial stakeholders were located in the vicinity of Greater Manila with a few located in secondary cities throughout the Philippines located in Visayas and Mindanao. Unfortunately, the TE team was unable to visit some of these cities due to travel restrictions to these areas. Fortunately, many of the institutional partners and government agencies were located within the Greater Manila Metro area (which has its own challenges related to urban mobility limiting the number of stakeholders that could be visited within one day). Notwithstanding, the limitations to this evaluation were considered to be minor considering the industrial and institutional stakeholders met during the TE mission who provided a reasonable indicator of the interest catalyzed by PIEEP on EnMS and systems optimization and raising awareness and investments in industrial energy efficiency.

## 2 Country and Project Background

### 2.1 Country Background

12. The Philippines is dependent on fossil fuel imports and susceptible to volatile world oil prices with more than 46% of its total energy supply in 2014 being imported<sup>2</sup>, increasing to 51% in 2016<sup>3</sup>. In 2016, 66% of the country's primary energy supply came from fossil fuels such as coal, natural gas and oil due to their lower costs. With the average annual growth rate of the country's real GDP ranging between 6.1 and 6.9% from 2010 to 2016, total final energy consumption for the Philippines was 23.71 Mtoe in 2010 rising to 31.64 Mtoe in 2016, an annual increase of 4.9%. Given the past years of robust economic growth, the forecast for Philippines GDP growth remains in the range of 6.1 to 6.9% for another 10 years. Driving this growth are the industrial and services sectors, both of which are energy-intensive sectors.
13. Energy trends in the Philippines indicate that the proportion and cost of importing energy into the country is increasing, reaching the equivalent of 27.81 Mtoe in 2016. Out of this, 26% was from coal and 34% from oil products<sup>4</sup>. In 2017, DOE data indicated that the country's net import bill (the difference between oil imports and exports) was US\$9.92 billion in 2017, a rise of 29.5% from the US\$6.89 billion in 2016<sup>5</sup>, of which more than 90% comes from the Middle East<sup>6</sup>. An

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<sup>2</sup> <https://tradingeconomics.com/philippines/energy-imports-net-percent-of-energy-use-wb-data.html>

<sup>3</sup> <https://www.iea.org/countries/philippines/>

<sup>4</sup> Ibid 3

<sup>5</sup> <https://www.doe.gov.ph/energist/ph-net-oil-import-2017-%E2%80%93-93-doe>

<sup>6</sup> <https://www.spglobal.com/platts/en/market-insights/latest-news/oil/040218-the-philippines-dependence-on-middle-east-crude-on-the-rise>

estimated 75% of the coal is imported, mainly from Indonesia and Australia<sup>7</sup>.

14. As mentioned in Para 12, the Philippines industrial sector is one of the most energy intensive sectors in its economy, consuming roughly 28% in 2016 of the 31.64 Mtoe of total final consumption. Energy consumption in this sector grew from 6.24 Mtoe in 2010 to 8.86 Mtoe in 2016, an average annual growth rate of 4.9%<sup>8</sup>. Assuming that this growth rate is sustained for the foreseeable future, adoption of energy efficiency by the industrial sector is essential for the sustainability of the Philippines economy.
15. In response to periodic energy crises since the 1970s, the GoP has responded with policies and measures to improve its energy efficiency and national security as a means of ensuring energy supplies to industries are adequate, reliable and affordable, and enabling them to provide continuous employment, low-cost goods and services, that would translate into sustained economic development. Since 2004, the GoP has been active in encouraging the private sector to provide adequate and reliable sources of electricity while at the same time, addressing the issue of climate change that involves increasing the use of indigenous renewable energy and promoting energy efficiency. In 2013, the 2014-2030 Philippine Energy Plan (PEP) was formulated to provide the necessary policy framework to address:
  - strengthening of existing policy, advocacy, programs and regulations;
  - funding for energy efficiency implementation by increasing commercial finance with decreasing reliance on public budgets and donor funding sources;
  - institutional development to provide clear organizational mandates and roles and responsibilities that includes the strengthening of data collection, monitoring activities and reporting requirements; and
  - markets and pricing to eliminate subsidies and cross-subsidies, and create pricing incentives for energy efficiency.
16. The PEP included the National Energy Efficiency and Conservation Program (NEECP), the central strategy for achieving energy security of the Philippines that was launched by the Department of Energy, aimed at improving energy utilization through energy efficiency and conservation, and avoiding an annual 8.95 million tonnes CO<sub>2</sub> emissions. Since 2012, NEECP has implemented:
  - A DOE Fuel Economy Run, focusing on vehicle maintenance and driving capabilities to promote and obtain data on actual fuel consumption;
  - Don Emilio Abello Energy Efficiency Awards that give recognition to outstanding companies and energy managers who implement energy efficiency and conservation (EE&C) programs;
  - The ASEAN-wide Best Practices Awards Competition (for energy management in buildings and industry) that was launched in March 2000 as part of the program on EE&C of the ASEAN;
  - A Standards and Labelling Program for household appliances that includes DOE's Lighting and Appliance Testing Laboratory (LATL) conducting energy performance tests on electrical household appliances, such as room air conditioners and refrigerators and lighting system

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<sup>7</sup> Philippines-based Institute for Climate and Sustainable Cities (ICSC): [icsc.org/strandedcoal](https://www.icsc.org/strandedcoal)

<sup>8</sup>

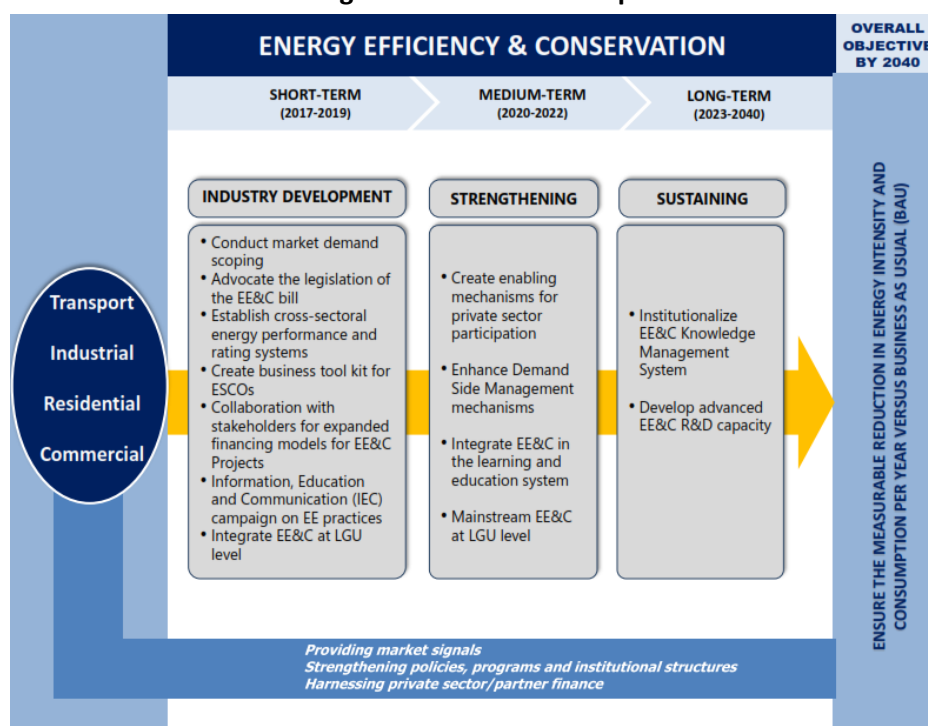
<https://www.iea.org/statistics/?country=PHILIPPINE&year=2016&category=Energy%20consumption&indicator=TFCShareBySector&mode=chart&dataTable=BALANCES>

such as fluorescent lamps and ballasts;

- Energy audits, a technical service provided by the DOE to manufacturing plants, commercial buildings and other energy-intensive companies, with support from energy service companies (ESCOs) in providing engineering and energy management services. This is in line with a 2008 DOE-Department Circular for DOE to promote and accredit ESCOs;
- Government Energy Management Program (GEMP), an ongoing program of the DOE to monitor fuel and electricity consumption of all government departments, bureaus, government owned and controlled corporations, academic institutions, as well as the establishment of energy conservation programs and an energy conservation group in each agency;
- A program to secure voluntary agreements between the DOE and industrial and commercial establishments, to encourage these sectors to voluntarily monitor their energy consumption and implement EE&C programs;
- Information, education and communication (IEC) campaigns, disseminating information on energy standards, energy efficient products and technologies; and
- Promotion of energy efficient technologies in the industrial, commercial, government buildings and household sectors (demand-side management).

The program is voluntary resulting to slow uptake and achievement of results. The 2017-2040 NEECP roadmap is provided on Figure 1<sup>9</sup>.

**Figure 1: NEECP Roadmap**



<sup>9</sup> From December 2013 report on “An Energy Efficiency Roadmap for the Philippines 2014-30” by Switch Asia Policy Support Component in the Philippines available on:

[https://policy.asiapacificenergy.org/sites/default/files/energy\\_efficiency\\_and\\_conservation\\_roadmap2014-2030.pdf](https://policy.asiapacificenergy.org/sites/default/files/energy_efficiency_and_conservation_roadmap2014-2030.pdf)

## 2.2 Sector-specific issues of concern to the Project

17. The actions and activities of the PEP and NEECP mentioned in Paras 15 and 16 to encourage energy efficiency have been piecemeal with an outcome of mixed results that still leaves the Philippines industrial sector with electricity tariffs still amongst the highest in the region. This afflicts many industrial establishments with significant power and fuel components of total operating costs. At the commencement of PIEEP in 2011, there were government-led efforts to establish the requisite regulatory framework to improve industrial energy efficiency, to improve the performance of this sector against high electricity tariffs and fuel oil prices.
18. The main industrial sub-sectors in the Philippines are food and beverages, rubber products, tobacco, textiles, clothing and footwear, pharmaceuticals, paints, plywood and veneer, paper and paper products, and electronics. With 28% of total energy consumption in the Philippines attributable to the industrial sector from 2010 to 2016, the efforts of the Philippines industrial sector for any EE achievements in the sector is primarily in response to increases to high energy prices. This has resulted in ad-hoc efforts to improve EE and a lack of focus on EE issues by senior industry managers. Moreover, when there is relief from these higher energy prices, industries revert to business-as-usual that includes the inefficient use of energy. Consequently, adoption of EE technologies, systems and services had been slow. A continuation of this BAU scenario likely leads to oversized and poorly controlled industrial energy systems that would lead to further increases in the costs of production.
19. In addition, industrial-sourced greenhouse gas (GHG) emissions are attributable to fossil fuel based power generation and to on-site industrial combustion of coal and fuel oil, mostly for steam generation. The overall inefficiency of fossil-fuel usage in the industrial sector is a threat to the environmental and economic sustainability of the country. Surveys of industrial enterprises during the PPG phase revealed the importance of reducing energy consumption; however, less than 20% of those industries spend an appropriate 40 hours on energy management per week.
20. A PPG industrial energy efficiency survey conducted in 2009<sup>10</sup> also revealed that Filipino industrial establishments, in general, do take energy measurements and analyse their energy consumption, either in specific sections of their process as required or for the whole plant (that would include consideration of installations of efficient lamps, motors, and variable-speed drives). The flaw in this approach, however, is the lack of an energy management system in place, and the lack of a comprehensive and integrated approach to sustain energy cost reductions and improve facility productivity. In addition, surveyed companies gave priority to other investment projects to improve productivity instead of EE investment projects.
21. Prior to the commencement of PIEEP, larger Filipino exporting companies adopted national or international management system standards, mainly in response to the importance of being ISO certified, for ISO 9001 for quality management systems or ISO 14001 for environmental management. However, these certifications did not bring formal energy management systems to the majority of Filipino companies. Moreover, energy policy for most of these companies was usually placed within a small engineering or maintenance group.
22. As a result, potential systems-level energy savings prior to PIEEP were largely unrealized. In the USA, Great Britain and China, IEE experiences have added 20-50% efficiencies for complete systems optimization, a vast improvement over the Filipino industrial sector with a focus on individual system components, which has a typical improvement potential of 2-5%. Barriers to

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<sup>10</sup> "Survey on Industrial Energy Efficiency" by the Energy Efficiency Practitioners Association of the Philippines, Inc., 2009.

full adoption of energy efficiency practices prior to PIEEP included: (1) companies having investment priorities other than energy efficiency; (2) insufficient information available on cost benefits of energy efficiency in general; (3) insufficient technical expertise within companies to identify, develop and implement energy efficiency projects; (4) shortage of capital for investments in energy efficiency; (5) insufficient expertise specific to implementing energy management; (6) lack of external drivers such as energy efficiency or CO<sub>2</sub> emissions targets; and (7) market does not place any added value on energy efficient companies. Without removal of these barriers, energy consumption and GHG emissions are likely to continue increasing in the Philippines industrial sector, despite the presence of several domestic energy efficiency programs and initiatives.

23. PIEEP is focused on removal of these barriers to industrial energy efficiency and achieving changes in *how energy is managed* in an industrial facility, rather than through installation of new technologies. This would require the engagement of top management to change the management of energy, integrating energy management into daily management practices and systems for continual improvement. The transfer of know-how to setup an Energy Management Standard (EnMS), ISO 50001, was to provide the necessary framework and organization for industrial establishments to establish, implement, maintain, and improve an energy management system (EnMS), enabling systematic achievement of continual improvement in energy performance, energy efficiency, and energy conservation. Department of Trade and Industry's Bureau of Philippine Standards (DTI-BPS), one of the executing agencies of PIEEP, adopted it as a national standard in 2012 (PNS ISO50001:2012).

## 2.3 Project Summary

### 2.3.1 Project Goal, Objective and General Information

24. The objective of the Philippines Industrial Energy Efficiency Project was to "introduce ISO 50001 energy management standard along with system optimization approach for improvement of industrial energy efficiency of the Philippines".
25. To achieve this objective, the Project was structured into 3 components, each of which were designed to deliver outputs, supported by monitoring and evaluation. The PIEEP design is captured in a Project Results Framework (PRF), which can be found in Annex 5.
26. The 3 components of PIEEP are as follows:
  - Component 1: Energy Management. The purpose of this component was to provide an enabling environment to encourage the adoption of energy management standards by the industrial sector by supporting the Government in promulgating energy management standards, and assisting the industrial sector in building its capacity as well as the capacity of industry support organizations to implement ISO 50001 compliant energy management systems;
  - Component 2: Systems Optimization. The purpose of this component was to increase adoption of system optimization energy efficiency projects by the industrial sector by assisting them in building their capacity as well as the capacity of industry support organizations to implement systems optimization;
  - Component 3: Enhancement of Financing Capacity. The purpose of this component was to increase the capacity of the financial sector to support industrial energy efficiency projects through training of personnel from financial institutes the financial aspects and appraisals of industrial energy efficiency projects.

27. General information of the PIEEP Project is presented in Table 1. Key dates of PIEEP are provided on Table 2. Project expenditures broken down into Project components and co-financing are provided on Table 3.

**Table 1: General Information on the PIEEP Project**

<b>Project title</b>	Industrial Energy Efficiency
<b>GEF ID number</b>	3601
<b>UNIDO ID (SAP Number)</b>	GF/PHI/11/002
<b>Region</b>	EAP
<b>Country(ies)</b>	Philippines
<b>GEF Focal area and operational program:</b>	GEF-4 Climate Change 2: Promoting energy efficiency in the industrial sector, SP2 – Industrial Energy Efficiency
<b>Co-implementing agency(ies)</b>	n/a
<b>GEF agencies (implementing agency)</b>	UNIDO
<b>Project executing partners</b>	Department of Energy (DoE), Bureau of Philippine Standards under the Department of Trade and Industry (BPS-DTI)
<b>Project Size (FSP, MSP, EA)</b>	FSP
<b>Project CEO endorsement/Approval date</b>	25 March 2011
<b>Project implementation start date</b> (PAD issuance date)	23 March 2012 (16 April 2011)
<b>Original expected implementation end date</b> (indicated in CEO endorsement / Approval document)	30 November 2016
<b>Revised expected implementation end date</b> (if any)	31 March 2019
<b>Project duration (months)</b>	96 months
<b>GEF grant (USD)</b>	US\$ 3,166,065
<b>GEF PPG (USD) (if any)</b>	US\$ 85,650
<b>Co-financing (USD) at CEO endorsement</b>	US\$ 24,000,000
<b>Total project cost (USD)</b> (GEF grant + co-financing at CEO endorsement)	US\$ 27,251,715
<b>Agency fee (USD)</b>	US\$ 325,171

**Table 2: Key dates for the PIEEP Project**

<b>Milestone</b>	<b>Expected date</b>	<b>Actual date</b>
Project CEO endorsement / Approval date	25 March 2011	25 March 2011
National approval		December 2011
PMU establishment		January 2012
Project implementation start date (PAD Issuance Date)	1 June 2011	23 March 2012 (16 April 2011)
Original expected implementation end date (indicated in CEO endorsement/ approval document)	30 November 2016	22 September 2017
Revised expected implementation end date (if any)		31 March 2019
Terminal evaluation completion	1 March 2017	31 March 2019
Planned tracking tool date	1 March 2017	31 March 2019



**Table 3: Summary of PEEP Project Framework**

Project Component	Activity Type <sup>11</sup>	GEF financing (in USD)		Co-financing (in USD)	
		Approved	Actual <sup>12</sup>	Promised	Actual <sup>13</sup>
1. Energy management	a,b,c	1,078,650	n/a	4,600,000	18,860,661
2. Systems optimization	a,b,c	1,163,500	n/a	18,200,000	3,990,436
3. Enhancement of financing capacity	a, b	503,500	n/a	475,000	n/a
Project management	a	316,000	n/a	705,000	n/a
Monitoring and evaluation	a	105,000	n/a	20,000	n/a
<b>Total</b>		<b>3,166,650</b>	<b>3,090,931</b>	<b>24,000,000</b>	<b>22,851,097</b>

### 2.3.2 Partners and Stakeholders

28. The PEEP Project was launched with GEF funding, together with in-kind and cash contributions from UNIDO and co-financing partners in the Philippines. As the implementing agency for the Project, UNIDO was accountable for the GEF grant and for monitoring in-kind contributions provided by the Department of Energy as well as in-kind and cash contributions from the financial institutional partners. Further details concerning financing aspects are in Annex 4. Key stakeholders involved in Project execution and their envisaged roles at the commencement of PEEP are outlined in Table 4. These actors were identified and engaged in PEEP's design based on their ability and interest to strengthen the Project's outcomes and play a role in sustaining its results.

**Table 4: Stakeholders identified at PEEP design stage**

Stakeholder and Mandate	Role in PEEP
<b>Department of Energy (DoE)</b> DoE's mandate is to prepare, integrate, coordinate, supervise and control all plans, programs, projects and activities of the government relative to energy exploration, development, utilization, distribution and conservation. DOE is also responsible for formulating, planning and implementing the energy policy of the country. Its Energy Utilization Management Bureau (EUMB) has the responsibility for formulating and implementing policies, plans, programs, and regulation on utilization of energy; this includes conventional as well as new and renewable energy technologies. Within EUMB, there is the Energy Efficiency and Conservation Division (EECD). DoE also chairs the Steering Committee of the Don Emilio Abello Energy Efficiency Award.	DoE is the lead agency in setting and promulgation of policies related to EE and energy conservation development, and serves as the Chair of the Project Steering Committee (PSC). The Project has provided technical assistance to DoE to update and advance these policies, and to promote ISO 50001 on behalf of DoE.
<b>Bureau of Philippine Standards of the Department of Trade and Industry (BPS-DTI)</b> BPS develops, promotes and implements product standards and related programs nationwide. It also participates and represents the Philippines in various standards related activities globally. BPS is an active member of the International Organization for Standardization (ISO), the International Electrotechnical Commission (IEC), the Asia Pacific Economic Cooperation (APEC), and the ASEAN Consultative Committee for Standards and Quality. BPS also provides services related to the Accreditation of Conformity Assessment Bodies which awards certificates of accreditation to management system certification bodies that issues certificates such as ISO 9001, ISO 14001 and ISO 50001.	BPS-DTI will oversee a greater volume of approvals for ISO 50001 for industrial entities commensurate with the energy saving targets of PEEP.

<sup>11</sup> Activity types are:

- a) Experts, researches hired
- b) Technical assistance, workshop, meetings or experts consultation scientific and technical analysis
- c) Promised co-financing refers to the amount indicated on endorsement/approval.

<sup>12</sup> Not available

<sup>13</sup> From Tables 4.5 and 4.10 of the PEEP Survey Assessment of Project Impact/Results – Final Report, IIEC-Asia, March 2019. These numbers are likely under-reported since no co-financing estimates (likely in-kind) were made for government stakeholders such as DOE and DTI-BPS.



Stakeholder and Mandate	Role in PIEEP
<b>Department of Environment's and Natural Resources (DENR)</b> The DENR is tasked to formulate and implement policies, guidelines, rules and regulations related to environmental management and pollution prevention and control. It likewise implements and supervises the government's policies, plans and programs pertaining to the management, conservation, development, use and replenishment of the country's natural resources and biological diversity. DENR serves as the GEF focal point.	DENR was to provide oversight on the development of impacts of PIEEP to ensure that it aligns with the environmental goals of the Philippines government.
<b>Department of Science and Technology (DoST)</b> DoST formulates the Technology and Science Plans, and promotes technological and scientific research in the country, and provides where appropriate certain technological and assessment services. Under the purview of DoST, the Philippine Council for Industry and Energy Research & Development (PCIERD) is a government agency for the planning, monitoring, and promotion of scientific and technological research for applications in the industrial, energy, utility, and infrastructure sectors.	DoST will be represented on the PSC to provide technical guidance on the utility of various EE technologies and measures as well as techniques for the collection of monitored energy data that can be used to measure energy savings of an enterprise generated from an EE investment.
<b>Development Bank of Philippines (DBP)</b> <b>Land Bank of the Philippines (Land Bank)</b> DBP is a state/owned development bank aiming at various economic sectors, while the Land Bank (also state-owned) has a focus on agriculture. DBP aims to cater for the need of enterprises with emphasis on small and medium-scale enterprises. In their development financing DBP and Land Bank are committed to environmental and sustainable development projects and have been financing projects in the area of renewable energy, energy efficiency and biofuels.	Both banks were to participate in training for financial sector personnel, with an intended outcome of these banks being able to more confidently approve lines of credit and loans for financing industrial energy efficiency investments.
<b>Bank of the Philippine Islands (BPI)</b> BPI is a leading private-owned provider of financial services in the Philippines. BPI's Sustainable Energy Finance (SEF) Program makes available finance for companies to invest in technologies aimed at improving the efficiency of energy generation, energy distribution and energy use. Sustainable energy projects include energy efficiency modifications and renewable energy technologies	

### 2.3.3 Key Events in Project Design and Implementation

29. Table documents the key milestones related to project design and implementation.

**Table 5: Key events in PIEEP Project design and implementation**

Key project event	Date
Project design was commenced during economic downturn and rise of oil prices	2009
Project preparations for PIEEP undertaken	August 2009 – December 2010
CEO endorsement approval	25 March 2011
Implementation start date of Project (PAD issuance date)	23 March 2012 (16 April 2011)
Setup of PMU including a National Coordinator for PIEEP	January 2012
Provision of training for EnMS and SO with a focus on 4 industrial sectors: metal & steel, chemicals, food processing and pulp & paper	2012-15
Follow-up surveys to monitor implementation of EnMS and SO	2018 to 2019
Policy workshop to formulate legislative policies and courses of action for DOE to drive implementation of EnMS in enterprises	20 February 2014
Designation of a National Coordinator for PIEEP commenced work	March 2015
Sectoral scope of PIEEP expanded beyond 4 sectors	Commencing mid-2015
Outreach to PEZA	2015
Outreach to Quezon City	2016
Senate and Congress sign off on new Energy Efficiency and Conservation Act (EECA)	January 2019
Terminal date of PIEEP	31 March 2019

#### 2.3.4 Implementation Arrangements and Project Partners

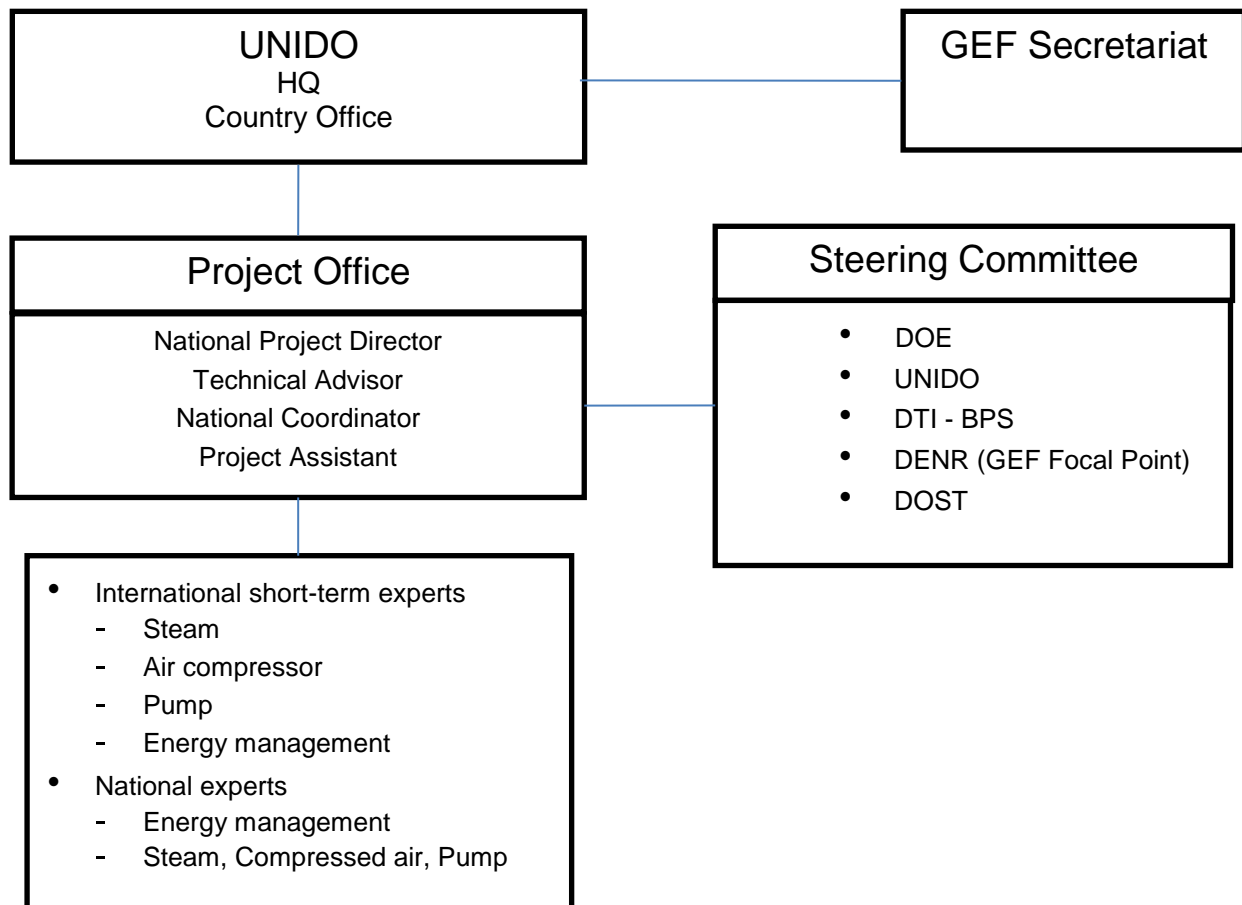
30. As the GEF Implementing Agency, UNIDO had responsibility for the delivery of planned PIEEP outputs and the achievement of intended outcomes. As agreed with the Government of the Philippines (GoP), UNIDO was also expected to directly execute PIEEP with its execution partners DoE and DTI-BPS whose profiles are provided in Table 4. UNIDO's responsibilities to PIEEP included overall management and monitoring, Project performance reporting to GEF, procurement of international expertise to deliver outputs planned under the 3 PIEEP components, and providing supplemental technical expertise to ensure technically sound deliverables consistent with Project requirements.
31. A Project Management Unit (PMU) was to be established with the contributions from DoE. The PMU was to be staffed with a National Project Director (NPD), a Technical Advisor, a National Coordinator (NC) and a Project Assistant (PA). PMU responsibilities to PIEEP included day-to-day management, monitoring and evaluation of Project activities as per approved work plans, and coordination of all Project activities being carried out by national experts and partners, in close collaboration with DoE and DTI-BPS. UNIDO was to provide the PMU with GEF funds as required to execute work plans and to support the necessary management and monitoring of PIEEP. Execution arrangements for the PIEEP are illustrated on Figure 2.
32. The Project management arrangements also included a Project Steering Committee (PSC) that was to be established with representatives from the key government institutions participating in PIEEP, namely DoE, DTI-BPS, DoST, and the GEF Focal Point in the Philippines (under DENR) as well as UNIDO. The PSC was tasked to review and evaluate progress and provide broad policy guidelines for implementation of the three project components.
33. Detailed working plans for the entire implementation period of PIEEP were to be developed by UNIDO in collaboration with the DOE and PMU. The work plans were to clearly define roles and responsibilities for the execution of Project activities, as well as monitoring and evaluation, and to set milestones for deliverables and outputs. The working plan would be used as a basis for advancing funds to the PMU, and as a management and monitoring tool by UNIDO and the PMU to be reviewed and updated as appropriate on a biannual basis.

#### 2.3.5 Positioning of the UNIDO Project

34. The Philippines Industrial Energy Efficiency Project was positioned at the time of its design in 2010 to support the GoP strategy on sustainable energy development, reflecting in part, the general concern of the GoP on inefficient energy usage by the industrial sector. Moreover, rising GHG emissions from fossil fuel combustion in industry and power generation, and high prices for imported fuels constituted threats to the environment and economic sustainability of the country. GoP is also conscious of the need to improve the competitiveness of the Philippines industrial sector by reducing production costs and promoting sustainable and low-carbon development. As mentioned in Paras 15 and 16, PIEEP was positioned to support the GoP in contributing towards meeting the objectives and targets of:
  - the 2014-2030 Philippine Energy Plan that includes the NEECP and the Energy Efficiency and Conservation Roadmap (that has been updated annually since 2012);
  - the Climate Change Act 9729 (2010) that aims at mainstreaming climate change into government policy formulations, establishing the framework, strategy and program on

climate change, and creating the Climate Change (CC) Commission<sup>14</sup> and strengthening the coordination functions of the a Climate Change Office (CCO)<sup>15</sup> that serves as the coordinating mechanism internally amongst DENR offices and externally with other national government agencies, non-government organizations and local government units on matters related to climate change;

**Figure 2: PIEEP Execution Arrangement**



- The Energy Efficiency and Conservation Act of 2017 (EECA), legislation that was passed by the Senate and Congress as of January 2019, and became the Republic Act 11285, signed on 12 April 2019 by the President. This law establishes a policy foundation for accelerating energy efficiency in the economy, and to develop an integrated, comprehensive energy management policy to maximize the impact of energy efficiency and conservation in the economy. The EECA empowers the DOE to lead and coordinate with other government agencies a national program on EE&C obligating industrial establishments consuming more than 500 MWh annually of energy to adopt ISO 50001 energy management systems. Further

<sup>14</sup> The CC Commission is under the Office of the President, and setup as the lead-policy making body of the government tasked to coordinate, monitor and evaluate government programs and ensure mainstreaming of climate change in national, local, and sectoral development plans

<sup>15</sup> The CCO is under DENR and was created in 2009

details of this legislation are contained in Paras 79 and 88.

35. PIEEP was also positioned amongst other donor related projects related to the GoP's drive to become more energy independent. A sampling of some of these projects included:
- The IFC-backed Philippines Sustainable Finance Program (PSEF) that sought to increase local sources of sustainable energy financing to stimulate private sector investment through IFC's partner banks and reduce GHG emissions<sup>16</sup>. PSEF was implemented during the 2009-2016 period;
  - A JICA-supported project entitled "Developmental Study of Energy Efficiency and Conservation in the Philippines" (implemented during 2009-2012) which provided support for an organizational framework on energy efficiency and conservation promotion and assisting the design of an energy efficiency and conservation bill<sup>17</sup>;
  - A World Bank GEF supported project entitled "Chiller Energy Efficiency Project" that was implemented from June 2010 to January 2017 with the objective of reducing GHG emissions by replacing old, inefficient chillers, both CFC and non CFC<sup>18</sup>;
  - The ADB-supported "Philippine Energy Efficiency Project" (PEEP) implemented from 2009 to 2014 with the Asian Clean Energy Fund that was a US\$35 million a 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 energy consumption<sup>19</sup>;
  - GTZ-supported "Eco-Industrial Development of Philippine Economic Zones" implemented in 2009 to provide a management framework for planning and operating clustered or networked industries in 2 economic zones aiming to reduce environmental impact and enhance business competitiveness (such as closed-loop models for energy and material recycling, recovery and re-use)<sup>20</sup>.
36. Considering the aforementioned, PIEEP was well positioned within the Philippines to occupy the unique space of building the capacity of industrial stakeholders, the DOE and DTI-BPS on ISO 50001 Energy Management Systems and Systems Optimization.

## 3 Project Assessment

### 3.1 Project Design

#### 3.1.1 Overall Design

37. The PIEEP design was assessed against the 2010 baseline scenario and barriers to widespread adoption of energy efficiency in the industrial sector in the Philippines as described in Paras 17 to 23. The PIEEP design was aimed at advancing industrial energy efficiency in the Philippines

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<sup>16</sup> <http://documents.worldbank.org/curated/en/990311501766568248/pdf/117882-WP-PUBLIC-IFC-00507694-Phil-SEF-Executive-Summary-of-Evaluation.pdf>

<sup>17</sup> [http://open\\_jicareport.jica.go.jp/pdf/12058228\\_01.pdf](http://open_jicareport.jica.go.jp/pdf/12058228_01.pdf)

<sup>18</sup> <https://www.thegef.org/project/chiller-energy-efficiency-project>

<sup>19</sup> <https://www.adb.org/sites/default/files/project-document/161212/42001-013-pcr.pdf>

<sup>20</sup> [https://www.sia-toolbox.net/sites/default/files/peza\\_gtz\\_eid\\_brochure.pdf](https://www.sia-toolbox.net/sites/default/files/peza_gtz_eid_brochure.pdf)

through building the capacity of the industrial sector in the Philippines to adopt and invest in energy efficiency measures, building the capacity of financial institutions to support industrial energy efficiency projects, and providing policy support to establish the legal framework for promulgating energy management standards. Unlike several other UNIDO-GEF projects, PIEEP did not include any pilot projects or Project investments, relying solely on the quality of training and follow-up by trained national experts to generate direct energy savings and GHG emission reductions. A number of PPG activities were undertaken by UNIDO between August 2009 and December 2010 to determine the baseline and barriers to widespread adoption of energy efficiency in the industrial sector including:

- close collaboration with the DoE on the collection and analysis of information on the industrial sector including energy management issues, capacity needs of relevant national institutions, and baseline policy, all of which serve as a basis for incremental assistance from GEF project;
- surveys and consultations with selected industrial stakeholders managing industrial entities with the food and beverage sector having sufficient fiscal resources and the willingness to make IEE investments;
- two workshops to consult with all relevant stakeholders on a proposed project design, designed to solicit feedback and improve the design to meet the needs of the industrial sector; and
- preparations of the Request for CEO Endorsement (RCE) document for submission to GEF for funding.

38. The PIEEP design incorporated an approach of concurrent activities to support the preparation of energy management standards and the training of industrial stakeholders and industrial support groups on EnMS and systems optimization policy framework, followed by training support to personnel from the financial sector. With PIEEP having ambitious targets of over 500 companies implementing operational improvements over a 5-year period, transformational change from this Project was intended but with challenges to achieve considering:

- the baseline comprehension of EnMS by the industrial sector at large;
- extensive efforts to engage industrial stakeholders who would typically be skeptical of offers of free technical assistance;
- efforts to arrange the numerous training sessions; and
- extensive efforts to follow-up on all industrial stakeholders to report on whether or not they have adopted EnMS and undertaken efforts to implement EE measures.

39. The PIEEP design also assumed that the industrial stakeholders adopting EnMS would be encouraged to invest in systems optimization and other EE measures if loan finance were more accessible. Considering that none of the industrial partners of PIEEP to date have required bank financing indicates that large industrial stakeholders can self-finance their own EE projects. The work of Component 3, however, should not be considered as an effort in vain since industrial SMEs, if they are to be addressed for their energy performance, will require financing and different approaches for implementation. This is further discussed in Paras 77, 79, 85, 111, 115, 127 and 139.

40. With regards to these GHG emission targets, the evaluation team appreciates the uncertainties

of estimating *global environmental benefits of the PIEEP or any other GEF project*. The indicators and targets for energy savings and GHG emission reductions generally meet SMART criteria although the “achievability” is questionable considering the difficulties in forecasting what EE measures may be undertaken for each factory, and “measurability” problematic due to difficulties in obtaining energy savings information from all IEE participants.

***The rating for overall design is “satisfactory”***

### 3.1.2 Logframe and Reconstructed Theory of Change

41. The Project Results Framework (PRF) for PIEEP was assessed to obtain a comprehensive understanding of intended outcomes in comparison with the actual outcomes achieved. In addition, the quality of SMART indicators and targets in the PRF has been assessed for its effectiveness in the monitoring of progress. The full PIEEP PRF is provided in Annex 5. Table 6 is a condensed version of the PRF with suggested amendments to the description of outputs in the PRF as described on pages 29-33 of the RCE Document.
42. While the overall design of PIEEP appears responsive to the needs of Philippine industrial stakeholders in 2009, the general quality of the PRF in the context of best practices for its preparation is *moderately satisfactory* with outcome and output descriptions generally meeting most SMART criteria, and, most importantly, assisting PIEEP implementers in managing the Project. Some minor comments on the quality of the PRF in comparison with best practices for preparing PRFs includes:
  - Objective (impact) level indicators and targets meet SMART criteria;
  - Notwithstanding that output descriptions are prepared according to UNIDO guidance (including the 2011 UNDG RBM handbook), outputs can be better distinguished from outcomes or actions by simply dropping the verb from the wording of an output. Output descriptions on pages 29-33 of the RCE document are described with verbs whereas the “Revised Outputs” on Table 6 are revised without the verbs. For example, Output 1.2 in the PRF can be worded as “training material and tools on energy management”, simply corrected by dropping the word “developed”;
  - Some output indicators not meeting SMART criteria. Comments are as follows:
    - Though all targets are to be achieved by the EOP, some of these targets should have some time-bound description given the delivery of these outputs is clearly before the EOP. An example would be the delivery of Outputs 1.2, 2.1 and 3.2, all required for conducting training for EnMS, systems optimization, and financial appraisals of EE projects. Since the indicators for these outputs of “availability of technical training materials....” is not appropriately time-bound, a suggested change for this could be “technical training materials and tools available for training events..... by Year 1”;
    - The Output 1.3 indicator of “a national campaign to promote industrial energy management and ISO 50001” has a target of “publicity materials brochures”. The indicator is not relevant to the target, and could be improved by keeping the target but changing the indicator to, for example “publicity brochures to support a national campaign to promote industrial energy management and ISO 50001”;
    - The Output 1.7 indicator of “recognition program for participating factories....” with its target of “existing DOE award program strengthened” can be more specific in terms of what is being measured. A suggested and more specific indicator could be “% annual

increase in number of factories participating in award scheme who are reporting energy savings”;

- The Output 3.3 target should have been “500 financial managers trained in ....” to reflect the indicator description.

**Table 6: PIEEP Project Results Framework**

Components	Outcomes	Outputs (in 2011 PRF)	Revised Outputs (for ToC analysis)
Project Objective	Introduce ISO 50001 energy management standard along with system optimization approach for improvement of industrial energy efficiency of the Philippines.		
C1: Energy management	<p>Energy management standard promulgated nationally</p> <p>Capacity of industry and industry support organizations developed to implement ISO compliant energy management systems</p> <p>Increased adoption of energy management standards by industry</p>	<p>O1.1: Policy support</p> <p>O1.2: Training materials and tools on energy management developed</p> <p>O1.3: National awareness campaign on ISO50001 launched</p> <p>O1.4: Peer-to-peer network developed</p> <p>O1.5: Trained national experts/factory personnel on energy management</p> <p>O1.6: ISO compliant energy management systems implemented</p> <p>O1.7: Recognition program developed</p>	<p>O1.1: Policy support</p> <p>O1.2: Training materials and tools on energy management</p> <p>O1.3: National awareness campaign on ISO50001</p> <p>O1.4: Peer-to-peer network</p> <p>O1.5: Trained national experts/factory personnel on energy management</p> <p>O1.6: Implemented ISO compliant energy management systems</p> <p>O1.7: A developed recognition program</p>
C2: Systems optimization	Capacity of industry and industry support organizations developed to implement systems optimization. Increased adoption of system optimization energy efficiency projects by industry	<p>O2.1: Training materials and tools developed</p> <p>O2.2: Trained national experts/factory personnel on systems optimization</p> <p>O2.3: Vendors participation on system optimization training</p> <p>O2.4: Documented systems optimization demonstration projects</p>	<p>O2.1: Training materials and tools on SO</p> <p>O2.2: Trained national experts/factory personnel on systems optimization</p> <p>O2.3: Trained vendors on system optimization training</p> <p>O2.4: Documented systems optimization demonstration projects</p>
C3: Enhancement of financing capacity	Increased availability of financial capacity and support for industrial energy efficiency projects	<p>O3.1: Harmonized energy efficiency project evaluation criteria</p> <p>O3.2: Training materials developed</p> <p>O3.3: Managers trained in the financial aspects of energy efficiency projects</p> <p>O3.4: Support for packaging of loans for industrial energy efficiency projects</p>	<p>O3.1: Harmonized energy efficiency project evaluation criteria</p> <p>O3.2: Training material on financing IEE</p> <p>O3.3: Trained managers in the financial aspects of energy efficiency projects</p> <p>O3.4: Trained officers on IEE project appraisals</p>

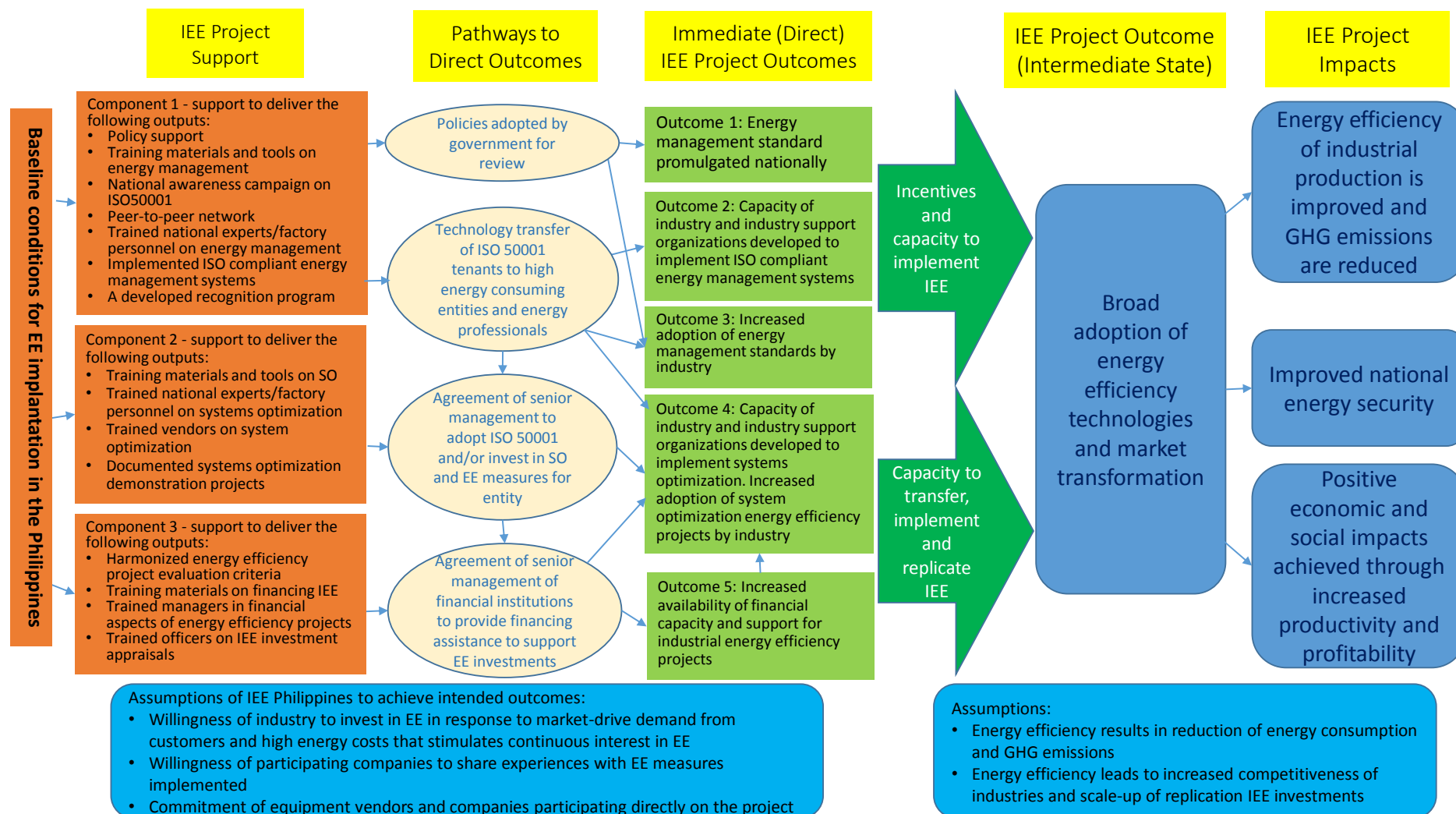
43. The PIEEP design and its PRF were re-examined using a Theory of Change (ToC). The ToC essentially describes the Project as a roadmap of pathways driven by regulatory or market drivers in combination with Project activities to reach intended Project outcomes and long-term outcomes; this would enable to a more effective assessment of PIEEP sustainability. A ToC for the PIEEP was prepared for this TE as shown on Figure 3 that is closely linked to the PIEEP PRF in Annex 5, and using UNIDO's "Generic Theory of Change for UNIDO Energy Efficiency Programs"<sup>21</sup> with slight changes made to reflect the ground conditions in the Philippines.
44. The logic of the ToC diagram in Figure 3 flows in a horizontal direction (left to right) from component activities and outputs (brown boxes) to long term Project impacts (dark blue boxes) of the PIEEP. The ToC includes Project pathways (light pink ovals), direct outcomes (green boxes), and an intermediate state that leads to 3 intended long-term impacts of the PIEEP of "consumption of fossil fuel in industrial production is minimized and GHG emissions are reduced", "improved national energy security" and "positive economic and social impacts achieved through increased productivity and profitability". The initial assessment of the PIEEP PRF led to some adjustments to the language of the outputs in the ToC (essentially rewording of outputs that clarify required actions to achieve the intended outcome as described in Table 6) which led to re-constructing the Project's ToC.
45. The ToC analysis re-confirms the intended outcomes of the PIEEP would generate long-term impacts after the EOP that would need to be driven by:
- Promulgation of legislation making energy management systems mandatory or setting minimum energy performance standards for industry;
  - The availability of a critical mass of EnMS and systems optimization experts to assist industries towards energy efficiency; and
  - The availability of capacity within the financial sector to provide financing of IEE investments for industrial establishments.
46. In this ToC visualisation, success of the PIEEP to achieve its intended direct outcomes was predicated on the following assumptions (some of which are mentioned in the PRF) that are somewhat beyond the control of the PIEEP:
- Energy costs continue to be high, stimulating interest amongst industrial establishments to improve their energy efficiency;
  - Willingness of companies to share experience with EE measures and projects implemented;
  - The demand for industrial outputs is sustained, creating demand for improvements in energy intensities of production.
47. In a Review of Outcomes to Impacts (ROtI), pathways from direct outcomes to achieve IEE Project (long term) impacts include an intermediate state of "broad adoption of energy efficiency and market transformation". Assumptions that will increase the likelihood of achieving long term impacts includes "legislation mandating EE is conducive to changing behaviour of industries that increases interest and investment towards energy efficiency", and "EE leads to increased industry competitiveness and a scale-up of replication EE investments". The second assumption can also be considered a driver that is somewhat related to the driver of "incentives to implement EE".

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<sup>21</sup> 2017 UNIDO Independent Evaluation Division Elaboration



**Figure 3: Reconstructed Theory of Change for PIEEP**



48. In summary, the overall design of the PIEEP is *satisfactory* due to its clarity of promoting ISO 50001 energy management systems and systems optimization, notwithstanding the aforementioned issues mentioned in Para 42 on the shortcomings of the SMART indicators in the PIEEP PRF.

***The rating for the log frame is “satisfactory”***

## **3.2 Project Performance**

### **3.2.1 Relevance**

49. PIEEP is highly relevant to the Philippine government strategy on sustainable energy development. As mentioned in Paras 15, 16 and 34, GoP has been intent on addressing the issues related to the decreasing competitiveness of its industrial sector due to its inefficiencies of energy use, its own national energy security, and its need to address climate change, which has prompted the formulation of the Philippine Energy Plan (PEP), the latest version of which is 2014-2030.
50. Furthermore, the PEP is basically anchored on the policy framework set in place with the formulation of the Energy Reform Agenda (ERA). The ERA is consistent with national development directives such as the President’s Social Contract and the 2011-2016 Philippine Development Plan, and is responsive to global policy frameworks on energy such as the UN Sustainable Energy for All (SE4All) Initiative and the APEC Green Growth Goals.
51. PIEEP is also relevant to the by-products of the PEP including the National Energy Efficiency and Conservation Program (launched in 2004), and the latest Energy Efficiency and Conservation Roadmap (2014-2030) that includes the recently approved Energy Efficiency and Conservation Act (EECA) mentioned in Para 34 and further discussed in Paras 79 and 88. As mentioned in Para 34, PIEEP is also relevant to the Climate Change Act 9729 (2010) that aims to mainstream climate change into government policy formulations, establishing the framework, strategy and program on climate change and creating the Climate Change (CC) Commission.
52. PIEEP also supports GEF-4 Climate Change Strategic Program 2 “Promoting energy efficiency in the industrial sector” by addressing key existing barriers on information, technical capacity and market barriers for industrial energy efficiency in the Philippines. PIEEP has directly contributed to the increasing promotion, deployment, and diffusion of energy-efficient technologies and practices in industrial production and manufacturing processes (Climate Change Strategic Long-term Objective 2). PIEEP implementation included improvement of policy and regulatory frameworks; institutional capacity building for industrial EE, and the demonstration of the application of industrial EnMS based on ISO 50001 and optimization of industrial energy systems with a number of partner industrial establishments.
53. PIEEP is also fully in line with UNIDO’s mandate, core competences and benefits that were provided from UNIDO’s comparative advantage as a GEF implementing agency in the sustainable energy and climate change domain. The organization’s mandate is to support inclusive and sustainable industrial development, having strong core competences in the field of green industry, cleaner production and sustainable energy. UNIDO has made significant contributions to the development of the ISO 50001 energy management system standard (EnMS) and promotion of systems optimization practices. To date, UNIDO has developed and implemented similar IEE projects in more than 25 countries. In particular, PIEEP is a part of the parent programme/umbrella project: “Reducing industry’s carbon footprint in South East Asia through

compliance with an energy management system (ISO 50001)". The programme is composed of national projects to be implemented in Indonesia, Malaysia, Myanmar, the Philippines, Thailand and Vietnam; each designed to facilitate introduction of ISO 50001 through training and capacity building, including a technical focus on systems optimization.

**The rating for relevance is "highly satisfactory"**

### 3.2.2 Effectiveness

54. The effectiveness of the PIEEP was assessed by examining the extent to which targets against the outcomes and outputs in the PRF and TOC were achieved, or are expected to be achieved in the near future. Accordingly, the results of these analyses are provided in Tables 7 to 10.
55. Table 7 provides a summary of the status of achieving objective-level targets. Monitoring of these targets has been a challenge for the PMU given the number of industrial establishments that have received PIEEP training in EnMS and systems optimization, the efforts to contact these establishments on adoption and implementation, the diverse nature of adoption of EnMS and SO implementation (ranging from no-cost solutions to equipment replacements), and the reluctance by many establishments to fully reveal their energy efficiency activities, primarily for proprietary reasons. As a result, the monitoring of direct energy savings and emission reductions over the Project duration was not undertaken by the PMU. Instead, this monitoring work was outsourced to IIEC in September 2018, delivering a survey report in March 2019<sup>22</sup>.

**Table 7: Summary of the Project's Success in Achievement of Objective**

<b>Objective: Introduce ISO 50001 energy management standard along with system optimization approach for improvement of industrial energy efficiency of the Philippines</b>	
<i>Target/Indicators</i>	<i>Status as at March 2019</i>
1. Energy savings of 1,143,149 GJ and 359,877 KWh over project duration (To be determined based on the technical assessments of investment projects)	<i>Likely exceeded based on IIEC survey that estimated annual energy savings of 2,053,046 GJ/year and 114,181 MWh/yr from no less than 57 enterprises. Cumulative energy savings over project duration not measured due to difficulties in obtaining information on energy savings. See Paras 55-57.</i>
2. Corresponding direct GHG emissions reductions of 261,754 tons of CO <sub>2</sub> over project duration	<i>Exceeded target based on the IIEC survey of 322,618 tons of <u>annual</u> CO<sub>2</sub> reductions. See Para 57.</i>

56. The IIEC survey compiled energy consumption information from over 230 respondents out of which energy savings related information was received for 111 enterprises. Energy savings from the IIEC survey concluded electricity savings of 102,206 MWh/yr and 11,975 MWh/yr from EnMS adoption and systems optimization respectively. Similarly, energy savings from reduced consumption of primary fuels (mainly diesel, kerosene, LPG and coal) was 309,693 GJ/yr and 1,743,353 GJ/yr from EnMS adoption and systems optimization respectively. On the basis of these annual savings, there is a strong likelihood that these targets have been exceeded if one assumes that the average operation of each of these measures is more than 2 years.
57. These energy savings were converted into GHG emission reductions using official emission factors from the Philippine Climate Commission. The emission reductions from the survey was

<sup>22</sup> PIEEP Report on Survey Assessment of Project Impact/Results – Final Report by IIEC, Thailand, March 2019

322,618 tons of CO<sub>2</sub> reduced annually<sup>23</sup>, a number considerably higher than the GHG emission reductions target of 261,754 tons CO<sub>2</sub> cumulative to the EOP. Considering the source of energy savings data was from information reported by the industries themselves and national experts, the credibility of the surveyed emission reduction is strong, and can be considered as a *highly satisfactory* outcome. Moreover, the IIEC report also reported that with over 400 survey requests sent out, more than 170 industrial enterprises did not respond making the reported energy savings estimates on the low side.

### **Component 1: Energy Management**

58. Component 1 was designed to provide technical assistance to develop an enabling environment for industrial enterprises to adopt ISO 50001 energy management systems in their operations. The activities leading to outputs of this component were designed to assist industries in overcoming their ad hoc approaches to energy management and conservation through informing and encouraging them to adopt ISO 50001. In addition, policy assistance was to be provided to stakeholders in a regulatory environment where EE and EC in the Philippines were voluntary at the commencement of PIEEP in 2011, resulting in a general lack of adoption of EE and EC by the industrial sector, and the DOE experiencing difficulties in raising the importance of EE and EC to the industrial operations.
59. To address these aforementioned issues, Component 1 was set up to deliver the following outputs (mirroring the output wording of Component 1 in the ToC in Figure 3 and Table 6):
  - Output 1.1: Reviewed and analyzed policies. This was designed to strengthen the capacity of policy makers to introduce an energy management standard by familiarizing them with policy instruments in developed economies to catalyze adoption of energy efficiency;
  - Output 1.2: Training materials and tools on energy management. This was designed to increase the understanding of industry personnel of the importance of EnMS and energy management planning including energy performance reporting;
  - Output 1.3: National awareness campaign on ISO 50001. This output was designed to increase awareness of the industrial sector and key stakeholders on the importance of shifting to an ISO 50001 system;
  - Output 1.4: Peer-to-peer network. This output was designed to facilitate information exchanges between participating industry partners;
  - Output 1.5: Trained national experts/factory personnel on energy management. This was designed as an initial step to develop local experts who could evolve into national energy management experts and serve as agents for replication of EnMS expertise as well as adoption of EnMS by more industrial enterprises;
  - Output 1.6: Implemented ISO compliant energy management systems. This output was designed to encourage adoption of EnMS through a selected number of industrial sectors and strengthen the impact of PIEEP;
  - Output 1.7: A developed recognition program. This output was designed to enhance the current DOE awards system that is an incentive for energy efficiency in the industrial sector.

Table 8 provides a summary of the status of delivery of these outputs and outcomes.

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<sup>23</sup> This includes 91,353 tons CO<sub>2</sub> from EnMS and 231,265 tons CO<sub>2</sub> from systems optimization

**Table 8: Summary of the PIEEP Progress in delivering outputs under Component 1**

Expected Outcome 1: Energy management standard promulgated nationally		
Expected Outcome 2: Capacity of industry and industry support organizations developed to implement ISO compliant energy management systems		
Expected Outcome 3: Increased adoption of energy management standards by industry		
<i>Programmed Outputs</i>	<i>Target/Indicators</i>	<i>Status as at January 2019</i>
1.1 Policy support	<i>Policy paper</i>	A policy paper was delivered to promote a department circular mandating all government offices and buildings to implement EnMS. See Para 60.
1.2 Training materials and tools on energy management	Availability of training materials on energy management	EnMS training material available on PIEEP website. See Para 61.
1.3 National awareness campaign on ISO50001	A national campaign to promote industrial energy management and ISO 50001	Achieved. See Para 62.
1.4 Peer-to-peer network	A peer-to-peer (information sharing) web- based network established to enable companies to share information on energy management	Peer-to-peer network setup. See Para 63.
1.5 Trained national experts/factory personnel on energy management	40 Filipino experts and 500 factory personnel trained in energy management practice and procedures	44 Filipino experts and 647 factory personnel trained. See Para 64.
1.6 Implemented ISO compliant energy management systems	200 factories implemented operational energy management projects with 40 factories fully compliant with ISO 50001	Only 46 factories implementing operational management projects with only 10 fully compliant with ISO 50001. See Para 65.
1.7 A developed recognition program	Recognition program (award scheme) for participating factories based on successful achievements	Recognition program delivered. See Para 66.

60. With regards to the delivery of Output 1.1, support was provided by PIEEP to DOE in promoting Department Circular #930305 (Voluntary submission of energy consumption data of Philippine private businesses and Administrative Order 110 mandating all government offices and buildings to implement EnMS program) to bolster the passage of an EECA bill requiring both private and public sector to implement energy-related standards such as ISO 50001 as well as energy efficiency and conservation best practices.
61. With regards to the delivery of Output 1.2, EnMS training materials were developed and continuously reviewed and updated during PIEEP implementation of the workshops and training activities. Training materials included the EnMS Awareness Workshop, EnMS Two-Day User Training, and EnMS Experts Training (3 modules), were available on the Project website<sup>24</sup> but have been transferred to a DOE website after completion of the PIEEP in March 2019.
62. With regards to the delivery of Output 1.3, there were several PIEEP contributions to the launching of National Awareness Campaign for ISO 50001 including efforts in 2015 and 2016:
- The set-up of a booth and presentation of PIEEP during the EU-backed Energy Smart Philippines on 14 July 2015;
  - Organization of the Industrial Energy Efficiency Forum on 25 November 2015;
  - Four (4) Awareness Workshops on EnMS conducted (1 in Luzon, 1 in Visayas and 2 in Mindanao during first quarter of 2016);
  - Three (3) 2-day User training on EnMS conducted (1 in Visayas and 2 in Mindanao during

<sup>24</sup> <http://www.iee-philippines.com/downloads/training-manuals>

first quarter of 2016);

- Attendance at the CEO Energy Efficiency Forum organized by European Chamber of Commerce (ECCP) with PEZA presenting PIEEP efforts to promote ISO 50001.
63. With regards to the delivery of Output 1.4, a peer-to-peer network was established in 2014 using the web-based platform “Basecamp” for national experts to facilitate communication with international experts and completion of training activities. This includes groups for energy management system and systems optimization facilitating the continuous exchanging of technical information and sharing best practices on energy efficiency and conservation initiatives including effective plant assessments around production scheduling. In 2017, the Project switched to the no-cost Face Book group platform used by the PMU to set up and manage for EnMS and SO initiatives.
64. With regards to the delivery of Output 1.5, target of 40 Filipinos trained in EnMS and 500 factory personnel to become familiar with EnMS has been achieved including:
- 44 national experts who have been trained on the ISO 50001 standard and have passed the EnMS Expert Modules. Two batches of training were completed: 19 from Batch 1 in 2015 and 25 from Batch 2 in 2016. These experts were sourced from diverse backgrounds that included consultants, experts from industrial partners, partner government agencies, equipment and service providers, and academia;
  - 1,992 management and engineering personnel from 1,034 factories who have been trained under 13 EnMS 2-day user training events to become familiar with EnMS and have the capabilities to implement energy management plans.
65. With regards to the delivery of Output 1.6, the targets for the 200 factories implementing EnMS, national experts working with 40 factories, and the completion of 40 case studies has only been partially achieved:
- Only 46 industrial establishments were implementing EnMS (with 18 completed and 28 on-going) with another 11 establishments planning EnMS implementation in the near future<sup>25</sup>. These enterprises are a reflection of the uptake of EnMS from the 2-day User Trainings;
  - An estimated 40 National Experts have worked with 18 companies to implement EnMS. An estimated 22 companies have implemented ISO compliant energy management system, out of which 10 companies have achieved full ISO 50001 certification;
  - Only 14 EnMS case studies have been developed including Nestle Philippines, Steel Asia, Pag-asa Steel Works, and Funai Electric. Out of these studies, 3 case studies have not been approved, pending company review of the information to be disseminated.
66. With regards to the delivery of Output 1.7:
- The DOE has an ongoing national recognition program held annually, the Don Emilio Abello Energy Efficiency Awards;
  - For the 2015 Award, the DOE created a special category specifically for companies that have partnered with PIEEP to save energy through EnMS and Systems Optimization. The initial 18 companies that implemented EnMS were recognized with the energy

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<sup>25</sup> Ibid 22, Table 4.1

management system implementation award in December 2015.

67. In summary, PIEEP activities delivered the intended outputs of this component that includes substantial contributions to the training of engineers and factory personnel on EnMS, and positive feedback from all EnMS training participants. PIEEP did not deliver its target on Output 1.6 with 46 industrial establishments implementing EnMS, a shortfall from the target of 200. This shortfall, however, is not viewed by this Evaluation as a negative outcome, considering the interest generated by PIEEP in EnMS, and the difficulties in engaging industrial establishments to adopt new practices (as further discussed in Para 105). As such, Component 1 is assessed as satisfactory.

### **Component 2: Systems Optimization**

68. While equipment manufacturers have improved the performance of the individual system components (such as motors, steam boilers, pumps and compressors) to a high degree, the improvement of the *energy efficiency of these systems* that include these components is often quite low. Thus, while energy efficiency of individual components may only improve an entire process by 2-5%, examination of the system as a whole and carefully matching equipment to demand needs, efficiency improvements of 20-50% are possible. Energy can be saved, and reliability and control of the system can be enhanced, while maintenance costs decline. Payback periods for systems optimization projects are typically short, ranging from a few months up to 3 years, and involve commercially available products and accepted engineering practices. The focus in systems optimization (SO) is not only on changing or supplementing equipment, but on eliminating or reconfiguring inefficient uses and practices. The first point of entry in SO is to assessing the function of a component (such as motors, pumps, fans, compressed air or boilers) in the system as a whole, rather than at the individual system components separately.
69. Component 2 was designed to build and strengthen competence of the industrial sector to implement energy efficiency measures through a systems optimization approach. This would involve the delivery of 4 outputs:
- Output 2.1: Training materials and tools on SO. These training materials and tools were to be delivered to assist industrial facilities and consultants to understand and apply the system optimization approach applied to targeted industrial systems: pumps, fans, compressed air and steam;
  - Output 2.2: Trained national experts/factory personnel on systems optimization. This output was designed as an initial step to build the capacity of 40 highly-skilled Filipino experts through rigorous training on technical issues related to SO;
  - Output 2.3: Trained vendors on system optimization training. This output was intended to provide training to introduce equipment vendors, manufacturers' representatives, and suppliers of steam boilers, pumps, fans and compressors to system optimization techniques;
  - Output 2.4: Documented systems optimization demonstration projects. This output was intended to provide case studies to document the energy and greenhouse gas emissions savings directly attributable to the project, and to boost confidence of future implementers of SO investments.

Table 9 provides a summary of the status of delivery of these outputs and outcomes.

**Table 9: Summary of the PIEEP Progress in delivering outputs under Component 2**

Outcome 4: Capacity of industry and industry support organizations developed to implement systems optimization.		
Outcome 5: Increased adoption of system optimization energy efficiency projects by industry		
<i>Programmed Outputs</i>	<i>Target/Indicators</i>	<i>Status as at March 2019</i>
2.1 Training materials and tools on SO	Training curricula and guidelines for steam, compressed air and pumping systems optimization	Training curricula and guidelines delivered. See Para 70.
2.2 Trained national experts/factory personnel on systems optimization	40 Filipino engineers intensively trained national experts and factory personnel on systems optimization  400 factory personnel familiar with systems optimization of which 150 are familiar with use of UNIDO's tools	90 Filipino engineers trained, and 1,172 factory personnel familiar with SO out of which 424 were trained on UNIDO tools. See Para 71.
2.3: Trained vendors on system optimization training	40 Filipino equipment vendors (pumps, compressors motors etc.) knowledgeable about capture of systems level efficiency opportunities applicable to their products.	25 Filipino equipment vendors knowledgeable. See Para 72.
2.4: Documented systems optimization demonstration projects	60 systems assessments completed, of which 40 lead to completed projects, 25 case studies documenting energy savings	Only 34 assessments completed with more than 163 projects being implemented with 6 case studies. See Para 73.

70. With regards to delivery of Output 2.1, training materials and manuals completed for steam, pump and compressed air systems optimization were continuously updated with training participant feedback using Basecamp up to 2016, and the free Face Book platform afterwards.

71. With regards to delivery of Output 2.2:

- To date, 44 national experts have been certified on steam, compressed air and pumps who have completed “Expert Training” and passed final exams, out of the total of 90 experts who joined the expert training for systems optimization;
- To date, 1,172 factory personnel have been trained and are familiar with systems optimization, of which 424 are familiar with the use of UNIDO's tools.

72. With regards to the delivery of Output 2.3, 25 equipment vendors (pump, boiler and compressed air) have been trained by the project on System Optimization. While the turnout for vendor training was not to target levels, a critical mass of knowledgeable vendors is available to the industrial sector who should be able to claim market advantages when future demand for equipment purchases for SO (that includes steam, air and pumping systems) becomes mandatory under the new EECA.

73. With regards to the delivery of Output 2.4, a number of ongoing assessments on compressed air, steam and pump systems were implemented and documented for demonstration project purposes. While only 6 case studies on SO are currently available (3 on steam system optimization and 3 on compressed air system optimization that are from the same studies as mentioned in Para 65), there are 25 factories that have served as host plants for SO assessments, of which 34 assessments have been completed to date<sup>26</sup>. The IIEC survey reports the completion of 163 SO projects, 148 ongoing SO projects and another 243 SO projects planned. While this far exceeds the target of 40 completed SO projects, monitoring of this indicator has been difficult given that these assessments present a suite of SO investments which each factory chooses to implement when resources and time are available; access to these suites of IEE investments and

<sup>26</sup> The number of host plants and assessments were lower than the total of local experts (44) trained by the project due to the fact that some of the freelance local experts have joined the enterprise-based candidate experts to assess host plants with freelance experts encountering difficulties in finding their own host facilities.



reporting the progress of each investment for each factory is difficult for the PMU. As such, the PMU could only rely on the IIEC survey on the number completed SO projects which may be higher considering that the survey likely underreports the number of completed and ongoing SO projects. For the 6 SO case studies, their issuance has not been cleared by the host industrial establishments pending their review of the material in these studies for any sensitive proprietary information that they would not want released.

74. In summary, the delivery of outputs of Component 2 is assessed as *satisfactory*. To this end, PIEEP has made a substantial contribution to the training of engineers and factory personnel on systems optimization. While targets for equipment vendor training (Output 2.3) and completed SO projects and case studies (Output 2.4) were not reached, these were not deemed to be serious shortfalls considering the difficulties in convincing a large number of industrial establishments to make these investments during the implementation of PIEEP, and for reasons mentioned in Para 22, most prominently being companies having investment priorities other than energy efficiency.

### ***Component 3: Enhancement of Financing Capacity***

75. Component 3 was designed to strengthen capacities of personnel from the financial sector with the aim of increasing access of loan finance to industrial enterprises. To achieve this outcome, the delivery of 4 outputs was proposed:
  - *Output 3.1: Harmonized energy efficiency project evaluation criteria*. This output was designed to provide and develop a process for consistent evaluation of energy efficiency projects by national financial institutions and the government. Evaluation criteria for energy efficiency projects delivered by PIEEP were consistent with accepted banking practices, and included a scoring system to provide guidance for bankers to determine the validity of projected energy savings from IEE investments, and to provide guidance on using the scoring system to determine IEE investment returns;
  - *Output 3.2: Training material on financing IEE*. This output was designed to develop training materials and tools of bankable IEE projects, and financial and incentive schemes for IEE projects in the Philippines;
  - *Output 3.3: Trained managers in the financial aspects of energy efficiency projects*. This output was designed to build the capacity of local financial institutions on IEE evaluation criteria, and of factory managers and national experts on EnMS and developing IEE projects. Training would be delivered by international finance experts;
  - *Output 3.4: Trained officers on IEE project appraisals*. This output was designed to build capacity of bankers, financial analysts, industrialists and investment decision makers to improve their abilities on assessing IEE projects, and being better informed on offering loan finance to industrial enterprises.

Table 10 provides a summary of the status of delivery of these outputs.

76. With regards to the delivery of Output 3.1, Project evaluation criteria were harmonized amongst the 7 local banks and 2 leasing companies that attended the workshop in May 2016. A scoring tool was developed as a part of the evaluation criteria for EE projects and summarized in a harmonization report issued in 2016<sup>27</sup>.

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<sup>27</sup> PIEEP Report on “Guidelines on the Harmonized Project Evaluation Criteria for Energy Efficiency Projects” by IIEC, Thailand, May 2016

**Table 10: Summary of the PIEEP Progress in delivering outputs under Component 3**

Outcome 6: Increased availability of financial capacity and support for industrial energy efficiency projects		
Outputs	Target/Indicators	Status as at January 2019
3.1: Harmonized energy efficiency project evaluation criteria	Evaluation criteria for industrial energy efficiency project financing are developed and harmonized by financial institutions	Evaluation criteria developed. See Para 76.
3.2: Training material on financing IEE	IEE-specific training materials and guidelines available to both loan applicants and FI staff.	IEE training materials and guidelines available to FI staff. See Para 77.
3.3: Trained managers in the financial aspects of energy efficiency projects	Financial managers with increased knowledge of: Risk Assessment Technical issues. Legal concerns pertaining to evaluation of IEE investments	25 financial managers trained. See Para 78.
3.4: Trained officers on IEE project appraisals	Financial managers with improved understanding of IEE investment project appraisal	25 financial managers trained. See Para 78.

77. With regards to the delivery of Output 3.2, IEE training materials and guidelines were made available (in the form of hardcopies with CDs of training materials) to financial institutions and local experts. These materials covered 1) Developing Financial Proposals for Energy Efficiency Projects; 2) Using the Automated Worksheet for the Financial Modelling of EE Investment Projects; and 3) Harmonized Evaluation Criteria for EE Projects. Financial institutions and local experts would provide these materials to industrial loan applicants if there was demand. During PIEEP, the need for loan finance was not demonstrated since there was a focus on large industrial establishments who were able to arrange their own financing and equity on the IEE investments.
78. With regards to the delivery of Outputs 3.3 and 3.4, 37 financial managers and local experts were trained on financial aspects of EE projects in Manila and Cebu, and on improving their understanding of EE investment project appraisal.
79. In summary, the delivery of outputs within Component 3 is assessed as *satisfactory*. While there were no quantitative targets in the PIEEP PRF, the contributions of the outputs from this component were not key to the delivery of the targets in Components 1 and 2. As mentioned in Para 77, there was no demand for assistance to source financing for IEE investments from these large industries. However, with the passing of the EECA legislation in January 2019 (that was signed by the President on 12 April 2019), demand for assistance to source financing will increase for smaller industrial establishments or SMEs (who consume around the minimum 500 MWh of energy) who likely will be seeking assistance to comply with the EECA. As such, there will be a latent impact on the technical assistance from Component 3 that has enabled participating financing institutions to appraise risks of IEE investments, likely at a time when these industrial SMEs move towards EECA compliance.

***The rating for project effectiveness is “satisfactory”***

### 3.2.3 Efficiency

80. Up to the TE date of 31 January 2019, 98% of the PIEEP-GEF resources or US\$ 3,090,931 was expended over a 7.8-year period for undertaking PIEEP activities. While the original PIEEP duration was 60 months, it will be completed in just under 96 months with its current terminal date of 31 March 2019. Table 11 provides an overview of UNIDO budget lines on which the GEF grant has expended funds (up to 31 January 2019). Almost 68% of the budget was expended mostly on experts and local subcontractors for technical assistance provided to design and deliver training programs for EnMS, SO and financing.

**Table 11: PIEEP Project Resource use breakdown up to 31 January 2019**

UNIDO Cost Code	Amount (US\$)
1100 - International Experts	1,599,719
1500 - Project Travel	142,803
1700 - National Experts	498,824
2100 - Subcontracts	363,602
3000 - Trainings/Fellowships/Study Tours	100,323
4300 – Premises	215
3500 - International Meetings	4,312
4500 – Equipment	284,283
5100 – Sundries	96,850
<b>TOTAL</b>	<b>3,090,931</b>

81. According to PIRs prepared for PIEEP, cumulative expenditures of the GEF funds were as follows:

- US\$ 477,479 (15%) up to 30 June 2012;
- US\$ 1,063,517 (34%) up to 30 June 2013;
- US\$ 1,662,964 (52%) up to 30 June 2014;
- US\$ 2,212,120 (58%) up to 30 June 2015;
- US\$ 2,638,202 (67%) up to 30 June 2016;
- US\$ 2,776,631 (88%) up to 30 June 2017;
- US\$ 3,007,153 (95%) up to 30 June 2018; and
- US\$ 3,090,931 (98%) up to 31 January 2019.

This disbursement rate reflects significant investment in the preparation of EnMS and SO training materials up to 2014, followed by a period of delivery of EnMS and SO training and awareness raising events starting from 2014 to the present.

82. While PIEEP will have exceeded its planned timespan from 5 to 8 years, the efficiency of the expended US\$ 3,090,931 of the total GEF grant of US\$3,166,065 has been assessed as **satisfactory** considering delivery of most outputs accompanied by the challenges of engaging industrial establishments under the conditions set by the Project which included the sharing of energy consumption information. PIEEP has managed to:

- deliver training on EnMS and SO to more than 1,900 personnel representing more than 1,000 factories;

- provide training and certification of more than 44 national experts on EnMS;
- engage 46 industrial enterprises to adopt EnMS of which 18 companies have fully implemented EnMS, out of which only 10 companies have achieved full ISO 50001 certification (Para 65) and 25 factories hosting implemented systems optimization measures (Para 73);
- generate an abundance of positive feedback regarding its training activities and the benefits to participating industrial enterprises that has resulted in requests for further training and technical assistance; and
- achieve and actually exceed its GHG emission reduction targets of 261,000 tons CO<sub>2</sub> cumulative to the EOP (see Para 57).

***The rating for project efficiency is “satisfactory”***

### 3.2.4 Sustainability of Benefits

83. Sustainability of PIEEP has been assessed as *moderately likely (ML)* due to:

- Capacity limitations of the DOE to implement and enforce the EECA (Para 88);
- Fractured communications between industrial establishments to share best practices for IEE that may be an impediment to an acceleration of IEE adoption (see Para 87);
- The likelihood of that some of the banks are willing but not ready to provide IEE loans to SMEs (who consume around the minimum 500 MWh annually of energy) who will need assistance to collateralize loans (Para 85).

### Financial Risks

84. The sustainability of EE investments for the Philippines industrial sector is dependent to a moderate degree on the availability of affordable financing. PIEEP focused mainly on large industries or Type II Designated Establishments (that consume more than 4,000 MWh per year of energy<sup>28</sup>) for the training on EnMS and systems optimization. As such, there was no requirement of financial assistance required by participating industrial partners during PIEEP to adopt EnMS and implement systems optimization since these companies either had their own resources or had access to loans through financing institutions (as mentioned in Para 77). Furthermore, the IIEC survey from March 2019 reveals that only 9% of respondents cite the lack of capital as a barrier to implementation of SO investments, and only 1% cite the lack of loan finance<sup>29</sup>, which may only include respondents who are Type II Designated Establishments of the EECA.
85. For this Evaluation, a potential sustainability issue is the higher risk that industrial entities that are in the order of the minimum of 500 MWh per year of energy or Type I Designated Establishments (likely being industrial SMEs) may not have access to commercial loans for IEE investments. Since Component 3 was involved in building the capacity of the financial sector in assessing and appraising IEE projects, financial institutions in the Philippines are now in a better position to approve loans for these purposes, possibly to Type I Designated Establishments who may need assistance to collateralize their loans. Though the Evaluation understands that PIEEP was focused on Type II industrial establishments, any follow-up efforts for industrial energy

<sup>28</sup> Defined in the EECA as Type II Designated Establishments in Clause 18

<sup>29</sup> Ibid 22, Table 4.20 on page 39

efficiency in the Philippines will likely face this challenge of engaging Type I Designated Establishments. An SME lending window with the Philippines Development Bank (PDB) does exist; however, linking this lending window with IEE projects with Type I Designated Establishments may require extensive consultations with PDB and other participating financial institutions to design an appropriate lending program for these Establishments for IEE investments. From a financial perspective, the sustainability of the PIEEP outcomes is *moderately likely (ML)*.

**The rating for financial risks is “moderately likely”**

### Socio-political Risks

86. Sustainability of this Project is dependent to a high degree on the sociopolitical status of the senior managers of the industrial establishments. The Evaluation Team observed that the industrial establishments visited during the mission were highly motivated to reduce their energy costs to place their businesses in a position of increased profitability. All industrial establishments visited during the mission (all of which were large industrial establishments or Type II designated establishments as defined in Section 18 of the EECA) had energy and sustainability managers who attended PIEEP awareness raising and training events, were able to propose action plans to their senior management, and were able to implement these plans all of which resulted in substantial energy savings for these industrial entities, and promoted their energy managers to senior positions. In addition, another common theme amongst senior managers interviewed during the TE mission was the adoption of energy efficiency into the corporate culture and operations of all these plans. This culture promoted awareness amongst all plant employees to reduce energy consumption in their facilities including minimizing the use of air-conditioning in offices, and shutting off lights and appliances when not in use.
87. The sustainability of PIEEP is also dependent to a high degree on the ability of the industrial sector to communicate within its sector on the importance of energy efficiency. Notwithstanding the satisfactory results of industrial participation under the PIEEP, acceleration of energy efficiency within the industrial sector will, to a large extent, depend on the availability of case studies and communications between various industrial establishments on energy efficiency best practices. The Evaluation Team has observed that communications between industrial establishments during this Project have not been sufficiently frequent, mainly due to the overall feeling amongst enterprises that energy consumption information is proprietary and not to be shared with others. This may serve as a limitation to an acceleration in the adoption of best practices for energy efficiency in the industrial sector in the Philippines. From a sociopolitical perspective, the sustainability of the PIEEP is assessed as *moderately likely (ML)*.

**The rating for socio-political risks is “moderately likely”.**

### Institutional Framework and Government Risks

88. As mentioned in Paras 34 and 79, the Senate and Congress of the Government of the Philippines has passed the “Energy Efficiency and Conservation Act of 2017” (EECA) that was signed into Law on 12 April 2019 as Republic Act 11285, obligating industrial establishments that use more than 500 MWh of energy to adopt ISO 50001 energy management systems and meet annual SEC targets set by DOE<sup>30</sup> with the eventuality that MEPS will be set for specific processes or equipment<sup>31</sup>. The outcomes of PIEEP have resulted in the availability of over 500 trained personnel from these industrial establishments, and the availability of certified 44 national

<sup>30</sup> Section 19 of the EECA

<sup>31</sup> Section 13 of the EECA

experts in EnMS and SO to ensure these establishments are able to comply with the obligations of the EECA. However, there remains a need for assistance to formulate EECA implementing rules and regulations within 6 months from January 2019 and to build the capacity of DOE to implement and enforce the EECA that would include a need for substantial increases in the number of DOE personnel as well as training of these personnel on energy efficiency, EnMS and SO. As such, from an institutional framework and governance perspective, the sustainability of PIEEP is assessed as *moderately likely (ML)*.

**The rating for institutional framework and government risks is “moderately likely”.**

### Environmental Risks

89. PIEEP is aimed at achieving an impact of positive global environmental benefits, including improvements in resource efficiency, and the reduction of electricity and primary fuel consumption that would lead to substantial GHG emission reductions. The general perception within the industrial sector in the Philippines is that efficiency of consumption of resources should lead to decreased operational costs of production and increased profitability provided that good economic conditions persist in the country that would lead to long-term sustainability of the industrial enterprise and improved environmental conditions. As such, the environmental risks of PIEEP are low. From an environmental perspective, sustainability of PIEEP is assessed as *highly likely (HL)*.

**The rating for environmental risks is “highly likely”**

**The rating for sustainability of PIEEP benefits is “moderately likely”**

## **3.3 Impact**

90. In reference to the Reconstructed Theory of Change for PIEEP as illustrated in Figure 3, the evaluation can conclude that the 5 intended outcomes of PIEEP were achieved including Outcome 1: Energy management standard promulgated nationally; Outcome 2: Capacity of industry and industry support organizations developed to implement ISO compliant energy management system; Outcome 3: Increased adoption of energy management standards by industry; Outcome 4: Capacity of industry and industry support organizations developed to implement systems optimization resulting in increased adoption of SO by the industrial sector; Outcome 5: Increased availability of financial capacity and support for IEE projects.
91. With PIEEP achieving these outcomes, there is a critical mass of expertise and the presence of mandatory legislation in the form of the EECA which will drive demand for services for compliance and adoption of energy efficiency technologies in the industrial sector, transforming the market for IEE. However, as mentioned in Para 88, the DOE will face challenges with its current level of staffing and capacities to implement and enforce the EECA. Depending on the level of external and donor support for bridging these capacity gaps and the level of industrial establishment compliance to the EECA, the pace of EECA implementation towards the long term PIEEP impacts as illustrated on Figure 3<sup>32</sup> may be slower. As such, the likelihood of impact of PIEEP in achieving long-term IEE impacts can be assessed as *moderately likely*.

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<sup>32</sup> Includes long term impacts of “energy efficiency of industrial production is improved and GHG emissions are reduced”, “improved national energy security”, and “positive economic and social impacts achieved through increased productivity and profitability”

*The rating for likelihood of impact is “moderately likely”*

### 3.4 M&E System

#### M & E Design

92. M&E design is rated as **satisfactory**. This was based on an M&E system plan as specified on Pages 53 to 56 (Annex H) in the RCE document, stating the importance of the M&E plan to ensure successful implementation of PIEEP through tracking and reviewing project activities execution and accomplishments, identifying issues to allow the PMU to take early corrective action if performance deviates significantly from original plans, and adaptively managing the Project through adjustments and updating of the Project strategy and implementation plan in tandem with changes on the ground and actual results achieved.
93. The M&E design makes reference to the “measuring impact indicators” in the PRF through “tracking and reporting on Project time-bound milestones and accomplishments” by UNIDO in collaboration with the PMU and project partners. With the discussion in Para 42 on the issue SMART quality of PIEEP indicators, the M&E design can be regarded as reasonably effective for the purposes of monitoring progress of PIEEP.

#### M & E Implementation

94. M&E implementation for PIEEP was assessed as **satisfactory**. PIRs for PIEEP were prepared on an annual basis, using a Word format from 2011 up to 2013, followed by a switch to an Excel spreadsheet format from 2014 to 2016. The 2017 PIR was formatted as a Word document which only provided updates on progress.
95. A minor issue with this rating was related to PIR progress reporting on outputs where targets given in the RCE Document were a challenge to measure to a reasonable degree of accuracy (such as the GHG emission reductions over PIEEP duration which would require full cooperation of industrial partners in disclosing information on energy savings cumulative during the Project) or were not specific or measurable (such as targets for Output 1.7 of “existing DOE award program strengthened” or Outputs 2.3 and 3.3 where targets are “vendors knowledgeable” or “managers have increased knowledge”). Despite this minor shortcomings, there were examples of adaptive management by the Project including:
- Addition of policy support under Output 1.1 to include Department Circular No. 930305 on the voluntary submission of energy consumption data of Philippine private businesses and Administrative Order 110 that mandates all government offices and buildings to implement EnMS. This was in response to the DOE’s request for this assistance which was a contributor to the passing of the EECA in January 2019;
  - Expansion of the number of industrial sectors under the Project from the original 4 sectors (metal & steel, chemicals, food & beverages and pulp & paper) to include water utilities, cement and semiconductor/microelectronic sectors in EnMS and SO training<sup>33</sup>. This expansion augmented efforts required to engage the target of more than 500 factories (in Output 1.5) in EnMS and SO training;
  - Approaching industry associations and LGUs to add more efficiencies in the expansion of the

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<sup>33</sup> As was added in the 5<sup>th</sup> PSC meeting of 3 December 2015

actual network of factories. This was first suggested in the 3<sup>rd</sup> PSC meeting<sup>34</sup> and resulted in collaborations with Quezon City, the Philippines Economic Zone Authority (PEZA), and the Philippines Association of Water Districts (PAWD)<sup>35</sup>.

96. There were other attempts of adaptive management to improve the visibility of PIEEP and raise awareness of EnMS and SO amongst other industrial enterprises through organization of conferences where industries and energy managers could exchange information and experiences on best practices on energy management<sup>36</sup>. Unfortunately, there was a lack of positive response amongst most industrial enterprises to share such information considered proprietary, thus scuttling arrangements for these events.
97. In addition, a mid-term review (MTR) was conducted for PIEEP in June 2015. While the Project received a satisfactory assessment in its MTR, there were 3 recommendations made to assist PIEEP in reaching its targets and to improve its sustainability: i) accelerate the setup of an “association of energy experts”; ii) institutionalize EnMS and systems optimization training through undergraduate programs at universities; and iii) clarification of the PIEEP exit strategy including the roles and responsibilities of DOE and DTI-BPS. UNIDO is aware of these recommendations, the responses to which are further discussed in Paras 135 to 137.

#### Budgeting and Funding for M&E Activities

98. Budgeting and funding of M&E activities has been rated as **moderately satisfactory**. The M&E budget in the RCE Document was estimated at an indicative amount of US\$125,000, considered a normal amount for a project of this size. However, this amount only included the cost of the inception workshop of the Project, and the preparation of the mid-term evaluation, terminal evaluation and the Project terminal report. The budget did not include PMU cost of monitoring and tracking progress and preparing the PIRs, a key documentation tool for reporting progress and proposing adaptive management measures.
99. The Evaluation Team has viewed annual PIEEP work plans since 2016 that provide the basis for fund requests from the field office to UNIDO HQ for funds for specific field activities. None of these fund requests included specific monitoring activities under Project Management such as tracking and reviewing Project activities and implementation progress, preparing detailed monitoring plans, and outsourcing services to monitor specific Project activities. This may possibly be due to the lean staffing of the PMU which only included 2 full-time staff, the Project Coordinator and a Project Assistant. The 2016 PIR was the only progress report that had indicated a monitoring & evaluation budget. As such, budgeting for M&E activities throughout the PIEEP duration appears inconsistent.

***The rating for M&E implementation is “satisfactory”***

### **3.5 Monitoring Long Term Changes**

100. PIEEP was primarily designed to support the promotion and adoption of EnMS and systems optimization by industrial enterprises throughout the Philippines. A significant proportion of PIEEP resources were utilized to monitor the adoption of EnMS and implementation of systems optimization by participating industrial enterprises. The monitoring of these industries was undertaken mainly by the PMU and IIEC who were recruited towards the end of PIEEP to undertake a survey to monitor energy savings and GHG emission reduction impacts of the

<sup>34</sup> Page 24 of the 3<sup>rd</sup> PSC meeting minutes of 3 December 2013

<sup>35</sup> As outlined in the 6<sup>th</sup> PSC meeting minutes of 3 December 2015

<sup>36</sup> Suggested on Page 10 of the 2<sup>nd</sup> PSC meeting of 15 March 2013



Project. Unfortunately, this has not led to PIEEP facilitating a set up for monitoring long term changes:

- DOE does not appear to have the capacity to monitor hundreds of industrial factories on their adoption of EnMS and implementation of systems optimization;
- given the difficulty of obtaining energy savings information from most industrial enterprises, DOE in future will have difficulty obtaining accurate energy savings information; and
- the promulgation of the EECA, however, will obligate industrial establishments consuming more than 500 MWh of energy per year to report their energy consumption as a condition for compliance. PIEEP has contributed to the EECA formats for voluntary submission of energy consumption data by these industries under Department Circular #930305. In the context of monitoring long term changes in energy consumptive patterns of industry, the DOE will still need capacity building to enforce this requirement and to manage the energy consumption information from these submissions.

### 3.6 Processes affecting achievement of project results

#### 3.6.1 Preparation and readiness / quality at entry

101. The PPG phase of PIEEP was undertaken between 2009 and 2010, led by a Project Manager from UNIDO HQ with strong support from DOE. PPG activities included:

- a survey conducted through ENPAP (Energy Efficiency Practitioners Association of the Philippines) to collect data and information on energy consumption, energy management practices and energy efficiency of enterprises in different industrial sectors (some of these results are provided in Paras 18-20);
- workshops as outreach to industrial sector stakeholders (one at the beginning and one at the end of the PPG phase) to gauge industry willingness to take up EE projects.

102. These activities, however, did not include industrial associations or institutional partners who were “adaptively” engaged by PIEEP after 2015 that had the impact of scaling up adoption of IEE (see Paras 95, 105, 113 and 129). As such, the preparation and readiness and quality at entry for the Project was assessed as moderately satisfactory.

***The rating for quality at entry/preparation and readiness is “moderately satisfactory”***

#### 3.6.2 Country Ownership

103. Country ownership of PIEEP is reflected in the GoP’s strong support of energy efficiency and reflected in the numerous plans, programmes and roadmaps and various acts as outlined in Section 2.3.5 of this report. Moreover, the promulgation of the Energy Efficiency and Conservation Act in April 2019 reflects the commitment of the Government of the Philippines to meet its energy reduction goals and targets of the Energy Efficiency and Conservation Roadmap (2014 - 2030). A strategic approach to implementing the EECA to maximize adoption of EnMS in the Philippines industrial sector needs to align with the goals and targets of this Roadmap. PIEEP has managed to catalyse interest in IEE amongst Type II Designated Establishments that is reflected in the high level of co-financing generated by this Project (see Para 111). This will strengthen alignment of the Philippines industrial sector towards national achievement of the Roadmap’s goals and targets.

### 3.6.3 Stakeholder Involvement

104. Stakeholder engagement on PIEEP activities was highly effective. During the PPG phase of the Project of 2009-10, UNIDO was able to consult with all relevant government agencies (including personnel from the DOE, DTI-BPS and DoST), and to survey more than 50 industrial entities through ENPAP (see Para 101). This provided designers of PIEEP with information on the willingness of industrial entities to make IEE investments on which incremental GEF activities would be based upon.
105. During implementation of the Project, stakeholder engagement by the PMU represented a challenge, especially with engagement of prospective industrial enterprises on the Project's offer of free technical assistance on EnMS and systems optimization. According to the PMU, this involves several referrals from the NPD and the one-on-one visits to meet with potential industrial partners to discuss the merits of EnMS and systems optimization on their costs of operation and production. During the early stages of the PIEEP (2012 - 2015), engagement of stakeholders involved visits to actual industrial facilities in the 4 focus sectors of metal & steel, chemicals, food & beverages and pulp & paper. As mentioned in Para 95, PMU personnel engaged wider section of stakeholders (commencing in 2015) by including 3 other sectors (water districts, semiconductors/microelectronics, and cement) in reaching out to institutional stakeholders such as Quezon City, PEZA, and other LGUs.
106. The outcome of the Project's stakeholder engagement strategy was **satisfactory** in consideration of the strong interest that PIEEP has generated from a wide section of stakeholders, creating considerable demands for EnMS and systems optimization training at the EOP.

### 3.6.4 Financial Planning

107. PIEEP AWP's were to provide the estimated required funding for the upcoming year, the flow of funds of which were triggered by requests from PMU, and approved by HQ on a continuous basis through UNIDO's ERP/SAP system. Typically, low value procurement was approved by the HQ's PM in SAP with higher value procurement (>\$40,000) requiring the involvement of UNIDO's Procurement Department. The operational cash advances for the operations of the PIEEP-PMU were released on an "as-needed basis", released in €2000 tranches. All other expenditures such as procurement and travel, first obtain approval from the HQ Project Manager. Financial planning of PIEEP was based primarily on annual work plans prepared by the PMU in close collaboration with UNIDO HQ.
108. With the delivery of funds to the PMU in Manila, a total of 6 missions from UNIDO HQ were made to the Philippines between 2012 and 2017 to attend PSC meetings, conduct due diligence on the expenditure of the Project funds, and to monitor the progress on adoption of EnMS, and investment into systems optimization within these industrial enterprises. Co-financing targets of PIEEP did meet its targets of US\$24 million, deemed satisfactory considering this is a ratio of more than 5:1 for co-financing leverage from GEF funds (see Para 111).

### 3.6.5 UNIDO Support

109. As GEF's implementing agency, UNIDO had responsibility for timely implementation of the Project, delivery of planned outputs, technical backstopping, and monitoring achievement of expected outcomes. UNIDO was also accountable to the GEF grant and other funding resources provided by the Philippines government and the financial institutions in the Philippines. UNIDO's performance in undertaking these responsibilities was conducted in a manner that was responsive to the requests and needs of the PMU, Government of the Philippines and Filipino

industrial stakeholders. The end result of UNIDO's support for PIEEP was that it significantly contributed towards achieving the intended objective of promoting ISO 50001 EnMS and adoption by industrial enterprises of EnMS to reduce their energy consumption.

110. All stakeholders interviewed during the Terminal Evaluation mission highly valued the participation of UNIDO. They expressed confidence in the technical assistance provided by international consultants of UNIDO, all of the mentioning the energy savings benefits to their businesses, and overwhelmingly expressed their support for UNIDO's continuation of these trainings. Similarly, PIEEP's institutional partners, DOE, DTI-BPS and DOST, mentioned the excellent relationship with the PMU and PIEEP's responsiveness to ensuring appropriate progress.

***The rating for UNIDO's support is "highly satisfactory"***

### 3.6.6 Co-Financing on Project Outcomes and Sustainability

111. Overall PIEEP co-financing did reach its intended levels of US\$24 million, in part due to investments made by more than 34 industrial enterprises in EnMS and systems optimization totalling US\$22.85 million (see Table 3). As mentioned in Footnote 13, the total co-financing on Table 3 was likely under-estimated as there were no (likely) in-kind contributions estimated from institutional partners such as DOE and DTI-BPS. In addition, the March 2019 IIEC survey reported that only 170 out of 400 survey requests sent to industrial establishments were returned, further suppressing the actual co-financing realized on PIEEP (Paras 55-57). With the Project's focus on Type II Designated Establishments that consume more than 4,000 MWh annually of energy, these establishments financed their IEE investments 50% with their own internal cash and the other 50% with bank loans. Co-financing details are provided in Annex 4.
112. Co-financing from the large industrial establishments on this Project is likely to be sustained in the Philippines. While co-financing from financing institutes was not realized during the PIEEP, the need for IEE financing will certainly arise with many industrial establishments including Type I Designated Establishments now obligated to comply with the new EECA, and future minimum energy performance standards that will certainly be formulated for various industrial processes. Financing will also be required for industrial enterprises that fall under the jurisdiction of PEZA and LGUs such as Quezon City who are being proactive on advancing green industry.

### 3.6.7 Delays of Project Outcomes and Sustainability

113. By 2015, the PMU was of the opinion that there was a risk that the PRF target of involving more than 500 factories was not going to be achieved. Moreover, this was caused by difficulties experienced by the Project in recruiting a project engineer to assist the National Coordinator in the outreach to industrial partners. To increase the likelihood of meeting the target of familiarizing personnel from 500 factories on EnMS, the National Coordinator after 2015 made efforts and successfully engaged the involvement of industry associations, and institutional partners such as LGUs and PEZA. This adaptive management measure has significantly contributed to the sustainability of PIEEP.

### 3.6.8 Implementation approach

114. The key approach of the PIEEP design was to focus on raising awareness and training of personnel from large industrial establishments on EnMS and systems optimization, which would be sufficient in convincing these enterprises of adopting efforts towards energy efficiency in their operations given the potential for cost savings and additional profitability. To improve the adoption of energy efficiency by a greater proportion of industrial establishments, the PIEEP

implementation approach also included assistance to financing sector personnel to improve their capacities to more efficiently approve IEE loan finance. Unlike several other UNIDO IEE projects globally, PIEEP did not provide any financial support for pilot IEE investments.

115. As mentioned in Paras 95 and 113, adaptive management was required to adjust the implementation approach of PIEEP to improve the prospects of meeting targets in the PIEEP PRF. While the assumption that EnMS and SO training itself would be sufficient to catalyze interest and investment into IEE, all of the industrial partners participating on PIEEP have financed IEE or have arranged financing through their own personnel or capacities. While the resources for Component 3 on building financing capacity could be viewed as not contributing to the objective-level targets of PIEEP, the promulgation of the EECA will create more demand for IEE expertise and investment (possibly from Type I Designated Establishments or industrial SMEs who have not been covered on this Project), and position financial sector personnel with strengthened capacity to be able to appraise and more efficiently approve IEE financing. While the implementation approach closely follows and complies with the principles and stated commitments of the Paris Declaration, the primary issue for the Evaluation Team on the implementation approach has been the slow progress in institutionalizing EnMS and SO training to sustain the promotion of ISO 50001 and systems optimization implementation after the EOP<sup>37</sup> (as mentioned in Para 97 as a recommendation of the PIEEP MTR).

***The rating for implementation approach is “satisfactory”***

### **3.7 Project coordination and management**

116. Day-to-day management and coordination of PIEEP in Manila was undertaken by the PMU whose office premises were donated to the Project by DOE. This facilitated close collaboration between the PMU and the DOE to maximize the opportunities of industrial cooperation. Informal PMU meetings with the DOE, specifically the Energy Efficiency and Conservation Division, was possible under this arrangement that led to annual work plans containing considerable inputs from DOE, sharing its network of industrial contacts for follow-up by the PMU, and subsequent relationships with several industrial establishments, industry associations, and other institutional partners. One of the primary reasons, however, for the completion of PIEEP over an 8-year period instead of the designed 5-year period was related to PIEEP’s difficulties in recruiting a project engineer. There were also delays in finding a replacement for the first National Coordinator in 2014. As a consequence, much of the progress in field activities on PIEEP was attributable to the dedicated work of the National Coordinators.
117. As mentioned in Para 116, the National Coordinator within the PMU fulfilled an important role especially for Component 1 on the Project’s initial engagement of industrial establishments to participate in PIEEP’s training activities and awareness raising events. This involved 2 to 3 visits to some of industrial establishments to convince them of the benefits of their participation to their operations. With a critical mass of industrial establishments interested in Project-supported training, the PMU was able to work with UNIDO HQ in arranging EnMS and SO training events using international experts from the HQ roster. Follow-up activities by the PMU after many of the training events involved activities to further engage other industry establishments through industry associations, LGUs and other institutional partners, and activities related to

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<sup>37</sup> Shortly after the MTR, PIEEP held discussions with DOE about the institutionalizing EnMS and SO training as part of university curriculum. Discussions also took place between interested universities and DOE on integrating EnMS and SO in the college senior year curriculum. However, this did not materialize as the schools are governed by the Commission on Higher Education (CHED). At the time of finalizing this evaluation, the DOE and the CHED have not started discussions about this MTR recommendation.

monitoring participating industrial establishments on their adoption and implementation of EnMS.

118. The PMU also played a very similar role in arranging systems optimization training under Component 2 that also included follow-up visits with industrial establishments on implementing and investing in systems optimization. Given the scale of monitoring activities required to report IEE replication amongst Filipino industrial establishments, the Project as a whole made a decision to outsource key monitoring activities required to conduct a survey of the industrial sector's adoption of EnMS and implementation of systems optimization. This survey was conducted during 2018 by IIEC, the results of which have been analysed and used to report PIEEP achievement of its objective-targets (Paras 56-58).
119. The PMU also played a central role in the initial contacts with personnel in the financial sector for activities under Component 3. These activities, however, did not commence until 2015 given the extensive efforts required by the PMU to execute the activities and deliver outputs of Components 1 and 2.
120. In conclusion, the management and coordination of PIEEP has led to the Project achieving its intended outcomes, and its GHG emission reduction target. Achievement of these results is an excellent reflection of the competence of the PMU staff that was supported by UNIDO HQ in providing international inputs and financial support to Philippines-based activities. Unfortunately for this Project, there were difficulties in recruiting additional technical staff to increase Project outreach to industrial and institutional partners which would have decreased the time over which PIEEP was implemented. Balancing the aforementioned comments, the overall assessment of the Project coordination and management can be assessed as "satisfactory".

***The rating for Project coordination and management is "satisfactory"***

### **3.8 Gender Mainstreaming**

121. The UN has a mandate to address human rights and gender equality in all interventions to promote social justice and equality<sup>38</sup>. Since PIEEP was designed as a GEF-4 project at its design stage in 2009-10, no explicit recommendations or requirements for gender mainstreaming or for gender disaggregated targets were required.
122. PIEEP participated in the Sub-Study on Gender Mainstreaming in the GEF during the 6<sup>th</sup> Comprehensive Evaluation of the GEF (OPS6) held on 30 January 2017 and conducted by the Independent Evaluation Office of GEF. Given traditional male dominance in this economic sector, it is not surprising that most trained experts have been men. However, 22% of participants to the workshops and training between July 2016 and July 2017 have been women as compared to the previous year's 20%. This increase of women to PIEEP capacity building activities is the result of the gender awareness and aligns with the report of GEF-IEO which mentions UNIDO did a gender analysis on 71% of their projects (Draft Report IEO-GEF, p.35).
123. Gender considerations were not a mainstream focus of PIEEP or during the PPG phase. Efforts have been made, however, to encourage women and include them in the capacity building activities of PIEEP. Since 2016, PIEEP has made sustained efforts to utilize gender disaggregated indicators and targets to measure impact, and further encourage female participation. The

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<sup>38</sup> Guidance Document: Integrating Human Rights and Gender Equality in Evaluations, UN Evaluation Group, Aug 2014, pg 19

Evaluation has not observed or reviewed any documentation that follows up on monitoring gender disaggregated indicators with the exception of monitoring the increase in female participation in training workshops and implementing energy efficiency on behalf of participating industrial establishments.

***The rating for gender mainstreaming is “satisfactory”***

### 3.9 Overall Rating of the Philippines Industrial Energy Efficiency Project

124. Overall performance of PIEEP is rated as *satisfactory*. An overall summary of these evaluation ratings<sup>39</sup> and findings is provided in Table 12.

**Table 12: Summary of Findings and Ratings by Evaluation Criteria for the Philippines Industrial Energy Efficiency Project**

Criterion	Summarized Assessment of the Findings	Rating
<b>Attainment of project objectives and results (overall rating)</b>	PIEEP was a significant contributor in catalysing interest in IEE in the Philippines resulting in PIEEP training activities being very popular. PIEEP also developed relationships with industrial associations and institutional partners who were able to leverage interest amongst those under their jurisdiction (Para 125 and 126)	S
Relevance	Strong relevance to GoP’s Energy Efficiency and Conservation Roadmap (2014-2030), the recently promulgated EECA in January 2019, and Climate Change Act 9729 (2010) (para 49-53)	HS
Effectiveness	Most targets met. Though targets not met for number of factories implementing EnMS and systems optimization and number of case studies completed and disseminated (Paras 65 and 73), the promotion of EnMS and the reporting of surveyed emission reductions indicates exceedance of GHG emissions (Para 57).	S
Efficiency	GEF funds have supported achievement of most targets, and the generation of an abundance of positive feedback regarding PIEEP training activities and benefits to participating industrial enterprises with requests for further training and technical assistance (Para 82)	S
Impact	PIEEP has left a critical mass of expertise and the presence of mandatory legislation in the form of the EECA that will drive demand for services for compliance and adoption of energy efficiency technologies in the industrial sector, transforming the market for IEE (Para 91).	ML
<b>Sustainability of project outcomes (overall rating)</b>	Capacity limitations of the DOE to implement and enforce the EECA, some of the banks not being ready to provide IEE loans to SMEs (Type I Designated Establishments) who will need future assistance to collateralize loans, and fractured communications between industrial establishments to share best practices for IEE (Para 83).	ML
Financial Risks	Lack of access to commercial loans for IEE projects for to SMEs (Type I Designated Establishments) that are around the minimum of 500 MWh per year of energy that are likely industrial SMEs, who will need assistance in collateralizing their loans (Para 85)	ML
Socio-political Risks	Acceleration of energy efficiency within the industrial sector will, to a large extent, depend on the availability of case studies and	ML

<sup>39</sup> Highly Satisfactory (HS); Satisfactory (S); Moderately Satisfactory (MS); Moderately Unsatisfactory (MU); Unsatisfactory (U); Highly Unsatisfactory (HU). Impact and Sustainability is rated from Highly Likely (HL) to Highly Unlikely (HU)



Criterion	Summarized Assessment of the Findings	Rating
	communications between various industrial establishments on energy efficiency best practice. These communications have been observed as fractured that may serve as a limitation to this acceleration (Para 87)	
Institutional framework and governance risks	Need for assistance to DOE formulate EECA implementing rules and regulations and to build the capacity of DOE to implement and enforce the EECA (Para 88).	ML
Environmental risks	General perception of Philippines industrial sector is efficiency of consumption of resources should lead to decreased operational costs of production, increased profitability, and improved environmental conditions (Para 89).	HL
<b>Monitoring and evaluation</b>		
M&E design	The M&E design makes reference to the “measuring impact indicators” in the PRF through “tracking and reporting on Project time-bound milestones and accomplishments” by UNIDO in collaboration with the PMU and project partners. The SMART quality of PIEEP indicators was deemed reasonably effective for progress monitoring (Para 93).	S
M&E plan implementation	PIRs prepared on an annual basis from 2011 to 2017 that facilitated PMU adaptive management decisions on actions to try and meet targets of number of industrial establishments of 400 (Paras 95 and 96)	S
Budgeting and funding for M&E activities	Budget did not include PMU cost of monitoring and tracking progress and preparing the PIRs, a key documentation tool for reporting progress and proposing adaptive management measures (Paras 98-99)	MS
<b>UNIDO specific ratings</b>		
Quality at entry/Preparation and Readiness	PPG phase undertaken between 2009 and 2010, did not include industrial associations or institutional partners who were engaged by PIEEP after 2015 that had the impact of scaling up adoption of IEE (Para 102)	MS
Implementation Approach	Key approach of PIEEP design was to focus on raising awareness and training for personnel from large industrial establishments on EnMS and systems optimization, to convince these enterprises of implementing EE in their operations. Approach also included assistance to financing sector personnel to improve their capacities to more efficiently approve IEE loan finance, but unlike several other UNIDO IEE projects globally, did not provide any financial support for pilot IEE investments (Para 114).	S
UNIDO Supervision and Backstopping	All stakeholders mentioned the excellent relationship with the PMU, its responsiveness to ensuring appropriate progress, confidence in the technical assistance provided by UNIDO international consultants, and overwhelmingly their support for UNIDO’s continuation of their training programs (Para 110).	S
<b>Overall rating</b>		<b>S</b>

## 4 Conclusions, Lessons Learned, Recommendations

### 4.1 Conclusions

125. The Philippines Industrial Energy Efficiency Project was a significant contributor in catalyzing interest in industrial energy efficiency in the Philippines. This was achieved primarily through PIEEP achieving most of its intended output targets, and by extension most of its intended

outcomes. Moreover, there is a strong likelihood that the PIEEP's GHG emission reduction targets were also exceeded, in part due to the findings that both EnMS and systems optimization trainings provided through PIEEP training activities were very popular.

126. The popularity of these trainings could also be attributed to PIEEP reaching out to not only individual industrial establishments, but outreach to industrial associations (such as the Philippines Sugar Milling Association) and institutional partners (such as the Philippines Economic Zone Authority and Quezon City) who were able to leverage those under their jurisdiction to scale up the interest in EnMS and systems optimization. At the conclusion of PIEEP, these organizations were positioned to assist DOE in implementing the newly promulgated EECA, notably the enforcement of SEC targets and future MEPS of various industrial sectors.
127. Notwithstanding the provision of training to financial institutions under Component 3, all of the industrial establishments working with PIEEP (all of them being large) were able to implement EnMS and SO investments using their own in-house expertise to secure financing. The benefits of PIEEP's financial training, however, are to be realized at a later date when demand for services related to IEE loans will increase with banks such as the Land Bank of Philippines, and the Development Bank of the Philippines, to service industrial SMEs needing to comply with the newly promulgated EECA.
128. While the recent promulgation of the Energy Efficiency and Conservation Act can be viewed as a positive development of PIEEP and for the Government of the Philippines, challenges lie ahead for the DOE and DTI-BPS in implementing the EECA including the need to:
  - formulate implementing rules and regulations within a GoP 6-month mandated period (see Para 88);
  - adopt a strategic approach for the adoption of EnMS in the industrial sector that aligns with the Energy Efficiency and Conservation Roadmap for 2014 to 2030 (Para 103);
  - address the DOE's capacity constraints, most notably its shortage of staff and critical number of national experts who could be dedicated to assist DOE in a strategic approach to implementing the EECA (see Para 88); and
  - institutionalizing EnMS and SO training to sustain the promotion of ISO 50001 and systems optimization implementation after the EOP (see Para 115).

## 4.2 Lessons Learned

129. *Lesson #1: Activities related to market transformation can benefit from the early involvement of institutional organizations or special interest association as partners.* With the intended long-term impact of PIEEP being the transformation of the industrial market for energy efficiency, the implementation approach of PIEEP could have benefited from earlier inclusion of industry associations, and institutional partners such as LGUs and PEZA, all of whom have the capacity to scale-up energy efficiency adoption by promoting, institutionalizing and mainstreaming EnMS, systems optimization through training programs to their members. This would have resulted in these associations and industrial entities leveraging their influence on other industrial sectors and entities to become interested in energy efficiency. Without initial involvement of such partners, the PIEEP PMU needed to adaptively manage its activities to identify and engage associations and institutional partners to provide wider exposure to EnMS and systems optimization, and increase the likelihood of sustainability of training activities in EnMS and SO.



Earlier identification of potential institutional training partners would have minimized activity on this adaptive management measure.

130. Lesson #2: Start-up of an industrial energy efficiency program should involve larger and better resourced industrial establishments where the probability is better for successfully implementing EE projects and quickly demonstrating the benefits. A focus on smaller industrial establishments would have entailed higher risks of a poor demonstration of IEE, caused greater difficulties in demonstrating the benefits of energy efficiency, and probably resulted in less uptake of energy efficiency investments. The challenge associated with associating with larger better resourced establishments is ensuring that these establishments agree on full disclosure and dissemination of the information generated by the IEE demonstration on their premises. Some of these entities may not agree to such disclosure causing difficulties in conducting a successful IEE demonstration.

### 4.3 Recommendations

131. Recommendation #1 (to the DOE and DTI-BPS): Prepare a detailed profile of the Philippines industrial sector that will provide DOE a basis for identifying future IEE programmes. Considering the effort to build such a profile, the following could be undertaken during the initial stages of building a national industrial sector profile for energy use:

- Undertake efforts for a “pilot” industrial energy profile in a jurisdiction such as Quezon City where several industrial establishments are located, where the LGU is a proactive PIEEP partner with a partnership with DOE, and is undertaking an energy efficiency and conservation program (that includes industrial energy efficiency as a condition for industrial establishments to legally retain their business licenses). The pilot profile could be aligned with the activities of the Quezon City Carbon Bank and be used as a sample industrial profile for other cities in the Philippines;
- Access electricity consumption information that may already be available through both LGUs and electric cooperatives. As a labor intensive activity, the labour to compile and analyse this activity can focus on a pilot area such as the Quezon City LGU;
- Conduct a survey of industries and their energy consumption that fall under a selected PEZA “Special Economic Zone” (SEZ). PEZA may already have this information available for analysis which could then be disaggregated into industrial sub-sectors of interest and electricity consumption;
- Undertake a “pilot” breakdown of motors used in industry including their energy performances in Quezon City or selected SEZs of PEZA. This would provide a good profile of industrial energy usage since motors likely comprise in the range of 40 to 50% of all energy consumed in the industrial sector. This work could be tied with the results of the EU-funded HEMS project<sup>40</sup>;
- Tie in these efforts to build a national industrial sector energy profile with the DOE’s initiatives to build an on-line energy consumption database.

132. Recommendation #2 (to DOE and DTI-BPS): Identify strategic needs for facilitating “industrial sectoral” implementation of the EECA. This may include:

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<sup>40</sup> One of the key HEMS findings was an EPC-model for motor purchases with Philippines industrial establishments will not be successful in a voluntary regulatory regime. The mandatory requirements of the EECA may change the behaviour of industrial establishments towards the EPC model.

- Specialized legal assistance to draft implementing rules and regulations for implementing EECA (with a focus on the industrial sector);
  - Preparing a strategic industrial sectoral plan for implementing EECA including milestone dates. The strategic sectoral plan should include extensive consultations with industry on milestone dates and approaches for setting MEPS (see Recommendation 3);
  - Staffing requirements commensurate with strategic sectoral plans and milestone dates that includes the number of additional officers to be certified to manage EnMS and energy audits, for managing industrial energy reports, for energy data collection, and for enforcing the EECA;
  - Estimates of fiscal requirements for staffing and supporting infrastructure.
133. Recommendation #3 (to DOE and DTI-BPS): During the initial phase of industrial sectoral implementation of EECA, focus on developing “process MEPS”<sup>41</sup> to facilitate use of best EE technologies and equipment:
- Convene working groups to encourage (and sustain) dialogue with industry associations on setting process MEPS;
  - Working groups should formulate strategies to optimize industry-wide compliance to new MEPS including discussions on technology options, inclusion of renewables if appropriate, financing requirements, and milestone dates;
  - Introduce labeling schemes that will encourage purchases of EE equipment such as electric motors that would cover more than 40% of all energy consumption of most industrial establishments. This would dovetail with current DTI-BPS and DOE efforts on S&L for household appliances.
134. Recommendation #4 (to DOE and DTI-BPS): Sustain strengthened linkages with institutional partners built under PIEEP including LGUs, water districts, electric cooperatives, hospital associations, and PEZA under a green city initiative:
- Strengthen DOE linkages with these institutional partners to inform them of DOE’s plans for EECA implementation and outreach to assist these partners in reducing carbon footprint of the industrial sector;
  - Work with these partners to develop their roles as institutional partners that can be defined on implementing rules and regulations in Recommendation 2.
135. Recommendation 5 (to DOE and DTI-BPS): ): Immediately undertake actions to support ongoing efforts strengthen the pool of Certified Energy Managers (CEMs) and Certified Energy Conservation Officers (CECOs) through formation of an EnMS experts association. In addressing the need to institutionalize EnMS and SO training, the DOE and DOE-BTS should:
- undertake actions to establish professional certification systems for CEMs and CECOs in collaboration with TESDA (according to Section 11 of EECA), certified energy auditors (Clause 19g of EECA), and ESCOs (Section 12 of EECA). This could involve the recently-formed Philippine Institute of Energy Management Professionals (PIEMP) consisting of UNIDO-PIEEP alumnus and who now meet on a monthly basis. Such actions can be beneficial to form a critical mass of personnel and encourage individual national experts to work as CEMs, ECOs

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<sup>41</sup> Process MEPS is a benchmark energy intensity for an industrial process (unit of energy per unit of production)

and certified energy auditors;

- raise the profile of the roster of successfully certified CEMs, CECOs and energy auditors as an EnMS experts association on a website (that posts PIEEP knowledge products) and at awareness raising events with industries that will require their services. This will also improve the confidence of these national experts of sufficient demand for their professional expertise that will convince them to better dedicate their workloads to conduct energy audits and manage industrial energy systems in compliance with the EECA.

136. Recommendation 6 (to DOE and DTI-BPS): Strengthen linkages with universities and technical colleges to include EnMS and systems optimization in their curriculum. Further to the need for institutionalizing EnMS and SO training mentioned in Paras 115 and 128, DOE needs to continue its dialogue with the Commission on Higher Education (CHED). During the course of this dialogue, DOE and/or DTI-BPS should seek the resources and personnel to prepare and complete an “Energy Management Manual” or “Guidebook on Energy Management” which can serve as a basis for reference material and the development of modules by the Commission on Higher Education (CHED) and TESDA for an EECA training curriculum. The benefits of this dialogue and manual would foster a larger scale of learning for these topics and better assurances of compliance to national standards and appropriateness for curriculum inclusion.

137. Recommendation 7 (to DOE and DTI-BPS): Seek donor funding from bilateral sources to bridge the period between the end of PIEEP (31 March 2019) and the commencement of the subsequent project in energy efficiency. Bridge funding is urgently needed for experienced legal assistance to prepare implementing rules and regulations for the EECA to be completed by August 2019. In addition, there is also some urgency for these funds to be used to building the industrial profile for a pilot jurisdiction as mentioned in Recommendation 1.

138. Recommendation 8 (to UNIDO): If possible and with DOE consent, expand scope of IEE to include RE solutions in subsequent programming with the Philippines to reduce operational costs and improve competitiveness of industrial sector:

- Involvement of institutional partners for EE and RE who are interested in measures to offset utility electricity costs through solar PV and other RE technologies;
- Prepare strategies on leveraging support of LGUs and electric cooperatives to assist industries to comply with the EECA through energy efficiency as well as renewable energy technologies;
- Involvement of financial institutions (such as the Philippines Development Bank as in Recommendation #9) who will be available for EE and RE lending to industrial SMEs;
- UNIDO international experience can provide guidance to DOE on strategizing implementation of EECA that may include the experiences of other ASEAN countries implementing similar legislation.

139. Recommendation 9 (to UNIDO): Assist DOE to strengthen linkage with banks with SME lending windows<sup>42</sup>:

- Discuss in detail bank products for lending to SME industries including mechanisms for loan guarantees;

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<sup>42</sup> This would include the Philippines Development Bank and Land Bank.

- Integrate participating banks into strategic plans of Recommendation 2 on how these banks can scale-up this SME lending window to meet demands of the industrial sector for EE and RE investments and EECA compliance.

The Evaluation Team anticipates that the Type I Designated Establishments in Clause 18a of the EECA would be industrial SMEs, who will require the financial services of an SME lending window.

140. Recommendation 10 (to UNIDO): Assist DOE to intensify PEZA involvement in developing and mainstreaming industrial parks in the Philippines to Eco-Industrial Zones or Parks (EIPs) with development approaches designed to improve the energy performance, sustainability and inclusiveness of the industrial sector and to work towards an international standard on Eco-Industrial Parks<sup>43</sup>. Both Turkey and Viet Nam have several large EIPs from which can serve as lessons on EIP development for the Philippines.

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<sup>43</sup> <http://www.greengrowthknowledge.org/sites/default/files/downloads/resource/122179-WP-PUBLIC-AnInternationalFrameworkforEcoIndustrialParks.pdf>

## Annex 1. Evaluation ToR

<b>Title:</b>	International Evaluation Consultant
<b>Main Duty Station and Location:</b>	Home-based
<b>Missions:</b>	Missions to Vienna, Austria and to the Republic of the Philippines
<b>Start of Contract (EOD):</b>	15 December 2018
<b>End of Contract (COB):</b>	31 March 2019
<b>Number of Working Days:</b>	38 working days spread over the above mentioned period

### 1. ORGANIZATIONAL CONTEXT

The UNIDO Independent Evaluation Division (ODG/EIO/IED) is responsible for the independent evaluation function of UNIDO. It supports learning, continuous improvement and accountability, and provides factual information about result and practices that feed into the programmatic and strategic decision-making processes. Independent evaluations provide evidence-based information that is credible, reliable and useful, enabling the timely incorporation of findings, recommendations and lessons learned into the decision-making processes at organization-wide, programme and project level. ODG/EIO/IED is guided by the UNIDO Evaluation Policy, which is aligned to the norms and standards for evaluation in the UN system.

### 2. PROJECT CONTEXT

Detailed background information of the project can be found the terms of reference (TOR) for the terminal evaluation.

MAIN DUTIES	Concrete/ Measurable Outputs to be achieved	Working Days	Location
<p>1. Review project documentation and relevant country background information (national policies and strategies, UN strategies and general economic data).</p> <p>Define technical issues and questions to be addressed by the national technical evaluator prior to the field visit.</p> <p>Determine key data to collect in the field and adjust the key data collection instrument if needed.</p> <p>In coordination with the project manager, the project management team</p>	<ul style="list-style-type: none"> <li>Adjusted table of evaluation questions, depending on country specific context;</li> <li>Draft list of stakeholders to interview during the field missions.</li> <li>Identify issues and questions to be addressed by the local technical expert</li> </ul>	6 days	Home-based

MAIN DUTIES	Concrete/ Measurable Outputs to be achieved	Working Days	Location
and the national technical evaluator, determine the suitable sites to be visited and stakeholders to be interviewed.			
<p>2. Prepare an inception report which streamlines the specific questions to address the key issues in the TOR, specific methods that will be used and data to collect in the field visits, confirm the evaluation methodology, draft theory of change, and tentative agenda for field work.</p> <p>Provide guidance to the national evaluator to prepare initial draft of output analysis and review technical inputs prepared by national evaluator, prior to field mission.</p>	<ul style="list-style-type: none"> <li>• Draft theory of change and Evaluation framework to submit to the Evaluation Manager for clearance.</li> <li>• Guidance to the national evaluator to prepare output analysis and technical reports</li> </ul>	5 days	Home based
3. Briefing with the UNIDO Independent Evaluation Division, project managers and other key stakeholders at UNIDO HQ (included is preparation of presentation).	<ul style="list-style-type: none"> <li>• Detailed evaluation schedule with tentative mission agenda (incl. list of stakeholders to interview and site visits); mission planning;</li> <li>• Division of evaluation tasks with the National Consultant.</li> </ul>	2 days	Through skype
4. Conduct field mission to the Republic of the Philippines in 2018 <sup>44</sup> .	<ul style="list-style-type: none"> <li>• Conduct meetings with relevant project stakeholders, beneficiaries, the GEF Operational Focal Point (OFP), etc. for the collection of data and clarifications;</li> <li>• Agreement with the National Consultant on the structure and content of the evaluation report and the distribution of writing tasks;</li> <li>• Evaluation presentation of the evaluation's preliminary findings,</li> </ul>	10 working days (excluding travel)	Republic of the Philippines (specific project site to be identified at inception phase)

<sup>44</sup> The exact mission dates will be decided in agreement with the Consultant, UNIDO HQ, and the country counterparts.

MAIN DUTIES	Concrete/ Measurable Outputs to be achieved	Working Days	Location
	conclusions and recommendations to stakeholders in the country, including the GEF OFP, at the end of the mission.		
5. Present overall findings and recommendations to the stakeholders at UNIDO HQ	<ul style="list-style-type: none"> <li>After field mission(s): Presentation slides, feedback from stakeholders obtained and discussed.</li> </ul>	2 days	Vienna, Austria
6. Prepare the evaluation report, with inputs from the National Consultant, according to the TOR; Coordinate the inputs from the National Consultant and combine with her/his own inputs into the draft evaluation report. Share the evaluation report with UNIDO HQ and national stakeholders for feedback and comments.	<ul style="list-style-type: none"> <li>Draft evaluation report.</li> </ul>	10 days	Home-based
7. Revise the draft project evaluation report based on comments from UNIDO Independent Evaluation Division and stakeholders and edit the language and form of the final version according to UNIDO standards.	<ul style="list-style-type: none"> <li>Final evaluation report.</li> </ul>	3 days	Home-based
	<b>TOTAL</b>	<b>38 days</b>	

## REQUIRED COMPETENCIES

### **Core values:**

1. Integrity
2. Professionalism
3. Respect for diversity

### **Core competencies:**

1. Results orientation and accountability
2. Planning and organizing
3. Communication and trust
4. Team orientation
5. Client orientation
6. Organizational development and innovation

### **Managerial competencies (as applicable):**

1. Strategy and direction
2. Managing people and performance
3. Judgement and decision making
4. Conflict resolution

## **MINIMUM ORGANIZATIONAL REQUIREMENTS**

### **Education:**

Advanced degree in environment, energy, engineering, development studies or a related area.

### **Technical and functional experience:**

- Minimum of 15 years' experience in evaluation of development projects and programmes
- Good working knowledge of industrial energy efficiency
- Knowledge about GEF operational programs and strategies and about relevant GEF policies such as those on project life cycle, M&E, incremental costs, and fiduciary standards
- Experience in the evaluation of GEF projects and knowledge of UNIDO activities an asset
- Knowledge about multilateral technical cooperation and the UN, international development priorities and frameworks
- Working experience in developing countries will be an asset.

### **Languages:**

Fluency in written and spoken English is required.

All reports and related documents must be in English and presented in electronic format.

### **Absence of conflict of interest:**

According to UNIDO rules, the consultant must not have been involved in the design and/or implementation, supervision and coordination of and/or have benefited from the programme/project (or theme) under evaluation. The consultant will be requested to sign a declaration that none of the above situations exists and that the consultants will not seek assignments with the manager/s in charge of the project before the completion of her/his contract with the UNIDO Independent Evaluation Division.



## **Annex 2. List of Documents Reviewed**

### **Project Documents and Other Relevant Documentation**

CEO Endorsement Document for the PIEEP, UNIDO, February 2011

National Inception Workshop Report from March 2012

Annual Project Implementation Reports (PIRs), UNIDO/PMU, 2012 to 2017

Mid Term Review of Industrial Energy Efficiency, Philippines, UNIDO, June 2015

Project Steering Committee Meeting Minutes for 1<sup>st</sup> to 7<sup>th</sup> PSC meetings (July 2012 to December 2017)

Signed MoUs between DOE, PEZA, Quezon City and PAWD

PIEEP Case Studies for Funai, Steel Asia, Pag-asa Steel Works, and Nestle

Minutes of the Meeting on the Workshop on the Integration of PEE Project activities to DOE for sustainable program implementation, March 2017

Industrial Energy Efficiency Stakeholders Policy Workshop, UNIDO, February 2014

Development Study on Energy Efficiency and Conservation in the Republic of the Philippines, March 2012, JICA

Energy Efficiency and Conservation Roadmap, Philippines, 2017-2014, Switch Asia

Quezon City Status and Updates on PIEEP, November 2017, Quezon City/UNIDO

Philippine Energy Efficiency Project – Project Completion Report (Project No. 42001-013) June 2015, ADB

Implementation Completion and Results Report on World Bank-GEF Project “Chiller Energy Efficiency Project for the Philippines”, June 2017, World Bank

PEZA’s Initiatives on Energy Efficiency and Conservation, April 2018, PEZA (Atty. Rene Joey Mipa, Zone Administrator)

PIEEP Report on “Guidelines on the Harmonized Project Evaluation Criteria for Energy Efficiency Projects” by IIEC, Thailand, May 2016

PIEEP Report on “Survey Assessment of Project Impact/Results – Final Report” by IIEC, Thailand, March 2019

### **Guidance Documents Consulted**

Evaluation Manual (draft), UNIDO Independent Evaluation Division, August 2017

Evaluation Report Format Guidance, UNIDO Independent Evaluation Division, September 2017

Introduction to Theory of Change / Impact Pathways, the ROTI Method and the ROTI Results Score Sheet (UNEP, last updated December 2015)

## Annex 3. List of Respondents

### Related to UN Agencies

Name	Organisation	Position	Role in PIEEP	Location
Sanjaya SHRESHTA	UNIDO	Industrial Development Officer, Renewable and Rural Energy Division, Energy Department	PIEEP Project Manager	Vienna, Austria
Tove SAHR	UNIDO	Project Assistant, Renewable and Rural Energy Division, Energy Department	Involved in administrative functions	Vienna, Austria
Tonilyn LIM	UNIDO	Country Representative for UNIDO Philippines	Liaison with GEF Focal Point	Manila, Philippines
Oscarlito MALVAR	UNIDO	National Project Coordinator	Coordination of all field activities (after 2015)	Manila, Philippines
Sheena GAZAGAN	UNIDO	Project Assistant	Administration of PIEEP activities in the Philippines	Manila, Philippines
Michelle PAGUEL	UNIDO	Training Assistant	Administration of PIEEP activities in the Philippines	Manila, Philippines
Richard SAING	Formerly UNIDO	National Project Coordinator	Coordination of all field activities (from 2012 to 2014)	Manila, Philippines
Richard MORRISON	UNIDO International EnMS Expert	International EnMS Expert	Assistance in training for EnMS implementation	Cork, Ireland

### Related to National Agencies

Name	Organisation	Position	Role in PIEEP	Location
Jesus POSADAS	Department of Energy	Undersecretary	Chair of the Project Steering Committee	Manila, Philippines
Patrick AQUINO	Policy and Planning Bureau, DOE	Director	Policy and planning for energy utilization	Manila, Philippines
Jesus TAMANG	Energy Utilization Management Bureau, DOE	Director	Energy planning	Manila, Philippines
Jesus ANUNCIACION	Energy Utilization Management Bureau, DOE	Asst. Director	Energy planning	Manila, Philippines
Tereso PANGA	Philippines Economic Zone Authority	Deputy Director General of Policy and Planning	Promotion of eco-industrial zones for industrial entities	Manila, Philippines
Raul SABULARSE	PCIEERD, Department of Science and Technology	Deputy Executive Director	PSC Member	Manila, Philippines
Ernani DIONISIO	Philippines Accreditation Bureau, Department of Trade and Industry	Director III	Accreditation of testing bureaus for setting standards	Manila, Philippines
Mary Joan de PABLO	Philippines Accreditation Bureau, DTI	System Accreditation Officer	Accreditation of testing bureaus for setting standards	Manila, Philippines
Leah Ann ARELLA	Bureau Philippines Standards, DTI	Standards and Conformity Officer	Setting of standards and oversight of testing programmes	Manila, Philippines

## Related to Project beneficiaries

Name	Organisation	Position	Role in PIEEP	Location
Oscar CORTES	Philippine Sugar Miller Association	Deputy Director	Setup of a pilot project for biodiesel production.	Manila, Philippines
Kristine GAYEM Marc Clarence YU	CEMEX Holdings Philippines	Energy Director Energy Analyst	Oversight of EnMS programme for CEMEX	Manila, Philippines
Genaro CATALAN, Jr.	Asia Brewery, Inc.	Senior Vice President	Oversight of EnMS programme for Asia Brewery	Cabuyao, Laguna, Philippines
Deo CALIBA	Tong Hsing Electronics CIP 1	Admin Manager	Oversight of EnMS programme for Tong Hsing facility	Calamba City, Laguna, Philippines
Erick Estiller	Tong Hsing Electronics CIP 1		Oversight of EnMS programme for Tong Hsing facility	Calamba City, Laguna, Philippines
Tony Fernandez	Tong Hsing Electronics CIP 1		Oversight of EnMS programme for Tong Hsing facility	Calamba City, Laguna, Philippines
Maricris C. VINES	Universal Robina Corporation	Manager, Integrated Management System Operational Governance and Sustainability	Oversight of EnMS programme for all URC facilities	Manila, Philippines
Ronaldo Sales	Chowking Foods Corp	AVP2 & Site Head	Oversight of EnMS programme for all Chowking facilities	Manila, Philippines
Thomas BORRAMEO	Funai Electric Cebu	Facilities Manager	Oversight of EnMS programme for all Funai facilities	Lapu-Lapu City, Cebu, Philippines
Jessie Vero	SMYPC-Cebu Glass Plant,	Head, Engineering Services Department	Oversight of EnMS programme for all SMYPC-Cebu facilities	Mandaue City, Cebu, Philippines
Anthony B. SAN MATEO	San Miguel Yamamura Packaging Corporation	Quality, Engineering Environment, and Safety Manager, Management Services Department	Technical Manager of EnMS programme for all San Miguel facilities	Manila, Philippines
Roel GONZALES	Maynilad Water Services Inc.	Senior Vice President	Oversight of EnMS programme for all Maynilad facilities	Manila, Philippines
Tetchie RENTOY	Quezon City Administration	Head, Environmental Protection and Waste Management Department (EPWMD)	Oversight of EnMS	Quezon City, Philippines
Andrea PO	Quezon City Administration	Deputy Head, EPWMD	Operational Lead of EnMS	Quezon City, Philippines
Lala RIOS	Quezon City Administration	Division Chief	Administrative Support	Quezon City, Philippines
Jack GUEVERRA	Quezon City Administration	Deputy Division Chief	Administrative Support	Quezon City, Philippines
Derick LEYNES	Quezon City Administration	Project Officer	Project Support	Quezon City, Philippines
Carlos SANTOS, Jr.	Philippines Association of Water Districts	President	Main contact person for providing training to all PAWD constituents	Manila, Philippines
Mark MERCADO	RDF Feed, Livestock & Foods, Inc.	Plant Manager	Oversight of EnMS programme for all RDF facilities	San Fernando City, Pampanga, Philippines

## Annex 4. Summary of Project Identification and Financial Data

### Project Factsheet

Milestone	Expected date	Actual date
Project CEO endorsement/approval date	25 March 2011	25 March 2011
Project implementation start date (PAD issuance date)	21 October 2013	16 April 2011
Original expected implementation end date (indicated in CEO endorsement/ approval document)	30 November 2016	1 May 2017
Revised expected implementation end date	31 December 2018	31 March 2019
Terminal evaluation completion	31 October 2016	31 March 2019

### Project budget

#### Financing plan summary

	Project Preparation	Project	Total (\$)
Financing (GEF / others)	85,650	3,166,065	3,251,175
Co-financing (cash and in-kind)		24,000,000	24,000,000
<b>Total (USD \$)</b>	<b>85,650</b>	<b>27,166,065</b>	<b>27,251,175</b>

#### Financing plan summary - Component breakdown

Project components	Donor (GEF) (\$)	Co-Financing (\$)	Total (\$)
1. Energy Management	1,078,065	4,600,000	5,678,065
2. Systems Optimization	1,163,500	18,200,000	19,363,500
3. Enhancement of financing capacity.	503,500	475,000	978,500
Project management	316,000	705,000	1,021,000
Monitoring and Evaluation	105,000	20,000	125,000
<b>Total</b>	<b>3,166,065</b>	<b>24,000,000</b>	<b>27,166,065</b>

## Co-Financing sources, breakdown and actual co-financing realized

Name of Co-financier (source)	Classification	Type	Amount committed at design (\$)	Actual amount realized (\$)
Project Government Contribution	Nat'l Gov't	Cash and in-kind	4,000,000	n/a
Land Bank	Bank	Loan	10,000,000	n/a
Bank of Philippine Islands	Bank	Loan	10,000,000	n/a
Development Bank of Philippines	Bank	Loan	<sup>45</sup>	
Partner industrial entities	Private sector	Cash	0	11,236,728
Banks (who provided loans to partner industrial entities) <sup>46</sup>	Banks	Loan	0	11,614,369
<b>Total Co-Financing (\$)</b>			<b>24,000,000</b>	<b>22,851,097</b>

<sup>45</sup> Project Document mentions that DBP has issued a co-financing commitment without any ceiling.

<sup>46</sup> Partner industrial entities have not disclosed their sources of IEE loans.

## Annex 5. Project Results Framework

Project Strategy	Objectively Verifiable Indicators				
	Indicator (quantified and time-bound)	Baseline	Target	Source of verification	Risks and Assumptions
<b>Objective</b>	Measurable energy savings and emissions reductions by industrial enterprises	<p>Delay with introduction of standard.</p> <p>Adoption of standard by few large companies only. Emissions reductions from only least first cost projects undertaken by industry using in-house capital.</p>	Energy savings of 1,143,149 GJ and 359,877 KWh and corresponding direct GHG emissions reductions of 261,754 tons of CO2 over project duration (To be determined based on the technical assessments of investment projects)	<p>Terminal evaluation reports.</p> <p>Peer to peer network.</p>	<p>Willingness of industry to invest in energy efficiency in response to:</p> <ul style="list-style-type: none"> <li>Market-driven demand from customers</li> <li>Energy costs continue high enough to stimulate continuous interest in energy efficiency improvement</li> </ul>
<b>Component 1: Energy management</b> <b>Outcomes:</b> <ol style="list-style-type: none"> <li>Energy management standard promulgated nationally.</li> <li>Capacity of industry and industry support organizations developed to implement ISO compliant energy management systems.</li> <li>Increased adoption of energy management standards by industry</li> </ol> <b>Outputs:</b>					
<b>1.1 Policy support</b>	<i>Policy paper</i>	Limited knowledge within DOE staff of the integration to energy management into energy efficiency agreements between governments and industry associations.	Policy paper focusing on energy management in the context of negotiated agreements and experience in developed economies and China.	<i>Policy paper</i>	

Project Strategy	Objectively Verifiable Indicators				
	Indicator (quantified and time-bound)	Baseline	Target	Source of verification	Risks and Assumptions
<b>1.2 Training materials and tools on energy management developed</b>	Availability of training materials on energy management	Existing generic training materials as used by private sector EE service providers and similar energy audit training materials	Detailed and tested training materials to facilitate industries' conformance with an energy Management standard (ISO 50001)	Expert's reports	
<b>1.3 National awareness campaign on ISO50001 launched</b>	A national campaign to promote industrial energy management and ISO 50001	Continued DOE – sponsored information, education and communication campaign, but absence of an industry-focused cohesive effort to promote industrial energy efficiency	Publicity materials, brochures.	Reports from government counterparts.	
<b>1.4 Peer-to-peer network developed</b>	A peer-to-peer (information sharing) web-based network established to enable companies to share information on energy management	Existing (but under-funded) DOE data base.	Network in operation and in use to document energy savings by companies participating in the project and to identify companies worthy of recognition.	Project evaluation reports. Experts' reports.	Willingness of participating companies to share their experience with energy efficiency measures and projects implemented.
<b>1.5 Trained national experts/factory personnel on energy management</b>	Number of Filipino experts and factory personnel trained in energy management practice and procedures.	DOE energy management program and training for energy managers/auditors.	40 engineers trained specifically in energy management to a level such that they can train others. Personnel from 500 factories familiar with energy management of which 200 will be capable of implementing energy management plans	Project evaluation reports. Experts' reports.	Implementation risks. Successful completion of this output requires major planning and coordination effort by concerned government agencies and national experts or contractor.

Project Strategy	Objectively Verifiable Indicators				
	Indicator (quantified and time-bound)	Baseline	Target	Source of verification	Risks and Assumptions
<b>1.6 ISO compliant energy management systems implemented</b>	Number of factories implemented ISO compliant energy management systems and operational energy management projects	Limited uptake of energy management and conformance with ISO 50001.	200 factories complete operational improvement projects. National experts work with 40 factories to fully implement ISO 50001.  30 case studies.	Case studies.  Project evaluation reports.  Experts' reports.	Implementation risks. Successful completion of this output requires major planning and coordination effort by concerned government agencies and national experts or contractor. Insufficient external drivers to stimulate adequate uptake of standard.
<b>1.7 Recognition program developed</b>	Recognition program (award scheme) for participating factories based on successful achievements	Activities contributing to this output will strengthen the existing successful "Don Emilio Energy Efficiency Awards" given by DOE over the period 2006/9	Existing DOE award program strengthened	National workshop reports.	Willingness of participating companies to input data into the project's database.
<b>Component 2: Energy Management</b> <b>Outcomes:</b> 4. Capacity of industry and industry support organizations developed to implement systems optimization.					
<b>Outputs:</b>					
<b>2.1 Training materials and tools developed.</b>	Availability of technical training materials and tools on systems optimization for industries.	Continued use of generic IEE training materials, focusing on energy audits and sector-specific but generic technology replacement opportunities.	Training curricula and guidelines for steam, compressed air and pumping systems optimization		n/a



Project Strategy	Objectively Verifiable Indicators				
	Indicator (quantified and time-bound)	Baseline	Target	Source of verification	Risks and Assumptions
<b>2.2 Trained national experts/factory personnel on systems optimization.</b>	Number of trained national experts and factory personnel on systems optimization.	Systems approaches are understood by some Filipino energy experts.	40 Filipino engineers intensively trained on compressed air, pump, fan systems and steam system optimization.  400 factory personnel familiar with systems optimization of which 150 are familiar with the use of UNIDO's tools.	Experts' reports following completion of each system-based training module.	Implementation risks. Successful completion of this output requires major planning and coordination effort by concerned government agencies and national experts or contractor.
<b>2.3 Vendors participation on system optimization training.</b>	Number of equipment vendors participated on the training programs.	Continued exclusive focus by vendors on sale of individual equipment items. Least first cost continues as main driver for design of steam/motor systems.	40 Filipino equipment vendors (pumps, compressors motors etc..) knowledgeable about capture of systems level efficiency opportunities applicable to their products.	Experts' reports following completion of each system-based training module.	Continuous commitment of equipment vendors to participate in the project.
<b>2.4 Documented systems optimization demonstration projects.</b>	Documented energy efficiency (systems optimization) demonstration projects.	Some application of VSD and boiler tune-up options in selected sectors. See also section IIF(iv).	60 systems assessments completed, of which 40 lead to completed projects 25 case studies documenting energy savings.	Case studies and experts' reports.	Commitment of companies participating directly in the project.
<b>Component 3: Enhancement of financing capacity</b> <b>Outcomes:</b> 5. Increased availability of financial capacity and support for industrial energy efficiency projects  <b>Outputs:</b>					
<b>3.1 Harmonized energy efficiency</b>	Evaluation criteria are harmonized within financial	Ad-hoc IEE investment criteria as currently applied by banks.	Evaluation criteria for industrial energy efficiency project financing are developed and	Experts' reports.	Currently the majority industries (surveyed by UNIDO) finance energy

Project Strategy	Objectively Verifiable Indicators				
	Indicator (quantified and time-bound)	Baseline	Target	Source of verification	Risks and Assumptions
<b>project evaluation criteria.</b>	institutions to help them select better EE projects.		harmonized by financial institutions	Increased rate of FI approval for IEE investment opportunities.	efficiency from their own resources.
<b>3.2 Training materials developed.</b>	Availability of training materials on financing energy efficiency projects	Subject to the deliverables generated by the current IFC project	IEE-specific training materials and guidelines available to both loan applicants and FI staff.	Reports.	Availability of training materials.
<b>3.3 Managers trained in the financial aspects of energy efficiency projects.</b>	Number of managers trained.	Subject to the deliverables generated by the current IFC project	Financial managers with increased knowledge of: Risk Assessment, Technical issues, and Legal concerns, all pertaining to evaluation of IEE investments.	Experts' reports.	Implementation risks. Successful completion of this output requires major planning and coordination effort by concerned government agencies and national experts or contractor.
<b>3.4 Support for packaging of loans for Industrial energy efficiency projects</b>	Number of persons trained on the support for packaging for industrial energy efficiency projects.	Financial institution specific packaging	Financial managers with improved understanding of IEE investment project appraisal.	Reports.	Implementation risks as above.