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Independent terminal evaluation

Promoting Industrial Energy Efficiency through System Optimization and Energy Management Standards in Viet Nam

Project No.: GF/VIE10/003
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CONTENTS

ABBREVIATIONS AND ACRONYMS

APPR	Annual Project Progress Report
APR	Annual Project Review
CASO	Compressed Air System Optimization
DOSTs	Departments of Science and Technology in Provinces
DOITs	Departments of Industry and Trade (DOITs)
DSM	Demand Side Management
ECCs	Energy Conservation Centers
EC&EE	Energy Conservation and Energy Efficiency
EESPs	Energy Efficiency Service Provision/Providers
EnMS	Energy Management System
FS	Feasibility Study
GDE	General Directorate of Energy
GEF	Global Environment Facility
GHG	Greenhouse Gases
GOV	Government of Vietnam
HCMC	Ho Chi Minh City
HUT	Hanoi University of Technology
IE	Institute of Energy (MOI)
IHERE	Institute of Heat Engineering and Refrigeration (HUT)
VIETINBANK	Vietnam Industry and Trade Bank
LPG	Liquefied Petroleum Gas
MOC	Ministry of Construction
MOF	Ministry of Finance
MOIT	Ministry of Industry and Trade
MONRE	Ministry of Natural Resources and Environment
MOST	Ministry of Science and Technology
MPI	Ministry of Planning and Investment
NGOs	Non-Governmental Organizations
PMU	Project Management Unit
RFP	Request for Proposal
SPC	Project Steering Committee
SOEs	State Owned Enterprises
SSO	Steam System Optimization
STAMEQ	Directorate for Standard – Metrology and Quality
TOC	Theory of Change
TOE	Tons of Oil Equivalent
TOR	Terms of Reference
TV	Television of Viet Nam
UNIDO	United Nations Industrial Development Organization
VEPF	Vietnam Environment Protection Fund
VOV	Voice of Vietnam

GLOSSARY OF EVALUATION-RELATED TERMS

Term	Definition
Baseline	The situation, prior to an intervention, against which progress can be assessed.
Effect	Intended or unintended change due directly or indirectly to an intervention.
Effectiveness	The extent to which the development intervention's objectives were achieved, or are expected to be achieved.
Efficiency	A measure of how economically resources/inputs (funds, expertise, time, etc.) are converted to results.
Impact	Positive and negative, intended and non-intended, directly and indirectly, long term effects produced by a development intervention.
Indicator	Quantitative or qualitative factors that provide a means to measure the changes caused by an intervention.
Lessons learned	Generalizations based on evaluation experiences that abstract from the specific circumstances to broader situations.
Logframe (logical framework approach)	Management tool used to facilitate the planning, implementation and evaluation of an intervention. It involves identifying strategic elements (activities, outputs, outcome, impact) and their causal relationships, indicators, and assumptions that may affect success or failure. Based on RBM (results based management) principles.
Outcome	The likely or achieved (short-term and/or medium-term) effects of an intervention's outputs.
Outputs	The products, capital goods and services which result from an intervention; may also include changes resulting from the intervention which are relevant to the achievement of outcomes.
Relevance	The extent to which the objectives of an intervention are consistent with beneficiaries' requirements, country needs, global priorities and partners' and donor's policies.
Risks	Factors, normally outside the scope of an intervention, which may affect the achievement of an intervention's objectives.
Sustainability	The continuation of benefits from an intervention, after the development assistance has been completed.
Target groups	The specific individuals or organizations for whose benefit an intervention is undertaken.

EXECUTIVE SUMMARY

The Industrial Energy Efficiency (IEE) project was aimed at assisting industries to adopt ISO 50001 energy management standards and a systematic approach to improving energy efficiency at the system levels. Through the adoption of energy management standards, energy management practices were integrated into the management cycle in order to realize energy efficiency improvements on continuing basis.

The project was primarily focused on capacity building of stakeholders that included: (i) national experts in energy management and (ii) industrial enterprises, equipment suppliers, distributors, engineering/energy service companies and government planners for the introduction of ISO 50001. Based on experience with the implementation of the system optimization approach in other countries, the energy efficiency improvements on steam and compressed air systems are expected to lead to higher energy savings, from between 15 to 30% for compressed air systems and 10 to 15% for steam systems. The targeted sectors were: food, textiles, rubber and pulp & paper. Compliance with the ISO Standard, published in 2011, was expected to provide the required incentive for continuing attention to improved end-use efficiency. It is also expected that the project will contribute substantially towards meeting Vietnam's goals of improving energy efficiency in industry as envisioned in the National Energy Efficiency Program.

The **objective** of the project was therefore to promote energy efficiency in the industries through a systems optimization approach and introduction of ISO 50001, Energy Management Standards. To achieve the objective, the project was designed to produce four outcomes, including:

(i) A policy instrument (compatible with ISO 50001) in place delivering sustainable improvements in EE in industries;
(ii) A cadre of EE professionals within industrial facilities, consultants and suppliers is created to provide services on energy management and optimize industrial systems;
(iii) Increased adoption of ISO 50001 energy management standards and system optimization projects by industry; and
(iv) Increased financial capacity support for industrial EE initiatives.

The Project document was signed in January 2011 and the original completion date was 30 June 2014. However, project activities were initiated in July 2011 for an expected duration of three and a half (3.5) years. A total extension of 1 year and 6 months was granted.

Evaluation purpose, approach and methods

The main purpose of this terminal evaluation is to promote accountability for achievement of GEF and UNIDO objectives. The evaluation follows GEF guidelines for assessing projects in order to provide a comprehensive, systematic and evidence-based account of the performance of the completed project. The evaluation assesses project design, the process of implementation, achievements (outputs, outcomes, impacts and their sustainability) against project objectives approved by the GEF (including any agreed changes to the objectives during project implementation) and any other results. It is intended to assess the achievement of project results, and to draw lessons that can both improve the sustainability of benefits from this project, and aid in the overall enhancement of UNIDO programming.

A combination of desk studies, literature review, statistical analysis, individual interviews, surveys and direct observation provided a sound basis for an evidence-based qualitative and quantitative assessment, including an insight into reasons why certain results were achieved or not.

This evaluation was conducted by Mr. Segbedzi Norgbey (Independent Evaluation Consultant and team leader), and Mr. Nhien Ngo To (National Evaluation Consultant).

Evaluation results

This IEE project specifically set out to assist industries to adopt the new ISO 50001 energy management standard and to implement an approach to improving energy efficiency at the systems levels (steam and compressed air system). Through adoption of energy management standards, energy management practices will be integrated into the management of industrial enterprises with the resultant energy efficiency improvements on a continuing basis. The project's primary focus was on capacity building of stakeholders that included industrial enterprises, equipment suppliers, distributors, engineering/energy service companies and government planners.

This evaluation concludes that the project was relevant to national energy priorities and has enjoyed strong participation of local stakeholders in project identification. Good energy management practices have not kept pace with the rapid expansion in and modernization of the Vietnamese economy and for that matter industry. The need to implement best energy management systems and optimize systems was therefore evident. The project fills that need and is, therefore, relevant to the needs of Vietnam in its efforts to promote industrial development while reducing its carbon footprint. Work on energy efficiency issues is fully aligned with the UNIDO mandate to promote and "accelerate industrial development in developing countries and industrial development and co-operation on global, regional and national, as well as on sectoral levels". The project is also consistent with and supports GEF-4 Climate Change Strategic Program 2; promoting energy efficiency in the industrial sector. By addressing key existing barriers to information, technical capacity and markets for sustainable IEE in Vietnam, the project directly contributed to promoting and increasing the deployment and diffusion of energy–efficient technologies and practices in industrial production and manufacturing processes.

Regarding project design, the Evaluation Team observes that the project document is clearly drafted and easy to read and understand. The design of the project provides an objective and indicators allowing for an assessment of relevance and effectiveness. The indicators, as formulated, were sufficiently Specific, Measurable, Achievable, Relevant and Time-bound (SMART) and follow the principles of Results Based Management. M&E was considered in project design.

The intervention logic in the design is clear with activities producing outputs and outputs producing outcomes which were stated correctly to reflect behavioral changes and contribute to the achievement of project objectives. In the context of Program Performance and Results Based Management (RBM), project outcomes are key deliverables from the production of outputs and contribute to the attainment of the objective. **What is missing in the logical framework matrix for this project, however, is a clear statement of outcome indicators**. While project output and objective level indicators were developed, outcome indicators were ignored either by design or were overlooked.

The design of the project management framework and institutional structures were clearly thought through and this facilitated smooth project implementation. **However, Gender was not considered in project design.**

The evaluation of effectiveness is based on the extent to which the project objective of promoting industrial energy efficiency through systems optimization and ISO energy management standards was achieved. This evaluation concludes that overall this objective has been achieved, and to a significant extent expectations have been surpassed in some project components. The project increased the understanding of energy efficiency issues (i.e. EnMS and SO), resulting in the adoption of ISO 50001 energy management standards and the system optimization approach by industry as outcomes of the improved capacity and knowledge of national experts and industrial personnel. The enforcement requirements on EC&EE Law regarding energy management in the Decree No. 134/2013/ND-CP issued on 17 October 2013 are expected to be key drivers for sustainable energy efficiency improvements in industries which will ultimately assist in reducing environmental impacts while increasing industrial production through sustained energy management and efficiency in Vietnam.

Taken together, implementation of the activities in the three components of the project have contributed to creating an enabling environment for the widespread adoption of energy management and system optimization practices in industrial enterprises in Vietnam. In particular, the ISO 50001 energy management standard has been issued nationally. Fifty-four (54) trained national expert consultants and industrial facilities engineers equipped with the knowledge and skills on EnMS and SO approach have been providing services on EnMS, SSO and CASO to industries that have delivered energy efficiency improvements. Four hundred and thirty-four (434) individuals from industrial enterprises and 28 equipment suppliers have received the required knowledge and skills on EnMS and SO, and are ready to provide services for industries. By directly engaging stakeholders at local and national levels in the execution of the project as well as through targeted training during capacity building workshops, the project laid a strong foundation for energy efficiency improvements in industry. The project has catalyzed changes in behavior through the introduction of new technologies and approaches and the implementation of demonstration projects in industrial enterprises. These demonstrations are being replicated successfully in other industrial enterprises.

Project implementation was cost-effective as a result of a number of factors, including appropriate industrial sector selection, establishment of effective partnerships with key organizations, agencies and industries among others, building on programmes of partners and strong national support. However, a number of factors reduced efficiency. Some training participants were of the view that better geographic distribution of training workshops and more in-plant training activities would have ensured more coverage and better access to training events. In Ho Chi Minh City some participants would have liked to attend training events that were organized in Hanoi but which they could not attend for a variety of reasons. It is clear, however, that the limited budget for the project did not allow for the implementation of additional training events.

The TOC analysis shows that the project has put in place a number of ‘drivers’ that strengthen the potential for catalyzing progress towards achievement of impact [Global Environmental Benefits (GEBs)]. The project’s initiative to agree on clear evaluation criteria for EE projects with the commercial lending institutions to lend to industrial enterprises for new equipment purchases will go a long way to make application for loans easier. There is

evidence that industrial enterprises are willing to, and have indeed invested in some cases in modernizing their energy management systems. With regards to key drivers for change, there is clear evidence that support has been received from the National Standards Authority and, as stated above, the required legislation and policy instruments (consistent with ISO 50001) are in place to drive progress towards impact.

The project has created awareness and built capacity at the national level. Government agencies /institutions and industrial enterprises are primary beneficiaries of the capacity building efforts. The strong partnership formed between private and public sector institutions with different agendas provides the driving force for action. Collaboration with a high level of political support indeed provides a measure of sustainability because the political will is there to continue work towards a sustainable energy future. Ownership within government agencies and awareness and capacity built in industrial enterprises are likely to continue in the long term.

Availability of funds continues to be a constraint in implementing energy efficiency projects in some industrial enterprises. While a little more than half of the enterprises that participated in the User training did apply some of the systems solutions after the training, the lack of action from the remaining enterprises is mainly due to a slump in their production and the fact that their financial conditions were not quite stable.

The building of national, legal and institutional capacity to enable governments to integrate ISO 50001 energy management standard into national legislation and regulatory processes which are expected to deliver sustainable EE improvement in industries in Vietnam is a clear measure of sustainability. Indeed, the project was successful in increasing the adoption of ISO 50001 energy management standards with systems optimization in industries annually.

Efforts to reduce energy consumption resulting in a corresponding reduction in GHG emissions, in and of themselves, are environmental benefits. This evaluation did not observe any negative consequences on the environment from the implementation of project activities. Among the major factors contributing to efficiency were:

i. Establishment of partnerships with key organizations, agencies, academic and research institutions and local communities for project execution (Part I B) and other formal networks;
ii. Effective engagement of industrial enterprises
iii. Building on past and on-going programmes of partners and utilization of existing knowledge, such as those identified above.
iv. Use of the National Expert Trainer approaches which, as demonstrated above in section 3.8, resulted in additional training in industrial enterprises.
v. A lean and efficient Project Management Unit (PMU) - The PMU was slim (2 staff) and efficiently managed. Its location within MOIT facilitated efficient and effective collaboration with national partners.

The cost-efficient measures adopted resulted in the successful completion of the project on time and within budget. The Vietnamese Energy Efficiency Project can be compared favorably to other similar GEF medium size Energy Efficiency projects implemented by UNIDO such as those in Indonesia, and Burkina Faso etc. in terms efficiency in resource use for training programs and timeliness in project execution.

Lessons (to be) learned

Clear project design with practical application in industrial enterprises and clear links to ISO 50001 certification was responsible for project success and popularity. To improve the results framework for UNIDO projects, however, there is need to ensure that clear indicators are formulated at the higher results levels. This will facilitate monitoring against milestones at the outcome levels and the documentation of progress towards impact.

Strong project relevance & demand as well as strong support and effective collaboration with national partners were essential elements in project success.

Our interviews reveal that participants would have liked examples from local enterprises. Often, external experts used examples from foreign plants which were so large compared to local plants that sometimes the processes became unnecessarily complex and examples quite irrelevant to participating enterprises. National project personnel explained that at the beginning of project implementation, all training topics (EnMS and SO) were new ones to local industrial enterprises and there were no examples from Vietnam (even though regional countries had examples); hence, the use by external experts of examples from foreign plants. They note, however, that since the third year of project implementation, some local case studies have been developed and posted on the project website and project basecamp as reference for industrial enterprises. The issue was still fresh in the minds of training participants who would have liked examples from local enterprises or possibly from the region during the training events at when participants were interviewed during this evaluation.

Effective coordination among project implementing partners (UNIDO, MOIT, STAMEQ, etc.) was an important factor in the successful project implementation

1. INTRODUCTION

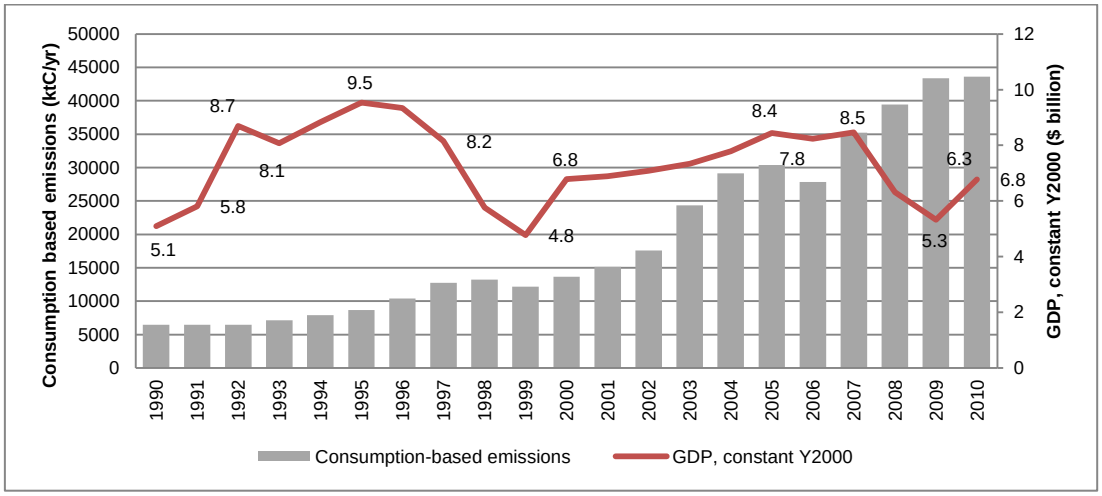
1.1. Brief country context

Like many other countries in the world, Vietnam is facing a dilemma: economic development and energy security as opposed to concerns for the environment. It is even more challenging in the context of climate change, especially given the fact that Vietnam is one of the most vulnerable countries to climate change. Improving energy efficiency through adaptation and mitigation measures could be a critical response to climate change (CC) for the country. More efficient energy use could also help Vietnam maintain its rapid economic growth, secure its energy balance as well as slow down the process of resource depletion.

Between 1990 and 2011, commercial energy increased by an annual average of 12.4%, while the growth in GDP rose by 7-8%. The energy self-sufficiency rate of Vietnam is 124.3%; energy exports are mainly crude oil and coal. Vietnam is a crude oil exporter, but it imported 100% of processed oil products. The total amount used for oil imports extends to USD 7.6 billion, accounting for 8.9% of total imports. The proportion of electricity produced from renewable energy (hydropower and biomass) in Vietnam accounted for 36.1% of the total 83.2 TWh, with grid coverage of 97.6%. Total per capita electricity consumption is about 917 kWh, lower than the average in the Southeast Asian region of 983 kWh/person; Asia - 1755 kWh/person, and the world - 2728 kWh/person.

As opposed to the declining trend in most developed countries between 2006 and 2010, carbon dioxide emissions increased sharply in developing countries. Although only ranked 33rd in the world in terms of total CO2 emissions, Vietnam is known to have the third highest CO2 emission increase rate in the world behind Namibia and Cambodia, which increased 676 fold in 20 years (1990-2010) [1].

Figure 1: Vietnam CO2 consumption based emissions 1990 – 2010



Source: Information of CO2 Emission, Oak Ridge National Laboratory's Carbon Dioxide Information Analysis Centre (CDIAC)

[1] Information of CO_2 Emission, Oak Ridge National Laboratory's Carbon Dioxide Information Analysis Centre (CDIAC)

This is understandable, considering that Vietnam's energy sector has changed radically with the transformation from an agricultural society relying primarily on traditional biomass fuels to a modern mixed economy. The figure above shows that in parallel with the process of economic growth, emissions have increased sharply in Vietnam. In order to meet its international obligations and secure its energy future, Vietnam has actively researched and implemented several projects to increase energy efficiency and also reduce greenhouse gases emitted.

1.2. Sector specific issues

Recognizing the need for reducing energy intensity, Vietnam started its efforts to promote energy efficiency a decade ago, covering a wide range of energy efficiency activities. In 2006, the Government of Vietnam (GoV) approved the Vietnam National Targeted Program in Energy Saving and Energy Efficiency (Vietnam National Energy Efficiency Program or VNEEP). This is the first-ever comprehensive plan to institute measures for improving energy efficiency and conservation (EE&C) in all sectors of the economy in Vietnam to meet the targets of 3% to 5% energy consumption reduction during 2006-2010 and 5-8% during 2011-2015. The program comprises a set of activities to encourage, promote, and disseminate energy efficiency and conservation in the country. The program has two phases: (i) Phase 1 (2006–2010) aims to start all components of the program; and (ii) Phase 2 (2011–2015) aims to expand each component, based on lessons learned from Phase 1.

The implementation responsibilities for VNEEP were assigned to the Ministry of Industry and Trade and its Energy Efficiency Office. As part of the energy efficiency program and government targets, the Law on Energy Efficiency and Conservation was approved by Vietnam National Assembly in the middle of 2010. A number of decrees and regulations to implement the Law have been prepared some of which have been approved and issued by the government and the relevant government agencies. The implementation of EE&C falls under a number of ministries, the provinces, local authorities and other specified organizations, with the Ministry of Industry and Trade (MOIT) acting as coordinator for the whole program and also implementing several components under the program. In particular, the MOIT has established the Energy Efficiency Office for the implementation of the program.

MOIT has been designated as the nodal agency in the implementation of the Law, including the responsibility for guiding and overseeing the implementation of VNEEP nationwide, monitoring and evaluation of programs, and ensuring compliance and enforcement of regulations under the Law. To fulfill these responsibilities, the MOIT has focused on the industrial sector because this sector contributed 40% to the GDP and is the largest consumer of energy in the economy. In Vietnam, the two hot economic development spots are Hanoi and Ho Chi Minh City. The GDP contribution of the two cities is about 28-31%, which is much higher than the average GDP contribution from other provinces. The total number of enterprises concentrating in these two cities accounts for 53.6% of businesses across the country, including 1,000 enterprises with over 500 employees. These two cities were therefore chosen as location for the IEE project to demonstrate pilot projects.

1.3. Project summary

1.3.1. Fact sheet of the project

Table 1: Project Fact Sheet

Project Title	**Promoting Industrial Energy Efficiency through System Optimization and Energy Management Standards in Vietnam - IEE Project**			
GEF Project ID:	3594		at endorsement (Million US$)	at completion (Million US$)
UNIDO Project ID:	GF/VIE/10003 103081	GEF financing:	US$ 859,091	US$ 859,091
Country:	Viet Nam			
Region:	Asia	Government:	US$ 1,000,000	US$ 742,360
Focal Area:	Climate Change Mitigation	Private Sector: Others:		US$ 9,587,000 US$ 70,000
FA Objectives, (OP/SP):	5: Removal of barriers to energy efficiency and energy conservation	National Co-financing: - Vietnam Environmental Protection Fund - Vietnam Development Bank	US$ 4,600,000 US$ 4,000,000 US$ 600,000	
Executing Agency:	MOIT	Total Project Cost:	US$ 6,459,091	US$ 11,258,451
Other Partners involved:	STAMEQ VDB VEPF	ProDoc Signature (date project began):		January 2011
		(Operational) Closing Date:	Proposed: June 2014	Actual: December 2015

1.3.2. Brief description of the project

The Industrial Energy Efficiency (IEE) project was aimed at assisting industries to adopt ISO 50001 energy management standards and a systematic approach to improving energy efficiency at the system levels. Through the adoption of energy management standards, energy management practices were integrated into the management cycle in order to realize energy efficiency improvements on continuing basis.

The project was primarily focused on capacity building of stakeholders that included: (i) national experts in energy management and (ii) industrial enterprises, equipment suppliers, distributors, engineering/energy service companies and government planners for the introduction of ISO 50001. Based on experience with the implementation of the system optimization approach in other countries, the energy efficiency improvements on steam and compressed air systems are expected to lead to higher energy savings, from between 15 to 30% for compressed air systems and 10 to 15% for steam systems. The targeted sectors were: food, textiles, rubber and pulp & paper. Compliance with the ISO Standard published in 2011 was expected to provide the requisite incentive for continuing attention to improved end-use efficiency. It is also expected that the project will contribute substantially towards meeting Vietnam's goals of improving energy efficiency in industry as envisioned in the National Energy Efficiency Program.

The **objective** of the project was therefore to promote energy efficiency in the industries through a system optimization approach and the introduction of ISO 50001, Energy Management Standards. To achieve the objective, the project is designed in four outcomes, including:

(v) A policy instrument (compatible with ISO 50001) in place delivering sustainable improvements in EE in industries;
(vi) A cadre of EE professionals within industrial facilities, consultants and suppliers is created to provide services on energy management and optimize industrial systems;
(vii) Increased adoption of ISO 50001 energy management standards and system optimization projects by industry; and
(viii) Increased financial capacity support for industrial EE initiatives.

The project document was signed in January 2011 and the original completion date was 30 June 2014. However, project activities were initiated in July 2011 for an expected duration of three and a half (3.5) years. A total extension of 1 year 6 months was given.

2. THE EVALUATION

2.1. Purpose and scope

This evaluation was conducted by Mr. Segbedzi Norgbey (Independent Evaluation Consultant and team leader, and Mr. Nhien Ngo To (National Evaluation Consultant).

The evaluation process is independent of the GEF, UNIDO, Ministry of Industry and Trade (MOIT) and project partners. The opinions and recommendations in this Terminal Evaluation are those of the Evaluation Team, international and national consultant, and do not necessarily reflect the position of GEF, UNIDO, MOIT or any other Project stakeholders.

An Evaluation was undertaken at the end of the project to assess project performance (in terms of relevance, effectiveness, and efficiency), and determine outcomes and impacts (actual and potential) stemming from the project, including their sustainability. The evaluation covered the full duration of the project from November 2010 to June 2015. It has two primary purposes: (i) to provide evidence of results to meet accountability requirements, and (ii) to promote learning, feedback, and knowledge sharing through results and lessons learned among UNIDO, governments, international and national executing agencies, the GEF and their partners to improve implementation of future similar projects.

The Evaluation was carried out between July – August 2015. Details of the in-country itinerary are provided in Annex B. The list of documents reviewed related to the Project is shown in Annex C.

2.2. Key question

The evaluation terms of reference (TOR) presented in Annex A stated one key question: that is *whether the project has achieved or is likely to promote industrial energy efficiency through the systems optimization approach and ISO energy management standards*.

A specific list of review criteria for the terminal evaluation on which the structure of this report is based is included in the TOR which is included as Annex A. Information used in the wider evaluation was evidence-based and efforts were made to triangulate information and opinions from interviews. An analytical tool used in the evaluation, the reconstructed TOC, is presented in Section 3 of the evaluation report and used to inform the analyses on project performance and sustainability.

2.3 Timeframe and data collection

The terminal evaluation was conducted by a team of two consultants, a lead international evaluator and a national consultant, between July 2015 and August 2015. The evaluation timeline and itinerary are provided in Annex B.

The findings of the evaluation are based on the following:

- A desk review of the information and proof of accomplishments, e.g., Project Document and Project Brief, Inception Report, Annual Project Reports (APR), Project

Implementation Review (PIR), Steering Committee minutes of meetings, Training reports, International mission reports, etc.

- Interviews with the UNIDO Project Manager and other relevant staff in UNIDO in Vienna (lead consultant by skype).
- Interviews with the National Coordinator, the PMU, and Staff of the Ministry of Industry and Trade (MOIT) the co-implementing agency.
- Individual and group meetings with project participants and demonstration enterprises.
- Face-to-face interviews and telephone interviews with other stakeholders, including users of the project results in Government agencies and relevant organizations (lead and supporting consultants).
- Site visits in Hanoi and Ho Chi Minh City.

The Project Management Unit prepared all the documents, information brochures, project reports and other relevant materials as required in the TOR and provided them to the terminal evaluation consultants. The PMU also helped to coordinate with all stakeholders to provide additional information and materials which the evaluation team requested.

2.4. Limitations of the evaluation

In terms of limitations of the evaluation, while the evaluation consultants were able to conduct a brief phone interview with the Project Manager before undertaking the field mission the discussions were barely enough to provide the background to the evaluation. However, a thorough briefing was conducted by the Project Management Unit upon arrival in Viet Nam. A limited number of industrial enterprises were visited and as a result of lack of availability, only one steering committee member could be interviewed. The use of a national consultant was very helpful in overcoming linguistic challenges.

3. PROJECT RELEVANCE, DESIGN AND PROJECT PERFORMANCE & IMPACT

This section of the report addresses the strategic relevance and performance and impact of the project, based on four main evaluation criteria – attainment of objectives and planned results, sustainability and catalytic role, and processes affecting attainment of project results.

3.1. Strategic relevance

Growth in energy consumption has outpaced economic growth in Vietnam. For that reason, the Government of Vietnam is concerned about increased energy demand in the industrial sector with the resultant greenhouse gas emissions. Energy efficiency programmes delivered in Vietnam, to date, have not delivered comprehensive capacity building with a strategic focus on the industrial sector. Further, energy management measures have been implemented in an *ad hoc* fashion. The introduction of energy management standards and best systems optimization practices has not kept pace with the rapid expansion in and modernization of the Vietnamese economy and for that matter industry. The need to implement best energy management and optimize systems was evident. The project fills that need and is therefore relevant to the needs of Vietnam in its efforts to promote industrial development while reducing its carbon footprint.

Work on energy efficiency issues is fully aligned with the UNIDO mandate to promote and "accelerate industrial development in developing countries and industrial development and co-operation on global, regional and national, as well as on sectoral levels". The vision of the Energy Branch of "achieving transformational change in industry by enabling local enterprises to produce and use renewable energy to generate prosperity" is consistent with UNIDO's mandate and its comparative advantage within the UN family. UNIDO has been successful in introducing and promoting energy management standards as the principal market-based policy tool to make energy efficiency part of best industry practice. UNIDO is internationally recognized as a leading advocate and provider of technical assistance on industrial energy efficiency policies, energy management standards and industrial energy systems optimization.

In sum, the IEE project is relevant to national energy priorities, and has enjoyed strong participation of local stakeholders in project identification. The project is relevant to UNIDO and its aim to reduce energy consumption resulting in a corresponding reduction in GHG emissions. The project is fully consistent with the GEF climate change focal area.

3.2. Analysis of project design

The "Theory of Change (TOC)" approach was used as the framework for the analysis of project design in this evaluation. It examined how project activities are intended to generate results by articulating sets of cause and effect relationships (see Figure 1.0). In contrast to a logical framework, a full theory of change allows consideration of multiple pathways and better captures the actions required, and possible risks, at various stages 'along' the causal pathway from activities towards the intended results.

Two important aspects of the theory of change are "impact drivers" and "assumptions." Assumptions are – explicitly or implicitly - made by individuals and groups planning activities, and/or devising the sub-program as a whole, that define the surrounding external conditions or expectations of conditions under which the program will operate, and which can influence whether certain elements in the theory of change, or cause-to-effect linkages between them, function as planned. Impact drivers are critical elements or factors (finances, political conditions, etc.) that are necessary (though not sufficient) for the program to reach its high-level objectives.

The theory of change is fundamental to the understanding of the underlying program logic and for this evaluation, it depicts what and how UNIDO planned or intends to achieve results in project. It also illustrates how UNIDO attempts to build on its relative comparative advantage in the area of energy efficiency. The theory of change is composed of causal chains showing the changes occurring from outputs towards intermediate states and further, and impact.

Some of the questions the theory of change examined more closely include:

- What is missing in the logic chain (outcomes or intermediate outcomes, assumptions, etc.) that should be included or considered if the strategy is to function according to plan?
- What assumptions underlie the logic of the results chain and where are they most critical? Are there any "killer" assumptions that throw off the entire logic chain? Has the project identified these assumptions and put in place adequate risk mitigation strategies in planning and implementation?
- What impact drivers or enabling conditions are necessary for the success of the project and where are they needed in the theory of change? Has UNIDO identified and ensured the presence of these impact drivers in their planning and implementation?

3.3. Project design logic

The Evaluation Team observes that the project document is clearly drafted and easy to read and understand. The design of the project provides an objective and indicators allowing for an assessment of relevance and effectiveness. The indicators, as formulated, were sufficiently Specific, Measurable, Achievable, Relevant and Time-bound (SMART) and follow the principles of Results Based Management. M&E was considered in project design.

The intervention logic in the design is clear with activities producing outputs and outputs producing outcomes which were stated correctly to reflect behavioral changes and which contribute to the achievement of project objectives. In the context of Program Performance and Results Based Management (RBM), project outcomes are key deliverables from the production of outputs and contribute to the attainment of the objective. **What is missing in the logical framework matrix for this project however, is a clear statement of outcome indicators. While project output level indicators were developed outcome indicators were ignored either by design or were overlooked.**

The design of the project management framework and institutional structures were clearly thought through and this facilitated smooth project implementation. **However, Gender was not considered in project design.**

3.4. Reconstructed Theory of Change for the IEE Vietnam Project

The reconstructed Theory of Change for the project shows how the IEE project focuses substantially on building a national program to develop capacity on Energy Management and System Optimization, creating national awareness, implementation of Energy Management and System Optimization demonstration projects, and developing financial capacity to support energy efficiency (EE) projects in industry. In parallel, the project promotes a policy instrument (compatible with ISO 50001) for delivering sustainable improvements in energy efficiency in industries. These are the direct outcomes expected from the project against which effectiveness of the project was assessed. Direct outcomes are expected to be achieved through a diverse set of outputs. These are presented at the bottom of the diagram, grouped along the direct outcomes they are expected to contribute to. In some cases evidence of achievement of direct outcomes might not be readily available, therefore the effectiveness evaluation will rely partly on the assessment of relevance, quality and timeliness of outputs delivered by the project.

The project objective is to "promote energy efficiency in industries through the introduction of ISO Energy Management Standards incorporating industrial energy systems optimization". The evaluation notes that the project objective is actually an intermediate state towards the desired state of "reducing environmental impact while increasing industrial production through sustained energy management and efficiency in Vietnam".

3.4.1. Key assumptions and drivers

For changes to happen along the causal pathways towards outcomes and impact a number of external conditions need to be met and several external factors need to be present. Key assumptions (labelled in the diagram) made by the project (assumptions are those external factors over which the project has no influence) are that commercial lending institutions are willing to lend to industrial enterprises for new equipment purchases through change in evaluation criteria for EE projects. Another key assumption is that industrial enterprises are willing to invest in modernizing energy management systems. Key drivers for change (external factors over which the project can have limited influence) are that support is received from the National Standards Authority and that the required policy instruments (compatible with ISO 50001) are in place to drive the delivery of sustainable improvements in energy efficiency in industries. The latter driver was stated in the project document and the logical framework as an outcome without any specific activities besides general awareness-raising to produce the policy instrument (compatible with ISO 50001) for delivering sustainable improvements in EE in industries.

The evaluation assesses the likelihood that the project will contribute to the desired impact by combining evidence on project performance (i.e. contribution to direct outcomes), progress on the project objectives (i.e. the intermediate state towards impact) and validity of assumptions and presence of drivers. The latter also provides the basis for assessing the likelihood of sustainability and up-scaling of project achievements.

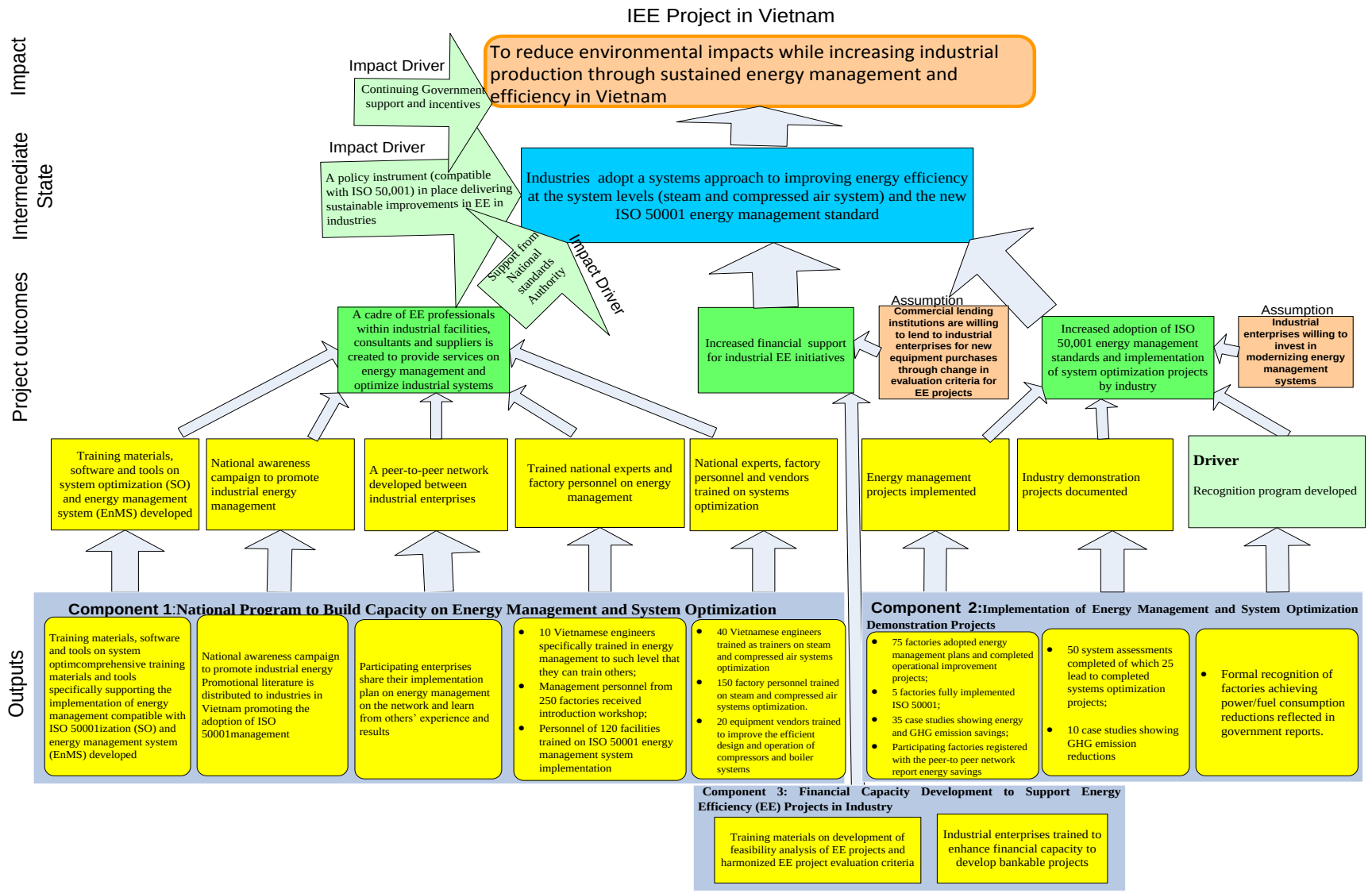


Figure 1: Reconstructed Theory of Change for the IEE Vietnam Project

3.5. Effectiveness Project Performance and Impact

The primary goal of the project was to promote energy efficiency in industry through the introduction of ISO 50001 Energy Management Standard including industrial energy systems optimization in order to realize energy efficiency improvements on a continuing basis in Vietnam. The approach involved a combination of market policy and normative interventions, including energy management standards, and the delivery of training curricula to both energy efficiency services "buyers," such as industry managers and engineers, and energy efficiency products and services "sellers," such as equipment manufacturers, distributors, operation and maintenance contractors. This approach was expected to support sustainable development of the energy efficiency service industry in Vietnam.

Successful implementation of the project was estimated to achieve annual electricity savings of 34,422 kWh, annually energy saving of 4,088 ktoe and the annual greenhouse gas (GHG) emissions reductions of 34,856 ktons of CO_2 during project implementation. Over the 3.5 years of project implementation 10 demonstration projects on Energy Management Systems (EnMS) and 30 demonstration projects on System Optimization (SO) were implemented. Training activities on EnMS and SO were provided to 54 national experts and personnel of 179 enterprises. This resulted in 77 enterprises having adopted EnMS plan and completed operational improvement projects, of which 14 enterprises got certification on EnMS ISO 50001, and 139 enterprises having implemented SO (Steam SO (SSO) & Compressed Air SO (CASO)) projects.

As a result of the implementation of EnMS and SO projects (both direct and indirect), the achieved annual energy savings and GHG reductions are estimated at 1,119,388 GJ (56,034 MWh, 21,735 TOE) and 106,394 ton CO_2eq, respectively. Actual investment figures for these implementation projects are estimated at USD 9.6 million which originates from various funding sources such as self-investment, banks, etc. The key indicators of the project at the objective level and the expected end-project targets have been achieved. Table 2 below shows the extent to which targets have been achieved.

What the data cited above did not clearly show is what proportion of targets would have been achieved in the absence of this project keeping in mind that some effort was being undertaken in Vietnam in implementing energy efficiency activities prior to the initiation of this project.

Table 2. Progress towards Achievement of objectives

Project Objective	Success Indicators	End Project Target	Actual Level at 30 December 2014*
Promote energy efficiency in the industries through introduction of ISO Energy Management Standard incorporating industrial energy systems optimization.	Measurable reductions in electricity and fuel consumption by industry. Calculated GHG emissions reductions.	34,422 MWh, 4,088 TOE and 34,856 t CO_2 savings attributable to the GEF intervention annually by the end of the project	56,034 MWh, 21,735 TOE and 106,394 tons CO_2 savings

Note:
** The energy saving and CO2 emissions figures in this report do not include the energy savings of 1,241,000 GJ (29,667 TOE) and CO2 emission reductions of 24,475 tons from some power generation enterprises as stated in PIR 2014.*
** The CO_2 reductions are mainly from the steam system optimization project implementation (accounting for 80%), specifically CO_2 reductions from new EE boiler application as well as solutions on system efficiency improvements*

Source: TERMINAL PROJECT REPORT, 16 July 2011 to 31 March 2015 prepared June 2015

3.5.1. Achievements of project expected outcomes

In approximately 3.5 years of project implementation, the 4 awareness workshops and capacity building programs undertaken by the project have increased the understanding of energy efficiency issues (i.e. EnMS and SO) resulting in the adoption of ISO 50001 energy management standards and system optimization approach by industry as outcomes of the improved capacity and knowledge of national experts and industrial personnel. The enforcement requirements on EC&EE Law conformity regarding energy management model application in the Decree No. 134/2013/ND-CP issued on 17 October 2013 are expected to be key drivers for sustainable EE improvement in industries and ultimately assist in reducing environmental impacts while increasing industrial production through sustained energy management and efficiency in Vietnam.

Taken together, implementation of the activities in the three components of the project have contributed to creating an enabling environment for the widespread adoption of energy management and system optimization practices in industrial enterprises in Vietnam. In particular, the ISO 50001 energy management standard has been issued nationally. Fifty-four (54) trained national expert consultants and industrial facilities engineers equipped with the knowledge and skills on EnMS and SO approach has been providing services on EnMS, SSO and CASO to industries that have delivered energy efficiency improvements. Four hundred and thirty-four (434) individuals from industrial enterprises and 28 equipment suppliers have received the required knowledge and skills on EnMS and SO, and are ready to provide services to industries.

According to project reports, 15 case studies on EnMS and SO adoption have been prepared and disseminated to industries through the websites of EECO and ECCs. The number of factories that have adopted EnMS plans and completed operational improvement projects in line with ISO

50001 annually has increased from 10 enterprises in 2012, to 32 and 34 in 2013 and 2014, respectively; the number of factories that have fully implemented EnMS and certified to ISO 50001 has increased from 4 enterprises in 2013 to 15 enterprises in 2015. This provides clear evidence of successful replication and up-scaling of best energy management practices and system optimization approaches in industry of Vietnam. Table 3 below provides the details of the extent to which the project outcomes have been achieved.

Table 3: The degree of achieved outcomes in comparison with the baseline

Project expected outcomes	Baseline Situation	Current Situation
Outcome 1:		
A policy instrument (compatible with ISO 50001) in place delivering sustainable improvements in EE in industries;	1.1 There is no energy management standard or standard energy management model existing in Vietnam;	1.1 ISO 50001 energy management standard issued nationally and the enforced requirements on EC&EE Law conformity regarding energy management model application in the Decree No. 134/2013/ND-CP issued on 17 October 2013 that are expected to deliver sustainable EE improvement in industries in Vietnam;
1.2. A cadre of EE professionals within industrial facilities, consultants and suppliers is created to provide services on energy management and optimize industrial systems.	1.2. National experts and industrial facilities engineers tend to focus more on individual system components, such as motors, pumps or boilers to improve industrial energy efficiency which can deliver EE improvement of 2-5% only.	1.2. A cadre of national experts and industrial facilities engineers equipped with the knowledge and skills on EnMS and SO approach has been providing services on EnMS, SSO and CASO to industries that have delivered EE improvements ranging from 6% - 20%.
Outcome 2: Increased adoption of ISO 50001 energy management standards and system optimization projects by industry	2.1. Energy management measures are implemented on ad-hoc basis. The number of enterprises who have implemented energy management in their facility is really low;	2.1. Number of factories that adopted EnMS plans and completed operational improvement projects in line with ISO 50001 annually has increased from 10 enterprises in 2012, to 32 and 34 in 2013 and 2014, respectively; the number of factories having fully implemented EnMS and certified to ISO 50001 has increased from 4 enterprises in 2013 to 14 enterprises in 2014;
	2.2. Absence of local examples of successful optimization of industrial steam and compressed air systems hindering nationwide uptake of good EE practice;	2.2. The number of enterprises having applied SO solutions has increased from 16 enterprises in 2013 to 123 enterprises in 2014;
	2.3. Ad-hoc publicity for EE success stories from industry.	2.3. 15 case studies on EnMS adoption and SO solution implementation posted and disseminated to industries through EECO Website and the project Basecamp.

Project expected outcomes	Baseline Situation	Current Situation
Outcome 3: Increased financial capacity support for industrial EE initiatives	3.1 Insufficient capital within industrial enterprises or lack of attractive commercial loans in the market due to enterprises are lacking of capacity to develop bankable projects;	3.1 The financial capacity supporting EE initiatives has been increased through integrating financial capacity training for industrial enterprises and national experts. The project training has provided tools and knowledge which will be used by the industry to develop bankable projects;
	3.2 Financial institutions continue to analyse EE projects based on financial evaluation criteria are in conformity with commercial bank's internal regulations which in practice, does not differentiate between normal projects and EE/EC projects;	3.2 Recommendations on harmonized financial criteria in evaluation of EE investment projects have been prepared by the project and noted by the relevant government agencies and financial institutions.
	3.3 Continued use of generic methods which have trouble considering financial impact and opportunities of EE in facilities.	3.3 The methods of life cycle assessment are applied in making a decision on the purchases of EE equipment by industry in or to analyze the financial impact and opportunities of EE

Source: Terminal Project Report, June 2015

3.5.2. Progress towards impact

As stated in section 3.4 above, the overall likelihood that the long term impact (Global Environmental Benefits) will be achieved is dependent on the ability of the project to build a national program to develop capacity in Energy Management and System Optimization, creating national awareness, implementation of Energy Management and System Optimization demonstration projects, and developing financial capacity to support energy efficiency (EE) projects in industry. In parallel, a policy instrument (compatible with ISO 50001) for delivering sustainable improvements in energy efficiency in industries is required. These were to be bolstered by key drivers involving and external factors over which project have some influence. Also a number of external conditions over which the project has no influence (assumptions) need to be met.

Implementation of the activities in the three components of the project has contributed to creating the enabling environment for the widespread adoption of energy management and system optimization practices in industrial enterprises in Vietnam. In particular, the ISO 50001 energy management standard has been issued nationally. Measures designed to move towards intermediate states and on to the achievement of project objectives are evident in the momentum that the project has generated, and in the uptake in industrial enterprises. However, availability of funds continues to be a constraint in implementing energy efficiency projects in some industrial enterprises.

The project has, in approximately 3.5 years of implementation, created awareness and built capacity and in the process increased the understanding of energy efficiency issues (i.e. EnMS

and SO) resulting in the adoption of ISO 50001 energy management standards and system optimization approach by industry. The EC&EE Law regarding energy management, Decree No. 134/2013/ND-CP is in place as a key driver for sustainable EE improvement in industries and will ultimately assist in reducing environmental impacts while increasing industrial production through sustained energy management and efficiency in Vietnam. Indeed, reports show that as a result of the implementation of EnMS and SO projects (both direct and indirect), the achieved annual energy savings and GHG reductions are estimated at 1,119,388 GJ (56,034 MWh, 21,735 TOE) and 106,394 ton CO2eq, respectively.

The project's initiative to agree on clear evaluation criteria for EE projects with the commercial lending institutions to lend to industrial enterprises for new equipment purchases will go a long way to make application for loans easier. There is evidence that industrial enterprises are willing to and, have indeed, invested in some cases in modernizing their energy management systems. With regards to key drivers for change, there is clear evidence that support has been received from the National Standards Authority and as stated above, the required legislation and policy instrument (consistent with ISO 50001) are in place to drive the progress towards impact.

3.6. Sustainability of project outcomes

Sustainability is understood as the extent to which outcomes and impacts derived from project implementation are likely to continue after external funding and assistance end. Factors and conditions affecting sustainability have been considered in four areas: socio-political factors, financial conditions, institutional conditions and environmental factors.

The IEE project was designed with the aim of achieving a sustainable energy future. The project was expected to be transformative in the sense that once implemented the project will result in higher levels of energy savings services, including management, feasibility analysis and the implementation of systems optimization measures in industrial buildings. Beside the development and implementation of energy management projects resulting from built capacity, the project was also expected to promote the development of institutional structures including legal and regulatory regimes that will effectively maintain energy management and systems optimization services. In terms of replication, the transformative nature of the project was expected to lead to the use of more energy efficient technologies and practices in industrial enterprises. Similarly, raising awareness on EnMS and Systems Optimization was expected to enable financial institutions to become more familiar with issues related to energy efficiency financing.

While it is too soon and too optimistic to say that this project has resulted in the achievement of a sustainable energy future, what is clear and incontrovertible is the fact that the project has achieved what it set out to accomplish.

3.6.1 Socio-political factors

An essential component of socio-political sustainability relates to ownership by state and non-state actors. The IEE project is focused on creating awareness and building capacity at the

national level. Government agencies/institutions and industrial enterprises are primary beneficiaries of the capacity building efforts. The strong partnership formed between private and public sector institutions with different agendas provides the driving force for action. Collaboration with a high level of political support indeed provides a measure of sustainability because the political will is there to continue work towards a sustainable energy future.

Ownership, awareness and capacity built within government agencies and industrial enterprises are likely to continue to shape attitudes and behaviors in the long term. Besides the 241 management personnel from industrial enterprises who took part in awareness raising workshops, through articles, news items, video clips, information leaflets and TV spots targeting different clientele, many more individuals have received awareness-raising materials. Indeed, as an indirect result of the project, another 1,620 participants from 857 enterprises received ISO introduction training workshops (delivered by IEE project-trained national experts) organized by Quacert and the ECCs of HCMC and Hanoi.

3.6.2 Financial conditions

The availability of financial resources was already discussed above as an assumption that is required to transform policy, plans, regulations and skills into action. Availability of funds continues to be a constraint in implementing energy efficiency projects in some industrial enterprises. While a little more than half of the enterprises that participated in the User training did apply some of the systems solutions after the training, the lack of action from the remaining enterprises is mainly due to a slump in their production and the fact that their financial conditions were not quite stable. It is expected that training undertaken under the project has provided the tools and knowledge which will be used by the industry to develop bankable projects.

3.6.3 Institutional sustainability

This dimension of sustainability addresses the issue of the sustenance of results and onward progress towards impact relating to factors associated with processes, policies, national agreements, legal and regulatory frameworks and governance structures. All three direct outcomes discussed above under effectiveness in this report have a direct bearing on this dimension of sustainability. As discussed in greater detail in the assessment of effectiveness, the building of national, legal and institutional capacity to enable governments to integrate ISO 50001 energy management standard into national legislation and regulatory processes in the Decree No. 134/2013/ND-CP issued on 17 October 2013 which is expected to deliver sustainable EE improvement in industries in Vietnam is a clear measure of sustainability.

The project was successful in increasing the adoption of ISO 50001 energy management standards and system optimization in industries, having increased annually from 10 enterprises in 2012, to 32 and 34 in 2013 and 2014, respectively; the number of factories that have fully implemented EnMS and certified to ISO 50001 has increased from 4 enterprises in 2013 to 15 enterprises in 2015 with additional enterprises in the process of ISO certification.

3.6.4 Environmental sustainability

This dimension addresses factors, positive or negative, that can influence the future flow of project benefits. It assesses project outputs or higher level results that are likely to affect the environment which, in turn, might affect sustainability of benefits. The implementation of activities to facilitate energy efficiency improvements in the industrial sector by supporting the development of a national energy management standard and energy efficiency services to reduce energy consumption resulting in a corresponding reduction in GHG emissions in and of itself is an environmental benefit.Indeed, all the project activities to create awareness, build capacity and implement activities to reduce energy consumption are aimed at promoting environmental benefit. This evaluation did not observe any negative consequences on the environment from the implementation of project activities.

3.6.5. Achievement of outputs and activities

Evaluation of the achievement of outputs and activities is based on the log frame and the reconstructed theory of change developed for this project. A review of the log frame clearly shows that all activities and outputs were necessary and appropriate, and formed a series of logical, sequential steps towards achievement of the project outcomes and objectives. Outputs were produced in a timely manner (following initial delays) and culminated in a cadre of trained energy efficiency professionals within industrial facilities, consultants and suppliers to provide services on energy management and optimization of industrial systems. In addition, there has been increased adoption of ISO 50001 energy management standards and implementation of system optimization projects by industry. While Bank loan guarantees have been secured for the implementation of EE projects, the extent to which enterprises have used the facility cannot be ascertained. Indeed, the evidence so far shows limited usage of the facility by the industrial enterprises.

Training assessments and interviews conducted with participants (including national experts and industrial facility engineers) show very high levels of satisfaction with training and demonstration activities. Planned targets were reached and, for the most part, exceeded. There were, however, calls for better geographic distribution of training workshops and more in-plant training activities. Interviews of project participants by the evaluation team further revealed that participants would have liked examples from local enterprises. Often, external experts used examples from foreign industrial plants which were so large compared to local plants that the processes sometimes became unnecessarily complex.

The national program to build capacity on energy management and system optimization was successful. Based on feedback from trainees after each training course, trainees and participants of workshops regarded the training materials, software and tools as highly beneficial in the sense that they covered the topics of the course and enhanced their understanding/skills in EnMS, SSO and CASO. The local translated versions of EnMS, SSO and CASO training materials are revised on a continuing basis. All information dissemination targets were reached and even exceeded. As an indirect impact of the project, another 1,620 participants from 857 enterprises received ISO introduction training workshops (delivered by IEE project-trained national experts)

organized by Quacert and the ECCs of Ho Chi Minh City and Hanoi. However, the extent to which awareness raising efforts have influenced policy development is a matter of conjecture.

In general, the establishment and running of a Basecamp network has been effective in creating a network of energy and industry professionals, making it a useful tool to connect the Project Management Unit and all stakeholders and enable smooth project implementation. Continuation of the network by the National Energy Efficiency and Conservation Office (EECO) will go a long way to sustain project benefits.

Targets on trained national experts and factory personnel on EnMS were met and exceeded. Although targets for ISO introduction workshops conducted by the IEE project have not been met, more than 1,000 participants from 515 enterprises received ISO training as an indirect impact of output 1.4. Targets on national experts trained on SO were also met in terms of numbers, however only 24 national experts were granted certificates. Targets on factory personnel and vendors on steam and compressed air systems optimization were met and exceeded. Feedback from national expert trainees and industrial trainees, international experts that conducted training courses on SSO and CASO were highly appreciated in terms of their experiences and professional qualifications.

Through the implementation of energy management and system optimization demonstration projects, a number of enterprises have been certified in the ISO 50001 energy management standards, and even higher numbers have been and are taking early steps towards applying the regulations and implementing activities with the aim of adopting EnMS in line with ISO 50001. All the SO implementation project targets were exceeded and the proportion of enterprises that applied SSO and CASO solutions after the User Training is relatively high. The training content was highly valued. While a little more than half of enterprises that participated in the User training did apply some of the systems solutions after the training, the lack of action from the remaining enterprises is mainly due to a slump in their production and the fact that their financial conditions were not yet stable.

Regarding financial capacity development to support Energy Efficiency (EE) projects in industry, feedback from national expert trainees on the training materials on financial analysis of EE projects was very positive. Recommendations on criteria harmonization for EE project evaluation were presented to the Government of Vietnam and bank/financial institution representatives. Table 4 below details outputs produced against planned targets for each project component.

Table 4: Achievement of outputs

Project component	**Planned output**	**Actual output achieved**	**Remarks**
Component 1: National Program to Build Capacity on Energy Management and System Optimization	**1.1** Training materials, software and tools on system optimization (SO) and energy management system (EnMS) developed: a) Availability of translated, comprehensive training materials and tools specifically supporting the implementation of energy management compatible with ISO 50001	**1.1** Training materials, software and tools on SO and EnMS have been developed a) Translated training materials, software and tools on Energy Management System (EnMS), Steam and Compressed Air System Optimization provided to trainees from industry and consultancy institutions.	Based on the feedback of trainees after each training course, trainees and participants of workshops regarded the training materials, software and tools as highly beneficial in the sense that they covered the topics of the course and enhanced their understanding/skills in EnMS, SSO and CASO. The local translated versions of EnMS, SSO and CASO are edited on a continuing basis.
	1.2 National awareness campaign to promote industrial energy management a) Promotional literature is distributed to industries in Vietnam promoting the adoption of ISO 50001.	**1.2** National awareness campaign to promote industrial energy management have been developed and implemented: a) Articles/news and case studies on ISO 50001 introduction posted in the EECO & related ECCs' websites; b) 4 TV programs on ISO 50001EnMS implemented; c) 1 leaflet on ISO introduction disseminated to more than 500 industrial enterprises; d) 241 management persons from enterprises received ISO EnMS introduction workshops in Hanoi, HCMC, Tien Giang and Hai Phong; e) 15 case studies on EnMS and SO project implementation showing energy and GHG emission savings. f) 1 short video clip in English on	All information dissemination targets were reached and even exceeded. As an indirect impact of the project, another 1,620 participants from 857 enterprises received ISO introduction training workshops (delivered by IEE project-trained national experts) organized by Quacert and the ECCs of HCMC and Hanoi. The extent to which awareness raising efforts have influenced policy development is a matter of conjecture.

Project component	Planned output	Actual output achieved	Remarks
		project outcomes and impact targeting Vietnam government, UNIDO, other donors, bilateral agencies and top level managers in enterprises showing; g) 1 long video clip in Vietnamese on 3 successful stories of EnMS adoption and relevant government policies on EnMS promotion aiming at middle level managers of enterprises.	
	1.3 A peer-to-peer network developed between industrial enterprises a)All participating enterprises share their implementation plan on energy management on the network and learn from others' experience and results.	**1.3**Basecamp (https://Basecamp.com/1858667), an electronic platform, for the exchange of information and views between industrial enterprises and international and trained national experts since its establishment in May 2012.	In general, the establishment and running of a Basecamp network has been effective in creating a network for energy and industry peers, making it a useful supporting tool to connect the PMU and all stakeholders and enable smooth project implementation. Continuation of the network by the National Energy Efficiency and Conservation Office (EECO) will go a long way to sustain project benefits.
	1.4 Trained national experts and factory personnel on energy management; a) 10 Vietnamese engineers specifically trained in energy management to such level that they can train others; b) Management personnel from 250 factories received introduction workshop; c) Personnel of 120 facilities trained on ISO 50001 energy management system	**1.4** National experts and factory personnel have been trained on energy management system. a) 27 national experts & 14 persons from 10 enterprises received training on EnMS Modules of which 27 national experts and 3 factory staffs were granted certificates; b) 241 management personnel from 219 enterprises received ISO EnMS introduction workshops organized by the IEE project;	Targets on trained national experts and factory personnel on EnMS were met and exceeded. Although targets for ISO introduction workshops conducted by the IEE project have not been met, more than 1,000 participants from 515 enterprises received ISO training as an indirect impact of output 1.4.

Project component	Planned output	Actual output achieved	Remarks
	implementation	c) 250 energy managers/production operators from 126 enterprises and another 29 energy consultants participated in the EnMS user training program.	
	1.5 National experts, factory personnel and vendors trained on systems optimization a) 40 Vietnamese engineers trained on steam and compressed air systems optimization to a level such that they can train others. b) 150 factory personnel trained on steam and compressed air systems optimization. c) 20 equipment vendors capable of actively contributing to a national effort to improve the efficient design and operation of compressors and boiler systems.	**1.5** National experts, factory personnel and vendors have been trained on systems optimization a) 44 national experts trained on steam (23) and compressed air (21) systems optimization of which 24 national experts were granted certificates; b) 286 energy managers/engineers from 156 enterprises and 11 other energy consultants participated in the User training program on systems optimization; c) 38 representatives from 22 vendors participated in vendor discussions on steam and compressed air systems optimization.	Targets on national experts trained on SO was met in terms of numbers, however only 24 national experts were granted certificates. Targets on factory personnel and vendors on steam and compressed air systems optimization were met and exceeded. As feedback from national expert trainees and industrial trainees, international experts that conducted training courses on SSO and CASO were highly appreciated in terms of their experiences and professional qualifications.
Component 2: Implementation of Energy Management and System Optimization Demonstration Projects	**2.1** Energy management projects implemented. a) 75 factories adopted energy management plans and completed operational improvement projects; b) 5 factories fully implemented ISO 50001; c) 5 case studies showing energy and GHG emission savings;	**2.1** Energy management projects have been implemented. a) 63 factories adopted energy management system including activities such as developing energy plans and completing operational improvement projects with assistance provided by trained national experts or their trained staff;	A number of enterprises have been certified to the ISO 50001 energy management standard, and an even higher number have been and are taking early steps towards applying the regulations, and implementing the actions with the aim to adopt EnMS in line with ISO 50001.

Project component	Planned output	Actual output achieved	Remarks
	c) Participating factories registered with the peer-to peer network report energy savings.	b) 14 factories fully implemented energy management systems and certified in line with ISO 50001; c) 5 case studies have been developed showing energy and GHG emission savings; c) Participating factories have registered with the basecamp network for sharing discussion.	
	2.2 Industry demonstration projects documented. a) 50 system assessments completed of which 25 lead to completed systems optimization projects; b) 10 case studies showing GHG emission reductions	**2.2**. Industry demonstration projects have been documented. a) 150 system assessments have been completed; 139 of which led to SO projects being implemented, details: • SSO assessments of 65 industrial enterprises done, of which 62 enterprises have implemented some SSO projects varies from low cost solutions such as condensate and flash recovery, piping insulation, replacement of valves and broken trap, etc. to the replacement of the old - inefficient boiler with new EE boilers; • CASO assessments of 85 enterprises done, of which 77 enterprises have implemented some CASO projects; b) 26 implementation reports showing energy savings and GHG emission reductions completed; c) 10 case studies showing GHG	All the SO implementation project targets were exceeded and the percentage of enterprises that applied SSO and CASO solutions after the User Training is relatively high. The training contents were highly valued. While a little more than half of enterprises that participated in the User training did apply some of the systems solutions after the training, the lack of action from the remaining enterprises is mainly due to a slump in their production or the fact that their financial conditions were not yet stable

Project component	Planned output	Actual output achieved	Remarks
		emission reductions have been developed.	
	2.3. Recognition program developed. a) Formal recognition of factories achieving power/fuel consumption reductions reflected in government reports.	**2.3.** Recognition program has been implemented. a) The project outputs have been periodically reported to MOIT and all project achievements integrated into the VNEEP Framework	
Component 3: Financial Capacity Development to Support Energy Efficiency (EE) Projects in Industry	**3.1.** Training materials on development of feasibility analysis of EE projects and harmonized EE project evaluation criteria. a) Availability of translated, comprehensive training materials and tools specifically supporting the development of financial proposal for energy management and system optimization projects; b) Criteria for evaluating EE projects are harmonized by the main financial institutions.	**3.1.** Training materials on financial analysis of EE projects developed and recommendations on harmonized EE project evaluation criteria made. a) Training materials and tools for development of the feasibility analysis/study of EE projects have been developed and disseminated to national experts and staff of some financial institutions b) Recommendations on criteria harmonization for evaluating EE projects discussed with relevant financial institutions and government agencies	Feedback from the national expert trainees on the training materials on financial analysis of EE projects was very positive. Recommendations on criteria harmonization for EE project evaluation were presented to the Government of Vietnam and bank/financial institution representatives.

Project component	Planned output	Actual output achieved	Remarks
	3.2 Industrial enterprises trained to enhance financial capacity to develop bankable projects. a) Industrial facility managers will have the capacity to analyze system optimization and energy management projects as energy and O&M costs reduction projects.	**3.2** Industrial enterprises have been trained to enhance financial capacity to develop bankable projects. a) 27 national experts and staff of financial institutions (Vietnam Environmental Protection Fund and National Foundation for Science and Technology Development) participated in the financial analysis training conducted in April 2014; b) Training on financial analysis of EE investment projects have been provided to enterprise personnel during trainings on EnMS, SSO & CASO conducted during 2012-4.	

3.7. Efficiency

Several measures that promote efficiency in project implementation were identified in the project document. They include: building on projects and programmes of national, bi-lateral and other development agencies such as the MOIT-DANIDA Cleaner Production program, JICA training program for energy managers, ADB conservation program in the energy sector, and World Bank program to develop a market for energy efficiency activities. Among others are the Vietnamese Energy Efficiency Programme, as well as the national energy policies and regulatory framework, the use of tested approaches such as the training of expert trainers and partnership with agencies that have expertise in capacity development in the area of energy efficiency such as Energy Conservation Centres, the Energy Institute and a host of other government agencies.

Among the major factors contributing to efficiency were:

- Establishment of partnerships with key organizations, agencies, academic and research institutions and local communities for project execution (Part I B) and other formal networks;
- Effective engagement of industrial enterprises
- Building on past and on-going programmes of partners and utilization of existing knowledge, such as those identified above.
- Use of the National Expert Trainer approaches which, as demonstrated above in section 3.8, resulted in additional training in industrial enterprises.
- A lean and efficient Project Management Unit (PMU) - The PMU was lean (2 staff) and efficiently managed. Its location within MOIT facilitated efficient and effective collaboration with national partners.

The cost-efficient measures adopted resulted in the successful completion of the project on time and within budget. The Vietnamese Energy Efficiency Project can be compared favorably to similar GEF medium size Energy Efficiency projects implemented by UNIDO such as those in Indonesia and Burkina Faso etc. in terms of efficiency in resource use for training programs and timeliness in project execution.

The Evaluation Team was made aware of a number of factors that reduced efficiency. Some training participants were of the view that better geographic distribution of training workshops and more in-plant training activities would have ensured more coverage and better access to training events. In Ho Chi Minh City some participants would have liked to attend training events that were organized in Hanoi but which they could not attend for a variety of reasons. It is clear, however, that the limited budget for the project did not allow for the implementation of additional training events.

3.7.1. Timeliness in project execution

The project was scheduled to start in January 2011 and be completed by June 2014. However, the project did not effectively start until July 2011. This was attributed by UNIDO mainly to delays in finalizing and signing of project documents within the Government of Vietnam. This effectively delayed the project by 6 months. Once the

project agreements were signed however, implementation was executed seamlessly and within the 3.5 years originally planned for the execution of project activities.

3.7.2. Catalytic role and replication

The catalytic role of UNIDO and the IEE project is evidenced by the approach of supporting the creation of an enabling environment and building local capacity to train Energy Efficiency officials and implement demonstration activities in industrial facilities. Trained energy management experts in turn trained other officials who promote best practices in other industrial enterprises. UNIDO and the GEF also aim to support activities that upscale new approaches in industrial enterprises through Energy Management Systems and Systems Optimization (both steam and air compression), with a view to achieving sustainable global environmental benefits. The project has catalyzed changes in behavior through the introduction of new technologies and approaches and through the implementation of demonstration projects in industrial enterprises. These demonstrations are being replicated in other industrial enterprises. As a key driver for progress towards achievement of impact, the project has not only supported the adoption of ISO 50001 standards in national legislation but has also developed a recognition program to encourage industrial enterprises to adopt new approaches. One key component of the project involves the development of harmonized criteria for evaluating energy efficiency projects by working with financial institutions to establish clear criteria for evaluating these projects for financial feasibility.

4. FACTORS AFFECTING PROJECT PERFORMANCE

4.1. Preparation and readiness

As stated above in the evaluation of project design, the project document is clearly drafted and easy to read and understand. The intervention logic in the design is clear with activities producing outputs and outputs producing outcomes, which were stated correctly to reflect behavioural changes and which contribute to the achievement of project objectives. In the context of Program Performance and Results Based Management (RBM), project outcomes are key deliverables from the production of outputs and contribute to the attainment of the objective. **What is missing in the logical framework matrix for this project however, is a clear statement of outcome indicators**. While project output level indicators were developed, outcome indicators were ignored either by design or were overlooked. The timelines for project implementation were adequate. What had not been anticipated was a 6-month delay as a result of the processes required within the Vietnamese government to internalize the project. However, during that 6 month period some procurement actions were initiated by UNIDO to enable the project to take off after government approval. Indeed at project inception, the Government of Vietnam was already in the process of elaborating legislation on energy efficiency and this in the end was largely influenced by the project to the extent that ISO 50001 standards were incorporated into the legislation.

The project management unit (PMU) was established on July 16, 2011 and has been managed by the National Project Director, who is designated by MOIT and a UNIDO project manager. It started with the selection and recruitment of two new staff: the national project coordinator and the project assistant. Decision on the establishment of a Project Steering Committee (PSC) which consisted of 8 representatives from MOIT, STAMEQ, Vietnam Environmental Protection Fund (VEPF), and the Energy Conservation Center (ECC) of Hanoi was made and its rules and functions approved by MOIT on 30 September 2011.

The Inception Workshop was held on 11 November 2011 with participation of more than 120 representatives from relevant agencies at MOIT, Ministry of Science and Technology (MOST), Ministry of Finance (MOF), Ministry of Natural Resources and Environment (MONRE), ECCs in provinces/cities, energy service & equipment providers, enterprises in selected industries, related associations and newspapers.

Key partners and stakeholders such as STAMEQ, VEPF, and the Vietnam Development Bank (VDB) effectively participated in the Inception Workshop. During the second half of Year 2011, MOIT contributed a total of $9,700 towards implementation of project activities as part of its counterpart contribution.

4.2. Country ownership and driven-ness

The project was designed with considerable stakeholder input especially from key line ministries such as Industry and Trade, Science and Technology, and Environment. The project fits within government initiatives to reduce energy costs in its industrial sector through efficient use. For that reason, and also because it was

seen to be a vehicle to further develop institutional capacity for efficient energy management, the project received endorsement from the government.

4.3. Stakeholder participation and public awareness

4.3.1 Project partners

A broad range of organizations including government institutions, NGOs and industrial enterprises participated in the project. The appropriate choice of partners and collaboration between them was instrumental in the successful implementation of the project. Potential lead partners were identified in the project document and seemed to have performed the roles specified for them. Among the key institutions are the Ministry of Industry and trade (MOIT), the Directorate of standards, Measurement and Quality (STAMEQ), the Vietnam Environmental Protection Fund (VEPF) and the Vietnam Development Bank (VDB).

Within the context of the project, MOIT was responsible for defining government policies and proposing the regulatory framework for Energy Efficiency in the country. MOIT hosted the Project Management Unit and provided in-kind and cash contributions to the tune of approximately USD 1 million. STAMEQ, a subsidiary organization of the Ministry of Science and Technology was responsible for developing national standards on energy efficiency and energy efficiency products. It played a major role in the implementation of ISO 50001 and served as a member of the project steering committee. The Vietnam Environmental Protection Fund, a non-profit organization working under the Ministry of Natural Resources and Environment, organizes the registration and certification for "certified Emission Reductions" and was the organization that indicated co-financing loan to the tune of USD 4 million for industrial enterprises that required investment funds into their energy efficiency project. The Vietnam Development Bank (government institution) was also one of the stakeholders that was willing to finance energy efficiency investment projects to the tune of USD 600,000. These lead institutions participated in the project steering committee.

The mix of partners was effective and efficient, with each partner making important contributions towards different aspects of the project, which were necessary for the achievement of project outcomes. Based on interviews with partners during the conduct of the terminal evaluation as well as the examination of progress reports, PIRs, and project accomplishments (terminal report and technical outputs), it was clear that there was excellent collaboration among the partners, driven in part, by their interest in and enthusiasm for the project. In addition to the key partners specified in the project document, partnerships were forged with other organizations and institutions during the course of project implementation. Among these were: DANIDA and JICA, bilateral institutions who had implemented energy efficiency projects in Vietnam. Partnerships were also forged with other institutions including Energy Conservation Centres (ECCs) of Hanoi, HCMC, Da Nang, TienGiang, Dong Thap, Can Tho and Haiphong. Experts from Technical Universities/Institutes, such as Technology Universities of Hanoi & Da Nang, Electricity University, Institute of Refrigeration and Heat (IHERE) were responsible for conducting training courses organized by the project, as well as Quacert and ECCs.

The project design recognized the benefit of involving Industrial Associations and industrial enterprises. The Associations, including the Paper and Pulp, Beverage and Seafood Processing, have participated effectively by encouraging their members to send their staff to join the project workshops and training programs. Energy Efficiency Service Providers such as Enerteam, Systech, International Management Consultancy and certification bodies such as Quacert, TUV, etc. have played a key role in directly accessing industry and providing consultation services (energy management system establishment, system optimization assessment of steam and compressed air systems).

4.3.2 Public awareness activities

A significant amount of effort was expended on raising public awareness within the country during project implementation. A national awareness campaign to promote industrial energy management was developed and implemented. This included: a) articles/news items and case studies on ISO 50001 introduction posted in the EECO & related ECCs' websites; b) TV programs on ISO 50001 EnMS implemented; c) leaflets on ISO introduction disseminated to more than 500 industrial enterprises; d) introduction workshops for management personnel from enterprises in Hanoi, HCMC, TienGiang and HaiPhong on ISO EnMS; e) video clips on project outcomes and impact targeting the government of Vietnam, UNIDO, other donors, bilateral agencies and top level managers in enterprises. The use of public media and awareness campaigns seemed to have been effective and efficient in disseminating information on industrial energy management.

Interviews and focus group discussions undertaken during visits by the Evaluation Team revealed that the level of awareness about energy efficiency issues and about the project itself, was relatively high at all levels of stakeholders. Nevertheless, it should be pointed out that the extent to which this level of awareness could be attributed directly to the project or to other initiatives and organizations could not be ascertained as no stakeholder awareness surveys were undertaken during project implementation and the fact that other energy efficiency project activities had been implemented prior to this project.

4.4. Financial planning and management

The project's financial plan and budget were presented in the Project Document and approved by the GEF. GEF support amounted to US$ 859,091. All of the GEF funding has been disbursed at the time of the evaluation. Table 1 below shows annual GEF disbursements

Table 5: Annually GEF budget disbursement

Items	Disbursed Amount (USD)
1. UNIDO Direct Payment	
Year 2011	42,541.00
Year 2012	347,501.91
Year 2013	295,354.83
Year 2014	127,778.09
Year 2015	42,645.15
2. Budget Balance	
Total GEF grant:	859,091.00
Actual Expenditures by 31 December 2014:	855,820.98
Total still available in budget:	3,270.02

Source: TERMINAL PROJECT REPORT, Period covered: 16 July 2011 to 31 March 2015

4.4.1. Co-financing from project partners

Co-financing from project partners materialized well above the levels anticipated. Project co-financing reported was USD 10.4 million, more than USD 4.8 million above the anticipated co-financing of USD 5.6 million. The additional co-financing realized was mainly equity finance investments from industrial enterprises primarily for Systems Optimization and Energy Management Systems solutions. In all USD 9.58 million was invested by industrial enterprises of which USD 6.66 million was for Steam Systems Optimization, USD 2.46 million for EnMS, and USD 0.46 million for Compressed Air Systems Optimization.

Government agencies provided support in the amount of USD 792,360, of which USD 742,360 was co-financing contributed by MOIT for the PMU office and for supporting EnMS model establishment in some designated enterprises. Fifty thousand (50,000) dollars was co-financing provided by STAMEQ/ QUACERT for issuing ISO 50001 certification nationally and for conducting training and awareness workshops.

Twenty thousand (20,000) USD was contributed by the ECCs of HCMC and Enerteam as cooperation with the project to carry out workshop & training organization and meeting rooms for project training review and examination.

Table 6: Co-Financing and Leveraged Resources (in USD as of 30 December 2014) [n1]

ID	Name of Organizations	Roles	Co-financing ($ value or In kind)		Leveraged ($ value)
			Cash ($)	In-kind ($)	
1	Ministry of Industry and Trade	Government Coordinating Agency	227,810	577,550	0
2	STAMEQ & Quacert	Counterpart	0	0	50,000
3	Energy Conservation Centers & Enterteam	Counterpart	0	0	20,000
4	Participating industrial enterprises	Investment for implementation of EnMS & SO projects	0	0	9,587,000
5	Sub-total		227,810	577,550	9,657,000
Total					10,462,360

Source: TERMINAL PROJECT REPORT, 16 July 2011 to July31, 2015

4.5. Implementation approach and management

4.5.1. Management arrangements

The institutional arrangements for the project were largely implemented as anticipated in the project document. The DIRECT MANAGEMENT MODALITY was used, whereby UNIDO, in coordination with the host country counterpart (MOIT), performed the responsibilities assigned to the Executing Agency was used.

MOIT, as host country counterpart appointed the Director of the Department for Science – Technology and Energy Efficiency to chair the Project Steering Committee (PSC). He also performed the role of National Project Director from July 2011 to November 2012. The National Project Director (NPD) provided strategic guidance to the Project Management Unit (PMU) in the implementation of the project. The PMU was established in July 2011 and was fully responsible for day-to-day activities and reported to the UNIDO Project Manager. As established, the PMU comprised of 2 core staff: The National Project Coordinator and a Project Assistant. On 23 November 2012, the General Directorate of Energy (GDE) issued Decision No. 74/QD-TCNL establishing the Management Unit for all Energy Efficiency Projects under the coordination of General Directorate of Energy. Therefore, the IEE Project now came under the direction and guidance of the Management Board of EE Projects Management Unit. Strong MOIT leadership and direction as well as strong support of relevant functional departments under the MOIT contributed substantially to project implementation success.

Senior representatives from GDE, STAMEQ, VEPF, ECC of Hanoi and the UNIDO Representative in Vietnam formed the Project Steering Committee. During project

implementation, the PSC has convened three times over the project duration. It provided direction on the project workplan development and solutions to potential challenges. The PSC have played a very important role in overall coordination of the project implementation and integration of its activities into national programs/projects related to EC&EE in Viet Nam.

4.5.2. UNIDO Supervision and Backstopping

Effective and regular communication and close coordination between the project office and UNIDO Project Management Team in Vietnam and Headquarters, as well as the proper instructions and guidance provided by the UNIDO Project Manager were very instrumental in achieving project goals as scheduled. The UNIDO Country Representative provided immeasurable support to the project office in addressing issues, problems and finding solutions to constraints. In addition the UNIDO Country Office played a significant role in local procurement and the recruitment of national experts and project staff.

4.5.3. Gender

The project design did not explicitly make any provisions for the consideration of gender. Nevertheless, women were involved in several activities and also benefited from the project in some cases. Incidentally, the PMU was manned by two very competent women. Women participated in some of the training activities but that was rather an exception than the rule. To some extent, the limited participation of women is explained by the realities on the ground. Women were not involved in any significant way in that field of engineering in the country which explained the small number of women workshop participants particularly in the area of systems optimization.

4.5.4. Monitoring and evaluation

M&E design followed UNDO's standard monitoring and evaluation procedures and GEF guidance on project monitoring. It described the review role of the Project Steering Committee and the schedules for participatory monitoring and reporting. The results framework included objectively verifiable indicators and means of verification for the project objectives, outcomes and outputs. The project document described, for the output level, the M&E activities, responsible parties, and performance indicators. As discussed in the section on design above, however, no indicators were included in the logframe at the outcome level making the determination on progress towards project outcomes more challenging. The project document also described monitoring and progress reporting at the project level (semi-annual progress reports, PIRs, midterm review and terminal evaluation, financial reporting, and audits), timing and responsible parties.

4.5.5. Budgeting and funding for M&E activities

No specific budget lines have been indicated in the project document for M&E activities. It had always been assumed that coordination of monitoring activities was primarily the responsibility of the PMU. However, the lack of a specific budget line for evaluation activities was a flaw in the design of monitoring and evaluation activities.

4.5.6 M&E Implementation

All reports anticipated in the project monitoring framework have been delivered. These included:

i. Inception workshop and inception workshop minutes was completed in November 2011 (within 3 months of the project implementation begin);
ii. Project implementation reports (PIRs) and workplans have been developed in accordance with GEF guidelines;
iii. Project progress reviews have been convened as per UNIDO regulations;
iv. Project terminal project report;
v. The project terminal evaluation has been conducted in accordance with the project M&E plan and GEF guidelines.

5. CONCLUSIONS

This IEE project specifically set out to assist industries to adopt the new ISO 50001 energy management standard and implement an approach to improving energy efficiency at the systems levels (steam and compressed air system). Through adoption of energy management standards, energy management practices will be integrated into the management of industrial enterprises with the resultant energy efficiency improvements on a continuing basis. The project's primary focus was on capacity building of stakeholders that included industrial enterprises, equipment suppliers, distributors, engineering/energy service companies and government planners.

This evaluation concludes that the project was relevant to national energy priorities, and has enjoyed strong participation of local stakeholders in project identification. The introduction of energy management standards and best systems optimization practices has not kept pace with the rapid expansion in and modernization of the Vietnamese economy and for that matter industry. The need to implement best energy management systems and optimize systems was evident. The project fills that need and is, therefore, relevant to the needs of Vietnam in its efforts to promote industrial development while reducing its carbon footprint. Work on energy efficiency issues is fully aligned with the UNIDO mandate to promote and "accelerate industrial development in developing countries and industrial development and co-operation on global, regional and national, as well as on sectoral levels". The project is also consistent with and supports GEF-4 Climate Change Strategic Program 2; promoting energy efficiency in the industrial sector. By addressing key existing barriers to information, technical capacity and markets for sustainable IEE in Vietnam, the project will directly contribute to promoting and increasing the deployment and diffusion of energy–efficient technologies and practices in industrial production and manufacturing processes.

The evaluation of effectiveness is based on the extent to which the project objective of promoting industrial energy efficiency through systems optimization and ISO energy management standards was achieved. This evaluation concludes that overall this objective has been achieved and, to a significant extent, expectations have been surpassed. The project increased the understanding of energy efficiency issues (i.e. EnMS and SO) resulting in the adoption of ISO 50001 energy management standards and system optimization approach by industry as outcomes of the improved capacity and knowledge of national experts and industrial personnel. The enforcement requirements on EC&EE Law regarding energy management in the Decree No. 134/2013/ND-CP issued on 17 October 2013 are expected to be key drivers for sustainable EE improvements in industries which will ultimately assist in reducing environmental impacts while increasing industrial production through sustained energy management and efficiency in Vietnam.

Taken together, implementation of the activities in the three components of the project have contributed to creating an enabling environment for the widespread adoption of energy management and system optimization practices in industrial enterprises in Vietnam. In particular, the ISO 50001 energy management standard has been issued nationally. Fifty-four (54) trained national expert consultants and industrial facilities engineers equipped with the knowledge and skills on EnMS and

SO approach has been providing services on EnMS, SSO and CASO to industries that have delivered energy efficiency improvements. Four hundred and thirty-four (434) individuals from industrial enterprises and 28 equipment suppliers have received the required knowledge and skills on EnMS and SO, and are ready to provide services for industries. By directly engaging stakeholders at local and national levels in the execution of the project as well as through targeted training during capacity building workshops, the project laid a strong foundation for energy efficiency improvements in industry.

Project implementation was cost-effective as a result of a number of factors, including appropriate industrial sector selection, establishment of effective partnerships with key organizations, agencies and industries among others, building on programmes of partners and strong national support. However, a number of factors reduced efficiency. Some training participants were of the view that better geographic distribution of training workshops and more in-plant training activities would have ensured more coverage and better access to training events. In Ho Chi Minh City some participants would have liked to attend training events that were organized in Hanoi but which they could not attend for a variety of reasons.

The TOC analysis shows that the project has put in place a number of 'drivers' that strengthen the potential for catalyzing progress towards achievement of impact (GEBs). The project's initiative to agree on clear evaluation criteria for EE projects with the commercial lending institutions to lend to industrial enterprises for new equipment purchases will go a long way to make application for loans easier. There is evidence that Industrial enterprises are willing to and, have indeed invested in some cases, in modernizing their energy management systems. With regards to key drivers for change, there is clear evidence that support has been received from the National Standards Authority and, as stated above, the required legislation and policy instruments (consistent with ISO 50001) are in place to drive the progress towards impact.

The project has created awareness and built capacity at the national level. Government agencies/institutions and industrial enterprises are primary beneficiaries of the capacity building efforts. The strong partnership formed between the private and public sector institutions with different agendas provides the driving force for action. Collaboration with a high level of political support indeed provides a measure of sustainability because the political will is there to continue work towards a sustainable energy future. Ownership within government agencies and awareness and capacity built in industrial enterprises are likely to continue in the long term.

Availability of funds continues to be a constraint in implementing energy efficiency projects in some industrial enterprises. While a little more than half of enterprises that participated in the User training did apply some of the systems solutions after the training, the lack of action from the remaining enterprises is mainly due to a slump in their production and the fact that their financial conditions were not yet stable.

The building of national, legal and institutional capacity to enable governments to integrate ISO 50001 energy management standard into national legislation and regulatory processes which are expected to deliver sustainable EE improvement in

industries in Vietnam is a clear measure of sustainability. Indeed, the project was successful in increasing the adoption of ISO 50001 energy management standards with systems optimization in industries, having increased annually.

Efforts to reduce energy consumption resulting in a corresponding reduction in GHG emissions, in and of itself, is an environmental benefit. This evaluation did not observe any negative consequences on the environment from the implementation of project activities.

Among the major factors contributing to efficiency were:

vi. Establishment of partnerships with key organizations, agencies, academic and research institutions and local communities for project execution (Part I B) and other formal networks;
vii. Effective engagement of industrial enterprises
viii. Building on past and on-going programmes of partners and utilization of existing knowledge, such as those identified above.
ix. Use of the National Expert Trainer approaches which, as demonstrated above in section 3.8 resulted in additional training in industrial enterprises.
x. A lean and efficient Project Management Unit (PMU) - the PMU was slim (2 staff) and efficiently managed. Its location within MOIT facilitated efficient and effective collaboration with national partners.

The cost-efficient measures adopted resulted in the successful completion of the project within budget. The Vietnamese Energy Efficiency Project can be compared favorably with a similar GEF medium size Energy Efficiency projects implemented by UNIDO such as those in Indonesia, and Burkina Faso etc. in terms efficiency in resource use for training programs and timeliness in project execution

LESSONS (TO BE) LEARNED

Clear project design with practical application in industrial enterprises and clear links to ISO 50001 certification was responsible for project success and popularity. To improve the results framework for UNIDO projects however, there is need to ensure that clear indicators are formulated at the higher results levels. This will facilitate monitoring against milestones at the outcome levels and the documentation of progress towards impact.

Our interviews reveal that participants would have liked examples from local enterprises. Often, external experts used examples from foreign plants which were s large compared to local plants that sometimes the processes became unnecessarily complex and examples quite irrelevant to participating enterprises. National project personnel explained that at the beginning of project implementation, all training topics (EnMS and SO) were new ones to local industrial enterprises. There were no examples from Vietnam (even though regional countries had examples); hence the use by external experts of examples from foreign plants. They note however, since the third year of project implementation, that some local case studies have been developed and posted on the project website and project basecamp as reference for industrial enterprises. The issue was still fresh in the minds of training participants

who would have liked examples from local enterprises or possibly from the region during the training events at when participants were interviewed during this evaluation.

Strong project relevance, demand and effective partnership among stakeholders, from the policy-makers, donors, to the industrial enterprises during project execution did not only facilitate the elimination of barriers to policy and adoption of energy efficiency measures but also leveraged substantial amounts of resources for the implementation of the project and energy efficiency activities within the industrial enterprises

Table 7. Summary assessment and ratings by evaluation criterion

Criterion	Summary Assessment	Rating
A. Attainment of project objectives and results	The overall rating is based on the ratings for Effectiveness (S) and Relevance (HS).	S
1. Effectiveness	The evaluation concludes that overall the objective of promoting industrial energy efficiency through systems optimization and ISO energy management standards has been achieved. The project increased the understanding of energy efficiency issues (ie. EnMS and SO) resulting in the adoption of ISO 50001 energy management standards and system optimization approach by industry as outcomes of the improved capacity and knowledge of national experts and industrial personnel. The enforcement requirements on EC&EE Law regarding energy management in the Decree No. 134/2013/ND-CP issued on 17 October 2013 are expected to be key drivers for sustainable EE improvements in industries which will ultimately assist in reducing environmental impacts while increasing industrial production through sustained energy management and efficiency in Vietnam.	S
2. Relevance	The project is relevant to national energy priorities, and has enjoyed strong participation of local stakeholders in project identification. Work on energy efficiency issues is fully aligned with the UNIDO mandate to promote and "accelerate industrial development in developing countries and industrial development and co-operation on global, regional and national, as well as on sectoral levels". The project is also consistent with and supports GEF-4 Climate Change Strategic Program 2; promoting energy efficiency in the industrial sector. By addressing key existing barriers to information, technical capacity and markets for sustainable IEE in Vietnam, the project will directly contribute to promoting and increasing the deployment and diffusion of energy–efficient technologies and practices in industrial production and manufacturing processes.	HS
3. Efficiency	Among the major factors contributing to efficiency were: i) Establishment of partnerships with key organizations, agencies, academic and research institutions for project execution and other formal networks; ii) Effective engagement of industrial enterprises iii) Building on past and on-going programmes of partners and utilization of existing knowledge, such as those identified above. iv) Use of the National Expert Trainer approaches	S

Criterion	Summary Assessment	Rating
	which, as demonstrated above in section 3.8 resulted in additional training in industrial enterprises. v) A lean and efficient Project Management Unit (PMU) - The PMU was slim (2 staff) and efficiently managed. Its location within MOIT facilitated efficient and effective collaboration with national partners. The cost-efficient measures adopted resulted in the successful completion of the project within budget. The Vietnamese Energy Efficiency Project can be compared favorably with similar GEF medium size Energy Efficiency projects implemented by UNIDO such as those in Indonesia, and Burkina Faso etc. in terms efficiency in resource use for training programs and timeliness in project execution	
B. Sustainability of project outcomes	The overall rating on this criterion is based on the lowest rating of the individual sub-criteria	L
1. Financial	Availability of funds continues to be a constraint in implementing energy efficiency projects in some industrial enterprises. While a little more than half of enterprises that participated in the User training did apply some of the systems solutions after the training, the lack of action from the remaining enterprises is mainly due to a slump in their production and the fact that their financial conditions were not yet stable. It is expected that training undertaken under the project has provided the tools and knowledge which will be used by the industry to develop bankable projects.	L
2. Socio-political	The strong partnership formed between the private and public sector institutions with different agendas provides the driving force for action. Collaboration with a high level of political support indeed provides a measure of sustainability because the political will is there to continue work towards a sustainable energy future. Ownership, awareness and capacity built within government agencies and industrial enterprises are likely to continue to shape attitudes and behaviors in the long term	HL
3. Institutional framework	The building of national, legal and institutional capacity to enable governments to integrate ISO 50001 energy management standard into national legislation and regulatory processes in the Decree No. 134/2013/ND-CP issued on 17 October 2013 that are expected to deliver sustainable EE improvement in industries in Vietnam is a clear measure of institutional sustainability. The project was successful in increasing the adoption of ISO 50,001 energy management standards and system optimization in industries, having increased more than threefold between 2012 and 2014.	HL

Criterion	Summary Assessment	Rating
4. Environmental	The Implementation of activities to facilitate energy efficiency improvements in the industrial sector by supporting the development of a national energy management standard and energy efficiency services to reduce energy consumption resulting in a corresponding reduction in GHG emissions in and of itself is an environmental benefit.This evaluation did not observe any negative consequences on the environment from the implementation of project activities.	HL
C. Catalytic role (and replication)	The project created an enabling environment and built local capacity to train Energy Efficiency officials and implement demonstration activities in industrial facilities. These energy management experts in turn trained other officials, who promote best practices in other industrial enterprises. The project has catalyzed changes in behavior through the introduction of new technologies and approaches and the implementation of demonstration projects in industrial enterprises. These demonstrations are being replicated in other industrial enterprises. As a key driver for progress towards achievement of impact the project has not only supported the adoption of ISO 50001 standards in national legislation but has also developed a recognition program to encourage industrial enterprises to adopt new approaches.	S
D. Stakeholder involvement	A broad range of organizations including government institutions, NGOs and industrial enterprises participated in the project. The appropriate choice of partners and collaboration between them was instrumental in the successful implementation of the project. Potential lead partners were identified in the project document and seemed to have performed the roles specified for them. Considerable effort went into public awareness-raising.	HS
E.Country ownership/driven-ness	The project was designed with considerable stakeholder input especially from key line ministries such as Industry and Trade, Science and Technology, and Environment. The project fits within government initiatives to reduce energy costs in its industrial sector through efficient use. For that reason and because it was seen to be a vehicle to develop institutional capacity for efficient energy management, the project received endorsement from the government.	HS
F. Achievement of outputs and activities	All outputs were achieved and activities completed. To a significant extent, expectations have been surpassed. Outputs were of a high quality.	HS

Criterion	Summary Assessment	Rating
G. Preparation and readiness	The project document is clearly drafted and easy to read and understand. The intervention logic in the design is clear with activities producing outputs and outputs producing outcomes which were stated correctly to reflect behavioural changes which contribute to the achievement of project objectives. What had not been anticipated was a 6-month delay as a result of the processes required within the Vietnamese government to internalize the project. However, during that 6 month period same procurement actions were initiated by UNIDO to enable the project to take off after government approval.	S
H. Implementation approach and management	The institutional arrangements for the project were largely implemented as anticipated in the project document. The DIRECT MANAGEMENT MODALITY was used, whereby UNIDO, in coordination with the host country counterpart (MOIT), performed the responsibilities assigned to the Executing Agency.	S
I. Financial planning and management	The financing and co-financing of the project was well planned. Fund disbursements from UNIDO were made on time and co-financing from Vietnamese Government institutions materialized.	S
J. Monitoring and Evaluation	The overall rating on M&E is based on rating for M&E Implementation.	S
1. M & E Design	M&E design followed UNIDO standard monitoring and evaluation procedures as well as GEF guidelines. The log frame did not have any outcome indicators and means of verification.	MS
2. M & E Implementation	PIRs, progress reports and MTR were completed as required and used to track project performance. Without clear indicators at the outcome level, reporting on progress towards outcomes could not be verified	S
3. Budgeting and funding for M & E activities	The project budget did not clearly show budget allocation for monitoring and evaluation activities. However resources were found in the budget to meet all monitoring, reporting and evaluation requirements.	S
K. UNIDO supervision and backstopping	UNIDO played an adequate role in supervision and backstopping. The UNIDO Country Representative provided immeasurable support to the project office in addressing issues and problems and finding solutions to constraints.	S

ANNEX A

TERMS OF REFERENCE (without annexes)

Independent terminal evaluation of UNIDO project:

PROMOTING INDUSTRIAL ENERGY EFFICIENCY THROUGH SYSTEM OPTIMIZATION AND ENERGY MANAGEMENT STANDARDS IN VIET NAM

UNIDO Project numbers: GF/VIE/09/001, GF/VIE/10/003
UNIDO SAP ID: 103081
GEF Project number: 3594

June 2015

CONTENTS

I. Project background and overview

1. Project factsheet

Project Title	Promoting industrial energy efficiency through system optimization and energy management standards in Viet Nam
GEF ID	3594
UNIDO project No. (SAP ID)	103081
Region	EAP
Country(ies)	Viet Nam
GEF Focal area(s) and operational programme	Climate Change CC-2 Promoting energy efficiency in the industrial sector
GEF Agencies (implementing agency)	UNIDO
Project executing partners	Ministry of Industry and Trade (MOIT)
Project size (FSP, MSP, EA)	MSP
Project CEO endorsement/Approval date	12 October 2010
Project implementation start date (PAD issuance date)	24 November 2010
Original expected implementation end date (indicated in CEO endorsement/Approval document)	30 June 2014
Revised expected implementation end date (if any)	30June 2015
Actual implementation end date	30 June 2015
GEF Grant (USD)	859,091
GEF PPG (USD) (if any)	50,000
UNIDO inputs (USD)	80,000
Co-financing (USD) at CEO Endorsement	5,680,000
Total project cost (USD) (GEF Grant + Co-financing at CEO Endorsement)	6,539,091
Mid-term review date	N/A
Planned terminal evaluation date	**31 April 2015**

Source: Project document

2. Project summary

The project *Promoting Industrial Energy Efficiency through System Optimization and Energy Management Standards in Viet Nam* (UNIDO project numbers GF/VIE/09/001; and GF/VIE/10/003 (SAP ID103081), GEF ID Number: 3594), has the objective to promote energy efficiency in the industries through introduction of

ISO Energy Management Standard incorporating industrial energy systems optimization.

This project aims at facilitating energy efficiency (EE) improvements in the industrial sector through supporting the development of a national energy management standard and energy efficiency services for the Vietnamese industry as well the creation of demonstration effects. It is expected that Viet Nam, and in particular its industry, will reduce the energy consumption compared to business as usual, resulting in correspondent GHG emissions reductions.

Viet Nam is located in the Southeast Asian region with a population of 86 million; current economic growth in Viet Nam has been achieved at over 8% per annum. Viet Nam has rich energy resources such as coal, oil, natural gas, hydro, and renewable energies, and, for now, is a net exporter country. However, according to the high economic growth, energy demand will increase rapidly, and it will exceed domestic energy supply capability in the future. Energy demand in Viet Nam is expected to increase by 2.5 times in 2015, and 5 times in 2025, compared with present consumption levels, and this, even if energy conservation is promoted.

Along with high economic growth, the growth rate of energy consumption is increasing faster than economic growth. Despite being a net exporter of energy resources presently, Viet Nam is expected to import crude oil by 2015, coal by 2016, and major development of hydropower will be completed by 2017. Regarding electricity, imbalance in demand and supply due to water shortages during the dry season grows into a serious problem. The rapid increase of energy consumption reflects the vigorous development of the industrial sector while increases of consumption in other sectors were relatively minor. Every sector recorded a two-digit growth of energy consumption which reflects the vigorous economic growth.

Industries in Viet Nam are showing greater interest in energy efficiency measures. The industrial sector is the biggest energy consumer in Viet Nam, accounting for 36% of total energy demand in 2006. Industry contributes two-fifths of GDP and is the largest consumer of energy in the economy. The growth rate of energy consumption is increasing faster than that of economic growth. The Government of Viet Nam is concerned about increased energy demand accompanied by industrial development and increased greenhouse gas emissions arising from fossil fuel combustion and power generation coupled with inefficient energy practices. Energy efficiency programs have not delivered comprehensive capacity building focused on the industrial sector and there is limited implementation of energy efficiency programmes/projects by the industrial enterprises. Even energy management measures are implemented on an ad-hoc basis.

The proposed project aims to address mainly the barriers related to technical, information, market and finance through capacity building interventions and implementation projects. The target groups of the projects are industrial enterprises (both decision makers and technical personnel), equipment vendors, energy professionals, ESCOs and government agencies. The objective of the project is to promote industrial EE through system optimization approach and ISO energy management standards. The proposed project is designed to offer: i) a system optimization approach to industrial enterprises to maximize energy savings at the system level, and ii) capacity building to adopt the ISO energy management standards for industrial enterprises to integrate EE as part of the management cycle for the realization of continuous annual energy savings.

Based on the available statistics, interviews with manufacturers and surveys, four sectors were selected in close consultation with the Ministry of Industry and Trade (MOIT) to participate in the project. The selection was based on the sectors' potential for EE, their willingness to participate and invest their share of energy consumption, and their current situation concerning energy management and system optimization. The final selection for Viet Nam included the food, textiles, rubber, and pulp & paper sectors. Within those four sectors, approximately 1,500 facilities are located near Ho Chi Minh City and 550 near Hanoi, the two major cities of Viet Nam.

Industries within the food, textile, rubber and pulp & paper industrial sectors will be the main target by this project's activities. Other beneficiaries include policy makers, energy efficiency professionals, energy service providers, energy equipment suppliers/vendors and financial institutions which will receive training to better understand and evaluate energy management and system optimization projects.

The project will enable energy savings for industry, which will result in GHG emission reductions based on the fuel/electricity used. With the help of the GEF grant of USD 859,091, it is expected to reach annual electricity savings of 308,009 MWh (34,422 MWh during project's implementation and 273,587 MWh after) and fuel savings of 40,001 TOE (4,086 TOE during project's implementation and 35,915 TOE after) through the industrial demonstration projects and training activities. In terms of GHG reductions, the electricity savings can be translated to 177,413 tCO^2 savings using an emission factor of 0.576. To translate the fuel savings into GHG emission savings, an emission factor of 77.4 tCO^2/TJ for fuel oil and 98.3 tCO^2/TJ for coal are used conservatively. Vietnamese facilities mostly supply their boilers with fuel oil or coal, but the exact fuel distribution in the country is unknown, hence the emission factor for fuel savings is used in 50:50 ratios for coal and fuel oil. Consequently, the GHG reduction resulting from fuel savings will total to 147,127 tCO^2.

The project will result in total emission reduction of 324,541 tCO^2: 34,856 tCO2 from direct emission savings. These two categories of direct and indirect GHG emission reductions that are relevant under this project as defined by the GEF are:

a. Direct GHG reductions – Emission reductions achieved by demonstration projects that are planned and implemented as part of the project as well as energy efficiency investments leveraged as result of the project during the project's supervised implementation period. Direct savings will occur on account of energy management and system optimization projects during the project duration as: energy management savings from operational improvements and implementation of ISO 50001 projects; and system optimization saving from optimization of steam and compressed air systems. In addition to these projects occurring during the project life, other optimization activities initiated by industrial enterprises themselves are not accounted towards calculations of the savings.

b. Indirect GHG Emission Savings – Emission reductions achieved after project completion as result of the enabling environment for EE practices and investments created by the GEF project through capacity building, policy framework, standards and other catalytic actions for replication. Indirect GHG emission savings produced by the GEF UNIDO project will be the result of the outputs generated by project

components 1 and 2. These outputs aim and contribute to create an enabling environment for a steady growth of energy efficient performance in industry and stimulate the creation of a national market for industrial energy efficiency products and services in the post project scenario. More precisely, the indirect savings will occur after the project completion from the year 5 onwards till the year 10.

The project is funded through a GEF grant, amounting to USD$859,091, a UNIDO contribution of USD 80,000; and the counterparts' co-financing of USD 5,680,000, which amount to total project budget of USD 6,539,091. Co-financers are: the Ministry of Industry and Trade, Viet Nam Environment Protection Fund and Viet Nam Development Bank.

The project implementation started in November 2010 and the initial project end date was in June 2014. The same was revised and the new expected implementation date is 30 June 2015.

An independent terminal evaluation for this project was foreseen in the project document as part of the Budgeted Monitoring and Evaluation Plan, with the purpose of conducting a systematic and impartial assessment of the project in line with UNIDO and GEF Evaluation policies. The terminal evaluation is planned to take place in April 2015.

3. Project objective

The proposed project aims to address mainly the barriers to industrial energy efficiency in Viet Nam, which are related to technical, information, market and finance in Viet Nam through capacity building interventions.

The objective of the project is to promote industrial Energy Efficiency through system optimization approach and ISO energy management standards.

The project consisted of three technical components:

The project entailed four project components:

Project Component 1 (PC1): "National Program to Build Capacity on Energy Management and System Optimization" should deliver sustainable improvements in EE in industries through placing a policy instrument (compatible with ISO 50,001 energy management standard), and create a cadre of EE professionals within industrial facilities, consultants and suppliers in order to provide services on energy management and optimize industrial systems.

PC1 contains the following five outputs:

1. Training materials, software and tools developed.
2. National campaign to promote industrial energy management.
3. A peer-to-peer network developed between industrial enterprises.
4. Trained national experts and factory personnel on energy management.
5 Trained national experts, factory personnel and vendors on systems optimization.

Project Component 2 (PC2): "Implementation of Energy Management and System Optimization Demonstration projects" though increased adoption of ISO 50,001 energy management standards and system optimization with the following outputs.

1. Energy management projects implemented.
2. Documented industry demonstration projects.
3. Recognition program developed.

Project Component 3 (PC3): "Financial Capacity Development to Support Energy Efficiency Projects in Industry" through increased financial support for industrial EE initiatives with the following outputs.

1. Training materials developed and harmonized EE project evaluation criteria.
2. Industrial enterprises trained to enhance financial capacity to develop bankable projects.

4. Project implementation arrangements

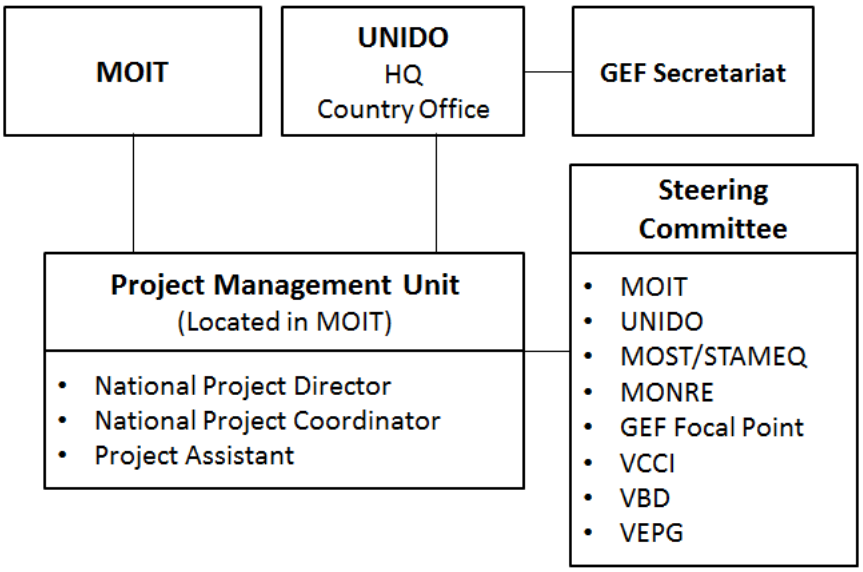
The primary stakeholder in this project is the Ministry of Industry and Trade (MOIT). The MOIT will coordinate direct project inputs from other participating agencies and organization. and will designate a senior official to the project as National Project Director (NPD) to guide the PMU in the implementation of the project. The PMU will be fully responsible for day to day activities of the project and will report to the UNIDO Project Manager.

The MOIT will specifically assume responsibility for the following tasks:

- In cooperation with STAMEQ, implementation of a national campaign to promote energy management and the use of ISO 50001.
- Identification/approval of host factories to participate in project and to facilitate training sites (wherever possible serve as training sites.
- In cooperation with STAMEQ, identification of trainees.
- Recognition program.

UNIDO will recruit the international teams responsible for delivering the training. UNIDO and the MOIT will together assume responsibility for delivery of the case studies, documenting the energy savings and reductions in GHG emissions directly attributable to the project.

Figure: Project Implementation Arrangements



Steering Committee (SC)

The Steering Committee (SC) will consist of high level representatives from the MOIT, the MOST/STAMEQ, GEF focal point, VDB, VEPF and UNIDO. It will be chaired by the MOIT. The primary roles of the SC are: (i) to provide overall guidance to the implementation of the project, (ii) to ensure good coordination among participating agencies and other organizations.

The Steering Committee will meet every year to monitor implementation progress and confirm the work plan for the subsequent year. Minutes of meetings will be signed by UNIDO and MOIT.

The Committee will be responsible for the staffing, planning and implementation of all key project activities in-country and will ensure satisfactory performance of national experts.

Work plans will be developed and implemented by UNIDO will primarily identify and schedule the training courses over a year period.

Project Management Unit Office (PMU)

UNIDO will create a Project Management Unit (PMU) responsible for the overall operational management and implementation of the project activities. The PMU will manage day-to-day operations of the project, and will be based at the MOIT premise and will comprise of two core members: National Project Coordinator and Project Assistant. The PMU will be guided by the National Project Director. Both these persons will be recruited by UNIDO. In addition, a number of national experts, subcontractors and international experts will support the PMU.

The PMU will prepare quarterly progress reports to review achievement in the previous quarter, prepare financial report and develop work plan and budget for next quarter. All these documents will be sent to UNIDO for endorsement/approval. The PMU will also produce annual progress reports, which must be submitted to the SC at least two weeks before the annual meeting. At the end of the project, the PMU will produce the terminal report, which is to be submitted to the SC at least two weeks before the final meeting.

National Project Coordinator (NPC)

The National Project Coordinator (NPC)'s overall role is to ensure the successful execution and implementation of the project toward achieving project results. The NPC is accountable to the Government and UNIDO and is responsible for mobilizing all national and international project inputs in a timely manner, supporting project management and implementation,

Budget information

The total budget of the project (including support costs) is USD **6,539,091** with the co-funding of USD **5,680,000** coming from the Ministry of Industry and Trade, Viet Nam Environment Protection Fund, Viet Nam Development Bank and UNIDO. The total budget provided by the GEF to UNIDO to implement the project was USD 859,091.

a) Overall cost and financing (including co-financing):

According to the project document, 13 percent of the total project budget originated from the GEF grant, whereas 87 percent from co-financing. For the project component 1: "National Program to Build Capacity on Energy Management and System Optimization" 52 percent from the co-financing and 48 percent from the GEF financing budget should have been spent for this component. For the project component 2: "Implementation of Energy Management and System Optimization Demonstration Projects" 4 percent should have been spent from the GEF grant, and 96 percent from the co-financing. Finally, for the project component 3: "Financial Capacity Development to Support Energy Efficiency Projects in Industry," 25 percent should have been spent from the GEF grant, and 75 percent from the co-financing funds, as it can be seen on the table below.

Project Components					
	GEF Financing[1]		**Co-Financing[1]**		**Total ($)**
	($) a	%	($) b	%	c=a+ b
1. National Program to Build Capacity on Energy Management and System Optimization	470,550	52	440,000	48	910,550
2.Implementation of Energy Management and System Optimization Demonstration Projects	225,900	4	4,909,500	96	5,135,400
3. Financial Capacity Development to Support Energy Efficiency Projects in Industry	50,500	25	149,500	75	200,000
Project management	85,141	33	175,000	67	260,141
Monitoring and Evaluation	27,000	82	6,000	18	33,000
Total Project Costs	**859,091**	**13**	**5,680,000**	**87**	**6,539,091**

Source: Project document

b) UNIDO budget execution (GEF funding excluding agency support cost):

Budget line	Item	EXECUTED BUDGET in 2012	EXECUTED BUDGET in 2013	EXECUTED BUDGET in 2014	EXECUTED BUDGET in 2015 (as of Feb. 12)	Total Expenditure (2012-present (12 Feb.)
1100	International experts	97,295.87	113,594.77	9,478.05	0	**220,368.69**
1500	Project travel	14,721.27	30,554.75	4,919.26	3,909.75	**54,105.03**
1700	National experts	79,540.86	89,214.86	65,899.78	16,044.49	**250,699.99**
2100	Subcontracts	2,500	21,940.30	24,318.42	-218.35	**48,540.37**
3000	Study tours/ in-service training	87,927.01	18,376.09	1,483.12	-6,670.98	**101,115.24**
4500	Equipment	86,945.64	7,196.61	0	-1,009.02	**93,133.23**
5100	Sundries	21,112.26	12,738.14	16,659.85	-6,501.58	**44,008.67**

Source: SAP database, UNIDO Project Manager, February 2015

II. Scope and purpose of the evaluation

The terminal evaluation will cover the whole duration of the project from its starting date in November 2010 to the estimated completion date in June 2015. It will assess project performance against the evaluation criteria: relevance, effectiveness, efficiency, sustainability and impact.

The terminal evaluation has an additional purpose of drawing lessons and developing recommendations for UNIDO and the GEF that may help for improving the selection, enhancing the design and implementation of similar future projects and activities in the country and on a global scale upon project completion. The terminal evaluation report should include examples of good practices for other projects in a focal area, country, or region.

The evaluation team should provide an analysis of the attainment of the main objective and specific objectives under the three core project components. Through its assessments, the evaluation team should enable the Government, counterparts, the GEF, UNIDO and other stakeholders and donors to verify prospects for development impact and sustainability, providing an analysis of the attainment of global environmental objectives, project objectives, delivery and completion of project outputs/activities, and outcomes/impacts based on indicators. The assessment includes re-examination of the relevance of the objectives and other elements of project design according to the project evaluation parameters defined in chapter VI.

The key question of the terminal evaluation is whether the project has achieved or is likely to promote industrial EE through system optimization approach and ISO energy management standards.

III. Evaluation approach and methodology

The terminal evaluation will be conducted in accordance with the UNIDO Evaluation Policy, the UNIDO Guidelines for the Technical Cooperation Programmes and Projects, the GEF's 2008 Guidelines for Implementing and Executing Agencies to Conduct Terminal Evaluations, the GEF Monitoring and Evaluation Policy from 2010 and the Recommended Minimum Fiduciary Standards for GEF Implementing and Executing Agencies.

It will be carried out as an independent in-depth evaluation using a participatory approach whereby all key parties associated with the project are kept informed and regularly consulted throughout the evaluation. The evaluation team leader will liaise with the UNIDO Office for Independent Evaluation (ODG/EVA) on the conduct of the evaluation and methodological issues.

The evaluation team will be required to use different methods to ensure that data gathering and analysis deliver evidence-based qualitative and quantitative information, based on diverse sources: desk studies and literature review, statistical analysis, individual interviews, focus group meetings, surveys and direct observation. This approach will not only enable the evaluation to assess causality through quantitative means but also to provide reasons for why certain results were achieved or not and to triangulate information for higher reliability of findings. The concrete mixed methodological approach will be described in the inception report.

The evaluation team will develop interview guidelines. Field interviews can take place either in the form of focus-group discussions or one-to-one consultations.

The methodology will be based on the following:

1. A desk review of project documents including, but not limited to:

    (a) The original project document, monitoring reports (such as progress and financial reports to UNIDO and GEF annual Project Implementation Review (PIR) reports), output reports (case studies, action plans, sub-regional strategies, etc.) and relevant correspondence.

    (b) Notes from the meetings of committees involved in the project (e.g. approval and steering committees).

    (c) Other project-related material produced by the project.

2. The evaluation team will use available models of (or reconstruct if necessary) theory of change for the different types of intervention (enabling, capacity, investment, demonstration). The validity of the theory of change will be examined through specific questions in interviews and possibly through a survey of stakeholders.

3. Counterfactual information: In those cases where baseline information for relevant indicators is not available the evaluation team will aim at establishing a proxy-baseline through recall and secondary information.

4. Interviews with project management and technical support including staff and management at UNIDO HQ and in the field and – if necessary - staff associated with the project's financial administration and procurement.

5. Interviews with project partners including Government counterparts, GEF focal points and partners that have been selected for co-financing as shown in the corresponding sections of the project documents.

6. On-site observation of results achieved in demonstration projects, including interviews of actual and potential beneficiaries of improved technologies.

7. Interviews and telephone interviews with intended users for the project outputs and other stakeholders involved with this project. The evaluator shall determine whether to seek additional information and opinions from representatives of any donor agencies or other organisations.

8. Interviews with the UNIDO Viet Nam Office and the project's management and Project Steering Committee (PSC) members and the various national and sub-regional authorities dealing with project activities as necessary. If deemed necessary, the evaluator shall also gain broader perspectives from discussions with relevant GEF Secretariat staff.

9. Other interviews, surveys or document reviews as deemed necessary by the evaluator and/or UNIDO ODG/EVA.

10. The inception report will provide details on the methodology used by the evaluation team and include an evaluation matrix.

IV. Evaluation team composition

The evaluation team will be composed of one international evaluation consultant acting as a team leader and one national evaluation consultant.

The evaluation team should be able to provide information relevant for follow-up studies, including evaluation verification on request to the GEF partnership up to two years after completion of the evaluation.

Both consultants will be contracted by UNIDO. The tasks of each team member are specified in the job descriptions attached to these terms of reference.

Members of the evaluation team must not have been directly involved in the design and/or implementation of the programme/projects.

The Project Manager at UNIDO and the Project Team in Viet Nam will support the evaluation team. The UNIDO GEF Coordinator will be briefed on the evaluation and equally provide support to its conduct.

V. Time schedule and deliverables

The evaluation is scheduled to take place in the period from **1April 2015** to **30June 2015**. The field mission is planned for **20-26April 2015**. At the end of the field mission, there will be a presentation of the preliminary findings for all stakeholders involved in this project in Viet Nam.

After the field mission, the evaluation team leader will come to UNIDO HQ for debriefing and presentation of the preliminary findings of the Terminal Evaluation. The draft Terminal evaluation report will be submitted 4-6 weeks after the end of the mission.

VI. Project evaluation parameters

The evaluation team will rate the projects. The ***ratings for the parameters described in the following sub-chapters A to J will be presented in the form of a table*** with each of the categories rated separately and with **brief justifications for the rating** based on the findings of the main analysis. An overall rating for the project should also be given.

A. Project design

The evaluation will examine the extent to which:

- ✓ the project's design is adequate to address the problems at hand;
- ✓ a participatory project identification process was instrumental in selecting problem areas and national counterparts;
- ✓ the project has a clear thematically focused development objective, the attainment of which can be determined by a set of verifiable indicators;
- ✓ the project was formulated based on the logical framework (project results framework) approach;
- ✓ the project was formulated with the participation of national counterpart and/or target beneficiaries; and
- ✓ relevant country representatives (from government, industries and civil society) have been appropriately involved and were participating in the identification of critical problem areas and the development of technical cooperation strategies.

B. Project relevance

The evaluation will examine the extent to which the project is relevant to the:

- ✓ National development and environmental priorities and strategies of the Government and population of Viet Nam, and regional and international agreements. See possible evaluation questions under "Country ownership/driveness" below.
- ✓ Target groups: relevance of the project's objectives, outcomes and outputs to the different target groups of the interventions (e.g. companies, civil society, beneficiaries of capacity building and training, etc.).

- ✓ GEF's focal areas/operational programme strategies: In retrospect, were the project's outcomes consistent with the focal areas/operational program strategies of GEF? Ascertain the likely nature and significance of the contribution of the project outcomes to the wider portfolio of GEF's Focal area and Operational Program of Climate Change: CC-2 Promoting energy efficiency in the industrial sector.
- ✓ UNIDO's thematic priorities: Were they in line with UNIDO's mandate, objectives and outcomes defined in the Programme & Budget and core competencies?
- ✓ Does the project remain relevant taking into account the changing environment? Is there a need to reformulate the project design and the project results framework given changes in the country and operational context?

C. Effectiveness: objectives and planned final results at the end of the project

- The evaluation will assess to what extent results at various levels, including outcomes, have been achieved. In detail, the following issues will be assessed: To what extent have the expected outputs, outcomes and long-term objectives been achieved or are likely to be achieved? Has the project generated any results that could lead to changes of the assisted institutions? Have there been any unplanned effects?
- Are the project outcomes commensurate with the original or modified project objectives? If the original or modified expected results are merely outputs/inputs, the evaluators should assess if there were any real outcomes of the project and, if there were, determine whether these are commensurate with realistic expectations from the project.
- How do the stakeholders perceive the quality of outputs? Were the targeted beneficiary groups actually reached?
- What outputs and outcomes has the project achieved so far (both qualitative and quantitative results)? Has the project generated any results that could lead to changes of the assisted institutions? Have there been any unplanned effects?
- Identify actual and/or potential longer-term impacts or at least indicate the steps taken to assess these (see also below "monitoring of long term changes"). Wherever possible, evaluators should indicate how findings on impacts will be reported in future.
- Describe any catalytic or replication effects: the evaluation will describe any catalytic or replication effect both within and outside the project. If no effects are identified, the evaluation will describe the catalytic or replication actions that the project carried out. No ratings are requested for the project's catalytic role.

D. Efficiency

The extent to which:

- The project cost was effective? Was the project using the least cost options?

- Has the project produced results (outputs and outcomes) within the expected time frame? Was project implementation delayed, and, if it was, did that affect cost effectiveness or results? Wherever possible, the evaluator should also compare the costs incurred and the time taken to achieve outcomes with that for similar projects. Are the project's activities in line with the schedule of activities as defined by the project team and annual work plans? Are the disbursements and project expenditures in line with budgets?
- Have the inputs from the donor, UNIDO and Government/counterpart been provided as planned, and were they adequate to meet requirements? Was the quality of UNIDO inputs and services as planned and timely?
- Was there coordination with other UNIDO and other donors' projects, and did possible synergy effects happen?

E. Assessment of sustainability of project outcomes

Sustainability is understood as the likelihood of continued benefits after the GEF project ends. Assessment of sustainability of outcomes will be given special attention but also technical, financial and organization sustainability will be reviewed. This assessment should explain how the risks to project outcomes will affect continuation of benefits after the GEF project ends. It will include both exogenous and endogenous risks. The following four dimensions or aspects of risks to sustainability will be addressed:

- ✓ **Financial risks.** Are there any financial risks that may jeopardize sustainability of project outcomes? What is the likelihood of financial and economic resources not being available once GEF assistance ends? (Such resources can be from multiple sources, such as the public and private sectors or income-generating activities; these can also include trends that indicate the likelihood that, in future, there will be adequate financial resources for sustaining project outcomes.) Was the project successful in identifying and leveraging co-financing?
- ✓ **Sociopolitical risks.** Are there any social or political risks that may jeopardize sustainability of project outcomes? What is the risk that the level of stakeholder ownership (including ownership by governments and other key stakeholders) will be insufficient to allow for the project outcomes/benefits to be sustained? Do the various key stakeholders see that it is in their interest that project benefits continue to flow? Is there sufficient public/stakeholder awareness in support of the project's long-term objectives?
- ✓ **Institutional framework and governance risks.** Do the legal frameworks, policies, and governance structures and processes within which the project operates pose risks that may jeopardize sustainability of project benefits? Are requisite systems for accountability and transparency, and required technical know-how, in place?
- ✓ **Environmental risks.** Are there any environmental risks that may jeopardize sustainability of project outcomes? Are there any environmental factors, positive or negative, that can influence the future flow of project benefits? Are there any project outputs or higher level results that are likely to affect the environment, which, in turn, might affect sustainability of

project benefits? The evaluation should assess whether certain activities will pose a threat to the sustainability of the project outcomes.

F. Assessment of monitoring and evaluation systems

- **M&E design.** Did the project have an M&E plan to monitor results and track progress towards achieving project objectives? The Evaluation will assess whether the project met the minimum requirements for the application of the Project M&E plan.
- **M&E plan implementation.** The evaluation should verify that an M&E system was in place and facilitated timely tracking of progress toward project objectives by collecting information on chosen indicators continually throughout the project implementation period; annual project reports were complete and accurate, with well-justified ratings; the information provided by the M&E system was used during the project to improve performance and to adapt to changing needs; and the project had an M&E system in place with proper training for parties responsible for M&E activities to ensure that data will continue to be collected and used after project closure. Where monitoring and self-evaluation carried out effectively, based on indicators for outputs, outcomes and impacts? Are there any annual work plans? Was any steering or advisory mechanism put in place? Did reporting and performance reviews take place regularly?
- **Budgeting and Funding for M&E activities.** In addition to incorporating information on funding for M&E while assessing M&E design, the evaluators will determine whether M&E was sufficiently budgeted for at the project planning stage and whether M&E was adequately funded and in a timely manner during implementation.

G. Monitoring of long-term changes

The monitoring and evaluation of long-term changes is often incorporated in GEF-supported projects as a separate component and may include determination of environmental baselines; specification of indicators; and provisioning of equipment and capacity building for data gathering, analysis, and use. This section of the evaluation report will describe project actions and accomplishments toward establishing a long-term monitoring system.The review will address the following questions:

a. Did this project contribute to the establishment of a long-term monitoring system? If it did not, should the project have included such a component?
b. What were the accomplishments and shortcomings in establishment of this system?
c. Is the system sustainable—that is, is it embedded in a proper institutional structure and does it have financing? How likely is it that this system continues operating upon project completion?
d. Is the information generated by this system being used as originally intended?

H. Assessment of processes affecting achievementof project results

Among other factors, when relevant, the evaluation will consider a number of issues affecting project implementation and attainment of project results. The assessment of these issues can be integrated into the analyses of project design, relevance, effectiveness, efficiency, sustainability and management as the evaluators find them fit (it is not necessary, however it is possible to have a separate chapter on these aspects in the evaluation report). The evaluation will consider, but need not be limited to, the following issues that may have affected project implementation and achievement of project results:

a. **Preparation and readiness / Quality at entry.** Were the project's objectives and components clear, practicable, and feasible within its time frame? Were counterpart resources (funding, staff, and facilities), and adequate project management arrangements in place at project entry? Were the capacities of executing institution and counterparts properly considered when the project was designed? Were lessons from other relevant projects properly incorporated in the project design? Were the partnership arrangements properly identified and the roles and responsibilities negotiated prior to project approval?

b. **Country ownership/drivenness.** Was the project concept in line with the sectoral and development priorities and plans of the country—or of participating countries, in the case of multi-country projects? Are project outcomes contributing to national development priorities and plans? Were the relevant country representatives from government and civil society involved in the project? Did the recipient government maintain its financial commitment to the project? Has the government—or governments in the case of multi-country projects—approved policies or regulatory frameworks in line with the project's objectives?

c. **Stakeholder involvement.** Did the project involve the relevant stakeholders through information sharing and consultation? Did the project implement appropriate outreach and public awareness campaigns? Were the relevant vulnerable groups and powerful supporters and opponents of the processes properly involved? Which stakeholders were involved in the project (i.e. NGOs, private sector, other UN Agencies etc.) and what were their immediate tasks?Did the project consult with and make use of the skills, experience, and knowledge of the appropriate government entities, nongovernmental organizations, community groups, private sector entities, local governments, and academic institutions in the design, implementation, and evaluation of project activities? Were perspectives of those who would be affected by project decisions, those who could affect the outcomes, and those who could contribute information or other resources to the process taken into account while taking decisions? Were the relevant vulnerable groups and the powerful, the supporters and the opponents, of the processes properly involved?

d. **Financial planning.** Did the project have appropriate financial controls, including reporting and planning, that allowed management to make informed decisions regarding the budget and allowed for timely flow of funds? Was there due diligence in the management of funds and financial audits? Did promised co-financing materialize? Specifically, the evaluation

should also include a breakdown of final actual project costs by activities compared to budget (variances), financial management (including disbursement issues), and co- financing.

e. **UNIDO's supervision and backstopping.** Did UNIDO staff identify problems in a timely fashion and accurately estimate their seriousness? Did UNIDO staff provide quality support and advice to the project, approve modifications in time, and restructure the project when needed? Did UNIDO provide the right staffing levels, continuity, skill mix, and frequency of field visits for the project?

f. **Cofinancing and project outcomes and sustainability.** If there was a difference in the level of expected co-financing and the cofinancing actually realized, what were the reasons for the variance? Did the extent of materialization of cofinancing affect project outcomes and/or sustainability, and, if so, in what ways and through what causal linkages?

g. **Delays and project outcomes and sustainability.** If there were delays in project implementation and completion, what were the reasons? Did the delays affect project outcomes and/or sustainability, and, if so, in what ways and through what causal linkages?

h. **Implementation approach[2].** Is the implementation approach chosen different from other implementation approaches applied by UNIDO and other agencies? Does the approach comply with the principles of the Paris Declaration? Does the approach promote local ownership and capacity building? Does the approach involve significant risks?

The evaluation team will rate the project performance as required by the GEF. The ratings will be given to four criteria: Project Results, Sustainability, Monitoring and Evaluation, and UNIDO related issues. The ratings will be presented in a table with each of the categories rated separately and with brief justifications for the rating based on the findings of the main analysis. An overall rating for the project should also be given. The rating system to be applied is specified in the same annex. As per the GEF's requirements, the report should also provide information on project identification, time frame, actual expenditures, and co-financing in the format in Annex 5, which is modeled after the GEF's project identification form (PIF).

[2] Implementation approach refers to the concrete manifestation of cooperation between UNIDO, Government counterparts and local implementing partners. Usually POPs projects apply a combination of agency execution (direct provision of services by UNIDO) with elements of national execution through sub-contracts.

I. Project coordination and management

The extent to which:

- The national management and overall coordination mechanisms have been efficient and effective? Did each partner have assigned roles and responsibilities from the beginning? Did each partner fulfil its role and responsibilities (e.g. providing strategic support, monitoring and reviewing performance, allocating funds, providing technical support, following up agreed/corrective actions…)?
- The UNIDO HQ and Filed Office based management, coordination, monitoring, quality control and technical inputs have been efficient, timely and effective (problems identified timely and accurately; quality support provided timely and effectively; right staffing levels, continuity, skill mix and frequency of field visits…)?
- The national management and overall coordination mechanisms were efficient and effective? Did each partner have specific roles and responsibilities from the beginning till the end? Did each partner fulfill its role and responsibilities (e.g. providing strategic support, monitoring and reviewing performance, allocating funds, providing technical support, following up agreed/corrective actions…)? Were the UNIDO HQ based management, coordination, quality control and technical inputs efficient, timely and effective (problems identified timely and accurately; quality support provided timely and effectively; right staffing levels, continuity, skill mix and frequency of field visits…)?

J. Assessment of gender mainstreaming

The evaluation will consider, but need not be limited to, the following issues that may have affected gender mainstreaming in the project:

- To which extent were socioeconomic benefits delivered by the project at the national and local levels, including consideration of gender dimensions?

K. Procurement issues

The following evaluation questions that will feed in the Thematic Evaluation on Procurement have been developed and would be included as applicable in all projects (for reference, please see Annex 9 of the ToR: UNIDO Procurement Process):

- To what extent does the process provide adequate treatment to different types of procurement (e.g. by value, by category, by exception…)
- Was the procurement timely? How long does the procurement process take (e.g. by value, by category, by exception…)
- Did the good/item(s) arrive as planned or scheduled? If no, how long were the times gained or delays. If delay, what was the reason(s)?
- Were the procured good(s) acquired at a reasonable price?
- To what extent were the procured goods of the expected/needed quality and quantity?
- Were the transportation costs reasonable and within budget. If no, pleased elaborate.
- Was the freight forwarding timely and within budget? If no, pleased elaborate.

- Who was responsible for the customs clearance? UNIDO FO?UNDP?Government?Other?
- Was the customs clearance handled professionally and in a timely manner? How many days did it take?
- How long time did it take to get approval from the government on import duty exemption?
- Which were the main bottlenecks / issues in the procurement process?
- Which good practices have been identified?
- To what extent roles and responsibilities of the different stakeholders in the different procurement stages are established, adequate and clear?
- To what extent there is an adequate segregation of duties across the procurement process and between the different roles and stakeholders?

VII. Reporting

Inception report

This Terms of Reference provides some information on the evaluation methodology but this should not be regarded as exhaustive. After reviewing the project documentation and initial interviews with the project manager the International Evaluation Consultant will prepare, in collaboration with the national consultant, a short inception report that will operationalize the ToR relating to the evaluation questions and provide information on what type of and how the evidence will be collected (methodology). It will be discussed with and approved by the responsible UNIDO Evaluation Officer. The Inception Report will focus on the following elements: preliminary project theory model(s); elaboration of evaluation methodology including quantitative and qualitative approaches through an evaluation framework ("evaluation matrix"); division of work between the International Evaluation Consultant and National Consultant; mission plan, including places to be visited, people to be interviewed and possible surveys to be conducted and a debriefing and reporting timetable[3].

Evaluation report format and review procedures

The draft report will be delivered to UNIDO Office for Independent Evaluation – ODG/EVA (the suggested report outline is in Annex 1) and circulated to UNIDO staff and national stakeholders associated with the project for factual validation and comments. Any comments or responses, or feedback on any errors of fact to the draft report provided by the stakeholders will be sent to UNIDO ODG/EVA for collation and onward transmission to the project evaluation team who will be advised of any necessary revisions. On the basis of this feedback, and taking into consideration the comments received, the evaluation team will prepare the final version of the terminal evaluation report.

The evaluation team will present its preliminary findings to the local stakeholders at the end of the field visit and take into account their feed-back in preparing the evaluation report. A presentation of preliminary findings will take place at UNIDO HQ after the field mission.

The terminal evaluation report should be brief, to the point and easy to understand. It must explain the purpose of the evaluation, exactly what was evaluated, and the methods used.

[3] The evaluator will be provided with a Guide on how to prepare an evaluation inception report prepared by the UNIDO Office for Independent Evaluation.

The report must highlight any methodological limitations, identify key concerns and present evidence-based findings, consequent conclusions, recommendations and lessons. The report should provide information on when the evaluation took place, the places visited, who was involved and be presented in a way that makes the information accessible and comprehensible. The report should include an executive summary that encapsulates the essence of the information contained in the report to facilitate dissemination and distillation of lessons.

Findings, conclusions and recommendations should be presented in a complete, logical and balanced manner. The evaluation report shall be written in English and follow the outline given in Annex 1.

Evaluation work plan

The "Evaluation Work Plan" includes the following main products:

1. Desk review, briefing by project manager and development of methodology: Following the receipt of all relevant documents, and consultation with the Project Manager about the documentation, including reaching an agreement on the Methodology, the desk review could be completed.
2. Inception report: At the time for departure to the field mission, the complete gamete of received materials have been reviewed and consolidated into the Inception report.

3. Field mission:The principal responsibility for managing this evaluation lies with UNIDO. It will be responsible for liaising with the project team to set up the stakeholder interviews, arrange the field missions, coordinate with the Government. At the end of the field mission, there will be a presentation of preliminary findings to the key stakeholders in the country where the project was implemented.
4. Preliminary findings from the field mission: Following the field mission, themain findings, conclusions and recommendations would be prepared and presented in the field and at UNIDO Headquarters.
5. A draft Terminal evaluation report will be forwarded electronically to the UNIDO Office for Independent Evaluation and circulated to main stakeholders.
6. Final Terminal evaluation report will incorporate comments received.

Evaluation phases	**Deliverables**
Desk review	Development of methodology approach and evaluation tools
Briefing with UNIDO Office for Independent Evaluation, Project Managers and other key stakeholder at HQ	Interview notes, detailed evaluation schedule and list of stakeholders to interview during field mission
Data analysis	Inception Evaluation Report
Conduct of Field mission. Present preliminary findings and recommendations to key stakeholders in the field	Presentation of main findings to key stakeholders in the field.

Present preliminary findings and recommendations to the stakeholders at UNIDO HQ	Presentation slides
Analysis of the data collected	Draft Terminal Evaluation Report
Circulation of the draft report to UNIDO/relevant stakeholders and revision	Final Terminal Evaluation Report

VIII. Quality assurance

All UNIDO evaluations are subject to quality assessments by the UNIDO Office for Independent Evaluation. Quality assurance and control is exercised in different ways throughout the evaluation process (briefing of consultants on methodology and process of UNIDO's Office for Independent Evaluation, providing inputs regarding findings, lessons learned and recommendations from other UNIDO evaluations, review of inception report and evaluation report by the Office for Independent Evaluation). The quality of the evaluation report will be assessed and rated against the criteria set forth in the Checklist on evaluation report quality, attached as Annex 4. The applied evaluation quality assessment criteria are used as a tool to provide structured feedback. UNIDO's Office for Independent Evaluation should ensure that the evaluation report is useful for UNIDO in terms of organizational learning (recommendations and lessons learned) and is compliant with UNIDO's evaluation policy and these terms of reference. The draft and final evaluation report are reviewed by UNIDO Office for Independent Evaluation, which will submit the final report to the GEF Evaluation Office and circulate it within UNIDO together with a management response sheet.

JOB DESCRIPTION INTERNATIONAL EVALUATION CONSULTANT

Title:	International evaluation consultant
Main Duty Station and Location:	Home based
Missions:	1 mission each to Vienna, Austria and Hanoi, Viet Nam
Start of Contract (EOD):	June 25, 2015
End of Contract (COB):	September 15, 2015
Number of Working Days:	25 working days

ORGANIZATIONAL CONTEXT

The Office for Independent Evaluation is responsible for the independent evaluation function of UNIDO. It supports learning, continuous improvement and accountability, and provides factual information about result and practices that feed into the programmatic and strategic decision-making processes. Evaluation is an assessment, as systematic and impartial as possible, of a programme, a project or a theme. Independent evaluations provide evidence-based information that is credible, reliable and useful, enabling the timely incorporation of findings, recommendations and lessons learned into the decision-making processes at organization-wide, programme and project level. The Office for Independent Evaluation is guided by the UNIDO Evaluation Policy, which is aligned to the norms and standards for evaluation in the UN system.

PROJECT CONTEXT

UNIDO Industrial Energy Efficiency Programme
Improving energy efficiency in industry is one of the most cost-effective measures to help supply-constrained developing and emerging countries meet their increasing energy demand and loosen the link between economic growth and environmental degradation, such as climate change.

The final goal of the UNIDO Industrial Energy Efficiency (IEE) Programme is to effect sustained energy management and efficiency practices in industry of developing countries and emerging economies in order to reduce the environmental pressure of economic growth while increasing productivity, helping to generate economic growth, creates jobs and alleviates poverty.

Time and again energy efficiency in industry has been demonstrated to be cost effective while having a positive effect on productivity. Despite this, energy efficiency improvements with very favorable payback periods often do not get implemented. When projects are implemented, it may often happen that results are not sustained due to lack of supportive operational and maintenance practices. Energy efficiency is still widely viewed as a luxury rather than a strategic investment in future profitability.

Three decades of national and international experiences with industrial energy efficiency programs have shown that most energy efficiency in industry is achieved

through changes in how energy is managed in an industrial facility, rather than through installation of new technologies.

The goal of sustainable energy efficiency in industry requires that energy efficiency is integrated into daily management practices and systems for continual improvement. In order to achieve that, top management needs to be engaged in the management of energy on an ongoing basis.

Detailed background information of each project can be found the Terms of Reference (TORs) for the terminal evaluation.

DUTIES AND RESPONSIBILITIES

MAIN DUTIES	Concrete/ Measurable Outputs to be achieved	Working Days	Location
1. Review project documentation and relevant country background information (national policies and strategies, UN strategies and general economic data); determine key data to collect in the field and adjust the key data collection instrument accordingly (if needed); Assess the adequacy of legislative and regulatory framework relevant to the project's activities and analyze other background info.	Adjust table of evaluation questions, depending on country specific context; Draft list of stakeholders to interview during the field missions; Brief assessment of the adequacy of the country's legislative and regulatory framework.	3 days	HB
2. Conduct field mission to Viet Nam in July 20154.	Conduct meetings with relevant project stakeholders, beneficiaries, etc. for the collection of data and clarifications; Agreement with the National Consultant on the structure and content of the evaluation report and the distribution of writing tasks; Presentations of the evaluation's initial findings, draft conclusions and recommendations to stakeholders in the country at the end of the missions.	7 days	Viet Nam
3. Present overall findings and recommendations to the stakeholders at UNIDO HQ5	After field mission(s): Presentation slides, feedback from stakeholders obtained and discussed	2 days	Vienna, Austria

[4] The exact mission dates will be decided in agreement with the Consultant, UNIDO HQ, and the country counterparts. Two or all three missions may be carried out consecutively.

[5] The debriefings at Vienna could be combined for two or all three countries, depending on the timing of field missions. The advantage of a joint presentation is that similarities and differences between countries can be compared and discussed.

MAIN DUTIES	Concrete/ Measurable Outputs to be achieved	Working Days	Location
4. Prepare the evaluation report according to TOR; Coordinate the inputs from the National Consultant and combine with her/his own inputs into the draft evaluation report.	Draft evaluation report.	9 days	HB
5. Revise the draft project evaluation reports based on comments from UNIDO Office for Independent Evaluation and stakeholders and edit the language and form of the final version according to UNIDO standards.	Final evaluation report.	4 days	HB
	TOTAL	25 days	

MINIMUM ORGANIZATIONAL REQUIREMENTS

Education:
Advanced degree in environment, energy, engineering, development studies or related areas.

Technical and functional experience:
Minimum 10 years' experience in energy efficiency projects.
Knowledge about multilateral technical cooperation and the UN, international development priorities and frameworks.
Knowledge of and experience in environmental projects management and/or evaluation (of development projects).
Working experience in developing countries.
Experience in evaluation of GEF energy projects and knowledge of UNIDO activities an asset.

Languages:
Fluency in written and spoken English is required.

Reporting and deliverables

1) At the beginning of the assignment the Consultant will submit a concise Inception Report that will outline the general methodology and presents a concept Table of Contents;
2) The country assignment will have the following deliverables:
   - Presentation of initial findings of the mission;
   - Draft report;
   - Final report, comprising of executive summary, findings regarding design, implementation and results, conclusions and recommendations.
3) Debriefing at UNIDO HQ:
   - Presentation and discussion of findings;
   - Concise summary and comparative analysis of the main results of the evaluation report.

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

Absence of conflict of interest:

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

JOB DESCRIPTION NATIONAL EVALUATION CONSULTANT

Title:	National evaluation consultant
Main Duty Station and Location:	Home-based
Mission/s to:	Travel to potential sites
Start of Contract (EOD):	15 March 2015
End of Contract (COB):	30 June 2015
Number of Working Days:	30 days

ORGANIZATIONAL CONTEXT

The Office for Independent Evaluation is responsible for the independent evaluation function of UNIDO. It supports learning, continuous improvement and accountability, and provides factual information about result and practices that feed into the programmatic and strategic decision-making processes. Evaluation is an assessment, as systematic and impartial as possible, of a programme, a project or a theme. Independent evaluations provide evidence-based information that is credible, reliable and useful, enabling the timely incorporation of findings, recommendations and lessons learned into the decision-making processes at organization-wide, programme and project level. The Office for Independent Evaluation is guided by the UNIDO Evaluation Policy, which is aligned to the norms and standards for evaluation in the UN system.

PROJECT CONTEXT

The National Evaluation Consultant will evaluate the projects according to the Terms of Reference under the leadership of the Team Leader (International Evaluation Consultant). S/he will perform the following tasks:

MAIN DUTIES	Concrete/measurable outputs to be achieved	Expected duration	Location
Review and analyze project documentation and relevant country background information (national policies and strategies, UN strategies and general economic data); in cooperation with the Team Leader: determine key data to collect in the field and prepare key instruments in both English and local language (questionnaires, logic models) to collect these data through interviews and/or surveys during and prior to the field missions; Coordinate and lead interviews/ surveys in local language and assist the Team Leader with translation where necessary; Analyze and assess the adequacy of legislative and regulatory framework in Viet Nam, specifically in the context of the project's objectives and targets;	List of detailed evaluation questions to be clarified; questionnaires/interview guide; logic models; list of key data to collect, draft list of stakeholders to interview during the field missions Drafting and presentation of brief assessment of the adequacy of the country's legislative and regulatory framework in the context of the project.	8 days	Home-based

MAIN DUTIES	Concrete/measurable outputs to be achieved	Expected duration	Location
provide analysis and advice to the Team Leader on existing and appropriate policies for Viet Nam for input to the midterm evaluation.			
Review all project outputs/ publications/feedback available in Vietnamese only; Briefing with the evaluation team leader, UNIDO project managers and other key stakeholders. Coordinate the evaluation mission agenda, ensuring and setting up the required meetings with project partners and government counterparts, and organize and lead site visits, in close cooperation with the Project Management Unit. Assist and provide detailed analysis and inputs to the Team Leader in the Preparation of the Inception Report.	Interview notes, detailed evaluation schedule and list of stakeholders to interview during the field missions. Division of evaluation tasks with the Team Leader. Inception Report.	7 days	Home-based (telephone interviews)
Coordinate and conduct the field mission with the Team Leader in cooperation with the Project Management Unit, where required; Consult with the Team Leader on the structure and content of the evaluation report and the distribution of writing tasks.	Presentations of the evaluation's initial findings, draft conclusions and recommendations to stakeholders in the country at the end of the mission. Agreement with the Team Leader on the structure and content of the evaluation report and the distribution of writing tasks.	7 days (including travel days)	Viet Nam
Prepare inputs and analysis to the evaluation report according to TOR and as agreed with the Team Leader.	Draft evaluation report prepared.	6 days	Home-based
Revise the draft project evaluation reports based on comments from UNIDO Office for Independent Evaluation and stakeholders and edit the language and form of the final version according to UNIDO standards.	Final evaluation report prepared.	2 days	Home-based
TOTAL		30 days	

REQUIRED COMPETENCIES

Core values:
1. Integrity
2. Professionalism
3. Respect for diversity

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

Managerial competencies (as applicable):
1. Strategy and direction
2. Managing people and performance
3. Judgement and decision making
4. Conflict resolution

MINIMUM ORGANIZATIONAL REQUIREMENTS

Education:
Advanced university degree in environmental science, engineering or other relevant discipline like developmental studies with a specialization in industrial energy efficiency and/or climate change.

Technical and functional experience*:*
- A minimum of five years practical experience in the field of environment and energy, including evaluation experience at the international level involving technical cooperation in developing countries.
- Exposure to the needs, conditions and problems in developing countries.
- Familiarity with the institutional context of the project in the Ministry of Industry and Trade is desirable.

Languages: Fluency in written and spoken English is required.

Absence of Conflict of Interest:

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

ANNEX B: THE EVALUATION TIMELINE

SCHEDULE FOR TERMINAL EVALUATION MISSION FROM 18 – 22 MAY 2015

"PROMOTING INDUSTRIAL ENERGY EFFICIENCY THROUGH SYSTEM OPTIMIZATION AND ENERGY MANAGEMENT STANDARDS IN VIETNAM"

Date	Activities
May 2015	Review and analyze project documentation and relevant country background information
18 May 2015	Meeting with UNIDO Country Office
	Presentation of evaluation process to MOIT Project Steering Committee Meeting (Including MOIT, UNIDO, PMU)
	Meeting with PMU (Mrs. Pham Nga - National Project Coordinator And Mrs. Le Van - Project Assistant)
19 May 2015	Meeting with STAMEQ
	Meeting with Certification Body – Quacert (02 national experts were participating in the Expert Training Program on EnMS)
	Meeting with ECC - Hanoi (05 national experts participating in the Expert Training on EnMS, SSO and CASO)
20 May 2015	Site visit – Colusa Miliket Food-Processing Company
	Meeting with ECC – HCMC (03 national experts on EnMS (02 persons) and SSO (01 person) and with EnerTeam (sent on EnMS (02 persons), SSO (02 persons) and CASO (02 persons)
21 May 2015	Site visit to the Duong Malt Company
22 May 2015	Presentation of preliminary findings and debriefing to Representatives of MOIT, UNIDO and PMU

ANNEX C: LIST OF DOCUMENTS REVIEWED RELATED TO THE PROJECT

ID	Name of Reports, Brochures and Articles	Prepared by	Issue date
1.	**Project Management**		
1.1.	ProDoc of IIE project	UNIDO	01/2011
1.2	Project Inception Workshop Minutes	PMU	11/2011
1.3	Regulation of Project Steering Committee Establishment	PMU & MOIT	9/2011
1.4	Project Implementation Reports for Year 2012, 2013 & 2014	PMU	October very year
2.	**Component 1.** National Program to Build Capacity on Energy Management and System Optimization		
2.1	Training materials and tools on EnMS, SSO&CASO and the training program frameworks	International experts	11/ 2011
2.2	Action plan for promotion campaign on ISO 50001 energy management standard	Mr. Luong Van Phan	2/2012
2.3	1 leaflet on ISO 50001 energy management system introduction	VTK – Media Company	12/2011
2.4	4 reports on conducted awareness workshops on EnMS and SO	PMU	During 2012-2014
2.5	2 Video Clips in English and Vietnamese on project introduction and 3 successful stories on EnMS implementation	VTK – Media Company	1/2015
2.6	9 training reports on conducted training courses on EnMS for national experts and industrial enterprises	PMU	During 2012 -2013
2.7	6 training reports on conducted training courses on SSO for national experts, industrial enterprises and equipment vendors	PMU	During 2012 - 2014
2.8	7 training reports on conducted training courses on CASO for national experts, industrial enterprises and equipment vendors	PMU	During 2013 - 2014
3.	**Component 2. Implementation of Energy Management and System Optimization Demonstration Projects**		
3.1	10 set reports on EnMS practices	Trained National Experts	During 5/2012-5/2013
3.2	18 SSO assessment reports and 18 SSO projects implementation reports	Trained National Experts	During 8/2012-8/2013
3.3	11 CASO assessment reports and 10 CASO projects implementation reports	Trained National Experts	During 1/2013 – 5/2014

ID	Name of Reports, Brochures and Articles	Prepared by	Issue date
3.4	5 case studies on EnMS, 10 case studies on SO	Trained National Experts	During 2014
3.5	Assessment report on impacts/results of the project training programs	Energy Conservation Center of HCMC	January 2015
4.	**Component 3. Financial Capacity Development to Support Energy Efficiency Projects in Industry**		
4.1	Training materials on financial analysis of EE investment project	Mrs. Nguyen Thi Mai Anh	11/2013
4.2	1 report on conducted training course on financial analysis of EE investment project	Mrs. Nguyen Thi Mai Anh	4/2014
4.4	Report on harmonized EE project evaluation criteria	Mr. Hoang Viet	11/2014