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IMPLEMENTATION COMPLETION AND RESULTS REPORT
TF 099859-VN

ON A
GRANT FROM THE GLOBAL ENVIRONMENT FACILITY TRUST FUND

IN THE AMOUNT OF US\$2.37 MILLION

TO THE

SOCIALIST REPUBLIC OF VIETNAM

FOR THE
CLEAN PRODUCTION & ENERGY EFFICIENCY (P116846)

MARCH 15, 2018

Energy & Extractives Global Practice
East Asia And Pacific Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective June 30, 2017)

Currency Unit = Vietnamese Dong (VND)

VND22,669 = US\$1

US\$0.000044 = VND1

FISCAL YEAR

January 1 – December 31

ABBREVIATIONS AND ACRONYMS

BAU	Business-As-Usual	ISR	Implementation Status and Results Report
CO₂	Carbon dioxide	ICR	Implementation Completion and Results Report
CPEE	Clean Production Energy Efficiency	ktCO₂	Thousand ton of carbon dioxide equivalent
CPS	Country Partnership Strategy	M&E	Monitoring and Evaluation
EA	Environmental Assessment	MoIT	Ministry of Industry and Trade
EE	Energy Efficiency	MRV	Measuring, Reporting, and Verification
EE&C	Energy Efficiency and Conservation	Mtoe	Million ton of oil equivalent
EECO	Energy Efficiency and Conservation Office	NPK	Nitrogen, Phosphorus, Potassium
EIRR	Economic Internal Rate Return	NPV	Net Present Value
ENPV	Economic Net Present Value	PAD	Project Appraisal Document
EPC	Energy Performance Contract	PDO	Project Development Objective
ESCO	Energy Service Company	PMU	Project Management Unit
ESP	Energy Service Provider	SEDS	Socio Economic Development Strategy
FY	Fiscal Year	SEDP	Socio Economic Development Plan
GDP	Gross Domestic Product	SME	Small and Medium Enterprise
GEF	Global Environment Facility	tCO₂	ton of carbon dioxide
GEO	Global Environmental Objective	toe	ton of oil equivalent
GHG	Greenhouse Gas	VA	Voluntary Agreement
GoV	Government of the Socialist Republic of Vietnam	VNEEP	Vietnam National Targeted Energy Efficiency Program
GSO	General Statistics Office of Vietnam		

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**DATA SHEET****BASIC INFORMATION****Product Information**

Project ID	Project Name
P116846	Clean Production & Energy Efficiency
Country	Financing Instrument
Vietnam	Specific Investment Loan
Original EA Category	Revised EA Category
Not Required (C)	Not Required (C)

Organizations

Borrower	Implementing Agency
General Directorate of Energy-Ministry of Industry and Trade	Ministry of Industry and Trade

Project Development Objective (PDO)**Original PDO**

The project development objective is to strengthen the capacity of the Socialist Republic of Vietnam and other key stakeholders for the effective delivery of the national energy efficiency program in key industrial sectors, thereby improving energy efficiency and reducing associated greenhouse gas emissions.

PDO as stated in the legal agreement

The objective of the Project is to strengthen the capacity of the Recipient and other key stakeholders for the effective delivery of the Program, thereby improving energy efficiency and reducing associated greenhouse gas emissions..

"Recipient" is defined as the Socialist Republic of Vietnam.

"Program" means the Vietnam National Energy Efficiency Program designed to improve energy efficiency and conservation in all sectors of the Recipient's economy and set forth or referred to in the Recipient's Decision Number 79/2006/QĐ-TTg dated April 14, 2006.



FINANCING

	Original Amount (US\$)	Revised Amount (US\$)	Actual Disbursed (US\$)
World Bank Financing			
TF-99859	2,374,407	2,373,815	2,373,815
Total	2,374,407	2,373,815	2,373,815
Non-World Bank Financing			
Borrower	1,775,000	1,775,000	353,000
Local Sources of Borrowing Country	0	0	800,000
Total	1,775,000	1,775,000	1,153,000
Total Project Cost	4,149,407	4,148,815	3,526,815

KEY DATES

Approval	Effectiveness	MTR Review	Original Closing	Actual Closing
05-Jul-2011	21-Oct-2011	01-Oct-2014	30-Jun-2016	30-Jun-2017

RESTRUCTURING AND/OR ADDITIONAL FINANCING

Date(s)	Amount Disbursed (US\$M)	Key Revisions
30-Jun-2016	1.63	Change in Loan Closing Date(s)

KEY RATINGS

Outcome	Bank Performance	M&E Quality
Satisfactory	Moderately Satisfactory	Modest

RATINGS OF PROJECT PERFORMANCE IN ISRs

No.	Date ISR Archived	DO Rating	IP Rating	Actual Disbursements (US\$M)
01	05-Feb-2012	Satisfactory	Satisfactory	0
02	10-Aug-2012	Satisfactory	Satisfactory	.15



03	04-Feb-2013	Satisfactory	Moderately Satisfactory	.19
04	12-Oct-2013	Satisfactory	Moderately Satisfactory	.39
05	20-Jun-2014	Moderately Satisfactory	Moderately Satisfactory	.84
06	18-Dec-2014	Moderately Satisfactory	Moderately Satisfactory	.84
07	23-Jun-2015	Moderately Satisfactory	Moderately Satisfactory	1.06
08	29-Jun-2015	Moderately Satisfactory	Moderately Satisfactory	1.06
09	30-Dec-2015	Moderately Satisfactory	Satisfactory	1.16
10	22-Jun-2016	Moderately Satisfactory	Satisfactory	1.52
11	30-Jan-2017	Moderately Satisfactory	Satisfactory	2.04
12	26-Jun-2017	Moderately Satisfactory	Satisfactory	2.37

SECTORS AND THEMES

Sectors

Major Sector/Sector (%)

Energy and Extractives 100

Other Energy and Extractives 100

Themes

Major Theme/ Theme (Level 2)/ Theme (Level 3) (%)

Environment and Natural Resource Management 100

Climate change 100

Mitigation 100

ADM STAFF

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I. PROJECT CONTEXT AND DEVELOPMENT OBJECTIVES

A. CONTEXT AT APPRAISAL

Country Context

1. At the time of Project appraisal, the Vietnamese economy had achieved remarkable economic development, substantially transforming from a primarily agrarian nation into a modern, diversified and market oriented economy. Sustained periods of rapid gross domestic product (GDP) growth (averaging 7.3 percent during 1990-2010), high per capita gross national income¹ of US\$1,390 in 2011 (compared to US\$130 in 1990), and significantly reduced poverty headcount ratio² (from 35.79 percent in 2002 to 4.78 percent in 2011) had led to a dramatic improvement in the welfare of the average Vietnamese citizen.

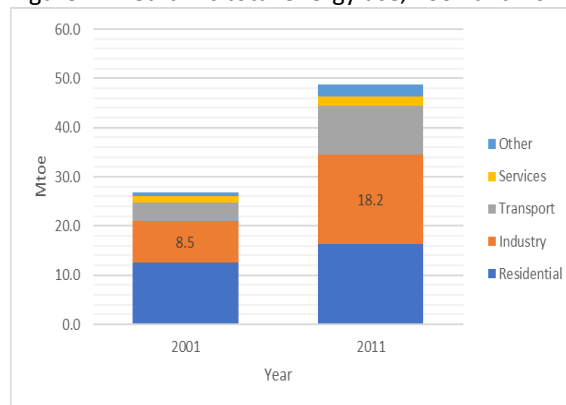
2. Vietnam was entering a new phase of development. The consolidation of its economic achievements required a stronger emphasis on improving its competitiveness, productivity, and innovation as its low-cost labor advantage began to dissipate; building resilience to macroeconomic shocks and climate change; curbing social rising inequalities; strengthening its infrastructure system; enhancing the management of its natural resources; and developing its human capital. The Government's development vision for the decade 2011-2020, laid out in its Socio-Economic Development Strategy (SEDS), directly responded to these development challenges through three major "breakthrough areas": (i) promoting human resources/skills development; (ii) improving market institutions; and (iii) infrastructure development. The 2011-2015 Socio-Economic Development Plan (SEDP) identified specific measures and resources needed to create a more competitive economy, outlining the importance of environmental protection, climate change mitigation, and adaptation.

Sectoral and Institutional Context

3. Vietnam's recent decades of strong and sustained economic growth were accompanied by rapid industrialization, a key driver of the country's overall energy intensity. In 2011, industrial energy consumption represented 37 percent of total energy use, compared to 32 percent a decade earlier,³ while CO₂ emissions increased by 2.6 times (from 44.2 to 125.6 million tons) over the same period.⁴

4. Industry and manufacturing value added had grown more than eight percent on average annually during the period 2001-2011 (representing 51.5

Figure 1: Vietnam's total energy use, 2001 and 2011



Source: IEA (2017), "World indicators", IEA World Energy Statistics and Balances (database)

¹ Atlas method (current US\$), World Development Indicators Database, The World Bank, 2017.

² Poverty headcount ratio at US\$1.90 a day (2011 purchasing power parity) (% of population), World Development Indicators Database, The World Bank, 2017.

³ Source: IEA (2017), World Indicators, IEA World Energy Statistics and Balances (database).

⁴ Source: OECD (2017), Air and GHG emissions (indicator), doi: 10.1787/93d10cf7-en (Accessed on 23 August 2017).



percent of GDP in 2011).⁵ It was also anticipated that the production of several key energy-intensive commodities (e.g., cement, glass products, paper, and paper products) would continue to increase at a faster rate than that of the total industrial value output, an indication of a movement toward more energy-intensive production. As a result, the upward pressure on energy demand gave rise to concerns regarding energy security and environmental protection.

5. The energy efficiency (EE) legal and regulatory framework was by and large composed of (i) the 2010 Law No. 50/2010/QH12 on economical and efficient use of energy, or the Energy Efficiency and Conservation (EE&C) Law, which introduced requirements on EE and management for energy intensive industrial enterprises; (ii) the Decree No 21/2011/ND-CP presenting measures for the implementation of the EE&C law; and (iii) the decree No. 73/2011/ND-CP defining the sanctions applicable to administrative violations of the EE&C Law. The Vietnam National Energy Efficiency Program (VNEEP), a comprehensive 10-year energy efficiency and conservation plan approved in 2006,⁶ was entering its second phase (2011-2015).⁷

Rationale for World Bank's assistance

6. The World Bank Group's strategic engagement was aligned with the national priorities outlined in the SEDS and the SEDP. It supported investments and policies designed to strengthen Vietnam's competitiveness, increase the sustainability of its development, and broaden access to economic and social opportunity while strengthening governance, promoting gender equality, and improving resilience in the face of external economic and climatic shocks. The Project was fully supported the objectives of the Country Partnership Strategy for Vietnam from FY07 to FY11, that had a pillar dedicated to the strengthening of natural resources and environment management including (a) promotion of sustainable business practices and use of energy saving equipment and technologies, and (b) improvement of energy system efficiency. It was also consistent with the Focal Area Strategies and Strategic Programming approved by the Council of the Global Environment Facility (GEF) in September 2017, which aimed to promote energy efficient technologies and practices in industrial production and manufacturing processes, among others.

7. The GEF-funded Vietnam Clean Production and Energy Efficiency Project (the Project) was designed to address significant barriers to the widespread adoption of industrial EE measures including (i) the lack of awareness of the potential savings and available technologies, (ii) insufficient in-depth knowledge and expertise of key stakeholders, (iii) absence of well-defined participation mechanisms for companies joining the voluntary agreement scheme and (iv) limited capacity of the nascent energy service company's industries. Ultimately, the Project aimed to contribute to industry competitiveness and climate change mitigation through the strengthening of the national capacity to deliver on energy efficiency programs and the mitigation of climate change impacts.

⁵ Source: The World Bank (2017), World Development Indicators (DataBank).

⁶ Decision No.79/2006/QĐ-TTĐ of April 2006.

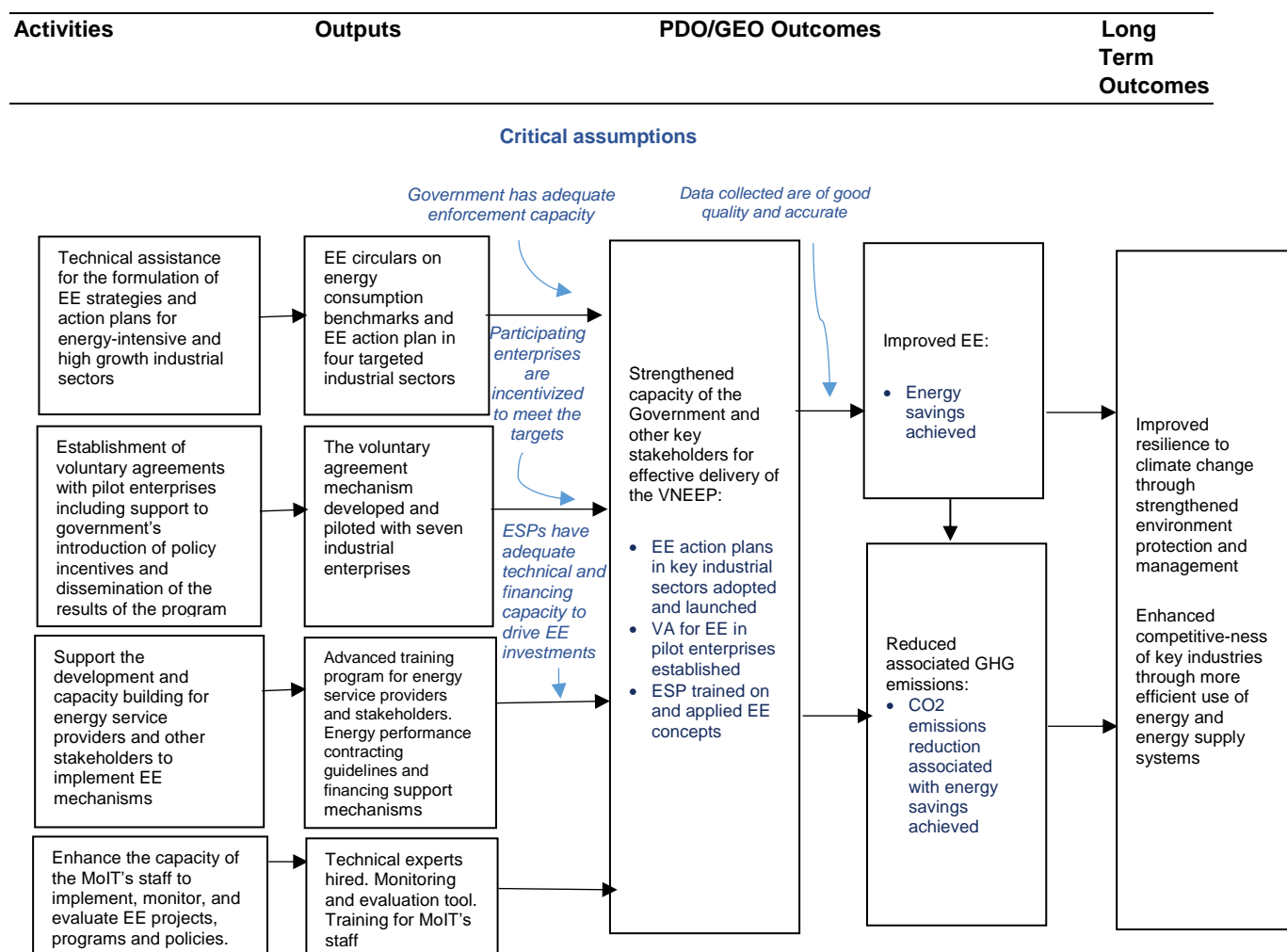
⁷ VNEEP-II aimed to achieve energy savings of 5 to 8 percent during the period 2011-2015, expanding on the initiatives implemented during the first phase 2006-2010.



Theory of Change (Results Chain)

8. The Project was articulated around a series of activities and outputs designed to address the barriers to the adoption of EE's best practices in key industrial sectors and hence, contribute to the strengthening of the national capacity to achieve energy savings and associated greenhouse gas (GHG) emissions reductions. The theory of change is illustrated below.

Figure 2: Vietnam Clean Production and Energy Efficiency Results Chain



Source: ICR author



9. The results chain presents the activities envisaged under the Project components, the associated outputs and how they contribute to the achievement of the outcomes. The assessment of the energy consumption within the target industries, the development of the voluntary agreement mechanism, the evaluation and development energy service provider industry, as well as the technical support to MoIT contribute to the achievement of the strengthening the capacity of the government and key stakeholders, which in turn, enable the achievement of energy savings and associated GHG emission reductions. The latter are expected to occur during the implementation of the Project and accrue over a longer period of time, as is the case with policy interventions and capacity building initiatives. In the long run, the Project implementation is expected to contribute to climate change resilience and industrial competitiveness.

Project Development Objectives / Global Environment Objectives (PDOs/GEOs)

10. The Grant Agreement⁸ provides that the objective of the Project is to “strengthen the capacity of the Recipient and other key stakeholders for the effective delivery of the Program, thereby improving energy efficiency and reducing associated greenhouse gas emissions.” Recipient is defined as the Socialist Republic of Vietnam, and “Program” means the Vietnam National Energy Efficiency Program designed to improve energy efficiency and conservation in all sectors of the Recipient’s economy and set forth or referred to in the Recipient’s Decision Number 79/2006/QĐ-TTg dated April 14, 2006.

11. This formulation is slightly different from the one provided in the Project Appraisal Document (PAD), which narrows the scope of intervention to “key industrial sectors.”⁹

12. There was no separate GEO statement in either the Grant Agreement or in the PAD.

Key Expected Outcomes and Outcome Indicators

13. The key expected outcomes of the Project are: (i) strengthened capacity of the Government and other key stakeholders for the effective delivery of the VNEEP; (ii) improved energy efficiency; and (iii) reduced GHG emissions associated with the energy savings achieved. The achievement of these outcomes is measured through the set of indicators listed below.

14. PDO-level indicators:

- a) Energy efficiency action plans in key industry sectors adopted and launched;
- b) Voluntary program for energy efficiency in pilot enterprises established; and
- c) Energy service providers trained on and applied advanced energy efficiency concepts.

15. GEO-level-results indicators:

- a) Energy savings achieved;
- b) CO₂ emission reductions associated with energy savings achieved.

⁸ Global Environment Facility Grant Agreement between the Socialist Republic of Vietnam and the International Bank for Reconstruction and Development, dated October 21, 2011.



Project Components

16. **Component 1: Energy Efficiency Action Plans for Key Industrial Sectors** (estimated cost of US\$3.21 million, of which US\$1.68 million is GEF grant; actual US\$1.42 million GEF). This component supported (i) the provision of technical assistance for the formulation of EE strategies and action plans for energy-intensive and high growth industrial sectors, and (ii) the establishment of voluntary agreements with pilot enterprises in such sectors including support to government's introduction of policy incentives and dissemination of the results of the program.

17. During Project implementation, four key industrial sectors, divided into 17 sub-sectors, were selected as focal areas:

- (i) Beverages: alcohol, beer, carbonated, non-carbonated;
- (ii) Chemicals: fertilizers, fertilizers-NPK,¹⁰ paints-solvent, paint-water, rubber;
- (iii) Pulp and paper: packaging, printing, tissues;
- (iv) Plastics: bags, bottles, construction, households, sacks and tarpaulin.

18. **Component 2: Development of Energy Service Providers** (estimated cost of US\$0.59 million, of which US\$0.49 million is GEF grant; actual US\$0.49 million GEF) to support the development of energy service providers and other stakeholders and build their capacity to implement mechanisms for the reduction of energy consumption and the improvement of energy efficiency solutions.

19. **Component 3: Capacity Building for Program Management, Monitoring and Evaluation** (estimated cost of US\$0.35 million, of which US\$0.20 million is GEF grant; actual US\$0.46 million GEF) to enhance the capacity of the Ministry of Industry and Trade (MoIT) staff to implement, monitor, and evaluate energy efficiency projects, programs and policies.

20. Actual and estimated component cost. As presented in Annex 3, the implementation of the Project resulted in minor deviations between the component cost estimated during appraisal and the actual component cost due to the difference in final contract prices. MoIT's in-kind contribution also fell short of the original to \$1.78 million estimated during the preparation of the Project.

B. SIGNIFICANT CHANGES DURING IMPLEMENTATION (IF APPLICABLE)

Revised PDOs/GEOs and Outcome Targets

21. PDOs/GEOs and outcome targets were not revised.

Revised PDO/GEO Indicators

22. PDO/GEO indicators were not revised.

Revised Components

23. Components were not revised.

¹⁰ Complex fertilizer comprised primarily of nitrogen, phosphorus and potassium.



Other Changes

24. The Project was originally implemented by the MoIT's Energy Efficiency and Conservation Office (EECO). Following Board approval, the implementation arrangements were modified when MoIT transferred the coordination and management of the Project to an EE Project Management Unit (PMU) established within its newly created General Directorate of Energy (GDE). In June 2016, the Project closing date was extended by one year, from June 30, 2016 to June 30, 2017. There were no changes in Project design and scope.

Rationale for Changes and Their Implication on the Original Theory of Change

25. Project implementation progress fell slightly behind the original schedule largely due to MoIT's internal reorganization, which led to changes in the management of the PMU. The Project closing date was thus extended by one year in 2016 to provide additional time to implement the outstanding activities to achieve the PDO indicators, monitor and evaluate the Project activities and impacts, and disseminate lessons learned from the Project to scale up the policy interventions required to meet the country's EE targets. These changes did not affect the original theory of change.

II. OUTCOME

A. RELEVANCE OF PDOs/GEOs

Assessment of Relevance of PDOs/GEOs and Rating

26. Rating: *High*

The Project's objectives are highly relevant. They directly contribute to the third focus area– “Ensure environmental sustainability and resilience” – of the World Bank Group's FY18-FY22 Country Partnership Framework¹¹ (CPF) and support the promotion of low carbon energy generation, including renewables and energy efficiency, and the reduction GHG emissions (CPF objective #9). More specifically, they are consistent with the WBG's ambition to help (i) the country transition in its energy mix by increasing energy efficiency through targeting enterprises to upgrade inefficient production systems and introduce new and clean technologies, and (ii) the government adopt effective measures to improve air quality management and address industrial pollution. The objectives of the Project are also fully aligned with Vietnam's EE agenda. The strengthening of the Government's capacity to implement EE programs, achieve energy savings, and reduce GHG emissions is at the core of Vietnam's development pathway, as articulated in the 2011-2019 SEDS. Moreover, their relevance is reaffirmed in the more recent 2016 Vietnam 2035 Report,¹² which promotes sustainable and climate resilient growth among the key thematic actions required to help the country attain upper middle-income status in two decades.

¹¹ Report No. 111771-VN

¹² *Vietnam 2035: Towards Prosperity, Creativity, Equity and Democracy* is a development report prepared jointly by the Government of Vietnam and the World Bank Group, and constitutes a supplemental roadmap for the country's economic, political and social reform agenda.



B. ACHIEVEMENT OF PDOs/GEOS (EFFICACY)

27. At closing, the Project exceeded two out of the three PDO-level indicators. The indicator “voluntary program for energy efficiency in pilot enterprises established” as well as the indicator “energy service providers trained on and applied advanced energy efficiency concepts” were exceeded by 40 percent and 200 percent, respectively. The indicator “energy efficiency action plans in key industrial sectors adopted and launched” was achieved by 75 percent at the Project closing and 100 percent in November 2017, about five months behind the agreed schedule.

28. In terms of GEO indicators, the Project conservatively achieved 469.7 ktoe in energy savings and 2,282.53 ktCO_{2eq} in GHG emissions reduction, exceeding the target values by 130 percent and 182 percent, respectively. A summary of the achievement of Project indicators is provided in Table 1.

Table 1: Summary of Indicators and Achievement

Indicators	Unit of measure	End target value	End actual value	Achievement
PDO level				
Energy efficiency action plans in key industrial sectors adopted and launched	Number	4	4	100 ¹³
Voluntary program for energy efficiency in pilot enterprises established	Number	5	7	140%
Energy service providers trained on and applied advanced energy efficiency concepts	Number	15	30	200%
GEO level				
Energy savings achieved	ktoe	360.4	469.7	130%
Greenhouse gas emissions reductions associated with the energy savings achieved	ktCO _{2eq}	1253.9	2282.8	182%

Assessment of Achievement of Each Objective/Outcome

29. The next paragraphs assess the achievement of each expected outcome of the Project: (i) strengthen capacity of the Government and other key stakeholders for the effective delivery of the VNEEP; (ii) improve energy efficiency; and (iii) reduce GHG emissions associated with the energy savings achieved. The achievement of these outcomes is measured by the indicators presented in Table 1 above.

(a) Strengthen capacity of the Government and other key stakeholders for effective delivery of the VNEEP.

30. *EE action plans in key industrial sectors launched and adopted.* The Project established a sound analytical basis to elaborate energy consumption benchmarks and regulation of industries. Energy savings potential of four key industrial sectors,¹⁴ which account for about 28 percent of the country’s total energy consumption, were assessed; specific initiatives for achieving energy savings were identified; and EE action plans were elaborated. The subsequent EE circulars¹⁵ provided a legal framework for investment made by the industries

¹³ Three out of four EE action plans were adopted and launched by the closing date. The one for the Pulp and Paper industry was adopted and launched in November 2017, five months after the closing date.

¹⁴ The industrial sectors were selected based on a set of criteria including their energy consumption proportion, potential energy saving and technically and economically feasible solutions

¹⁵ Chemicals EE circular included in circular No.02/2014/TT-BCT dated January 16, 2014 on solutions for economical and



to the efficiency of industrial energy uses and achieve actual energy savings, and provided a strong foundation for Vietnam to move toward a mandatory EE scheme/policy, which is being studied under technical assistance supported by the Bank.¹⁶ The activities increased awareness of all relevant stakeholders about the potential of the EE sector and strengthened their capacity to identify opportunities and design innovative business models to deliver on EE programs. The energy consumption benchmarks, EE action plans, and EE circulars provided the target industries with strong technical justifications and a legal/regulatory framework for EE investments, thereby improving the sectors' energy uses and competitiveness. Based on the effectiveness of these initiatives, MoIT conducted similar studies for the seafood and sugarcane industries and plans to further scale up the interventions for other industrial sectors using its own financing sources.

31. *Voluntary program for EE in pilot enterprises established.* The Project facilitated the launch of a pilot VA program through which selected industrial energy users committed, on a voluntary basis, to achieve specific energy consumption reduction targets through the optimization of their industrial processes and EE investments. Seven industrial companies, compared to a target of five, joined the program and implemented the EE action plans as committed in the VA with MoIT. A preliminary evaluation demonstrated that the participating enterprises fulfilled their commitments. The initiative created a new approach for promoting EE in Vietnam, which could supplement other policies and initiatives of the Government to facilitate the scaling-up of EE business. MoIT will consider scaling-up this initiative based on the achievement of the initial pilot period of two years.

32. *Energy Service Providers (ESPs) trained on and applied advanced EE concepts.* ESPs play a key role in optimizing industrial energy processes for a more efficient use of energy. Despite the large number of enterprises and consulting firms providing energy services to industries in Vietnam, the majority generally had low technical capacity, offered a limited range of services, and had limited access to financing as financial institutions considered the sector too risky. The Project supported the Government's efforts to facilitate the transition towards the Energy Service Company¹⁷ (ESCO) model by providing specialized training to ESPs. More than 75 staff from 30 ESPs were trained in specialized areas, including energy audits, development of EE projects, energy performance contracts (EPCs),¹⁸ financing mechanisms, and EE measurement and verification methods. In addition, the training program was delivered to various government agencies and banking institutions providing in-depth understanding of the ESCO business, thus enhancing development of policy, regulations, and financial products to support creating a favorable business environment and market for ESCO business in Vietnam. The training, which was the first of its kind in Vietnam, was highly appreciated by all stakeholders as conveyed in the training surveys as well as by training recipients interviewed. Annex 6 provides the consolidated results of the survey of participants in the third ESCO/ESP training¹⁹ delivered in Da Nang, Ho Chi Minh City, and Hanoi.

efficient use of energy in industries; Beverages EE circular - circular No. 19/2016/TT-BCT dated September 14, 2016 on energy consumption norms in beer and beverage production industry; Plastics EE Circular: circular No. 38/2016/TT-BCT dated December 28, 2016 on energy consumption norms in plastic production industry; and Pulp and Paper EE Circular was issued in November 2017.

¹⁶ Improving Energy Efficiency in Vietnam (P166036).

¹⁷ An ESCO is a commercial business providing a broad range of energy solutions including designs and implementation of energy savings projects, retrofitting, energy conservation, energy infrastructure outsourcing, power generation and energy supply, and risk management in order to help customers improve energy efficiency.

¹⁸ An EPC is an innovative financing mechanism that uses cost savings from reduced energy consumption to repay the cost of installing energy conservation measures. This allows beneficiary companies to achieve energy savings without upfront capital expenses. The costs of the energy improvements are borne by the performance contractor (the ESCO) and paid back out of the energy savings.

¹⁹ This third series of training was delivered between June 27 and July 15, 2016 and covered the following modules: ESCO business plan development, Advanced EPC contracts, Developing EE Projects and Sustainable Maintenance of EE targets,

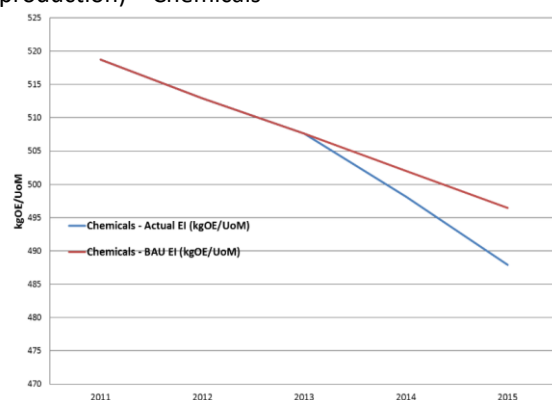


(b) Improve Energy Efficiency

33. The Project's global environmental impact was calculated following the methodology identified in the "Manual for Calculating GHG Benefits of the GEF Projects: Energy Efficiency and Renewable Energy Projects," issued by the GEF Council in 2008 (the "Manual"). The impact of the Project on energy savings and GHG emissions reduction was largely indirect, due to the nature of its activities/intervention, which aimed to create an enabling environment, build capacity, stimulate innovation, and create the conditions for the implementation of catalytic actions for replication at a larger scale. Notwithstanding this, investments made under the VA scheme²⁰ during Project implementation, and those that materialized following Project closure, were classified as direct and direct post-project impacts, respectively, in-line with GEF guidelines. The Project's GEO impacts are determined through the contribution of three sets of activities: (i) adoption and implementation of the EE action plans and EE circulars of four selected industrial sectors; (ii) piloting of the VA program; and (iii) capacity building of ESPs. Energy savings arising from the dissemination/marketing and preparation/contribution of the EE investment lending and risk sharing facility projects, and the ongoing technical assistance are not included in the evaluation because their impacts have been partly assessed and/or due to lack of robust evidence or significant attribution.

34. The PAD suggested to use a bottom-up approach to estimate the Project energy savings and associated GHG emissions, based on estimative investments in EE. This assumed that the relevant data would be collected through the national reporting system for designated enterprises established during first phase of the VNEEP. However, the system was not properly operated, and the relevant data were not collected by the industry associations either. Information required to perform a bottom-up analysis for EE circulars were either not available or unreliable, data is insufficient or non-existent. Instead, a top-down approach which is recommended by the GEF Council in the GEF Manual was conducted. The top-down approach was used to estimate the combined technical and economic market potential for EE for the Project over a post-Project influence period of 10 years (2016-2025)²¹ based on the studies on the benchmarking of the selected sectors, saving potential, and EE targets and action plans adopted by MoIT. The baseline emissions were based on the results of the VNEEP-1 (the Business-As-Usual scenario, or BAU). On the basis of review of international experience on the attribution of similar interventions and local context in Vietnam, the Project was conservatively estimated to have GEF causality at level 2 (the GEF contribution is modest and substantial indirect emission reductions can be attributed to the baseline) and a GEF causality factor²² of 30 percent in

Figure 2: Energy Intensity (Energy per Unit of production) – Chemicals*



*For illustrative purposes

Advanced Measurement and Verification, and ESCO Professional Certification Exam.

²⁰ See paragraph 31 for more details.

²¹ Actual impact values could be calculated for 2015 based on actual data.

²² The GEF causality factor expresses the degree to which the Project can take credit from the energy savings achieved.

Although the Manual recommends the use of a causality factor of 40 percent for a project whose contribution to the baseline shift is modest, it also recommends to estimate the causality factor conservatively.



the first two years, gradually decreasing to five percent in the last three years until 2025. Year 2015 was selected as the starting year for the calculation of energy savings is justified by the fact that energy savings achieved prior to the launch of the EE circulars are attributed to the baseline, in line with assumption made during the appraisal of the Project. The energy savings from the adoption of the EE action plan and the EE circular are qualified as indirect and were estimated at 429.2 ktoe in energy savings and 2,099.4 ktCO₂eq in GHG emissions reduction²³.

35. The determination of the energy savings of the VA program followed a bottom-up approach and was based on (i) the investment data and target results outlined in the agreement signed between the participating enterprises and MoIT; and (ii) the actual investment and impact results achieved during the first year, as verified by a monitoring and evaluation consultant. As stated in the Manual, the bottom-up approach assesses the likely effectiveness of a project's demonstration and triggering effects. The direct and direct post-project impacts are simply multiplied by the number of times that a successful investment under the project might be replicated after the project's activities have ended. The lifetime of the investment was seven years and the turnover factor to estimate the direct post-Project impact was 60 percent. Direct energy savings of the VA program are estimated at 18.2 ktoe and direct post-project energy savings amount to 9.98 ktoe²⁴.

36. As it is the case for the EE action plan and circulars, ESP trainings indirectly contribute to energy savings and their impact lie in the long-term outcomes achieved after Project completion. A survey of four top-rated ESPs among more than 30 ESPs trained by the Project was conducted to determine their investment projections in a period of five years following the Project closing (i.e., 2017-2021). This is equivalent to total investment of US\$10.2 million. The determination of the resulting energy savings is based on the fuel source and the technology of the underlying equipment. This results in indirect energy savings of approximately 12.27 ktoe.²⁵

(c) Reduce greenhouse gas associated with the energy savings achieved

37. The calculation of the Project's GHG emissions reduction was based on Vietnam's average electricity grid emission factor of 0.8154 tCO₂eq/MWh, as stipulated by the Government of Vietnam in March 2017 (from about 0.56 tCO₂eq/MWh during Project preparation), and the carbon dioxide intensity of the fuel source (other than electricity) used in the relevant industrial installations. The Project's GHG emissions reduction is equivalent to 2,282.8 ktCO₂eq split as follows: (a) indirect emissions: 21,190.58 ktCO₂eq, (ii) direct emissions: 64.74 ktoe, (iii) direct post-project emissions 27.46 ktoe. More details are provided in Annex 6, section IV.

Justification of Overall Efficacy Rating

38. The CPEE was instrumental in (i) setting up EE benchmarks for selected industrial sectors in Vietnam, energy efficiency action plans, and regulatory frameworks to achieve the energy saving potential; and (ii) piloting market mechanisms, such as voluntary agreements (VA), which were applied for the first time in Vietnam. In addition to providing a strong demonstration of feasible approaches and policy instruments that could be replicated at a large scale, the Project increased stakeholders' awareness, including industries, energy service providers and financing institutions, about the potential of the EE sector and strengthened their capacity to identify opportunities and design innovative business models to deliver EE programs. Since

²³ See details in Annex 6, section IV.

²⁴ See details in Annex 6, section IV.

²⁵ See detailed calculations in Annex 6, section IV.



the VNEEP ended in 2015, the Project significantly contributed to leverage EE business in Vietnam. Furthermore, analytics gathered through the implementation of the Project's activities informed the design of two large-scale follow on projects²⁶ supported by the World Bank to improve EE in the industrial sector and mobilize commercial financing, a major contribution to the long-term sustainability of EE programs in Vietnam (see paragraph 52 for more details). Not only, the Project met all the PDO level indicators and it also likely to achieve the expected target GEO outcomes indicators; target energy savings and associated GHG emissions reduction. For these reasons, ***the overall Project efficacy is rated Substantial***.

C. EFFICIENCY

Assessment of Efficiency and Rating

Rating: Substantial

39. The Project suffered implementation delays due to, *inter alia*, the prolonged vacancy of senior management positions in the PMU. The Project was also affected by MoIT's internal reorganization launched in 2012, which was shortly after the Project's approval.

40. MoIT's reorganization was key among the factors that led to a lengthy transition period due to the absence of key management-level personnel for decision making²⁷ that was critical for the Project to proceed (e.g., hiring consultants for key Project activities). This consequently slowed implementation progress and achievement of the PDO indicators. Once the PMU senior management positions were filled, implementation of the Project activities and associated disbursements accelerated.

41. The Project required a one-year extension to allow for additional time to implement outstanding activities to meet the PDO indicator targets, monitor/evaluate its impacts for scaling-up by the Government in the future, and completion of the dissemination and marketing activities.²⁸

42. Although, no economic or financial analysis was done at the time of Project appraisal, a cost-benefit analysis, presented in Annex 4, was completed to assess the economic value of the Project for the purposes of this report. The Project supported policy interventions, capacity building, and innovation with a view to catalyzing future EE investments. The economic benefits considered are energy savings and the reduction in GHG emissions resulting from the implementation of the Project.

43. The analysis of the economic flows shows that the Project results in net economic benefits when the global environmental benefits are considered. These economic benefits are driven by the valuation of the carbon emissions reduction, which is based on the social cost of carbon values recommended for World Bank projects. The economic net present value (EPNV) is equivalent to US\$8.6 million, which is equivalent to an economic internal rate of return (EIRR) of 153 percent. The ENPV increases to US\$24 million, or an EIRR of 163 percent, when the longer-term impact arising beyond the Project's implementation period are considered. The net economic value remains strongly positive with social discount rates ranging from three to 100 percent.

44. In spite of the shortcomings observed and the resulting implementation delays requiring a time extension, the Project's leveraged to small-size GEF grant, human and other resources efficiently to achieve

²⁶ Vietnam Scaling Up Energy Efficiency Project (P164938) and Vietnam Energy Efficiency for Industrial Enterprises (P151086).

²⁷ See paragraphs (a) and 59 for more details.

²⁸ See Annex 3.



its PDO objectives, paving the way for the preparation of larger scale and higher impact follow-up projects and thus, its efficiency is rated *Substantial*.

D. JUSTIFICATION OF OVERALL OUTCOME RATING

Rating: Satisfactory

45. The overall outcome of the Project is rated Satisfactory due to the high relevance of its PDO and GEO at closing, its substantial efficacy in achieving the intended outcome and the substantial efficiency with which the inputs and resources translated into results.

E. OTHER OUTCOMES AND IMPACTS (IF ANY)

Gender

46. The Project design did not provide for any outcome or impact specifically aimed at addressing gender considerations.

Institutional Strengthening

47. *Improved EE policy and regulatory framework through the introduction of sector-specific EE circulars and the VAs.* The EE&C Law provided a framework for economical and efficient use of energy for industrial producers in general. Its implementation decree²⁹ outlined the measures and regulations applicable to energy use of major energy users (e.g., industrial and agricultural production establishments and transport units consuming one thousand tons of oil equivalent or higher), but did not include specific sector-related provisions. The EE circulars not only provided standards specific to the relevant industrial sectors (e.g., chemicals, beverages, plastics, and pulp and paper) and their respective sub-sectors, but also expanded the scope of the regulation to all companies regardless of their energy consumption level.

48. The Project facilitated the introduction of VAs in Vietnam's EE landscape and policy framework, launching a new modality for cooperation between the private sector and public authorities to deliver energy savings and emissions reductions via increased EE.

49. *Strengthened capacity of ESPs and other key market players.* Weak ESP capacity was identified among the main barriers to the scale-up of EE technologies in Vietnam. Seventy-five staff of 30 ESPs benefited from advanced training in key areas, including energy savings and process optimization technologies, engineering and technical designs, EE business models, and contract management.

50. Awareness campaigns, workshops, and dissemination events were organized throughout the country, and a talk show on the Project was organized on national television. These activities also targeted various government agencies and banking institutions providing in-depth understanding on the ESCO business and helping raise broad awareness about the opportunities available within the EE industry.

Mobilizing Private Sector Financing

51. Private sector investment in mechanisms and systems that promote greater efficiency in the use of energy is expected to increase as the risk perception associated with EE investments decreases. The Project had an

²⁹ Decree No. 21/2011/ND-CP of March 29, 2011, detailing the law on economical and efficient use of energy and measures for its implementation.



indirect impact on the mobilization of private sector and, more broadly, commercial financing through (i) raising the awareness and building capacity of industrial enterprises, ESPs, and local financial institutions; and (ii) informing the design of a follow-on project addressing financial barriers to a wide adoption of EE solutions by industrial enterprises.

52. Two follow-on projects were developed, building on the achievements of the CPPE. In April 2017, the World Bank approved the Vietnam Energy Efficiency for Industrial Enterprises Project³⁰ which provides US\$100 million to participating financial institutions for on-lending to industrial enterprises and / or ESCOs based on market conditions, for the implementation of EE projects. This project will leverage a co-financing of US\$25 million from these participating financial institutions and US\$31.3 million from the sub-loan beneficiaries in the form of equity financing. The Vietnam Scaling Up Energy Efficiency Project,³¹ currently under preparation, is expected to provide US\$75 million to fund a risk-sharing facility that aims to issue partial credit risk guarantees for EE loans issued by participating financial institutions to end-beneficiaries (industries and ESCOs) in order to de-risk the sector and stimulate the emergence of commercially-financed EE investments.

Poverty Reduction and Shared Prosperity

53. Vietnam has had one of the world's fastest GDP per capita growth rates since the early 1990s, which has been accompanied by income growth for the bottom 40 percent of the population of more than 4.5 percent for the 2010-2014 period, compared to two percent on average for the total population over the same period.³² Continued robust and inclusive growth relies on the effective management of environmental impacts of industrialization and urbanization. By strengthening government capacity in developing and implementing EE initiatives, the Project contributes to increasing the competitiveness of the Vietnamese economy as energy savings are realized, and to enhancing environmental protection through lower GHG emissions.

Other Unintended Outcomes and Impacts

54. Although the Project achieved its GEO-level results, the contribution of the VA pilot program was modest. Based on the interviews conducted with industry associations and VA companies, the VA program would have had a greater impact if the Government had provided appropriate support and incentives such as mandatory technical specifications, financial incentives, access to financing, etc.

55. While the Project design emphasized energy savings as a mechanism to reduce GHG emissions, the analysis of the EE audit reports and preliminary energy savings and GHG emissions reduction data showed that these objectives could be achieved independently of each other in some cases. Indeed, some companies reduced GHG emissions through fuel substitution, switching to a less polluting source of energy, but the total energy used remained the same or increased (e.g., due to expanded production). On the other hand, there were instances where companies adopted more energy efficient equipment, with little impact on GHG emissions (e.g., switch from a 90 percent efficient gas boiler to a 100 percent EE electric heater with electricity produced by a diesel generator).

³⁰ The Vietnam Energy Efficiency for Industrial Enterprises Project (151086),

³¹ Vietnam Scaling Up Energy Efficiency Project (P164938)

³² Source: World Bank (2017), World Development Indicators.



III. KEY FACTORS THAT AFFECTED IMPLEMENTATION AND OUTCOME

A. KEY FACTORS DURING PREPARATION

56. *The design of the Project was simple, clearly articulated, and had strong linkages to the Government's development priorities and the Bank's engagement strategy in the country.* However, its stated development objective did not fully account for the implementation period of the VNEEP (2006-2015), which ended before the launch of critical capacity building activities under the Project (e.g., capacity building of ESPs and implementation of voluntary agreements).³³ As such, State and donor support in the form of funding to implement EE actions were reduced after VNEEP ended, depriving key actions of critical financing to bolster the implementation of EE actions.³⁴

57. *The low capacity of the implementing agency was adequately identified among the key risks threatening the achievement of the development outcome of the Project and was appropriately mitigated.* However, the MoIT's reorganization and its impact on the Project's implementation timely could not have been predicted. In addition, little or no consideration was given to potential challenges in accessing good quality energy consumption data, and in a timely manner. The Project design relied extensively on the assumption that existing measures regarding data collection, compilation, and dissemination were adequate for the needs of the Project, which affected the quality of the monitoring and evaluation of the Project (more below).

B. KEY FACTORS DURING IMPLEMENTATION

(a) Factors subject to government and/or MoIT control

58. *Delay in establishing a fully functional PMU.* After the Project became effective on October 21, 2011, it took slightly over four months to appoint a Project Officer to manage the day-to-day implementation activities and another nine months to hire a Project Assistant. Moreover, a new Project Officer had to be hired in the first year of the Project, when the initial one resigned in June 2012. The new staff required additional time to undertake the necessary training and familiarize themselves with the Project. Although the preparation activities subsequently accelerated, no consultancy contract other than those for the PMU staff had been signed by October 2012 leading to delay in the implementation of key activities.

59. *Changes in the management of the PMU due to internal reorganization of MoIT.* In 2012, MoIT consolidated PMUs established for various projects under an Energy Efficiency Project Management Unit, under the General Directorate of Energy, and appointed key management-level personnel.³⁵ The previous CPEE Project Director became Deputy Director of the new PMU and thus remained responsible for the daily management of Project implementation activities, ensuring business continuity. However, his position became vacant in April 2013, when he took up a new assignment with MoIT. The subsequent reassignment of the Director in January 2014 left the PMU without key decision makers until September 2014, when both positions were filled. This prolonged transition and lack of timely guidance from the PMU senior management delayed key decisions (e.g., hiring of consultants, acceptance of consultants' deliverables) and, ultimately, affected the Project implementation timeline.

³³ Although EE activities were integrated in other Government programs.

³⁴ Comment from the Vietnam Energy Conservation and Energy Efficiency Association, May 3, 2017.

³⁵ Decision no. 74/QĐ-TCNL dated 23 November 2012.



60. *Slow implementation of critical enabling activities.* Although the target numbers were exceeded at the closing of the Project, enabling activities such as the training of the ESPs and other stakeholders, and the signing of VAs were only conducted in 2016. In the same vein, after the EE circular for the chemicals sector in 2014, the two subsequent circulars were issued at the end of 2016. The methodology for monitoring the implementation of the Project's activities, the disbursement levels and the achievement of the PDO/GEO indicators, was also conducted in 2016, the year the Project was originally expected to close. The late implementation of these important activities delayed the adoption of the underlying policies by the relevant industries.

61. *Data availability.* The long lead time required to disseminate industry energy consumption statistics and the absence of EE investment data has significantly affected the ability to assess the achievement of the Project's GEO outcomes using a bottom-up approach, as envisaged during Project appraisal. It takes over a year to collect the underlying information (generally through annual surveys) and additional time to compile and disseminate the results.

62. *Access to financing for EE investments.* Companies were keen to implement low-cost measures (small maintenance, improvement of production processes, and innovation), but struggled to prioritize capital intensive actions (e.g., equipment replacement) over other operational and investment needs (e.g., capacity expansion). This was more prevalent for the companies with the lowest profitability margins and/or in the most competitive market segments.

63. The EE industry in Vietnam is nascent and most ESPs have a small asset base and limited or no track record to finance EE investments. Though the training provided valuable information on mechanisms and business models (such as EPCs) to drive the application of innovative EE concepts in industries, few ESPs have the capacity to raise the up-front capital required. This was primarily due to the difficulty to access funding from banks and the high financing costs associated with local commercial borrowing, as local banks are yet to be familiar with the EE industry.

(b) Factors subject to World Bank control

64. The Project benefited from the continuity in the World Bank's supervision personal. The World Bank's Task Team Leader at closing was part of the Project preparation team, and involved in its implementation since inception. Similarly, the core members were based in Vietnam, and remained involved in the Project throughout closing. This continued presence allowed of the establishment of strong relationships with MoIT's implementation team, and helped maintain the momentum.



IV. BANK PERFORMANCE, COMPLIANCE ISSUES, AND RISK TO DEVELOPMENT OUTCOME

A. QUALITY OF MONITORING AND EVALUATION (M&E)

M&E Design

65. The theory of change linking the Project's activities and the desired development and global environmental outcomes was clear. The PDO-level result indicators were straightforward, easy to measure, and informed by the intermediate level indicators. The GEO-level indicators were clear, but no specific detail was provided regarding the source and availability of measurement data. The PMU was primarily responsible for the collection and analysis of data required to assess the progress towards achieving results. It was supported by an external consultant, whose scope of work was to (i) develop an M&E methodology and an associated action plan; (ii) support data collection and verify the accuracy of data received from third parties; and (iii) evaluate the Project achievements relative to intended outcomes and impacts.

M&E Implementation

66. The methodology for monitoring and evaluating the implementation of the Project's activities, the disbursement levels as well as the achievement of the PDO/GEO indicators, was only designed towards the end of the Project, when the external consultant was hired.³⁶ It was expected that data collected by MoIT from designated enterprises would be utilized to calculate GEO outcome indicators. It later became clear that these data were not sufficiently relevant and reliable to calculate the GEO indicators. After investigations, it appeared that the Vietnam GSO had been conducting a survey for the manufacturing sector to evaluate the impact of the VNEEP. These data were found to be the only available source of information, though they are published with a significant time lag.

67. Two separate computer-based monitoring tools were developed to monitor the implementation of the Project activities (the output monitoring tool) and evaluate its performance relative energy savings and CO₂ emissions reduction (the impact evaluation tool). The output monitoring tool captured key action points and tracked completion status, generating monitoring reports providing a chronological account of implementation activities based on inputs entered by PMU staff. This provided a good understanding as to whether there were any issues encountered during the implementation and how they were addressed, and subsequently their impact on implementation schedule and budget.

68. The impact evaluation tool calculated energy savings and CO₂ emissions reduction for each target industrial group. The calculation methodology involved the comparison of actual performance indicators against estimated BAU values. Industry performance pre-2014 was attributed to the impact of the VNEEP, the main policy initiative that could have influenced the energy consumption of the target industry groups before the launch of the Project. Thus, the impact of the Project was determined as the difference between the calculated values of the industry performance indicators (based on data collected) and the estimated BAU values (based on the declining trend resulting from the VNEEP). Given that the first major activity of the Project (the EE action plan for the chemicals industry) was completed around the end of 2013, it was assumed that the GEO impact of the Project materialized from 2015. It was also estimated that the benefits of the CPEE would gradually decline until 2025, when its impact on the target industry groups becomes market standard

³⁶ The M&E consultant was hired in late October 2015, less than a year before the original Project closing date.



(or the new BAU scenario). MoIT is expected to continue collecting additional data for monitoring the Project's GEO impacts.

M&E Utilization

69. The output monitoring tool had a limited impact on the management of the Project's activities because it was developed within the last year of the original contract closing date. The PMU staff relied on alternative record keeping systems (e.g., diaries, emails, accounting records, etc.) to provide input data regarding implementation progress and thus progress reports related to the achievement of outputs could only be generated during the fifth year of implementation, apparently too late to inform decision making.

70. The raw data collected by the GSO required substantial processing before they could be used as input to the impact evaluation tool. In addition, the data were only available for a limited number of years (2011-2015). At the time of Project closing, data for 2016 and 2017 were not available and thus the actual impact values related to energy savings and CO₂ emissions reductions could not be calculated for these years. See also paragraph 61.

Justification of Overall Rating of Quality of M&E

71. The overall quality of the M&E is rated *Modest*. Lack of an M&E framework at the beginning of Project implementation and delay in developing the M&E framework (e.g., in place only in the fifth year), limited effectiveness of M&E. Although, the Project could monitor its progress toward achieving the PDO indicators through the alternative record keeping systems, it was difficult to track the Project's progress in meeting the GEO indicators. In addition, the utilization of the Impact evaluation tool was challenged by the unavailability of the relevant data required to assess the achievement of the GEO indicators.

B. ENVIRONMENTAL, SOCIAL, AND FIDUCIARY COMPLIANCE

72. *Environmental and Social Safeguards*. The Project was classified as category C at the time of appraisal as it was expected to have minimal or no adverse environmental impacts. The Project design neither included feasibility studies for downstream investments, nor financed demonstration projects identified during the preparation of the EE action plans and other capacity building activities. This remained relevant during the implementation period and thus no environmental assessment instruments were required.

73. *Fiduciary compliance*. Initial fiduciary compliance issues were encountered due to delays in staffing the PMU (the Project Officer was only appointed in April 2012, four months after Project effectiveness) and limited experience with World Bank fiduciary requirements. As a result, the first financial audit reports submitted for the Project were rejected due to unacceptable quality and subsequently revised to the Bank's satisfaction. Payment delays and slow disbursements were also identified and documented during the financial management supervision missions. Procurement activities and disbursements, which were slow during the first years of implementation, accelerated as the implementation arrangements became more stable. The capacity of the financial management staff was enhanced through regular training workshops. By Project closing, the fiduciary arrangements met the basic requirements in terms of staffing, accounting system, internal controls, financial reporting, and auditing.



C. BANK PERFORMANCE

Quality at Entry

Rating: Moderately Satisfactory

74. The Project built on the Government's development priorities and was closely aligned with the Bank's engagement strategy in the country. The Bank worked effectively with MoIT to design an innovative project, which aimed to strengthen the existing regulatory framework, pilot new policy mechanisms (e.g., VAs), build the capacity of all key stakeholders, and create awareness about the EE industry and its opportunities. The risks associated with the implementation of the Project were analyzed and appropriate mitigation measures were identified. However, a key gap in quality at entry was the absence of a sound M&E methodology to measure the GEO indicators. For this reason, the technical assistance component of the Project provided for the recruitment of an M&E consultant to assist MoIT design and implement the M&E arrangements.

74. The Project as designed did not include direct financing of EE investments, implying that direct attribution and the establishment of a causal relationship between the Project activities and the GEO targets related to energy savings and GHG emissions reductions would have been difficult to establish. Thus, the outcomes delineated by the PDO indicators were more aligned with the Project's direct interventions. Energy savings and associated GHG emissions arising from these interventions accrue over a longer time period, beyond the lifetime of the Project. The global environmental impact, calculated following the methodology recommended by the GEF council in "Manual for Calculating GHG Benefits of the GEF Projects: Energy Efficiency and Renewable Energy Projects," captures the Project's longer-term GEO achievements.

Quality of Supervision

Rating: Moderately Satisfactory

75. The Bank conducted frequent supervision missions throughout the duration of the Project. Project activities were adequately monitored, action points identified, and recommendations provided. Financial management and fiduciary aspects were closely monitored, identified issues were addressed, and training was provided to strengthen the capacity of the PMU staff. While the supervision adequately focused on the implementation of the Project's activities, more attention could have been paid to timely development and effective utilization of the M&E system.

Justification of Overall Rating of Bank Performance

76. Overall, the Bank performance is rated *Moderately Satisfactory*, due to the moderate shortcomings described above.

D. RISK TO DEVELOPMENT OUTCOME

77. *Capacity constraint (likelihood: medium, impact: medium).* There is a risk that the PMU no longer has enough human and financial resources to monitor impacts after the closing of the Project. The Project facilitated the recruitment of consultants to assist with key project management (e.g., Project Officer and Project Assistant) and M&E activities as well as the capacity building of the PMU staff, including on the utilization of the M&E impact evaluation tool designed to monitor the impact of the Project beyond its closing



date. MoIT's potential inability to sustain and enhance the capacity created through the Project represents the main risk to the development outcome of the Project. That said, MoIT will retain the PMU for implementation of the Vietnam Energy Efficiency for Industrial Enterprises Project and the upcoming EE risk sharing facility developed under the Scaling Up Energy Efficiency Project, thus there will be staff and resources that can continue to support the Project achievements over the longer-term.

78. *Institutional changes (likelihood: high, impact: medium).* A more recent reorganization of MoIT/GDE, which took place after the Project's closing, will likely affect the Project outcome. GDE was divided into three agencies, of which the newly established Department of Science and Energy Efficiency was assigned to take over the responsibility to complete the outstanding Project activities, which caused delay in the review and issuance of the EE circular for pulp and paper industry. However, the restructuring is likely to affect positively the existing supervision and monitoring arrangements for EE initiatives and increase MoIT's ownership and commitment (e.g., through changes in key personnel, dissolution and creation of new units, redistribution of responsibilities across units) and thus the sustainability of the development outcome of the Project.

79. *Lack of enforcement of EE regulations (likelihood: medium, impact: high).* The Project facilitated the adoption of additional regulatory instruments to strengthen the existing framework. However, there was no mechanism in place to monitor the application and enforce the provisions of the EE regulations and, more specifically, the EE circulars. Rather, a greater emphasis was put on raising awareness and providing technical training to key stakeholders. While it could be argued that this was the most sensible approach given the early development stage of the EE industry in Vietnam, MoIT's ability to enforce the implementation of the EE legal and regulatory framework will be of critical importance going forward.

V. LESSONS AND RECOMMENDATIONS

80. *Targeted policy-based interventions are effective ways to build stakeholder capacity, strengthen the sector dialogue and gather the analytical data required to design larger scale follow up interventions.* Not only did the US\$2.37 million CPEE Project contribute to the delivery of a milestone EE Government program, it informed the design of follow-on projects, channeling over US\$150 million in financing and guarantees to the Vietnam EE sector. This approach could be replicated in other sectors.

81. *Lack of supporting financing mechanisms is a barrier to the scale-up of EE actions, especially for entities having a weak financing capacity and limited access to capital markets.* Until the EE market matures, the Bank, other development partners, and the Government could help accelerate the uptake of EE initiatives by providing lines of credit to commercial banks for on-lending to EE projects or supporting the establishment of a guarantee mechanism to mitigate the underlying credit risk. The World Bank Vietnam Energy Efficiency for Industrial Enterprises and Scaling Up Energy Efficiency Projects aim to address these obstacles.

82. *Lack of adequate measuring, reporting, and verification (MRV) systems at national level weaken ability to monitor and enforce laws and regulations and potentially undermine the long-term effectiveness of the policy interventions.* Recipients should pay closer attention to their ability to sustain the impact of policy interventions by enhancing their capacity to monitor the implementation laws and regulations during and especially after Bank-supported projects have ended. Weak enforcement of the industrial benchmarking program and action plan contributed to lower than expected energy savings. Future efforts need to focus on strengthening the national MRV system for EE programs.

83. *Timely design and implementation the M&E framework is critical to the monitoring of project progress*



and the assessment of project outcomes. Elaboration of the M&E methodology, development of baseline data for key indicators, and/or verification that the information required to monitor results is readily available is absolutely necessary during project preparation.

84. *VAs have a limited impact on EE improvement.* VA is an innovative approach for promoting EE, supporting other Government 's policies and initiatives to facilitate the scaling-up of EE initiatives. Parallel support mechanisms and incentives should be provided to VA enterprises to maximize the impact of the VA programs and thus, foster a wide adoption of EE and conservation measures.

85. *Capacity building of ESPs is not sufficient to stimulate EE market transformation.* Effective EE policies to create the demand, combined with incentives (e.g., financial, etc.) to encourage ESPs to adopt the ESCO business model and offer innovative solutions to industrial enterprises, are needed for the ESCO industry to take off. Given the important role played by the energy service industry in the promotion and implementation of technical solutions for EE and conservation, future initiatives should consider market mechanisms designed to invigorate the transition towards a greater professionalization of that sector.

86. *Institutional changes and weak implementation capacity can significantly affect project outcomes.* The implementation of the Project's activities was affected by the delay in establishing a fully operational PMU when the Project became effective and, subsequently, in replacing key decision makers when the incumbents were assigned to other positions. The implementing entity needs to ensure that the PMU is fully staffed and key project management positions are filled at all times during project implementation. The Bank helps ensure this through appropriate covenants and prompt supervision.



ANNEX 1. RESULTS FRAMEWORK AND KEY OUTPUTS

A. RESULTS INDICATORS

A.1 PDO Indicators

Objective/Outcome: Strengthen the capacity of the Socialist Republic of Vietnam and other key stakeholders for the effective delivery of the national energy efficiency program

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Energy efficiency action plans in key industry sectors adopted and launched	Number	0.00 05-Jul-2011	4.00 30-Jun-2016		4.00 30-Nov-2017

Comments (achievements against targets): Chemicals EE circular included in circular No.02/2014/TT-BCT dated January 16, 2014 on solutions for economical and efficient use of energy in industries; Beverages EE circular - circular No. 19/2016/TT-BCT dated September 14, 2016 on energy consumption norms in beer and beverage production industry; Plastics EE Circular: circular No. 38/2016/TT-BCT dated December 28, 2016 on energy consumption norms in plastic production industry; and Pulp and Paper EE Circular was issued in November 2017.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Voluntary program for energy	Number	0.00	5.00		7.00



efficiency in pilot enterprises established		05-Jul-2011	30-Jun-2015		30-Jun-2016
Comments (achievements against targets): Piloting of the VA methodology was supported by a robust outreach and communication campaign, which led to a higher number of participants in the VA program, than originally targeted (7 out of a target of 5).					

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Energy service providers trained on and applied advanced energy efficiency concepts	Number	0.00 05-Jul-2011	15.00 30-Jun-2016		30.00 15-Jul-2016
Comments (achievements against targets): More than 75 staff members of 30 energy service providers were trained in specialized areas, including energy audits, development of EE projects, energy performance contracts, financing mechanisms, and EE measurement and verification methods. The third series of training was delivered between June 27 and July 15, 2016 and covered the following modules: ESCO business plan development, Advanced EPC contracts, Developing EE Projects and Sustainable Maintenance of EE targets, Advanced Measurement and Verification, and ESCO Professional Certification Exam					

Objective/Outcome: Improve energy efficiency

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Energy savings achieved	Number	0.00 05-Jul-2011	360.40 30-Jun-2016		469.75 30-Jun-2017



Comments (achievements against targets): Industrial energy savings facilitated by the Project accrue over time, beyond its implementation period. Using the approaches stipulated in “Manual for Calculating GHG Benefits of the GEF Projects: Energy Efficiency and Renewable Energy Projects”, the Project results in 441.52 ktoe in energy savings, 18.24 ktoe in direct energy savings, and 9.98 ktoe of direct post-project energy savings.

Objective/Outcome: Reduce associated greenhouse gas emissions

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
CO2 emission reductions associated with energy savings achieved	Number	0.00 05-Jul-2011	1253.90 30-Jun-2016		2282.77 30-Jun-2017

Comments (achievements against targets): As with the industrial energy savings, the carbon dioxide equivalent emissions reduction are realized over the longer term, beyond the implementation period of the Project. Using the carbon dioxide intensity of the fuel used in the underlying installations and Vietnam's average electricity grid emission factor, indirect GHG impact amount to 2,190.58 ktCO₂eq, direct and post-project impact are equivalent to 64.74 and 27.46 ktCO₂eq, respectively.

A.2 Intermediate Results Indicators

Component: Energy efficiency action plans for key industrial sectors

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Assessment of energy efficiency situation and potential in key industry sectors accomplished	Number	0.00 05-Jul-2011	4.00 30-Jun-2014		4.00 15-Dec-2016



Comments (achievements against targets): EE situation was assessed in all four target industries. This stock-taking exercise was supplemented by the review of local and international experience, leading to the assessment of energy saving potential of those industries and subsequently, the elaboration of the EE benchmarks.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Target-setting methodology and mechanism of voluntary agreement developed	Number	0.00 05-Jul-2011	1.00 30-Jun-2013		1.00 30-May-2014

Comments (achievements against targets): The design of the VA target setting methodology and mechanism was conducted and set the stage for the pilot phase of this initiative.

Component: Development of energy service providers

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Survey of energy service providers, evaluation of funding mechanisms, and development of training program and in-depth guidelines for energy service industry completed	Number	0.00 05-Jul-2011	4.00 30-Jun-2014		4.00 11-Dec-2015

Comments (achievements against targets): The survey and capacity needs assessment of ESPs informed the design of the capacity building programs. The needs assessment covered the evaluation of financing support structures and funding mechanisms for EE, including a review of international experience



with EE financing, an assessment of barriers to EE financing in Vietnam, as well as an elaboration of initial options for removing these barriers and developing incentives.



B. KEY OUTPUTS BY COMPONENT

Objective/Outcome 1: Strengthen the capacity of Government and other key stakeholders for the effective delivery of the Vietnam National Energy Efficiency Program	
Outcome Indicators	<ol style="list-style-type: none"> 1. Energy efficiency action plans in key industry sectors adopted and launched 2. Voluntary program for energy efficiency in pilot enterprises established 3. Energy service providers trained on and applied advanced energy efficiency concepts
Intermediate Results Indicators	<ol style="list-style-type: none"> 1. Assessment of energy efficiency situation and potential in key industry sectors accomplished 2. Target-setting methodology and mechanism of voluntary agreement developed 3. Survey of energy service providers, evaluation of funding mechanisms, and development training program and in-depth guidelines for energy service industry completed
Key Outputs by Component (linked to the achievement of the Objective/Outcome 1)	<p>Component 1: Energy Efficiency Action Plans for Key Industrial Sectors</p> <ul style="list-style-type: none"> - Energy consumption benchmarks - Energy Efficiency Action Plans - Energy Efficiency Circulars - Pilot voluntary agreements - Awareness raising campaigns <p>Component 2: Development of Energy Service Providers</p> <ul style="list-style-type: none"> - ESPs survey report - ESP Training needs assessment - Capacity building workshops



	<ul style="list-style-type: none"> - Dissemination of case studies and best practices <p>Component 3: Capacity Building for Project Management, and Monitoring and Evaluation</p> <ul style="list-style-type: none"> - Recruitment of a local Project Officer - Recruitment of an M&E consultant - Targeted training of the PMU personnel
Objective/Outcome 2: Improve energy efficiency	
Outcome Indicators	Energy savings achieved
Intermediate Results Indicators	n/a
Key Outputs by Component (linked to the achievement of the Objective/Outcome 2)	n/a
Objective/Outcome 3: Reduce associated greenhouse gas emissions	
Outcome Indicators	CO2 emission reductions associated with energy savings achieved
Intermediate Results Indicators	n/a
Key Outputs by Component (linked to the achievement of the Objective/Outcome 3)	n/a



C. FURTHER DETAILS ON OUTPUTS

The Project supported an effective information campaign, including on EE benchmarking and EE action plans, the VA initiative, ESP training, as well as other activities such as television talk shows, Project review and completion workshops, a Project website, etc. Eight workshops and dissemination events were organized throughout the country to promote the VA initiative and the ESCO business model. A talk show on the Project and EE program was presented in the central television channel. All activities helped raise public awareness, and that of target audiences, about the Project, EE opportunities, and best practice. The Project completion workshop was conducted on June 15, 2017.

As MoIT is the most important player in the industry, the Project paid special attention to MoIT's capacity building both in theoretical and on-the-job trainings. MoIT was empowered to lead all Project-supported activities and make their own decisions based on technical input from the Project and support from the Bank team and consultants. Procurement of all activities were structured in a way to maximize the involvement of local consultants, at the same time bringing international expertise and best practices to bear, thus enhancing local capacity for similar activities in future.

The Project also completed sector analytical work, enhancing the client's understanding and decision-making for implementation and scale-up to achieve large-scale energy savings as well as providing a basis for follow-up engagement by the Bank in the sector. The Project supported analytical work on EE financing mechanisms and development of a safeguards framework for EE investments, directly contributing to EE investment lending and risk sharing facility projects and creating a foundation for the Bank's ongoing technical assistance in the sector focused on mandatory EE mechanism and enhancing ESCO business in Vietnam.

ANNEX 2. BANK LENDING AND IMPLEMENTATION SUPPORT/SUPERVISION

A. TASK TEAM MEMBERS

Name	Role
Preparation	
Alberto U. Ang Co	Task Team Leader
Ky Hong Tran	Co-Task Team Leader
Mai Thi Phong Tran	Financial Management Specialist
Hung Tan Tran	Procurement Specialist
Joel J. Maweni	Lead Energy Specialist
Cristina Hernandez	Program Assistant
Teri Velilla	Program Assistant
Sameena Dost	Senior Counsel
Anh Nguyet Pham	Senior Energy Specialist
Beatriz Arizu de Jabonski	Senior Energy Specialist
Hung Tien Van	Senior Energy Specialist
Douglas J. Graham	Senior Environmental Specialist - safeguards
Thao Le Nguyen	Senior Finance Officer - disbursements
Dung Kim Le	Team Assistant
Supervision/ICR	
Defne Gencer	Task Team Leader
Ky Hong Tran	Task Team Leader
Hung Tan Tran	Procurement Specialist/Co-task Team Leader
Mai Thi Phuong Tran	Financial Management Specialist
Fowzia Hassan	Team Member
Hien Minh Vu	Team Member
Franz Gerner	Team Member
Hoa Chau Nguyen	Team Member
Thi Ba Chu	Team Member

**B. STAFF TIME AND COST**

Stage of Project Cycle	Staff Time and Cost	
	No. of staff weeks	US\$ (including travel and consultant costs)
Preparation		
FY09	6.728	23,499.84
FY10	5.275	24,245.08
FY11	28.225	98,578.90
FY12	0	0.00
Total	40.23	146,323.82
Supervision/ICR		
FY09	0	0.00
FY12	12.125	43,782.01
FY13	10.125	43,830.69
FY14	15.875	38,690.56
FY15	10.150	25,782.96
FY16	15.319	69,448.53
FY17	13.542	59,578.94
FY18	5.475	21,945.47
Total	82.61	303,059.16



ANNEX 3. PROJECT COST BY COMPONENT

Components	Amount at Approval (US\$M)	Actual at Project Closing (US\$M)	Percentage of Approval (%)
Energy Efficiency Action Plans for Key Industrial Sectors	1.68	1.42	84.5
Development of Energy Service Providers	0.49	0.49	100
Capacity Building for Program Management, and Monitoring and Evaluation	0.20	0.46	230
Total	2.37	2.37	100



ANNEX 4. EFFICIENCY ANALYSIS

A development impact of the Project was assessed in terms of its expected benefits and costs. This analysis was based on the GEO impacts of the elaboration of the EE action plans and circulars in the four target industries, during the implementation period of the Project (2011-2017). Additional benefits arising from the Project, including employment opportunities through the piloting of the voluntary agreement program, the capacity building of the ESPs and the marketing and dissemination activities have not been included in this analysis.

The net annual energy savings (in ton of oil equivalent) and CO₂ emissions reductions (in ton of CO₂ equivalent) attributable to the Project are monetized using estimated average annual crude oil price (in real terms)³⁷ and the social values of carbon for Project appraisal, recommended by the World Bank.³⁸ The cost elements of the Project are composed of (i) the US\$2.37 million grant amount supporting the Project implementation, (ii) the US\$1.153 million co-financing amount provided by the recipient, and (iii) the supervision cost of the Bank team. All the local costs were converted in United States Dollars.

The benefits (net energy savings and CO₂ emissions reductions) are based on the value calculated using the GEF methodology. The economic model is designed to calculate both the EIRR and the ENPV using a social discount rate of 12 percent. The sensitivity of the results was calculated for different oil price and social values of carbon assumptions.

A. RESULTS

The analysis of the economic flows of shows that the Project results in net economic benefits, when taking into environmental impact due to reduced CO₂ emissions. Under the base case scenario, the ENPV is equivalent to US\$8.6 million, or an EIRR of 156 percent.

³⁷ Source: World Bank, DataBank Commodity Prices – History and Projections. Crude oil average, real, \$/bbl <http://databank.worldbank.org/data/reports.aspx?source=commodity-prices~-history-and-projections&preview=on> (accessed on February 9, 2018).

³⁸ World Bank, Guidance note of social value of carbon in project appraisal, September 2014.



Figure A4.1: Calculation of economic returns – Base case (2011 – 2017)

	Calendar Year			2011	2012	2013	2014	2015	2016	2017
	Values	Units	Total	ENPV						
Legend										
#	Input variables									
#	Actual data									
#	Calculated values									
#	Outputs									
Social discount rate	12%									
Conversion factor (bbl / toe)	0.136									
Costs										
Project financing	\$		(2,374,407)	(1,558,120)	(188,209)	(453,439)	(273,710)	(384,435)	(740,642)	(333,971)
Client and other contribution	\$		(1,153,000)	(952,934)			(353,000)	(800,000)		
Supervision cost	\$		(303,059)	(186,248)	(6,789)	(67,310)	(38,343)	(22,074)	(60,949)	(35,985)
Total cost	\$		(3,830,466)	(2,255,706)	(6,789)	(255,519)	(491,782)	(648,785)	(1,245,384)	(776,626)
Benefits										
Energy savings	toe		156,326	125,609				53,250	54,989	48,087
Oil price	\$/bbl							51.99	45.66	55.95
Oil price	\$/toe		-	-				7.07	6.21	7.61
Energy savings	\$		1,083,889	692,630			-	376,504	341,494	365,891
Net benefits (excl. GHG impact))	\$		(2,746,577)	(1,703,546)	(6,789)	(255,519)	(491,782)	(648,785)	(868,880)	(435,133)
CO2 emissiions reduction	Ton CO2e		660,000	377,481		-	-	-	225,000	232,000
Social cost of carbon	\$/Ton CO2e		-	-					30	30.94
CO2 emissions reduction	\$		20,208,599	12,930,041			-	-	6,750,000	7,177,920
Results										
Net benefit (incl. GHG impact)	\$		17,462,023	8,604,204	(6,789)	(255,519)	(491,782)	(648,785)	5,881,120	6,742,787
ERR (including global GHG impact)	156%									

An additional scenario was run to assess the economic impact of the Project over the longer term, i.e., until 2025, beyond which the EE market developments can no longer be attributed to the impact of the Project. The ENPV increases to US\$24 million, or an EIRR of 163 percent, a measure of the magnitude of the longer-term economic impact of the Project, beyond the Project implementation period.

Figure A4.2: Calculation of economic returns (2011 – 2025)

	Calendar Year			2011	2014	2017	2020	2023	2024	2025
	Values	Units	Total							
Legend										
#	Input variables									
#	Actual data									
#	Calculated values									
#	Outputs									
Social discount rate	12%									
Conversion factor (bbl / toe)	0.136									
Costs										
Project financing	\$		(2,374,407)	(1,558,120)	(273,710)	(333,971)				
Client and other contribution	\$		(1,153,000)	(952,934)	(353,000)					
Supervision cost	\$		(303,059)	(186,248)	(6,789)	(22,074)	(71,610)			
Total cost	\$		(3,830,466)	(2,255,706)	(6,789)	(648,785)	(405,581)	-	-	-
Benefits										
Energy savings	toe		156,326	257,752		48,087.00	39,987.00	17,939.00	20,131.00	22,464.00
Oil price	\$/bbl			330.51		55.95	59.27	58.84	58.72	58.59
Oil price	\$/toe		-	44.95		7.61	8.06	8.00	7.99	7.97
Energy savings	\$		1,083,889	1,533,822	-	365,891	322,301	143,550	160,762	178,995
Net benefits (excl. GHG impact))	\$		(2,746,577)	(1,032,952)	(6,789)	(648,785)	(39,690)	322,301	143,550	160,762
CO2 emissions reduction	Ton CO2e		660,000	857,481	-	203,000	215,000	108,000	125,000	143,000
Social cost of carbon	\$/Ton CO2e		-	197.31		30.94	35	37.92	38.95	40
CO2 emissions reduction	\$		20,208,599	25,036,701	-	-	6,280,680	7,525,000	4,095,312	4,868,236
Results										
Net benefit (incl. GHG impact)	\$		17,462,023	24,003,749	(6,789)	(648,785)	6,240,990	7,847,301	4,238,862	5,028,998
ERR (including global GHG impact)	163%									

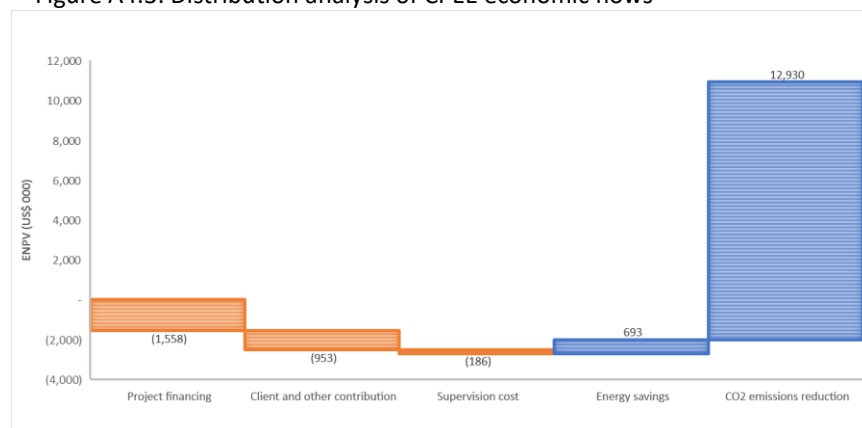
B. DISTRIBUTION ANALYSIS

The economic value of the Project is driven by its large positive environmental impact, as measured by the CO₂ emissions reductions facilitated by the implementation of the underlying activities, as shown in



the figure below.

Figure A4.3: Distribution analysis of CPEE economic flows



C. SENSITIVITY ANALYSIS

Social value of carbon. Sensitivity analysis using the low case social values of carbon (increasing from US\$15 per ton in 2015 to US\$20 in 2020) results in an ENPV of US\$3.6 million (or an EIRR of 94 percent). This confirms the robustness of the economic value of the Project, and its high dependence of on the valuation of the CO₂ emission reduction.

Social discount rate. The Project returns a positive ENPV with social discount rates ranging from three to 100 percent, which is consistent with its high EIRR of 156 percent in the base case, and confirms the robustness of the underlying economic flows.

Table A4.1: NPV social discount rate sensitivity table

<i>Social discount rate</i>	<i>ENPV (US\$M)</i>
3%	14.5
6%	12.2
12%	8.6
20%	5.6
50%	1.3
100%	0.168



ANNEX 5. BORROWER, CO-FINANCIER AND OTHER PARTNER/STAKEHOLDER COMMENTS

The Client has no comments the ICR and agrees with the Project's ratings



ANNEX 6. SUPPORTING DOCUMENTS (IF ANY)

I. LIST OF DOCUMENTS

Vietnam Policy Documents

Decree No. 102/ 2003/ND-CP of September 3, 2003, on economical and efficient use of energy;
Decision No: 79/2006/QĐ-TTg of April 14, 2006 approving the National Strategic Program on Economical and Efficient Use of Energy
Law No. 50/2010/QH12 of June 17, 2010 on economic and efficient use of energy
Decree 21/2011/ND-CP of March 29, 2011 regarding details and measures for implementation the Law on Energy Efficiency and Conservation
Decree No 73/2011/ND-CP of August 23, 2011 defining handling of administrative violations on economical and efficient use of energy
Decision No. 1427/QĐ-TTg of October 02, 2012 approving the National Target Program on Energy Efficiency and Conservation for the period 2006-2015.
Circular No. 02/2014/TT-BCT of 16 January 2014 promulgating EE&C measures in industries in general, and the Circular No. 19/2016/TT-BCT dated September 2016 on energy consumption norms in beer and beverage production industry

Global Environment Facility

Manual for Calculating GHG Benefits of GEF Projects: Energy Efficiency and Renewable Energy Projects, GEF Council, April 2008

WBG Engagement Strategy Documents

Vietnam Country Partnership Strategy for 2007-2011, Report No: 3826-VN dated January 3, 2007
Vietnam Country Partnership Strategy for FY12-FY16, Report No: 65200-VN dated November 7, 2011
Vietnam Country Partnership Framework for FY18-FY22, Report No. 111771-VN, 2017

Project and Financing Documents

Aide Memoires for Project Supervision Missions, World Bank. 2010 – 2017.
Project Implementation Status and Results Reports (ISRs). 2011 – 2017. World Bank.
Project Appraisal Document, Report No. 60012-VN World Bank, 2011.
Global Environment Facility Grant Agreement dated October 21, 2011
Amendment to the Grant Agreement letter dated xxx
Restructuring Paper, Report No. RES24354 dated June 29, 2016. World Bank

Other documents

Consultants deliverables under the Clean Production and Energy Efficiency Project
Vietnam 2035: Towards Prosperity, Creativity, Equity and Democracy, 2016, International Bank for Reconstruction and Development / The World Bank and The Ministry of Planning and Investment of Vietnam



II. RESULTS OF SURVEY OF ENERGY SERVICE PROVIDERS

Participation by Workshop Session	Count	%
Da Nang	8	15.69%
Ho Chi Minh City	25	49.02%
Ha Noi	18	35.29%
Total	51	100.00%
Organizational Position of the Participants	Count	%
Chief or Deputy Chief	27	52.94%
Consultant	2	3.92%
Lecturer	2	3.92%
Officer	10	19.61%
Project developer	1	1.96%
Researcher	1	1.96%
Staff	8	15.69%
Total	51	100%
Professional Position	Count	%
An Officer of the Energy Conservation Centre	21	42.00%
A Consultant of private Energy service provides/ESCO	12	24.00%
Officer of Power Corporation	11	22.00%
University Lecturer	3	6.00%
Others (in details)	3	6.00%
Total	50	100.00%
Organizational Background	Count	%
State Owned	39	76.47%
Joint Stock Company	6	11.76%
Company Ltd	4	7.84%
Other (in details)	2	3.92%
Total	51	100.00%
Education Level of Participants	Count	%
Post-graduated	22	43.14%
University	28	54.90%
<i>Did not answer</i>	1	1.96%
Total	51	100.00%



Professional Experience of Participants	Count	%
<2 years	1	1.96%
2-5 years	15	29.41%
5-10 years	23	45.10%
> 10 years	12	23.53%
Total	51	100.00%
Relevance of current job with energy management or ESCO fields	Count	%
Not related to the field	1	1.96%
Remotely related to the field	2	3.92%
Quite related to the field	7	13.73%
Mostly related to the field	15	29.41%
Totally related to the field	25	49.02%
<i>Did not answer</i>	1	1.96%
Total	51	100.00%
Attendance in the CPEE Training 1	Count	%
Yes	49	96.08%
No	2	3.92%
Total	51	100.00%
Was CPEE Training 1 useful to enhance your ESCO Business?	Count	%
Yes	49	100.00%
No	0	0.00%
Total	49	100.00%
Will CPEE Training 1 help you save more energy for clients?	Count	%
Yes	45	91.84%
No	4	8.16%
Total	49	100.00%
Estimate of how much CPEE Training 1 can help you save for the clients?	Count	%
Up to 5%	3	7.14%
5% - 10%	22	52.38%
Above 10%	13	30.95%
Other -----%	4	9.52%
Total	42	100.00%



How CPEE Training 1 can help you save for clients?	Count	%
Better calculations/ analytics	32	36.36%
Improved MRV	15	17.05%
More scientific methods	27	30.68%
New areas of Energy Efficiency	13	14.77%
Other	1	1.14%
Total	88	100.00%
Attendance in the CPEE Training 2	Count	%
Yes	49	100%
No	0	0%
Total	49	100.00%
Was CPEE Training 2 useful to enhance your ESCO Business?	Count	%
Yes	46	95.83%
No	2	4.17%
Total	48	100.00%
Will CPEE Training 2 help you save more energy for clients?	Count	%
Yes	43	89.58%
No	5	10.42%
Total	48	100.00%
Estimate of how much CPEE Training 2 can help you save for the clients?	Count	%
Up to 5%	3	7.14%
5% - 10%	21	50.00%
Above 10%	14	33.33%
Other -----%	4	9.52%
Total	42	100.00%
How CPEE Training 2 can help you save for clients?	Count	%
Better calculations/ analytics	36	37.50%
Improved MRV	19	19.79%
More scientific methods	26	27.08%
New areas of Energy Efficiency	14	14.58%
Other	1	1.04%
Total	96	100.00%



III. LIST OF WORKSHOP PARTICIPANTS

ESCO training for government officers - Nha trang, June 23-24, 2016

#	Participants	Organization
1	Trịnh Quốc Vũ	Tổng cục Năng lượng - GDE
2	Lê Phú Hưng	
3	Bùi Thị Như Trang	
4	Vũ Thị Ngọc Bích	
5	Hoàng Việt Dũng	
6	Nguyễn Lâm	Sở Công Thương TP. Hồ Chí Minh (Phòng quản lý năng lượng) - Hochiminh City Department of Industry and Trade
7	Phan Minh Tuấn	
8	Trương Tam	Sở Công Thương Khánh Hòa - Khanh Hoa Provincial Department of Industry and Trade
9	Lê Ngọc Phước	Sở Công Thương Phú Yên- Phu Yen Provincial Department of Industry and Trade
10	Lê Kim Chung	
11	Huỳnh Kim Tước	Trung tâm TKNL TP. HCM - Hochiminh City Energy Conservation Centre
12	Phan Sỹ Ngọc Huân	Sở Công Thương Ninh Thuận - Ninh Thuan Provincial Department of Industry and Trade
13	Nguyễn Ngọc Tường Vi	Tổng công ty Điện lực TP. Hồ Chí Minh - Hochiminh City Power Corporation
14	Võ Bích Ngọc	
15	Bùi Thị Thùy Trang	
16	Trần Viết Nguyên	Tập đoàn Điện lực Việt Nam - Electricity of Vietnam
17	Nguyễn Văn Duy	
18	Nguyễn Ngọc Giáp	
19	Nguyễn Mạnh Đức	Tổng công ty điện lực Hà Nội - Hanoi Power Corporation
20	Phạm Hồng Quang	
21	Nguyễn Trung Văn	
22	Đặng Nguyên Phương	Tổng công ty điện lực Miền Nam - Southern Power Corporation
23	Nguyễn Quang Hùng	Tổng công ty điện lực miền trung - Central Power Corporation
24	Nguyễn Ngọc Ánh	
25	Lê Hoài An	
26	Nguyễn Nghĩa	
27	Nghiêm Nguyên Cường	
28	Phan Tuấn Khanh	
29	Cao Thanh Phát	Công ty Điện lực Khánh Hòa - Khanh Hoa Power Company
30	Thái Quang Minh	
31	Nguyễn Chí Diểu	
32	Ngô Xuân Thủy	
33	Nguyễn Tuấn Hiệp	



List of participants ESCO for Financial Institutions - Hanoi, June 20 - 22, 2016

#	Participant	Organization
1	Vũ Thùy Linh	Ngân hàng Nhà Nước - State Bank of Vietnam
2	Nguyễn Thị Xuân	Hiệp hội Ngân hàng Việt Nam - Vietnam's Banking Association
3	Kiều Lan Anh	
4	Phạm Thị Thanh Tâm	Ngân hàng TMCP Sài Gòn - Hà Nội - Sai Gon - Hanoi Commercial Joint Stock Bank
5	Đặng Thu Ngân	
6	Bùi Duy Minh	Ngân hàng TMCP Ngoại Thương Việt Nam - Vietcombank
7	Nguyễn Minh Quân	Ngân hàng TMCP Công Thương - Vietinbank
8	Nguyễn Chí Hải	
9	Đào Thị Hồng Thuận	Ngân hàng Đầu tư và Phát triển Việt Nam - Vietnam Bank for Investment and Development
10	Lưu Hồng Liên	
11	Đỗ Thị Thu Huyền	Ngân hàng TMCP Kỹ Thương Việt Nam - Techcombank
12	Đào Kim Ngân	
13	Nguyễn Nghĩa	Ngân hàng TMCP Sài Gòn Thương Tín - Sacombank
14	Dư Hồng Ngọc	Quỹ Bảo vệ Môi trường Việt Nam- Vietnam Environment Protection Fund
15	Nguyễn Thị Ngọc Lan	Quỹ đầu tư xanh GIF - Green Investment Facility
16	Trần Việt Nguyên	Tập đoàn Điện lực Việt Nam - Electricity of Vietnam
17	Nguyễn Ngọc Giáp	
18	Nguyễn Công Danh	Tổng công ty điện lực Miền Nam -Southern Power Corporation
19	Nguyễn Duy Thiện	
20	Vũ Thu Hương	Tổng công ty điện lực Miền Bắc - Northern Power Corporation
21	Trương Thúy Liễu	
22	Phạm Hồng Quang	Tổng công ty Điện lực Hà Nội - Hanoi Power Corporation
23	Trần Khánh Ly	
24	Ngô Thị Thu Hiền	
25	Trần Xuân Phương	
26	Nguyễn Thị Thúy	
27	Nguyễn Ngọc Duy	
28	Đặng Trần Phương	
29	Nguyễn Tiến Hiệp	
30	Nguyễn Ngọc Tường Vi	Tổng công ty Điện lực TP. Hồ Chí Minh - Hochiminh City Power Corporation
31	Võ Bích Ngọc	
32	Nguyễn Vũ Minh Huy	

ESCO training program - Hanoi, July 25-27, 2016

#	Participant	Organization
1	Nguyễn Xuân Quang	Viện KHCN Nhiệt Lạnh - ĐH Bách Khoa - Hanoi University of Technology
2	Phạm Minh Công	Công ty CP tư vấn EPRO / EPRO Consulting JSC
3	Đỗ Văn Sáng	Trung tâm Tiết kiệm Năng lượng Hà Nội
4	Lê Văn Hải	Hanoi Energy Conservation Centre
5	Nguyễn Ngọc Duy	Tổng công ty Điện lực Hà Nội - Hanoi Power Corporation
6	Mai Văn Huyền	Trung Tâm Tiết Kiệm Năng Lượng HCMC - Hochiminh City Energy Conservation Centre
7	Hồ Quốc Sơn	Trung tâm TKNL và CGCN Đà Nẵng - Da Nang Energy Conservation Centre
8	Đoàn Anh Tuấn	Đại học Bách Khoa Đà Nẵng- Danang City Technology University



9	Tiết Vĩnh Phúc	Enerteam
10	Huỳnh Đức An	Công ty CP E&M / E&M JSC
11	Cao Thanh Tuấn	Trung tâm TKNL Cần Thơ - Can Tho Energy Conservation Centre
12	Nguyễn Đình Tuấn Phong	Đại học Điện Lực Electricity University
13	Nguyễn Thị Ngọc Lan	LCEE

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#	Participant	Organization
1	Nguyễn Văn An	Viện KHCN Nhiệt Lạnh - ĐH Bách Khoa Institute of Heating & Refrigeration Engineering (IHRE)
2	Nguyễn Xuân Quang	
3	Vũ Quốc Khánh	
4	Đỗ Văn Sáng	Trung tâm Tiết kiệm Năng lượng Hà Nội Hanoi Energy Conservation Centre
5	Trần Thị Loan	
6	Lê Văn Hải	
7	Nguyễn Tuấn Anh	
8	Nguyễn Bá Hải	
9	Dương Chí Công	Công ty CP Tư vấn Giải pháp Công nghệ Việt Nam Vietnam Technology Solutions JSC
10	Phạm Minh Công	Công ty CP tư vấn EPRO / EPRO Consulting JSC
11	Nguyễn Ngọc Duy	
12	Vũ Tiến Đạt	Công ty Cổ phần RCEE - NIRAS (RCEE-NIRAS JSC)
13	Nguyễn Đình Tuyển	Trung Tâm Tiết Kiệm Năng Lượng HCMC HCMC Energy Conservation Centre
14	Mai Văn Huyền	
15	Lê Thị Tuyết Lan	
16	Vũ Thị Lan Anh	Công ty cổ phần tư vấn và đầu tư năng lượng Việt Viet Energy Consultant and Investment Corporation (Viet ESCO)
17	Đỗ Hữu Chế	Đại học Điện Lực Electricity University
18	Nguyễn Đình Tuấn Phong	Đại học Điện Lực Electricity University
19	Phạm Anh Hải	Viện Khoa học Công nghệ Mỏ Vinacomin
20	Vũ Thế Nam	
21	Lê Quang Tuấn	
22	Nguyễn Tiến Đạt	Công ty CP Tư vấn Đầu Tư Thương Mại và Dịch vụ Năng lượng Việt Nam
23	Trần Viết Nguyên	Tập đoàn Điện lực Việt Nam
24	Nguyễn Ngọc Giáp	
25	Hồ Hữu Phùng	Đại học Bách Khoa Hà Nội Ha Noi University of Science and Technology

IV. (a) DETERMINATION OF THE GEO IMPACT IN THE FOUR TARGET INDUSTRY SECTORS

						Base Year													End of Life
Industry	UoM	Parameter	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025		
Beverages	TOE	Energy Consumption (BAU)	166,590	215,275	235,889	253,031	314,488	334,224	351,152	391,548	419,449	452,023	482,877	507,831	540,550	572,803	601,265		
	TOE	Target Energy Savings	0	0	0	0	19,996	21,165	22,146	24,591	26,231	28,148	40,479	42,396	44,941	47,425	49,572		
	%	% Energy Savings	0.00%	0.00%	0.00%	0.00%	6.36%	6.33%	6.31%	6.28%	6.25%	6.23%	8.38%	8.35%	8.31%	8.28%	8.24%		
Chemicals	TOE	Energy Consumption (BAU)	576,591	1,522,941	1,739,306	1,781,747	1,570,031	1,615,937	1,697,458	1,983,332	1,863,203	1,879,043	1,948,054	2,054,726	2,107,861	2,141,789	2,159,768		
	TOE	Target Energy Savings	0	0	0	0	141,303	145,434	152,771	178,500	167,688	95,998	99,550	104,982	107,774	109,585	110,544		
	%	% Energy Savings	0.00%	0.00%	0.00%	0.00%	9.00%	9.00%	9.00%	9.00%	9.00%	5.11%	5.11%	5.11%	5.11%	5.12%	5.12%		
Paper & Pulp	TOE	Energy Consumption (BAU)	104,672	348,877	364,780	341,416	515,423	516,367	534,123	642,805	665,602	729,209	790,732	825,336	890,100	948,004	993,215		
	TOE	Target Energy Savings	0	0	0	0	8,179	8,406	8,858	14,026	23,507	35,844	50,213	76,342	104,053	115,799	130,402		
	%	% Energy Savings	0.00%	0.00%	0.00%	0.00%	1.59%	1.63%	1.66%	2.18%	3.53%	4.92%	6.35%	9.25%	11.69%	12.22%	13.13%		
Plastics	TOE	Energy Consumption (BAU)	120,078	148,437	158,714	150,691	409,252	423,105	437,492	514,270	595,633	679,330	751,374	786,773	867,401	946,107	1,012,483		
	TOE	Target Energy Savings	0	0	0	0	8,021	8,293	8,575	10,080	23,349	39,945	58,908	77,104	102,006	129,806	158,757		
	%	% Energy Savings	0.00%	0.00%	0.00%	0.00%	1.96%	1.96%	1.96%	1.96%	3.92%	5.88%	7.84%	9.80%	11.76%	13.72%	15.68%		
Total Commercial Potential for	TOE	Energy Consumption (BAU)	967,931	2,235,529	2,498,689	2,526,886	2,809,195	2,889,633	3,020,226	3,531,955	3,543,887	3,739,605	3,973,036	4,174,667	4,405,912	4,608,702	4,766,731		
	TOE	Target Energy Savings	0	0	0	0	177,499	183,298	192,350	227,196	240,775	199,935	249,150	300,824	358,775	402,615	449,275		
	%	% Energy Savings	0.00%	0.00%	0.00%	0.00%	6.32%	6.34%	6.37%	6.43%	6.79%	5.35%	6.27%	7.21%	8.14%	8.74%	9.43%		
Savings Estimate Under CPEE	-	Causality Factor	0%	0%	0%	0%	30%	30%	25%	25%	20%	20%	15%	10%	5%	5%	5%		
	TOE	Energy Savings - Beverages	0	0	0	0	5,999	6,349	5,536	6,148	5,246	5,630	6,072	4,240	2,247	2,371	2,479		
	TOE	Energy Savings - Chemicals	0	0	0	0	42,391	43,630	38,193	44,625	33,538	19,200	14,933	10,498	5,389	5,479	5,527		
	TOE	Energy Savings - Paper & Pulp	0	0	0	0	2,454	2,522	2,214	3,506	4,701	7,169	7,532	7,634	5,203	5,790	6,520		
	TOE	Energy Savings - Plastics	0	0	0	0	2,406	2,488	2,144	2,520	4,670	7,989	8,836	7,710	5,100	6,490	7,938		
	TOE	Energy Savings - Total Annl	0	0	0	0	53,250	54,989	48,087	56,799	48,155	39,987	37,372	30,082	17,939	20,131	22,464		
	TOE	Energy Savings - Cumulative	0	0	0	0	53,250	108,239	156,326	213,125	261,280	301,267	338,640	368,722	386,661	406,792	429,255		
	kTon CO2e	GHG Emissions - Beverages	0	0	0	0	34	36	31	35	30	32	34	24	13	13	14		
	kTon CO2e	GHG Emissions - Chemicals	0	0	0	0	155	160	140	164	123	70	55	38	20	20	20		
	kTon CO2e	GHG Emissions - Paper and Pu	0	0	0	0	13	14	12	19	25	39	41	41	28	31	35		
	kTon CO2e	GHG Emissions - Plastics	0	0	0	0	22	23	20	23	43	74	82	71	47	60	74		
	kTon CO2e	GHG Emissions - Total Annl	0	0	0	0	225	232	203	241	221	215	212	175	108	125	143		
	kTon CO2e	GHG Emissions - Cumulative	0	0	0	0	225	457	660	901	1,122	1,337	1,549	1,724	1,832	1,956	2,099		

IV. (b) DETERMINATION OF THE GEO IMPACT OF THE VA PROGRAM

Total VA program		
Total investments committed under VA	US\$	1,100,000
Total energy saving	toe	4,982
Total associated GHG emission reduction	tCO2eq	15,785
First year implementation		
Actual implemented in the first year	US\$	500,000
First year energy saving	toe	2,606
First associated GHG emission reduction	tCO2eq	9,248
Implemented in the remaining period	US\$	
Actual implemented in the first year	US\$	600,000
Energy saving	toe	2,376
Associated GHG emission reduction	tCO2eq	6,537
Lifetime investment		
Investment lifetime	year	7
Aggregate lifetime energy saving of the first year investment	toe	18,242
Aggregate lifetime associated GHG emission reduction of the first year investment	tCO2eq	64,736
Turnover factor		0.6
Aggregate lifetime energy saving of the subsequent investment	toe	9,979
Aggregate lifetime GHG emission reduction of subsequent investment	tCO2eq	27,455
Total energysaving	toe	28,221
Total associated GHG emissions reduction	tCO2eq	92,191



IV. (c) DETERMINATION OF THE GEO IMPACT OF THE ESCO TRAINING PROGRAM

		2016	2017	2018	2019	2020	2021
<i>Projected annual investments after ESCO training</i>	US\$	1,232,000	1,232,000	2,663,022	2,222,022	2,222,022	1,888,689
<i>Annual energy saving</i>	toe	210	210	453	401	401	288
<i>Annual associated GHG emission reduction</i>	tCO ₂ eq	1,579	1,579	3413	2922	2922	2184

Investment lifetime	year	7
GEF Causality Factor	percentage	100%
Total investments committed after ESCO training	US\$	10,227,755
Total energy saving attributed by CPEE	toe	12,268.01
Total GHG emission reduction attributed by CPEE	tCO ₂ eq	91,139.75

* Investment data 2016, 2017 from ESCO survey done in Dec 2017

*** Data only for the ESCO investment, not including EE consulting services