

Independent Terminal Evaluation

Industrial Energy Efficiency in Egypt

UNIDO Project No.: 100349

GEF ID: 3742



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

UNIDO INDEPENDENT EVALUATION DIVISION
Office of Evaluation and Internal Oversight

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The evaluation team is composed of Mr. John Newman, international evaluation consultant and team leader, and Dr. Dalia Sakr and Ms. Heba Rabie, national evaluation consultants.

We hope that some of the proposed recommendations will contribute to the continuous improvement of future Projects.

List of acronyms and abbreviations

Abbreviation	Meaning
AFD	Agence Française de Développement
CASO	Compressed Air System Optimization
CO ₂	Carbon dioxide
EBRD	European Bank for Reconstruction and Development
ECO	Environmental Compliance Office
EEAA	Egyptian Environmental Affairs Agency, Ministry of Environment
EE	Energy efficiency
EGP	Egyptian pound
EIB	European Investment Bank
EEP	Energy Efficiency Plan
ENCPC	Egyptian National Cleaner Production Centre, MoTI
EnMS	Energy Management System
EnPI	Energy Performance Indicators
EPAP	Egyptian Pollution Abatement Project
EOS	Egyptian Organisation for Standardisation and Quality, MoTI
EPAP	Egyptian Pollution Abatement Project
ESG	Environmental, Social and Governance
EU	European Union
FEI	Federation of Egyptian Industries
GDP	Gross Domestic Product
GEF	Global Environment Facility
GEFF	Green Economy Financing Facility, previously Egypt Sustainable Energy Financing Facility (SEFF)
GHG	Greenhouse gas
IDA	Industrial Development Agency, MoTI
IEE	Industrial Energy Efficiency
IMC	Industrial Modernisation Centre, MoTI
ISO	International Organization for Standardization
kW	Kilowatt
kWh	Kilowatt-hour
M&E	Monitoring and evaluation
M&V	Measurement and verification

MoTI	Ministry of Trade and Industry, previously Ministry of Industry and Foreign Trade (MIFT)
MSO	Motor System Optimization
MTR	Mid-term Review
MW	Megawatt
MWh	Megawatt hours
NBE	National Bank of Egypt
NGO	Non-governmental organization
NPC	National Project Coordinator
ODS	Ozone Depleting Substances
PMU	Project Management Unit
PSC	Project Steering Committee
RE	Renewable energy
RECP	Resource Efficient and Cleaner Production
RECREEE	Regional Center for Renewable Energy and Energy Efficiency
SEFF	Egypt Sustainable Energy Financing Facility, now Green Economy Financing Facility (GEFF)
SMART	Specific, Measurable, Achievable, Realistic and Time-bound
SME	Small and Medium Enterprise
SO	System optimization
TA	Technical Assistance
tCO ₂	Tons of carbon dioxide (equivalent)
TE	Terminal evaluation
TWh	Terawatt hours
UNIDO	United Nations Industrial Development Organization
USD	United States dollar

Glossary of evaluation-related terms

Term ¹	Definition
Activity	Actions taken, or work performed through which inputs, such as funds, technical assistance and other types of resources are mobilized to produce specific outputs.
Assumptions	Hypotheses about factor or risks which could affect the progress or success of a development intervention.
Baseline	The situation, prior to an intervention, against which progress can be assessed.
Beneficiaries	The individuals, groups, or organizations, whether targeted or not, that benefit, directly or indirectly, from the development intervention.
Conclusions	Conclusions point out the factor of success and failure of the evaluated intervention, with special attention paid to the intended and unintended results and impacts, and more generally to any other strength or weakness. A conclusion draws on data collection and analyses undertaken, through a transparent chain of arguments.
Data collection tools	Methodologies used to identify information sources and collect information during an evaluation.
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, taking into account their relative importance.
Efficiency	A measure of how economically resources/inputs (funds, expertise, time, etc.) are converted to results.
Evaluation	The systematic and objective assessment of an ongoing or completed Project, programme or policy, its design, implementation and results. The aim is to determine the relevance and fulfilment of objectives, development efficiency, effectiveness, impact and sustainability.
External evaluation	The evaluation of a development intervention conducted by entities and/or individuals outside the donor and implementing organizations.
Finding	A finding uses evidence from one or more evaluations to allow for a factual statement.
Goal	The higher-order objective to which a development intervention is intended to contribute.

¹ For more related terms and definitions see also:

- OECD-DAC Glossary of Key Terms in Evaluation and Results Based Management (2010); <http://www.oecd.org/development/peer-reviews/2754804.pdf>.
- UNDG Results-based management handbook; <https://undg.org/document/undg-results-based-management-handbook/>
- UNIDO e-learning course on: Results-based Management and the Logical Framework Approach; <http://intranet.unido.org/training/rbm/#home>

Impacts	Positive and negative, primary and secondary long-term effects produced by a development intervention, directly or indirectly, intended or unintended.
Independent evaluation	An evaluation carried out by entities and persons free of the control of those responsible for the design and implementation of the development intervention.
Indicator	Quantitative or qualitative factor or variable that provides a simple and reliable means to measure achievement, to reflect the changes connected to an intervention, or to help assess the performance of a development actor.
Inputs	The financial, human, and material resources used for the development intervention.
Lessons learned	Generalizations based on evaluation experiences with Projects, programs, or policies that abstract from the specific circumstances to broader situations. Frequently, lessons highlight strengths or weaknesses in preparation, design, and implementation that affect performance, outcome, and impact
Logical framework (Log frame)	Management tool used to improve the design of interventions, most often at the Project level. 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.
Mid-term Review	Evaluation performed towards the middle of the period of implementation of the intervention.
Monitoring	A continuing function that uses systematic collection of data on specified indicators to provide management and the main stakeholders of an ongoing development intervention with indications of the extent of progress and achievement of objectives and progress in the use of allocated funds.
Outcome	The likely or achieved short-term and medium-term effects of an intervention's outputs.
Outputs	The products, capital goods and services which result from a development intervention; may also include changes resulting from the intervention which are relevant to the achievement of outcomes.
Project or program objective	The intended physical, financial, institutional, social, environmental, or other development results to which a Project or program is expected to contribute.
Quality assurance	Quality assurance encompasses any activity that is concerned with assessing and improving the merit or the worth of a development intervention or its compliance with given standards.
Recommendations	Proposals aimed at enhancing the effectiveness, quality, or efficiency of a development intervention; at redesigning the objectives; and/or at their allocation of resources. Recommendations should be linked to conclusions.

Relevance	The extent to which the objectives of a development intervention are consistent with beneficiaries' requirements, country needs, global priorities, and partners' and donors' policies.
Reliability	Consistency or dependability of data and evaluation judgments, with reference to the quality of the instruments, procedures and analyses used to collect and interpret evaluation data.
Results	The output, outcome or impact (intended or unintended, positive and/or negative) of a development intervention.
Results chain	The causal sequence for a development intervention that stipulates the necessary sequence to achieve desired objectives-beginning with inputs, moving through activities and outputs, and culminating in outcomes, impacts, and feedback.
Results framework	The program logic that explains how the development objective is to be achieved, including causal relationships and underlying assumptions.
Review	An assessment of the performance of an intervention, periodically or on an ad hoc basis.
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	Specifies a particular value that an indicator should reach by a specific date in the future.
Target groups	The specific individuals or organizations for whose benefit an intervention is undertaken.

Project factsheet

Project title	Industrial Energy Efficiency in Egypt
UNIDO Project ID	100349
GEF Project ID	3742
Project donor	GEF
Project CEO Endorsement/ Project approval date:PAD:	January 2011
Project implementation: Planned start date Actual start date	March 2011 1 January 2013
Project implementation: Planned end date Revised end date	29 February 2016 (planned duration: ## 60 months) 30 November 2018 (actual duration: ## 71 months)
Implementing agency: National Executing Partner: National Project Director: Co-operating partners:	UNIDO Egyptian Environmental Affairs Agency (EEAA) Egyptian Environmental Affairs Agency (EEAA) Ministry of Trade and Industry (MoTI) <ul style="list-style-type: none"> • Industrial Development Authority (IDA) • Industrial Modernization Center (IMC) • Egyptian Organization for Standards (EOS) Federation of Egyptian Industries / Environmental Compliance Office (FEI/ECO)
Donor funding budgeted: expenditures	USD 4,011,959 (GEF-4 replenishment cycle) USD 4,004,953
Co-financing expected: actual, government actual, private: actual, SEFF loans:	USD 24,121,000 (at CEO endorsement) USD ~300,000 (in-kind) USD 5,160,854 (in kind, case study development at five companies) USD 13,300,000 (loans, to four demonstration/pilot companies)
Total Project cost expected: actual:	USD 28,071,000 (at CEO endorsement) USD ~22,700,000
GEF Project preparation grant	
Mid-term review date	August 2014

Source: IEE Egypt (2011) and IEE Egypt (2018).

Executive Summary

This report presents the findings of the Independent Terminal Evaluation of the “**Industrial Energy Efficiency in Egypt**” project (herein referred to as “**the Project**”) implemented by the United Nations Industrial Development Organization (UNIDO) with a financing grant provided by the Global Environment Facility (GEF). The Project was a full-sized GEF project having the objective of facilitating energy efficiency (EE) improvements in the industrial sector through supporting the development of a national energy management standard and energy efficiency services for Egyptian industry as well the creation of demonstration effects.

The Project had five components – the first four focused on capacity building, the fifth involving direct implementation of IEE projects in partner facilities for demonstration purposes.

1. National Program to define energy benchmarks and energy efficiency policy
2. Awareness raising on industrial energy efficiency and management in industry
3. Technical capacity building on energy efficiency services
4. Access to finance for energy efficiency improvement projects
5. Implementation of Energy Management Systems and System Optimization

This terminal evaluation was conducted as a standard process, to assess the Project’s performance (in terms of relevance, effectiveness, efficiency, sustainability and progress to impact), to develop a series of findings, lessons and recommendations for enhancing UNIDO’s design of new projects and its implementation of ongoing projects. In addition, it serves as a case study for the “Independent Impact Evaluation of UNIDO’s Industrial Energy Efficiency-Related Programmes”.

The evaluation took place from June 2018 to January 2019, with a field mission during 30 July to 9 August 2018. Preliminary findings were discussed with staff at UNIDO HQ in Vienna in November 2018, leading to a final report in January 2019. The evaluation covered the whole duration of the project from its implementation start on 20 March 2012 to its completion on 30 November 2018.

The evaluation team is composed of Mr. John Newman, international evaluation consultant and team leader, and Dr. Dalia Sakr and Ms. Heba Rabie, national evaluation consultants.

KEY FINDINGS

A) Impact (or progress toward impact)

Direct Impacts. The Project’s achievements for GHG emission reductions (358 ktCO₂/year), energy saved (1,246 GWh/year) and IEE investment mobilised (USD 18.46 million) met or nearly met the respective targets.

Capacity Building. The Project increased the government’s capacity for IEE policymaking, through benchmarking studies and training and policy consultation on strategy and action plans. It increased industrial top management’s interest in having in-house EnMS and SO expertise. It then developed that expertise in industrial energy managers and EE service providers. It also developed EE project financing expertise in bankers. However, while capacity building achieved many benefits at personnel, company

and country levels, no measurements or estimates of its indirect GHG emission reduction and energy savings impacts were made.

B) Project design: The project design is rated with respect to overall design and the logframe.

1. **Overall design.** The Project's design was very similar to those of UNIDO IEE projects in other countries, with added work (at government request) on developing a policy framework for IEE and on training government staff on IEE. Overall, the Project was well designed, but required some adaptive changes during the inception phase to align with the government's priorities, and again after the Mid-term Review to reflect the re-defined scope of the financing component. A Working Group, consisting of representatives from partner agencies was formed in the inception phase "to ensure that all project partners were engaged to the project and provided necessary inputs in order to help the project move forward". (IEE Egypt, 2018). The Working Group was "very useful to ensure the country ownership and involvement of all relevant stakeholders in identifying the real needs and defining the interventions to be made". (IEE Egypt, 2018).
2. **Logframe.** The Project logframe has a clear logic and is consistent with a realistic theory of change. All output level indicators were Specific, Measurable, Achievable, Relevant and Time-bound (SMART). There were too few outcome indicators – only some of which were fully SMART. The logframe could have benefited from additional SMART outcome indicators.

C) Project performance

1. **Relevance.** The Project was well aligned, through close partner engagement, to government strategies and regulations promoting IEE. The Project is fully relevant to UNIDO and policies and relevant to the GEF focal area of climate change.
2. **Effectiveness.** The Project achieved or exceeded all the output-level targets for its capacity building components. The Project met or nearly met its SMART outcome-level targets and direct impact-level targets for the Implementation of EnMS and SO component, in that it yielded:
 - Greenhouse gas (GHG) emission reductions: 358 kt CO₂/year
(target: 292 kt CO₂/year)
 - Energy savings: 1,247 GWh/year
(target: 1,277 GWh/year)
 - Mobilised IEE investment: USD 18.46 million
(target: USD 18.9 million)
 - Companies having working ISO-certified or -compliant EnMSs: 29 companies
(target: 30 companies)
3. **Efficiency.** The Project carried its work within budget. The Project start was delayed almost 2 years because of the political instability associated with the Egyptian Revolution. The implementation period was extended, ultimately ending 2 years and 9 months after the planned end date. The project duration was 11 months greater than planned.
4. **Sustainability.** The resilience of the Project's outcomes and the pathways to their broader adoption socio-political risks (partners fulfilling their roles in the Post Project Strategy), and institutional framework and governance risks (national champion and promulgation of

more effective IEE policy in near future) is moderately unlikely. Resilience to financial and environmental risks is likely.

D) Cross-cutting performance criteria

1. **Gender mainstreaming.** UNIDO's gender policy was issued after the Project began and was not included in the logframe retrospectively. However, there was clearly an emphasis on including women in all stages of the project.
2. **Monitoring and Evaluation.** The Project's M&E system adequately tracked all the SMART indicators in the logframe. All output-level indicators/targets were SMART; 3 of the 8 outcome-level indicators/targets were SMART; 2 of the 3 impact-level indicators/ targets were SMART.
3. **Results-based Management.** The Project was well managed, with good oversight by the Project Steering Committee (PSC).

E) Performance of partners

1. **UNIDO.** UNIDO provided excellent supervision and support to the Project, but the PMU's efficiency could have benefited from additional document templates and structured communication with PMU colleagues in other countries.
2. **National counterparts.** National cooperating partners were well engaged in Project supervision via the PSC, but could have been more supportive in helping the Project carry out its activities.
3. **Donor.** GEF disbursed funds as planned.

F) Overall assessment: Overall, the Project was relevant, effective, efficient, and well monitored and managed. It addressed an urgent need of the Egyptian government and the country's industrial companies. Energy bills rose sharply during the Project implementation period, leading both government and industry to be more concerned with issues pertaining to energy efficiency (EE) and energy management. So while the Project's relevance was high during the design phase of the project, it became even more relevant as the implementation progressed. This has caused a wider impact than expected, where 70 companies received EnMS and SO technical support in comparison to the planned target of 50 companies due to increased market demand during the energy crisis and subsidies gradual removal. The Project was given exceptional opportunities, which it pursued fully, to play an instrumental role in developing IEE policy in Egypt. The Project contributed valuable improvements – in the form of greater inter-ministry/inter-agency communications and consensus, strategy foundations, and benchmarking tools – to further policy work. However, government agencies have not yet taken these improvements forward and operationalised them, so further development of effective IEE policies has stalled. The Project was also relevant to UNIDO and GEF. The sustainability of the Project's benefits is assessed as moderately unlikely.

RECOMMENDATIONS

The following recommendations derived from this Terminal Evaluation:

- **To Government of Egypt: *Project sustainability/broader adoption.*** The Project's national government counterparts should undertake their agreed upon responsibilities outlined in the Project's Post Project Strategy (IEE Egypt, 2015).
 - The **Egyptian Environmental Affairs Agency (EEAA)** should lead the coordination efforts, and lobby with the **Ministry of Trade and Industry (MoTI)**, for policies resulting from the policy strategy developed by the project.
 - The **Industrial Development Authority (IDA)** should house the benchmarking database. This will include conducting periodic updates of data for the 35,000 factories in its current database.
 - The **Egyptian National Cleaner Production Centre (ENCPC)** should coordinate and collaborate with IDA on the benchmarking activities, specifically with verification and auditing functions.
 - The **Egyptian Organization for Standards (EOS)** should continue to conduct awareness raising, assessments and testing of ISO conformity.
 - The **Industrial Modernization Center (IMC)** should continue its work on awareness raising, training, auditing activities in the SME sector. It should also develop, host and expand a Portal for IEE, containing the Project's information, training manuals, Toolkit, names and contacts of certified consultants, and their organisations.
 - The **Federation of Egyptian Industries (FEI)** should focus on intensive awareness raising and technical training for the private sector, and play a focal role in advertising and making industries aware of the sources of funding for IEE.
- **To Government of Egypt: *Broader adoption.*** Egypt should establish an adequately-resourced national EE champion to lead the country's effort to improve IEE, including the coordination of the Post Project elements in the previous recommendation.
- **To Government of Egypt: *Project sustainability.*** Egypt should develop a national certification scheme for energy consultants, managers and auditors.
- **To UNIDO: *Theory of Change, logframe and M&E.*** UNIDO projects should:
 - Develop an explicit Theory of Change – including stakeholders; outputs; intended immediate, intermediate and higher-level outcomes; broader adoption pathways; and intended impacts – underlying the interventions.
 - Develop their logframes in a manner consistent with the Theory of Change.
 - Pay more attention to SMART outcome indicators (and the supporting M&E systems) in the logframe to better assess sustainability factors, broader adoption pathways and potential impacts, and to inform adaptive management.
- **To UNIDO: *Broader adoption.*** Demonstration/pilot facilities should be selected, not only for their interest, commitment and potential GHG and energy impacts, but also for their ability and willingness to share their experiences publicly and through networks and to influence other companies in their company group, sector or supply chain.
- **To UNIDO: *Broader adoption.*** National experts should be recruited and trained as “on-the-ground” IEE champions and conduits for broad adoption of IEE practices and technologies in the post-project period. Their training should develop their technical skills, but also equip them

to run sustainable advisory businesses, to teach others EnMS and SO skills, and to influence top industrial managers on IEE issues.

- **To UNIDO: *Project sustainability.*** UNIDO projects should start developing crucial academic ties early in the project cycle. Universities and technical schools are important potential post-project training providers, but curriculum development in some of these institutions (e.g. public universities) can take many years and require support from high level officials.
- **To UNIDO: *Gender mainstreaming.*** UNIDO should increase its efforts to deploy female international training experts into partner countries and augment its support to female trainees.
- **To UNIDO: *PMU support.*** UNIDO HQ should further support operational efficiency and innovation of PMUs by providing additional document templates and structured communication with their PMU colleagues in neighbouring countries.

LESSONS LEARNED

- Demonstration/pilot facilities have greater impact if they have the ability and willingness to share their experiences publicly and through networks and to influence other companies in their company group, sector or supply chain.
- The real and perceived needs, and corporate predisposition, for external finance for IEE projects vary among enterprises in Egypt. Many, if not most, early projects emanating from EnMSs and SO assessments are no-cost, low-cost EE projects and can be funded from internal company budgets, i.e. without external financing.

GOOD PRACTICES

- The roles and responsibilities of the National Cooperating Partners were documented early in project in the Operational Manual.
- The Project's Post Project Strategy, completed just after the Mid-Term Review, was endorsed by all the project partners. The Strategy lays out the partners' individual agreed-upon roles and responsibilities in keeping the Projects' materials, initiatives and momentum going.
- The Project's national information campaign (Kafa'a) structure and strategy were based on a rapid assessment, carried out to guarantee maximum campaign impact and ensure that the expected outputs were realistic and valid. The rapid assessment aimed at understanding the overall situation of the industrial energy efficiency challenges and opportunities to ensure that the campaign approach would address real issues.
- The Project's Sustainability Fund was created to provide short-term support for the commercial IEE advisory services market for in the post-project period. The fund allocates money to support the work of the trained energy experts until such time the market dynamics are active, and the market is able on its own to support the services of those experts in the industrial energy management activities. The Fund will be an interest-bearing deposit account for three (3) years which will be used as a financial instrument that will, by utilizing accrued interest, subsidize the hiring of individual experts or companies to deliver technical services for industrial energy efficiency in Egypt.

Project ratings

#	Evaluation criteria	Rating in the Terminal Evaluation	Rating in the Midterm Review
A	Impact (or progress toward impact)	Satisfactory	
B	Project design		
1	Overall design	Satisfactory	Moderately Satisfactory
2	Logframe	Moderately Satisfactory	
C	Project performance		
1	Relevance	Highly Satisfactory	Highly Satisfactory
2	Effectiveness	Satisfactory	Satisfactory
3	Efficiency	Satisfactory	Moderately Satisfactory
4	Sustainability	Moderately Unlikely	Moderately Likely
D	Cross-cutting performance criteria		
1	Gender mainstreaming	Moderately Satisfactory	
2	M&E: - M&E design - M&E implementation	Design: Moderately Satisfactory Implementation: Satisfactory	Design: Moderately Satisfactory Implementation: Highly Satisfactory
3	Results-based Management (RBM)	Highly Satisfactory	Highly Satisfactory
E	Performance of partners		
1	UNIDO	Highly Satisfactory	Highly Satisfactory
2	National counterparts	Moderately Satisfactory	
3	Donor	Satisfactory	
F	Overall assessment	Satisfactory	Satisfactory

1. Introduction

Arepo Consult was commissioned by UNIDO to conduct the Independent Impact Evaluation of UNIDO's Industrial Energy Efficiency-Related Programmes. To serve as case studies for this impact evaluation at programme level, Arepo Consult carried out Terminal Evaluations of four projects: IEE-Egypt, IEE-Indonesia, IEE-Iran and IEE-Thailand. This report forms the Independent Terminal Evaluation of the "Industrial Energy Efficiency in Egypt" project, and was carried out by Mr. John Newman, international evaluation consultant and team leader, as a subcontractor to Arepo Consult, and Dr. Dalia Sakr and Ms. Heba Rabie, national evaluation consultants.

1.1 Evaluation objectives and scope

The objective of this Independent Terminal Evaluation is to assess the relevance, effectiveness, efficiency, sustainability and progress to impact of UNIDO's "Industrial Energy Efficiency in Egypt" project (SAP ID 100349 / GEF ID 3742), referred to from here onwards as "**the Project**". The evaluation assesses the Project based on the following criteria:

- A) Impact/progress toward impact,
- B) Project design,
- C) Project performance with the sub-criteria relevance, effectiveness, efficiency and sustainability of benefits,
- D) Cross-cutting performance criteria, and
- E) Performance of partners.

The second purpose of the evaluation is to draw on findings and lessons learned, provide recommendations for future Projects, and to help UNIDO improve upon the identification, preparation and implementation of the industrial energy efficiency-related programmes.

The key evaluation questions are the following:

- a) What are the key drivers and barriers to achieve the long-term objectives? To what extent has the Project helped put in place the conditions likely to address the drivers, overcome barriers and contribute to the long-term objectives?
- b) How well has the Project performed? Has the Project done the right things? Has the Project done things right, with good value for money?
- c) What have been the Project's key results (outputs, outcome and impact, if possible)? To what extent have the expected results been achieved or are likely to be achieved against the Project design? To what extent the achieved results will sustain after the completion of the Project?
- d) What lessons can be drawn from the successful and unsuccessful practices in designing, implementing and managing the Project?

The third purpose of the evaluation is to inform the "Independent Impact Evaluation of UNIDO's Industrial Energy Efficiency-Related Programmes" as a case study.

The terms of reference of the terminal evaluation are detailed in Annex I.

1.2 Overview of the project context

Egypt is a Lower Middle Income Country, with a fast-growing population of about 90 million as of 2015. The total GDP was estimated at USD 336 billion, where the services sector is the highest contribution to GDP with almost 56%, followed by industry 34%, and agriculture 11% in 2014/2015 as summarized in Table 1. The agriculture sector is a significant contributor to the total labour force at 27.5% and industry in second place at about 22% (CAPMAS, 2016).

Table 1: GDP Contribution by selected economic sectors in 2014/2015

Sector	GDP Value (Million EGP)	Contribution to Total GDP (%)	Contribution to Total Labour Force (% , 2014)
Agriculture	274,959	11.18%	27.5%
Mining (Oil, Gas & Other)	313,738	12.75%	0.2%
Manufacturing industries	407,868	16.58%	11.1%
Construction	118,035	4.8%	11.3%
Tourism	45,144	1.83%	NA
Other services	1,299,281	54.69%	
Total	2,459,025	100%	

Source: CAPMAS (2016).

Energy in Egypt

Egypt is endowed with an abundance of natural resources to supply the country's energy needs. Natural gas and petroleum products accounting 98% of the total primary energy consumption in 2014/2015. Contribution from other sources include: 1.5% hydro power, 0.4% coal and 0.1% wind and solar power (IEA, 2018). The final energy consumption by sector is outlined in Table 2. The highest electricity consumer is the residential sector representing 44%, followed by the industry sector at 26%. The industry sector, specifically the energy-intensive cement and fertilizers industries, is among the top consumers for natural gas.

Table 2: Final energy consumption by sector and fuel type, year 2014/2015

Sector	Electricity (GWh)	Natural gas (million m ³)	Fuel oil (ktons)	Gas oil (ktons)	Gasoline (ktons)	LPG (ktons)	Kerosene (ktons)	Jet fuel (ktons)	Other (ktons)
Industry	38,242	10,725	2,719	3,207	0	19	2	0	0
Transport	515	474	339	3,812	6,320	0	0	610	0
Residential	64,546	1,978	101	0	0	4,123	3	0	0
Agriculture	6,555	0	0	795	0	0	0	0	0
Electricity	28,230*	29,332	8,627	484	0	0	0	0	0
Other	36,787	4,543	0	5,283	0	0	0	0	1,608
Total	174,875	47,052	11,786	13,581	6,320	4,142	5	610	1,608

* This figure is the difference between the total electricity generated and the electricity sold. It includes self-consumption by the electricity sector and losses.

Source: CAPMAS (2018).

The Egyptian government has been implementing energy-efficiency programs for the last four decades, mainly through donor-financed programs, however it had minor impact on the national level (Sakr, 2016).

The political turmoil since 2011 with two revolutions, 25 January 2011 and 30 June 2013, caused significant disruption to the country's activities and severe economic deterioration. Only in FY 2014/2015, did the Egyptian economy begin to recover, as the GDP real growth rate doubled to 4.2%² compared to 2.1% in 2010/2011 when the social unrest stabilized with a new President sworn into office in June 2014. However, the 3.5-year period of political instability caused permanent change to the energy picture in the country. The energy situation in Egypt could be divided into three phases: i) pre-2011, ii) between 2011 - 2014, and iii) post-2014.

Energy Picture Pre-2011

The Government of Egypt had been increasing the energy supply through new oil and gas discoveries to meet the growing demand of the population. During this period, Egypt was a self-sufficient energy consumer, meeting fully its energy needs through local production. Energy efficiency, particularly on the demand side, received less attention. Energy intensity remained unchanged for the fifteen years prior to 2009 (World Bank, 2009).

The relatively low tariff on electricity and petroleum products discouraged the implementation of energy efficiency projects. During this period (and until 2013) the Egyptian government spent EGP 120 billion, or 7% of GDP, on fuel subsidies – three times the spending on education and seven times as large as health expenditures (IISD, 2014 and IMF, 2014). Not

² Egypt's GDP growth rate expanded to 5.4% in the second quarter of 2018. Source: Central Bank of Egypt from <https://tradingeconomics.com/egypt/gdp-growth>

surprisingly, the industrial sector had little awareness on energy efficiency technologies and practices and limited technical capacities to implement energy efficiency improvement.

There was poor energy planning between 2005 and 2010, and energy production did keep pace with the well performing Egyptian economy. For example, the Government misrepresented unproven reserves as actual expected production, obfuscating a situation of impending energy shortages. The upcoming energy shortages scenario was expected by the Government, but not as soon as it actually occurred (Ahram, 2015).

Energy Picture between 2011 - 2014

During the aftermath of the 2011 revolution, there has been a drop in the production rates of natural gas and petroleum products and halt of new explorations due to the limited ability of the Government to meet its financial obligations to foreign companies. A gap between energy production and consumption opened immediately, resulting in shortages of electricity and a severe crisis starting 2012. As production levels fell, natural gas production was able to meet only 27% of the country's total energy needs in 2014, compared with 49% in previous, unconstrained situations (Ahram, 2015). This shortage of fuel led to frequent electricity outages and peak load shedding throughout the country. To limit the electricity blackouts, the Government in 2012 started to reroute natural gas from energy-intensive industries, specifically the cement sector, to power plants to generate electricity for the residential sector. Many factories had to operate at lower capacity, because they did not receive enough gas.

Natural gas shortages and electricity blackouts continued throughout the years of 2013 and 2014, and reached a critical stage during the summer of 2014, when the power generation deficit peaked at 5,300 megawatts, corresponding to around one eighth of Egypt's installed energy capacity (IFC, 2016). Consequently, the production of the industrial sector decreased, and exports of products also decreased. The cement industry was greatly affected by the natural gas shortages. Companies were producing only 50% or less of their previous years' clinker production.

Energy Picture Post-2014

In 2014, the Government of Egypt took substantive steps to reform the energy sector and eliminate the country's budget deficit. As a first step, the Ministry of Electricity announced a five-year program (2014/2015 - 2018/2019) to eliminate energy subsidies entirely and to encourage energy savings. In parallel, the Ministry of Petroleum announced an increase in the prices of the petroleum products. The price of natural gas increased, for example, by as much as 33% for the cement industry.

As a second step, energy supplies are to be diversified. Egypt's Strategy for Integrated Sustainable Energy to 2035, specifies the following fuel mix target for electricity generation in 2034/2035 (approved scenario 4B): 34% coal, 19.9% oil and natural gas, 8.8% nuclear, 14.6% wind, 11.8% solar photovoltaic (PV), 7.6% concentrated solar power (CSP), and 3.2% hydropower. While the government began allowing the use of coal for power generation and for certain industries in 2014, licenses were conditional on the implementation of GHG reduction action plans and meeting regulatory thresholds for air pollution.

A third step is a transition to clean and renewable energy sources, including energy efficiency. All sectors are expected to reduce energy consumption by 18% by 2034/2035 compared to the baseline scenario 2009/2010. The '20/20' initiative, originally established in 2008, sets a target of 20% of all electricity to be generated from renewables by 2022, and 37% renewable

energy share by 2035. This is coupled with encouraging private sector investments through net metering, feed-in-tariffs, and other schemes.

A fourth step is reflected in Electricity Law no. 87 in July 2015, followed by its Executive Regulation no. 230 of year 2016. The law requires that energy consumers whose contractual capacity exceeds 500 kW appoint energy efficiency officials, having the task to improve the power usage efficiency in the facilities. If the contractual capacity exceeds 10 MW, an energy management system should be in place including an Energy Register which needs to be updated periodically (Executive Regulations, Article 64). This Energy Register should be monitored and supervised by an entity that the Cabinet would designate. Two levels of supervision should be in place: i) internal, through technical inspection unit within the establishment, and ii) external, through the Egyptian Organization for Standardization (EOS).

Finally, the decision of the Central Bank of Egypt to devalue the Egyptian pound (EGP) in November 2016 was an attempt to stabilize the economy which has been hampered by a shortage of U.S. dollars (USD). The exchange rate increased overnight from 8.8 EGP per USD to more than 19 EGP per USD and has remained near that level. This devaluation led to price inflation of 50% or more.

Energy Efficiency in Egyptian Industry

The structure of Egypt's economy is moving toward further industrialization, which consequently increases the energy consumption and the GHG emissions of the industrial sector. But many existing industrial facilities are old and use outdated, inefficient technology. Most Egyptian industries could save 10-40% of their energy consumption by relying on commercially available advanced technologies and improving operational practices.

The economics to implement energy efficiency measures are expected to improve as Egypt implements the energy reforms described above. The demand for energy efficiency by the industrial sector is expected to grow. However, several stakeholders expressed doubts about whether the market and policy are ready for transformational change towards energy efficiency. Markets are hampered by industry's persisting expectations of receiving free technical assistance (TA) from donor programmes. Policy is constrained by a general resistance to mandates and penalties, meaning that incentives will be needed, at least initially.

1.3 Overview of the project

The Project's design was similar to those of UNIDO Industrial Energy Efficiency (IEE) projects in other countries, with the core work being: 1) raising general IEE awareness, 2) technical training on Energy Management Systems (EnMS) and Systems Optimization (SO) for users and experts, 3) improving financing capacity for IEE investments and 4) implementing EnMS and SO in select industrial facilities to demonstrate the concepts and to provide practical training for the experts. The Project also did work on developing policy and strategies, benchmarking and fostering the market for IEE consultation. The Project's work on developing policy advice for IEE strategy and action plans, and its overall focus on large energy intensive industries (instead of small and medium enterprises), were added in the inception phase to address government priorities.

The objective of the Project is to facilitate energy efficiency (EE) improvements in the industrial sector through supporting the development of a national energy management standard and energy efficiency services for Egyptian industry as well the creation of demonstration effects.

The Project had five components – the first four focused on capacity building, the fifth involving direct implementation of IEE projects in partner facilities for demonstration purposes. The Project Logframe (revised after the Mid-term evaluation) is shown in **Error! Reference source not found.** Each component has an individual outcome target and encompasses several activities summarized by expected outputs.

Table 3: Project Components, Outputs and Outcome Targets

Component 1: National Program to define energy benchmarks and energy efficiency policy	
Outputs: 1.1 EnMS concepts promoted by relevant governmental stakeholders 1.2 M&V mechanism developed and adopted by relevant institutions 1.3 Energy database developed and available for evidence based policy dialogue 1.4 UNIDO guide on ISO 50001 implementation available as reference 1.5 Post-project action plan developed and implemented 1.6 Effective IEE strategy and action plan developed [added in revised logframe]	Outcome Target 1: Supportive policy and policy instruments for delivering energy efficiency in industry
Component 2: Awareness raising on industrial energy efficiency and management in industry	
Output Indicators: 2.1 Established network between industrial decision-makers 2.2a National information campaign developed and widely disseminated 2.2b Improved information services on IEE available at partner institutions 2.3 Monitoring and evaluation carried out and knowledge captured	Outcome Target 2: Widespread awareness on energy efficiency and energy management in industry
Component 3: Technical capacity building on energy efficiency services	
Output Indicators: 3.1 Number of persons trained on energy management and energy auditing 3.2 Number of persons trained on systems optimization	Outcome Target 3: A cadre of available energy management and system optimization experts is certified by UNIDO [changed in revised logframe]
Component 4: Access to finance for energy efficiency improvement projects	
Output Indicators: 4.1 Enhanced awareness on sources of IEE financing 4.2 TA support available to industry and existing financial and loan and credit schemes 4.3 Support in the development of dedicated credit lines and financial schemes within national banks and international organizations [changed in revised logframe]	Outcome Target 4: Increased awareness of available energy efficiency financial assistance [changed in revised logframe]

Component 5: Implementation of Energy Management Systems and System Optimization	
<p>Output Indicators:</p> <p>5.1 Number and quality of energy management plans implemented</p> <p>5.2a Number of detailed assessments conducted</p> <p>5.2b Number of demonstration projects implemented</p>	<p>Outcome Target 5:</p> <p>State-of-the-art energy management practices and energy efficiency measures are implemented and demonstrated</p>

Source: IEE Egypt (2011), IEE Egypt (2015), IEE Egypt (2018).

The activities were directed at ten industrial sectors: 1) iron and steel, 2) petrochemicals; 3) cement; 4) engineering, 5) chemicals, 6) ceramics, 7) fertilizers, 8) glass, 9) building materials and 10) food. Participants for expert training were factory personnel (managers and engineers), independent consultants, academia and government officials. Besides EnMS training, the project offered system optimization training for four technologies: compressed air systems (CASO) and motor system (MSO).

Project partners

The national co-operating partners of the project are:

- Egyptian Environmental Affairs Agency (EEAA) – National Executing Partner
- Ministry of Trade and Industry (MoTI)
- Egyptian Organization for Standardization and Quality (EOS), MoTI
- Industrial Development Authority (IDA), MoTI
- Industrial Modernisation Centre (IMC), MoTI
- Federation of Egyptian Industries (FEI), Environmental Compliance Office (ECO)

Their involvement in the Project (IEE Project, 2013) and their agreed post-Project responsibilities (IEE Egypt, 2015) are:

Egyptian Environmental Affairs Agency (EEAA) – National Executing Partner

Mandate: Defining Environmental policies, setting priorities and implementing initiatives within a context of sustainable development. This includes formulating environmental policies, development and monitoring of environmental projects, and implementation of pilot projects.

Project involvement:

- Raise awareness on sources of finance for energy efficiency (such as existing government sponsored incentive programs)
- Ensure the co-financing required for the project implementation is mobilized
- Guide the overall implementation of the project and liaise with other governmental and non-governmental entities to achieve the project objectives
- Conduct national information campaign on the benefits of EE and EnMS
- Conduct monitoring and evaluation of project results
- Arrange energy management and systems optimization training
- Develop post-project action plan

Post-Project responsibilities:

- With its main function of development and implementation of sustainable environmental policy function, EEAA should lead the coordination efforts, and lobby with MIFT, for policies resulting from the policy strategy developed by the project. This would include revisions to these policies in a timely manner. EEAA should also monitor and document demonstration projects as a part of its role to raise awareness on EE.

Ministry of Trade and Industry (MoTI), previously Ministry of Industry and Foreign Trade (MIFT)

Mission of MoTI's Egyptian National Cleaner Production Centre (ENCPC): To enhance the productivity and environmental performance of Egyptian companies and thus to create business opportunities for Egyptian Industries to contribute to their long-term competitiveness on the national and global markets.

Project involvement:

- Lead support for IEE Policy development

Post-Project responsibilities:

- ENCPC, established by MIFT in 2005, for technical assistance and technology transfer specifically for cleaner energy in industry, will coordinate and collaborate with IDA on the benchmarking activities, specifically with verification and auditing functions.

Egyptian Organization for Standardization and Quality (EOS), MoTI

Mandate: EOS is the competent and official body responsible for standardization activities, quality and industrial metrology aiming at increasing the competitiveness of the Egyptian products in the international and regional markets along with consumer's and environment protection. Services include providing training to technicians, testing and conformity, issuing certification.

Project involvement:

- Develop Energy Management Standards (EnMS) compatible with ISO 50001
- Develop Measurement and Verification structure for the developed EnMS
- Develop training tools for equipment vendors
- Provide training and build capacity of equipment vendors

Post-Project responsibilities:

With its monitoring and certification function, EOS would continue to conduct awareness raising, assessments and testing of ISO conformity. It has also been suggested by EOS to move awareness sessions to industrial zones for a more targeted audience.

Industrial Development Authority (IDA), MoTI

Mandate: Responsible for the implementation of industrial policy laid down by the Ministry of Industry and its affiliates, and to stimulate and encourage investment in the industrial sector. Also responsible for the development of policies and mechanisms necessary to link the development of industrial sectors and scientific research activities and associated technology requirements, in addition to the development and implementation of land development policies for industrial use, and making them available to investors and to facilitate the access to industrial licenses.

Project involvement:

- Provide general industrial data and statistics
- Provide industrial production and consumption data
- Develop the industrial energy database
- Develop the energy consumption benchmarks

Post-Project responsibilities:

- With its function to link industry with scientific research, IDA should house the benchmarking database. This will include conducting periodic updates of data for the 35,000 factories in its current database. These may increase or decrease over time.

Industrial Modernisation Centre (IMC), MoTI

Mandate: To support all industrial enterprises, individually or sectorally, according to their development needs, through comprehensive and customized business development competitiveness programmes. IMC's mandate focuses on companies employing more than 10 workers or industrial clusters.

Project involvement:

- Participate in the conduction of preliminary energy audits for factories
- Participate in the dissemination of the UNIDO guide on implementation of ISO 50001 and EnMS

Post-Project responsibilities:

- With its technical development function for SMEs, IMC would continue its work on awareness raising, training, auditing activities in the SME sector. IMC can coordinate with relevant syndicates in collaboration with FEI. IMC with FEI can play a significant role in strengthening public/private partnerships.
- The Portal for IEE, should be developed and linked to all partners. It should contain all information, training manuals, Toolkit, names and contacts of certified consultants, and their organisations. IMC have indicated that they are willing to not only host the portal after project completion, but also expand on the data and the information that is available and linked to it. They have stated that they have the financial and technical capacity to maintain the portal. The only concern here is that may become linked to only SME use or access due to IMC's mandate. A suggestion would be that they indeed host the portal if they are willing, with visible links to it from the other partner institutions websites ((IEE Egypt, 2015).

Federation of Egyptian Industries (FEI), Environmental Compliance Office (ECO)

Mandate: To drive industrial economic growth, both domestic and export, using an independent, proactive, self-sustainable and integrated approach to global competitiveness, while balancing the needs of our stakeholders.

Project involvement:

- Provide energy management and system optimization training
- Participate in the dissemination of energy management training tool
- Provide energy survey/Audit for the selected company
- Participate in awareness increasing on source of finance for energy efficiency
- Participate in the assessment of industrial system
- Participate in the design and implementation of system optimization audits

Post-Project responsibilities:

- With its function as the main champion for private sector business, FEI should focus on intensive awareness raising and technical training for the private sector. As importantly, FEI should play a focal role in advertising and making industries aware of the sources of funding for IEE.

Positioning of the Project

Energy efficiency initiatives targeting the industrial sector in Egypt were present as early as the 1990s through donor funded projects. During 1995 – 2005, approximately 100 million USD in technical and financial assistance were provided as grants and more than 50 million USD as credits have been invested in cleaner production-related activities (UNIDO, 2005). Examples of these projects are: Support for Environmental Assessment and Management (SEAM 1994 - 2005), Egyptian Pollution Abatement Project (EPAP I: 1997 - 2005), Egyptian Environment Initiatives Fund (EEIF: 1997 - 2004), Egyptian Environmental Policy Programme (EPPP/EP3: 1994 - 1999).

Other entities/programs providing on-going support and services:

- Egypt National Cleaner Production Center under the Ministry of Trade and Industry (ENCPC: since 2004).
- Environmental Compliance Office and Sustainable Development under the Federation of the Egyptian Industries (ECO: since 2001).
- Energy Efficiency and Environment Protection Programme developed by the Industrial Modernization Center (IMC: since 2007).
- Egyptian Pollution Abatement Programme under Egyptian Environmental Affairs Agency (EPAP III: since 2015).

However, even though that all these donor-funded projects were successful in creating awareness, building capacities, and providing some demonstration projects; there was low CP uptake from industry side (Sakr, 2016).

1.4 Evaluation methodology

The terminal evaluation was conducted in accordance with UNIDO Evaluation Policy.³ The evaluation was carried out using a participatory approach that sought to inform and consult key stakeholders of the Project.

The evaluation team adopted a theory of change approach to assess the causal links between Project activities, outcomes and outputs. The team assessed the extent to which the Project contributed to the conditions necessary to achieve the broad adoption of energy efficiency management systems based on ISO 50001 and more widespread incorporation of a systems optimization to maximize energy efficiency.

A combination of methods was used to deliver evidence-based qualitative and quantitative information, from diverse sources including: desk studies and literature review, individual and group interviews and feedback review.

In preparing for the interviews and country visit, the evaluation team carried out a desk review of programme and Project documents available at that point, including the Mid-term Review of the Project.

The evaluation took place from June 2018 to January 2019, with a field mission during 30 July to 9 August 2018. Preliminary findings were discussed with staff at UNIDO HQ in Vienna in November 2018, leading to a final report in January 2019. The evaluation covered the whole duration of the project from its implementation start on 20 March 2012 to its completion in November 2018.

The desk review involved a review of the original Project document (IEE Egypt, 2011), monitoring reports (such as progress and financial reports, Mid-term Review (IEE Egypt, 2014), and final report and presentation (IEE Egypt, 2018) and notes from the meetings of the Project Steering Committee. The full document list can be found in Annex III.

During the country mission, the evaluation team interviewed 42 stakeholders in 23 organizations, listed in Annex IV.

1.5 Limitations of the evaluation

The team was only able to visit a limited number of demonstration partner companies for interviews – two in total – when compared to the large number of demonstration companies involved. To collect the feed-back from a more representative sample of Project participants would require a more quantitative form of data collection via surveying Project participants.

A further limitation was that the evaluation team could not present the preliminary findings and conclusions to national stakeholders to receive feedback at the end of the field mission.

1.6 Reconstructed theory of change

The project document does not describe the Theory of Change underlying the Project's activities. The evaluation team reconstructed a Theory of Change – consistent with the project logframe – that outlines the logic chain connecting the Project's **planned outputs** to its

³ UNIDO (2015)

principal **stakeholders** and **implicit intended outcomes** and then to its **intended impacts** (see Figure 1). This reconstructed Theory of Change seeks to align the Project's elements in a way that reflects the impact logic from direct outputs to the ultimate goal:

to reduce greenhouse gas emissions by establishing a policy environment that enables and supports sustainable adoption of energy efficient technologies and management as an integral part of industries' business practices; an environment in which a cohort of well-trained and equipped experts in system optimization and energy management system implementation assists industries in developing and implementing energy efficiency improvement projects. IEE Egypt (2013).

This Theory of Change is intended to:

- Uncover the unstated outcome-level elements implicit in the Project design,
- Frame the “progress to impact” analysis, and
- Inform the Independent Impact Evaluation.

The logic chain portrayed in Figure 1 flows from left to right. The **intended outputs** (on the left) lead to immediate, intermediate and higher-level **implicit intended outcomes** – first among stakeholders and later in factories – which in turn lead to **intended impacts** (on the right) – GHG emission reductions, energy cost savings and EE technology investment. The various levels of **implicit intended outcomes** (in the centre) are coherent with the Project's structure, but not fully specified in the project logframe.

The first type of output (top) – **direct technical assistance (TA)** in implementing energy management plans, conducting detailed assessments and implementing demonstration projects in partner enterprises – leads most directly to measurable impacts. At the impact level, as soon as factories have implemented energy efficiency measures, they achieve GHG emission reductions, energy savings, resource consumption reductions, air quality improvements, and industrial competitiveness gains.

However, these interventions are costly and donor projects can typically only do them in limited instances. They typically serve as demonstration/pilot projects, filling several important roles in the market change pathway to broad IEE adoption and impact:

- Raising industrial motivation and confidence in IEE technologies/practices through recognised industrial leadership, demonstrated/documented technical and financial results, and published case studies,
- Acting as practical training venues for national experts,
- Implementing additional IEE projects within their plants,
- Influencing other facilities within their industrial groups, industrial parks and supply chain network to implement IEE projects.

Other outputs of the Project are related to **capacity building**, and include general awareness raising, information dissemination, technical/financial training, institutional arrangements for further training, and policy/financing development. Their intended outcomes are sustained policy/market framework conditions that motivate/enable industry to implement IEE practices and technologies as an integral part of their business practices, without direct UNIDO assistance. The intended impacts of capacity building activities are energy savings, GHG emissions reductions, etc. – the same as for direct assistance in adoption/implementation

activities. As it takes more time for capacity building interventions to result in implemented IEE projects, there can be significant delays (often after project closure) before actual impacts are apparent.

The evaluation team identified eight different target (sub)groups, which the Project is addressing, depending on the group, different outcomes follow. To better guide the reader through the TOC (Figure 1) colour and pictograms are used for the different target groups:

- Primary stakeholder: Energy-using enterprises (with varying degrees of intervention depth by the project) (■), with the subgroups:
 - i. Wider economy (🏭)
 - ii. Light-intervention companies (🏢)
 - iii. Deep-intervention companies (🏭)
- Technical services and equipment supply chain (✳), with the subgroups:
 - iv. Independent consultants and service professionals (👤),
 - v. Academics and trainers (🎓)
- Finance community (◆):
 - vi. Banks and financial institutions (🏦)
- Policy and standards communities (●):
 - vii. Technical standards community (🏢)
 - viii. Government regulators/agencies (🏛️)

Project Outputs

Analysing the outputs, these were clustered in the TOC-diagram as follows (on the left of (Figure 1):

- *Direct technical assistance:*
 - Implementing Energy Management System (EnMS) pilot/training projects (Output 5.1)
 - Implementing Systems Optimization (SO) implementation pilot/training projects (Outputs 5.2ab)
 - Locating/arranging external financing for IEE investments (Output 4.2)
- *Capacity Building:*
 - *Awareness, information, networks & recognition:*
 - General IEE awareness raising (Outputs 1.1, 2.2a)
 - IEE information dissemination (Outputs 1.1, 1.4, 2.2b)
 - Peer-to-peer networks (Output 2.1)
 - Recognition (Output 2.2a)
 - *Technical training*
 - EnMS training (materials) – users (Output 3.1)
 - SO training (materials) – users (Output 3.2)
 - EnMS training (materials) – experts (Output 3.1)
 - SO training (materials) – experts (Output 3.2)

- *Financing development:*
 - Financial awareness and capacity (Output 4.1)
 - Financial training (materials) (Output 4.2)
- *Standards development:*
 - Focused on performance of plants (Outputs 1.2, 1.4)
- *Policy development:*
 - Policies/strategies (with incentives/penalties to motivate IEE actions) (Output 1.6)
 - Benchmarking development/training (Outputs 1.1, 1.3)
 - Institutional arrangements for continued work on Capacity Building activities (i.e. information & awareness, training, and financing, standards, and policy development) (Output 1.5)




Project Outcomes

■ Stakeholder group I: Energy-using enterprises

While the project works with many different target groups, only the primary group (■), the energy-using enterprises can achieve actual energy efficiency savings. On intermediate outcome level, the project improves the inhouse capacity of the companies it engaged with. On a higher outcome level, the underlying project logic of the IEE project is that all targeted audiences multiply their knowledge to other factories and actors. Energy-using enterprises themselves are an important multiplier too. They might spread their experience and knowledge to other factory sites, within their company group or even with outside companies.

Outcomes of the interventions targeting the energy-using enterprises

Intermediate outcomes:



- ① Partner enterprises (deep-intervention companies ) apply EE approaches and implement EE measures – with direct impacts, and share the results within their company group, companies in the sector, companies in the supply chain and the wider economy. They also boost concept demonstration/confidence and provide practical training venues for experts.
- ② Industry top management (in light-intervention companies ) are aware, informed, motivated and committed to implementing EnMS/SO/IEE activities through approving the: training of staff, hiring of consultants, investing in better equipment, and applying for financing based on improved business and financial proposal if needed.
- ③ Sufficient factory engineers/technicians (in light-intervention companies ) are qualified (at user level) to implement EnMS/SO/IEE activities carrying out: training staff, hiring consultants, investing in better equipment, and applying for financing based on improved business and financial proposal.

Higher-level outcome:



- Outside of the deep- and light-intervention companies in contact with UNIDO, other companies copy the show cases and replicate them in their own facilities. Industrial enterprises implement EnMS / implement SO/ train staff / hire consultants / invest in better equipment / apply for financing based on improved business plans and financial proposals if needed.

All other stakeholders addressed by the UNIDO project either create framework conditions, such as regulatory work, offer credit lines; or they directly offer their services to industrial consumers.

* Stakeholder group II: Technical services and equipment supply chain

Some target groups such as independent consultants () will not carry out energy efficiency measures directly but merely work as knowledge disseminators. Academics, researchers, and lecturers () work as multipliers of information since they train students or factory personnel.


Outcomes of the interventions targeting the technical services and equipment supply chain

- ④ Sufficient independent consultants () qualified (at expert level) to offer EE services to factories implementing EnMS/SO/IEE activities, and also to serve as champions/influencers for IEE issues.
- ⑥ Academics and educators () teach EnMS/SO/IEE topics, in stand-alone courses or as part of university or technical school curricula.

◆ Stakeholder group III: Finance community

If banks and financial institutions offer better conditions to energy-using enterprises these can more easily access financing.





Outcomes of the interventions targeting the finance community

- ⑦ The finance community () offers IEE-appropriate credit lines, guidelines and analytical capacity to offer sufficient external financing – easily-accessible at attractive terms – to factories implementing EE activities

● Stakeholder group IV: Policy and standards communities

Within the technical standards community improved accreditation and certifications bodies improve the quality of services supplied to energy-using enterprises.

Outcomes of the interventions targeting the policy and standards communities

- ⑨ The technical standards community () has the capacity to market/maintain EnMS standards.
- ⑩ Government regulators/agencies () have capacity and funding to develop/maintain industrial EE benchmarks for use by government and industry.
- ⑪ Government regulators/agencies () have capacity and political will to implement effective – sufficiently ambitious and motivating – EnMS/SO/IEE policies/strategies.
- ⑫ Institutionalised () maintenance and expansion of replication pathways – education/training, communications channels, peer networks, etc. – for IEE champions/influencers.

Summary of project outcomes

Due to improved inhouse expertise and an improved supportive framework, energy-using enterprises to carry out EE works, implement EnMS / SO, train staff, hire consultants, invest in better equipment apply for financing (intermediate outcomes). The improved knowledge base replicates in the market via replication pathways and reaches more companies that had not been directly involved with the UNIDO project (higher-level outcome).

Project impacts

On the impact level, as soon as energy-using enterprises (🏭🏭🏭) have implemented energy efficiency measures, they achieve GHG emission reductions, resource consumption reductions, improved air quality, create income effects, increased industrial competitiveness and economic growth.

These impacts may not be completely attributable to UNIDO's intervention though. Projects in all enterprises (i.e. deep-intervention companies 🏭, light-intervention companies 🏭 and the wider economy 🏭) will be influenced **external market factors** (e.g. energy prices, government policies and other donor programmes) in addition to UNIDO-generated impacts.

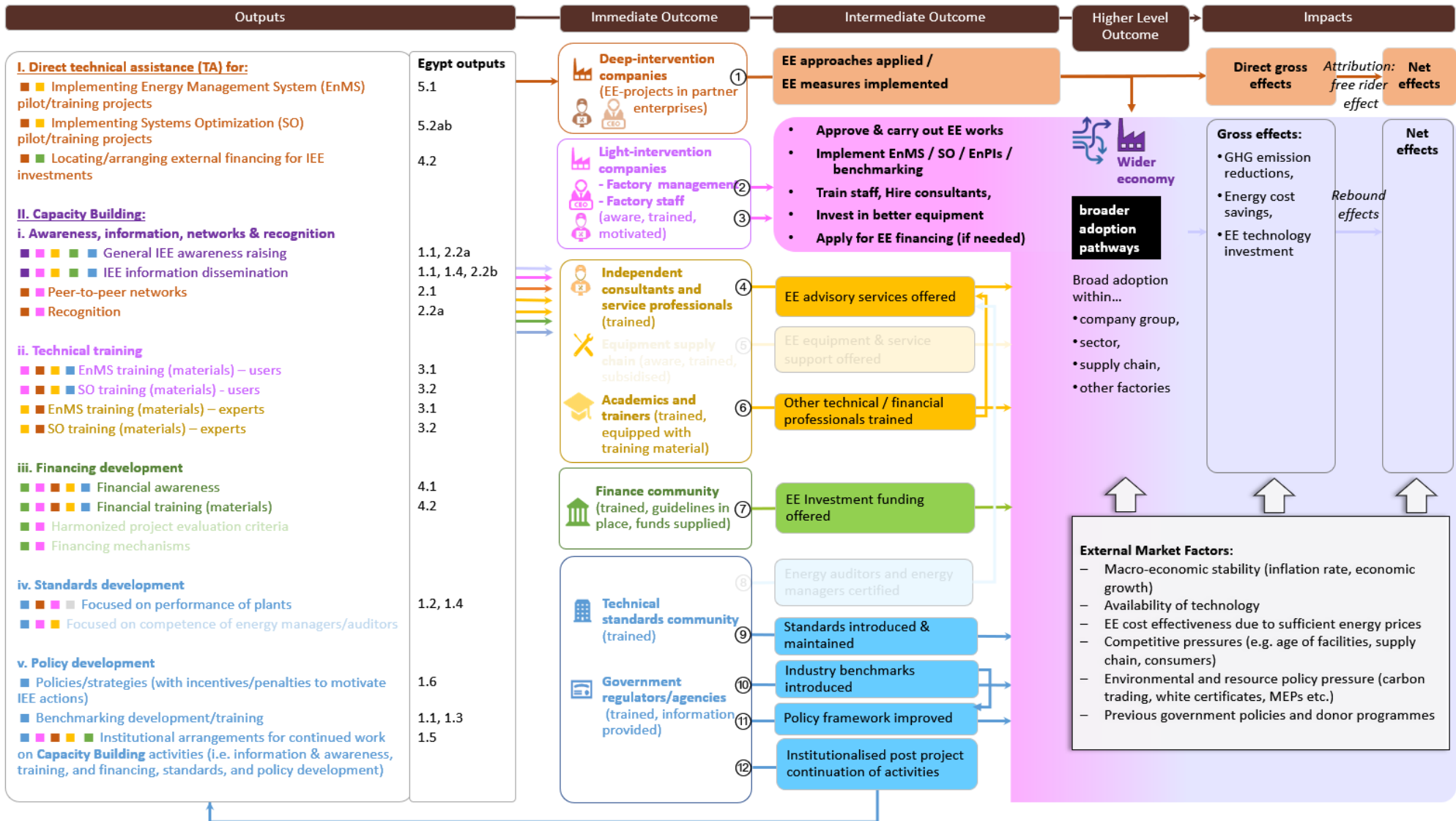
Further, the impacts of projects may be smaller than ex-ante estimates suggest they should be. Different types of **rebound effects**, such as increase in production and income effects (see textbox 1), may reduce that economy-wide effect of EE interventions.

Lastly, the EE-projects implemented in partner enterprises (i.e. deep-intervention companies 🏭) may embody **free rider effects** (i.e. impacts reported from interventions that would have been done regardless of Project assistance).

Textbox 1: Rebound Effects

Improved energy efficiency can have multiple unintended consequences that have the potential to erode much of the anticipated energy savings. Efficiency increases oftentimes reduces product or service prices, which can in turn ramp up consumption, thus partly cancelling out the original savings. This is known as **direct rebound effect**. To give an example if product prices for plastic products decreases, use of plastic packaging material might increase negating the energy savings by increased production. **Indirect** or **second-order effects** are resulting from the fact that lower production costs have an economic growth effect. Consumers can invest the savings in new, possibly even more energy-intensive consumer goods, e.g. a plane ticket, in this case the efficiency gains backfire via the economic growth effect and net emissions increase.

Figure 1: Theory of Change of the IEE project: Output to Impact level



Source: Own diagram.

2. Project's contribution to development results – Effectiveness and Impact

2.1 Project's achieved results and overall effectiveness

Effectiveness refers to the extent to which the development intervention's objectives (outputs and outcomes) were achieved, or are expected to be achieved, taking into account their relative importance (UNIDO 2018). This section discusses the Project's objectives in terms of **outputs** – the degree to which output targets were achieved. The progress on short- to medium-term **outcomes** and longer-term **impact**, including global environmental benefits, replication effects, and other local effects, was discussed in section 2.2.1.

The Project set out to achieve the 18 outputs – having 41 output targets – summarised in the logframe (Table 5). This version of the logframe was developed in 2015, incorporating revisions recommended in the Mid-term Review (IEE Egypt, 2014). It also includes achievements mentioned in the Project final report (IEE Egypt, 2018) for several outputs and targets that were not included in the 2015 logframe.

The Project achieved or exceeded all its planned output targets.

2.1.1 Benchmarks and IEE policy (Component 1)

The project did considerable work in the policy area: first, in the planning and organisation of the Project during the inception phase, and later, in the Project's formal tasks on benchmarking, policy recommendations and sector strategies.

In the inception phase, a **Working Group** of representatives from partner agencies was formed “to ensure that all project partners were engaged to the project and provided necessary inputs in order to help the project move forward”. (IEE Egypt, 2018) The Project roles of the various partners were documented in the Operational Manual. Besides making sure that the Project was relevant to the government's priorities, the working group served as an important conduit of IEE information and coordination among the relevant agencies in the government. It set the stage for the work on **policy advice on IEE strategy and action plans** described below.

Later, in the implementation phase, the Project (using Austrian Energy Agency trainers) taught local consultants about **IEE benchmarking data collection and analytical techniques**, using the Egyptian cement, fertilizer and iron and steel sectors as case studies. The results were presented to a workshop of about 100 industrial companies' representatives, governmental staff and decision makers, and to several companies asking for individualised briefings. The case study data (coded to protect company confidentiality) was turned over to the IDA. One of the recently-trained local consultants then trained staff in the IDA and ENCPC in the benchmarking techniques, using the Egyptian ceramics industry as a case study⁴. The ceramics sector

⁴ Benchmarking information and the institutional competence and systems to produce it are important foundations for defining future governmental actions and policies. During the 4th meeting of the Project Steering committee in March 2015, the Ministry of Industry officially nominated IDA and ENCPC to be responsible for the continuity of the activity beyond the project completion. IDA and ENCPC should take ownership for the development of future benchmark reports as well as updating existing ones periodically.

benchmarking report was presented at the September 2017 Vienna expert group meeting on national experiences and best practices on IEE benchmarking. The Egyptian delegation, which included the heads of IDA and the ENCPC, learned about integrated benchmarking systems used elsewhere. Integrated systems build on existing governmental data collection and analysis systems to support IEE policy tools, such as enterprise ratings, best techniques definitions, best practices exchange, best performers awards, sectoral savings potentials, sectoral EE road maps, investment subsidies for best technologies and information support for recommendations on development programs. MoTI then requested the Project to design, in cooperation and consultation with MoTI, the Ministry of Electricity, the Ministry of Petroleum and FEI, an integrated benchmarking system for Egypt. The Project is working on this activity and the report will be finalized by end of September 2018.

The Project also devoted consider time and effort to developing **policy advice on IEE strategy and action plans** for the Project partners. First, the project produced the Base Line Assessment and the International Best Practices reports in 2014. Then, the Project organized a series of workshops, ministerial-level meetings – the first with the Minister of Environment and the second with both the Minister of Environment and the Minister of Industry – and cabinet briefings over about two years (May 2014 to Aug 2016). The effort ultimately developed, with government consensus and ownership in the outcome, an IEE strategy and a set of policy recommendations. The process aimed particularly at ensuring the central role and commitment of MoTI in carrying out the strategy and recommendations. The 13 policy recommendations included a description, an outcome, stakeholders which include the policy owner the policy facilitator etc. activity needed to implement the policy, an indicator, phasing strategy for each policy directive.

In line with the IEE policy recommendations, a Policy Unit was created in MoTI in late 2015. It was envisioned that Policy Unit should own the proposed IEE policy document, detail and update the IEE strategy and policies and report to the Egyptian Energy Planning Authority that will identify the status of energy efficiency on the national level and not just on the ministerial level. The Unit reports directly to the Minister of Trade and Industry.

On 10 November 2016, the MoTI launched its Industrial Development and Foreign Trade Strategy 2020. The strategy complies with the sustainable development strategy: Egypt's vision 2030, which has been endorsed by the President and the Egyptian Parliament. The strategy included recommendations from the IEE policy recommendations.

Afterwards, MoTI moved towards the development of sector strategies, leading the efforts to develop the first five sector strategies namely; automotive, chemicals, construction and building materials, engineering feeding industries and ready-made garments and textiles. Following the guidance of HE Minister of Trade and Industry and in close coordination with the Policy Unit and other donors, the IEE The Project was enlisted to provide technical support in incorporating the IEE policy recommendations into these first five sector strategies. The IEE project coordinated with various stakeholders including the ENCPC, because IEE can be viewed as a part of a broader pillar on resource efficiency. Four policy reports – on integration of energy efficiency into the chemicals, building materials, food and textiles sectors – were developed and handed over to

The IEE Post-Project Action Plan calls for IDA to house the benchmarking database – conducting periodic updates of data for the 35,000 factories in its current database – and ENCPC to coordinate and collaborate with IDA on the benchmarking activities, specifically with verification and auditing functions. (IEE Egypt, 2015 and 2018)

the MoTI. The reports identified general and sector-specific IEE policies which should be developed by the MoTI and implemented by the Government of Egypt.

2.1.2 Awareness raising in industry (Component 2)

The Project created and ran a national information campaign (named Kafa'a) and facilitated the operations of two peer-to-peer information sharing networks – EnMS in the petrochemical sector; MSO in petroleum sector.

The Kafa'a national information campaign aimed to familiarize the industrial sector with the importance of the implementation of EnMS and SO. Its structure and strategy were based on a rapid assessment, carried out to guarantee maximum campaign impact and ensure that the expected outputs are realistic and valid. The rapid assessment aimed at understanding the overall situation of the industrial energy efficiency challenges and opportunities to ensure that the campaign approach would address real issues. It included a SWOT analysis to guide the design of the campaign. The key challenges and opportunities found were:

- Energy efficiency solutions can be no/low cost and do not always require large investments, but the decision makers and top management are not necessarily aware of that.
- At a time of an economic crisis, the main goal of industries is to survive, and energy efficiency is not a priority, especially since it (energy) is subsidized.
- There is a market demand for energy efficiency, yet there is a lack of responsibility with little incentives from the government.
- The industrial sector is in need of major awareness on the benefits and impact of energy efficiency, but there are financial, legal, technical and managerial barriers to industrial energy efficiency.

A media coaching session was delivered for representatives from the Project partners. The session aimed at familiarizing communication representatives with how the media operates and how to make the most of their interactions with the media.

The Kafa'a campaign included: branding; flyers; infographics; posters targeting factory workers; branded greeting cards, planners and gadgets (USBs and thermos bottles); success story and case study one-pagers; a policy flyer; four (7-9 minute) documentary videos; a recognition scheme; and press releases. The campaign was supported by an info-unit, which disseminated the awareness material and actively identified and responded to industries interested in enrolling in the campaign. In total, 350 companies were contacted, and 149 companies (109 SMEs; 40 heavy industrial enterprises) registered to participate.

During the Kafa'a campaign, IMC held EnMS half-day awareness sessions in seven industrial cities, reaching 616 participants. The sessions targeted staff within each facility designated by management as responsible for implementing the management system. The session guided the participants through the Plan-Do-Check-Act cycle as it applies to the ISO 50001 energy management system. Instruction was given on how to establish an effective energy policy, set improvement targets and objectives, establish energy performance indicators, identify significant energy uses and opportunities for improvement.

Peer-to-peer (P2P) information sharing networks help the exchange of knowledge and experience gained by the local experts/companies to other local experts/companies within their

sector. The network creation facilitates exchange of information among companies and is a replication channel for of training and capacity building activities.

The SIDPEC petrochemical company successfully implemented an EnMS as a Project demonstration project and rolled out training and implementation activities in other petrochemical companies This created the basis for a peer to peer (P2P) network that was established under the supervision of the Holding Company for Petrochemicals ECHEM. SIDPEC trained 37 representatives of six petrochemicals companies on EnMS and followed up on the implementation of EnMS in those companies under the supervision of UNIDO experts. The main components used for P2P network establishment were regular meetings within companies' premises during EnMS implementation visits by national and international experts, the meetings during webinars to communicate and follow-up with the international experts through Skype conference calls, and the knowledge transfer through the project management portal called Basecamp which was provided by UNIDO to support the effective communication.

The energy savings achieved by the implementation of EnMS through the P2P network were 21.457 GWh/year of electricity and 90,428 GWh/year of natural gas.⁵

SIDPEC received a 2016 Clean Energy Ministerial (CEM) Energy Management Insight Award, which recognizes ISO 50001-certified organizations for providing a case study to share insights on the benefits of energy management systems through a campaign for energy management.

Following the SIDPEC-ECHEM model, the Project provided technical support for 19 companies from the petroleum sector on Motor System Optimization. ECHEM and the Ministry of Petroleum are replicating the P2P model on MSO through the supervision and follow up of the implementation of MSO projects from three local experts who were previously trained and qualified by the Project.

2.1.3 Technical capacity on EnMS and SO (Component 3)

The Project conducted numerous technical training sessions on various topics (EnMS, MSO and CASO), at various levels (0.5-day awareness, 2-day user level, and 10-12-month expert level), and for various target groups (factory staff, private sector consultants and government personnel). Overall, 567 people received user-level or higher training on EnMS, 156 received training on MSO and 82 received training on CASO. The Project trained 81 EnMS experts, 118 MSO experts and 54 CASO experts. The participation profile of the training sessions is shown in Table 4.

⁵ These savings are included in the total direct impact figures presented in section 2.2.1.

Table 4: Participants in training courses

	EnMS User	EnMS Expert	MSO User	MSO Expert	CASO User	CASO Expert
Industry	488	41	117	99	44	39
Private sector consultants	28	22	19	17	33	12
Government	51	18	20	2	5	3
Total	567	81	156	118	82	54

Note: There is double counting of people among the various courses. The MSO User and CASO User figures include participants who later received expert level training in same topic, and some people received training in more than one topic.

Source: IEE Egypt (2018).

At the EnMS user level, during September 2013 - March 2015, training was given to 103 factory staff, 28 private sector consultants and 51 government personnel were trained. After March 2015, trainings were only given on-site at specific companies that showed either a strong commitment or a lack of staff technical capacity. During this latter period, some 395 industrial staff from 23 companies were trained on-site at those companies.

Three cycles of EnMS expert training took place. Each cycle encompassed three modules – EnMS planning, EnMS implementation and EnMS checking (auditing) – each involving classroom work, on-the-job experience with assigned companies, auditing of demonstration plants and coaching by EnMS experts over the course of 10-12 months. The first two cycles taught a mix industry staff, private sector consultants and government personnel. Third cycle taught only private sector consultants, mostly the staff of four of the leading consultancy firms involved with energy and environment projects.

To receive a “UNIDO certificate of qualification for national EnMS experts,” the students had to submit final reports summarising the work carried out at their assigned companies and also had to pass an examination.⁶

The first cycle of training was taught by two international experts; the second cycle was taught by one international expert and one national expert from the previous cycle; the third cycle was taught by two national experts with occasional remote support from international experts. The “shift from international to national consultants was a main focus for the project since its inception to ensure knowledge transfer and thus sustainability of the project’s impact.” (IEE Egypt, 2018)

Later, a refresher course (taught by the same international experts) was given to the national EnMS experts to update them on new developments in the ISO 50000 series, and to give them

⁶ Because of unmet institutional accreditation prerequisites, a formal national personnel certification scheme for energy managers and auditors could not be established at EOS within the timeframe of the Project. In its place, the Project issued its own “UNIDO certificate of qualification for national EnMS experts” that fulfilled the course requirements and pass the examination.

the opportunity to discuss the challenges of their work and to network with their colleagues. In addition, two 2-day training sessions on Energy Performance Indicators (EnPI) taught by an international expert were conducted. The 72 participants were mostly senior electrical and mechanical engineers and consultants (EnMS experts, etc.)

There were three cycles of MSO training and one cycle of CASO training, all involving user and expert levels on instruction. The first two cycles of MSO user training involved 94 participants in three sessions with differing mixes of industry (60%), consulting (20%) and government people (20%). At the Ministry of Petroleum's request, the third cycle of MSO training was offered only to 62 petroleum sector personnel. The CASO training encompassed two sessions with 61 participants: 72% from industry, 20% from consulting firms and 8% from government.

The MSO and CASO user level trainings were two days long; the expert level trainings were five days and included examinations

Discussions on including MSO topics in university courses were held with electrical engineering professors at the University of Cairo. It was agreed that "any new course material developed would need to support existing curricula. ... A series of lectures for universities introducing the concept of a motor as part of a system, rather than an isolated item of equipment was completed and delivered in November 2017 to the university professors." The evaluation team was told that introducing MSO as a standalone university course in a public university would need to be done within a set 10-year curriculum review cycle and would be very difficult curriculum constraints (e.g. adding new material entails dropping an equal amount of existing material).

The evaluation team interviewed several national experts and participants in training activities, both in focus groups and individually. The overall direct feedback was very positive with training participants stressing that they gained a new perspective and benefited from the combination of a theoretical and a practical learning approach. There were some minor complaints about the repetition between the user- and expert-level training.

Some interviewees mentioned that some trainees lack the necessary soft skills for persuading top management of the benefits of IEE activities. The Project training did not specifically cover this topic, but perhaps future projects could. At the very least, PMUs should take this skill into account when recruiting and screening potential national expert candidates.

2.1.4 Financing IEE (Component 4)

The Project's component on "Access to finance for EE improvement projects" began in August 2014. The original logframe called for it to review and map available financing schemes from different financing sources/organizations which can be used to finance IEE projects. It was found that the sources for financing EE activities are very limited, with only three financial sources identified, namely the European Bank for Reconstruction and Development (EBRD), the Egyptian Pollution Abatement Project (EPAP 3) and the Federation of Egyptian Industries' (FEI) Environmental Compliance Office (ECO).

Following the mid-term review recommendations and the IEE post project action plan, the Project re-focused on activities within its scope of influence. Activities related to creating new finance

models and financing indicators, which are outside of the Project's control, were removed⁷. Instead, the Project worked to build the capacity of the local banking sector and national financing institutions and raise their awareness of energy being one of the most challenging topics currently facing Egypt. The Project partnered with the Egyptian Banking Institute (EBI) to transfer international experience in financing energy projects, technical, financial feasibility and analysis of energy projects to the financial sector. Specifically, the Project:

- Carried out a needs assessment of the local banking sector to identify their real needs.
- Held an awareness session for 70 high level managers of 13 local banks to introduce them to the energy challenges facing Egypt, the importance of financing energy projects and international approaches for dealing with energy challenges various countries.
- Held 3-day trainings for 34 middle managers (operational staff) from local banks to explain the financial analysis approaches for energy projects (possible return on investment, payback period etc..). The training objective was to enable the participants to: 1) identify EE/RE potential in investment projects of clients and advise them about potential EE/RE lending products of the bank and 2) be aware of broad EE project opportunities in different industries and be able to convey this basic information to clients during meetings and also to senior management for initiating the development of specialized EE/RE products in target areas. This activity was complemented with a train the trainer session for two EBI representatives to establish sustainability of the initiative.
- Organised a study tour for seven local banking representatives and four government representatives showcasing the experience of Tunisia, which is successful in financing Energy Efficiency and Renewable Energy projects. The Egyptian delegation met Tunisian energy sector government entities and agencies, local banks with experience in financing energy investment projects and private sector companies having implemented such projects.
- Developed with EBI a road map/action plan for the coming five years.

Under its activity "Linking to existing financing instruments", the Project worked closely with the European Bank for Reconstruction and Development's (EBRD) Egypt Sustainable Energy Financing Facility (SEFF) to provide the Project demonstration companies that had identified investment opportunities and were willing to receive loans⁸ with the necessary concessional

⁷ The overall project objective is

To facilitate energy efficiency improvements in the industrial sector through supporting the development of a national energy management standard and energy efficiency services for Egyptian industry as well as the creation of demonstration projects in large and medium sized businesses

And, while this may necessitate the need for industries to access finance, this is not within the scope of the project activities. "Increased access to finance" is dependent on a stable economic situation, collateral, credit lines and availability in finance institutions, willingness of private sector actors to borrow, viable credit histories, all of which are outside the control of the project. What the project can realistically do, is provide a mapping of available finance schemes, a network that would enable stakeholders to access these schemes, if they wish, and a tool that would provide technical assistance for feasibility studies. (Post Project Strategy and updated log frame, 2015)

⁸ Egypt SEFF was a new credit line dedicated to energy efficiency and renewable energy investments in Egypt. The credit line was developed by the EBRD and is currently available to clients in Egypt through the National Bank of Egypt (NBE). In 2017, EBRD, the Agence Française de Développement (AFD), the European Investment Bank (EIB) and the EU launched Green Economy Financing Facility (GEFF) for

funding. Four Project pilot companies (Evergrow, Fresh, ABCO and Al Amreya cement) received commitments of USD 13.3 million of SEFF funding for their EE projects.

The Project's Sustainability Fund – to sustain the market demand for the services related to energy management thus making use of the technical knowledge and skills developed – was developed following the October 2016 Steering Committee meeting and was finally established near Project's closure in 2018. The purpose of the Fund is to maintain the momentum of the work created by the IEE project through the cadre of specialized/certified energy management and SO experts. Project money, in the amount of USD 600,000, has been transferred to the Fund (an interest-bearing deposit account for three years), which will use the money's accrued interest to support the work of the trained energy experts until such time the market dynamics are active, and the market is able on its own to support the services of those experts in the industrial energy management activities. The Project published a tender where companies or government or quasi-government applied to manage and operate the fund for three years. The Project aims to create a dynamic market within this period then transfer the remaining funds to EEAA Environmental Protection Fund to use it on energy efficiency activities. The Project worked with EEAA to formulate a cooperation protocol which was signed by UNIDO-EEAA and Regional Center for Renewable Energy and Energy Efficiency (RCREEE) (the winner of the tender) during the closing event of the project on 24 September 2018. The protocol clarifies the responsibility of each organization in streamlining the procedures for management and operation of the Sustainability Fund. (IEE Egypt, 2018)

2.1.5 Direct Implementation of EnMS and SO (Component 5)

The indicators and targets associated with the Direct Implementation of EnMS and SO component are defined at the outcome and impact levels. The achievements for this component are discussed in section 2.1.

2.1.6 Achievements summary

Table 5 shows the expected outputs, targets and reported achievements for each of the Projects components and activities.

Egypt. This EUR 140 million programme for Egypt will provide loans for energy efficiency and small-scale renewable energy investments by private companies through a group of participating banks, with the aim of also achieving energy security. The Project worked on informing the partner companies about GEFF in all the events.

Table 5: Project's expected outputs, targets and reported achievements

Expected Output	Targets	Indicator status (SMART Output, Outcome, Impact)	Achievement (Reported)	Target Achieved
Project Objective: To facilitate energy efficiency improvements in the industrial sector through supporting the development of a national energy management standard and energy efficiency services for Egyptian industry as well as the creation of demonstration projects in large and medium sized businesses				
Quantitative Outcome 1 Investment in EE technology and processes (energy management, system optimization and implementation of EE measures and demonstration projects) and resulting energy savings	<ul style="list-style-type: none"> Investment: USD 18.9 million Energy savings: 1277 GWh/year 30 companies having working ISO-compliant energy management systems [same as in Component 5.1] 	<ul style="list-style-type: none"> SMART Outcome SMART Impact SMART Outcome 	<ul style="list-style-type: none"> Investment: USD 18.46 million (5.16 self-financed investment; 13.3 million Egypt SEFF loan;) Energy savings: 1,246 GWh/year 29 companies having working ISO-compliant energy management systems 	<ul style="list-style-type: none"> ~✓ ~✓ ~✓
Quantitative Outcome 2 Direct and indirect emission reduction	<ul style="list-style-type: none"> Direct emission reduction: 292 kt CO₂/year (assuming an average 10-year life of energy investment, 2.92 Mt CO₂ cumulatively) Cumulative indirect emission reduction due to project's capacity building and TA activities ranging from 8.75 Mt CO₂ (bottom-up approach) to 44.8 Mt CO₂ (top-down) 	<ul style="list-style-type: none"> SMART Impact SMART Impact 	<ul style="list-style-type: none"> Direct emission reduction: 358 kt CO₂/year (assuming an average 10-year life of energy investment, 3.58 Mt CO₂ cumulatively) Achievement not reported 	<ul style="list-style-type: none"> ✓ [achievement not reported]

Expected Output	Targets	Indicator status (SMART Output, Outcome, Impact)	Achievement (Reported)	Target Achieved
Component 1: National Program to define energy benchmarks and energy efficiency policy				
Outcome 1: Supportive policy and policy instruments for delivering energy efficiency in industry		• SMART Outcome	• Achievement reported only for underlying output targets	
1.1 EnMS concepts promoted by relevant governmental stakeholders	<ul style="list-style-type: none"> TOT to 20 governmental professionals 3 awareness raising workshops conducted by governmental entities and attended by 60 representatives from industrial enterprises 	<ul style="list-style-type: none"> SMART Output SMART Output 	<ul style="list-style-type: none"> TOT held for 22 experts from IMC and EOS 3 Awareness sessions held for various industrial sectors 	<ul style="list-style-type: none"> ✓ ✓
1.2 M&V mechanism developed and adopted by relevant institutions	<ul style="list-style-type: none"> M&V protocol developed and implemented by EOS 	<ul style="list-style-type: none"> SMART Output 	<ul style="list-style-type: none"> M&V protocol developed and handed over to EOS 	<ul style="list-style-type: none"> ✓
1.3 Energy database developed and available for evidence-based policy dialogue	<ul style="list-style-type: none"> 2-3 day training workshops on benchmarking methodology and data analysis supported by project Databases designed and operational Benchmark data are available per sector and size of industry, at IDA and ENCPC, for four industrial sectors, and made available on web info portal 	<ul style="list-style-type: none"> SMART Output SMART Output SMART Output 	<ul style="list-style-type: none"> 4 Benchmarking reports for Cement, Fertilizers, Iron and Steel and Ceramics 4 IEE sector strategies reports for (textile, food, chemicals and building material) sectors 	<ul style="list-style-type: none"> ✓ ✓ ✓
1.4 UNIDO guide on ISO 50001 implementation available as reference	<ul style="list-style-type: none"> Guide translated, distributed and available on web 	<ul style="list-style-type: none"> SMART Output 	<ul style="list-style-type: none"> EnMS guide translated and disseminated 	<ul style="list-style-type: none"> ✓
1.5 Post-project action plan developed and implemented	<ul style="list-style-type: none"> Final project report consolidating results & lessons learnt from project implementation, as well as post-project strategy Post project action plan endorsed by partners 	<ul style="list-style-type: none"> SMART Output SMART Output 	<ul style="list-style-type: none"> Final report delivered Post project action plan developed 	<ul style="list-style-type: none"> ✓ ✓
1.6 Effective IEE strategy and action plan developed [added in revised logframe]	<ul style="list-style-type: none"> Recommendations for policy directives developed and agreed upon by all partners 	<ul style="list-style-type: none"> SMART Output 	<ul style="list-style-type: none"> IEE Policy recommendations report 	<ul style="list-style-type: none"> ✓

Expected Output	Targets	Indicator status (SMART Output, Outcome, Impact)	Achievement (Reported)	Target Achieved
Component 2: Awareness raising on industrial energy efficiency and management in industry				
Outcome 2: Widespread awareness on energy efficiency and energy management in industry		• SMART Outcome	• Achievement reported only for underlying output targets	
2.1 Established network between industrial decision-makers	<ul style="list-style-type: none"> • At least 2 Peer-to-peer networks established (to assist companies in info exchange, energy management plan design and implementation) 	• SMART Output		• ✓
2.2a National information campaign developed and widely disseminated	<ul style="list-style-type: none"> • Info campaign developed on energy management, system optimization and EE in industry in general • 30 companies participating in recognition scheme for participating companies • Decision makers informed through 9-18 events (workshops, seminars, meetings) attended by over 300 industry owners and managers on EE in industry in which project participates 	<ul style="list-style-type: none"> • SMART Output • SMART Output • SMART Output 	<ul style="list-style-type: none"> • Communication plan developed • Brochure, promotional material and newsletters developed • Website developed • More than 100 articles published in national newspapers informing about various project activities. • Peer to peer network for petrochemicals established • National Campaign implemented for 1 year • Participation in events to increase project visibility attended by over 300 industry owners and managers on EE. 	<ul style="list-style-type: none"> • ✓ • ✓ • ✓
2.2b Improved information services on IEE available at partner institutions	<ul style="list-style-type: none"> • Upgraded and inter-linked websites (e.g. of EEAA, MoTI, ECPC, etc.) to provide integrated info on EE • Project newsletter • Published best cases of energy savings • Publications of proven demonstration projects 	<ul style="list-style-type: none"> • SMART Output • SMART Output • SMART Output • SMART Output 		<ul style="list-style-type: none"> • ✓ • ✓ • ✓ • ✓

Expected Output	Targets	Indicator status (SMART Output, Outcome, Impact)	Achievement (Reported)	Target Achieved
2.3 Monitoring and evaluation carried out and knowledge captured	<ul style="list-style-type: none"> Monitoring (quarterly and annually) Mid-term review & final evaluation Factory Assessment reports Benchmarking data collection and reports Collation and publication of case studies, lessons learned from (inter-) national sources Self-reporting mechanisms in place and utilized in partner institutions 	<ul style="list-style-type: none"> SMART Output SMART Output SMART Output SMART Output SMART Output SMART Output 	<ul style="list-style-type: none"> Mid-term and final evaluation missions carried out. Regular progress reports developed Case studies developed 	<ul style="list-style-type: none"> ✓ ✓ ✓ ✓ ✓ ✓
Component 3: Technical capacity building on energy efficiency services				
Outcome 3: A cadre of available energy management and system optimization experts is certified by UNIDO [changed in revised logframe]		• SMART Outcome	• Achievement reported only for underlying output targets	
3.1 Number of persons trained on energy management and energy auditing	<ul style="list-style-type: none"> 55 experts trained in implementing EnMS at expert level 300 industrial professionals trained in EnMS implementation (2 day User Training) 30 government agency personnel trained in EnMS implementation (2 day User Training) 	<ul style="list-style-type: none"> SMART Output SMART Output SMART Output 	<ul style="list-style-type: none"> >800 industrial representatives aware of EnMS Approximately 400 industrial representatives trained on EnMS User level 63 governmental personnel trained on EnMS and MSO 81 local experts trained on implementing EnMS at expert level 	<ul style="list-style-type: none"> ✓ ✓ ✓
3.2 Number of persons trained on systems optimization	<ul style="list-style-type: none"> Training on 2 systems conducted for 40 industry personnel and consultants per system 	• SMART Output	<ul style="list-style-type: none"> 63 governmental personnel trained on EnMS and MSO 156 local experts trained on MSO expert level 61 local experts trained on CASO expert level 	<ul style="list-style-type: none"> ✓

Expected Output	Targets	Indicator status (SMART Output, Outcome, Impact)	Achievement (Reported)	Target Achieved
Component 4: Access to finance for energy efficiency improvement projects				
Outcome 4: Outcome: Increased awareness of available energy efficiency financial assistance [changed in revised logframe]		• SMART Outcome	• Achievement reported only for underlying output targets	
4.1 Enhanced awareness on sources of IEE financing	<ul style="list-style-type: none"> • 1-2 workshops held on available sources of finances for IEE in industry 	• SMART Output	<ul style="list-style-type: none"> • Awareness event on RE/EE financing of projects held for 70 high level management bankers • Study tour for Tunisia was carried out in October 2017 for 4 governmental representatives and 7 local banking representatives. 	• ✓
4.2 TA support available to industry and existing financial and loan and credit schemes	<ul style="list-style-type: none"> • Trained experts are able to extend TA to industry and financial institutions • Two workshops held for financial institutions detailing available TA and available trained experts • Study developed [not mentioned in revised logframe] • New sources of finance available [not mentioned in revised logframe] • Model developed [not mentioned in revised logframe] • 20 projects supported financially by funding from new and existing credit lines [not mentioned in revised logframe] 	<ul style="list-style-type: none"> • SMART Output • SMART Output • SMART Output • SMART Output • SMART Output • SMART Output 	<ul style="list-style-type: none"> • Training held for 34 bankers from the operational level staff. • Training of trainers held for 2 EBI representatives • 3 sources of finance were identified 	<ul style="list-style-type: none"> • ✓ • ✓ • ✓ • ✓ • ✓ • ✓
4.3 Support in the development of dedicated credit lines and financial schemes within national banks and international organizations [not mentioned in revised logframe]			<ul style="list-style-type: none"> • A sustainability fund for IEE was established to sustain the technical capacity built by the project 	<ul style="list-style-type: none"> • No target in log-frame

Expected Output	Targets	Indicator status (SMART Output, Outcome, Impact)	Achievement (Reported)	Target Achieved
Component 5: Implementation of Energy Management Systems and System Optimization				
Outcome 5: State-of-the-art energy management practices and energy efficiency measures are implemented and demonstrated		• SMART Outcome	• Achievement reported for underlying output/outcome/impact targets	
5.1 Number and quality of energy management plans implemented	<ul style="list-style-type: none"> Standardized energy performance monitoring in line with EnMS 50001 Energy management plans and operational improvements made in 50 companies (associated energy and CO2+ savings are given in indicator A and B) ISO 50001-compliant energy management plans fully implemented in 30 companies [same as in Quantitative Outcome 1] 	<ul style="list-style-type: none"> SMART Output SMART Outcome SMART Outcome 	<ul style="list-style-type: none"> 70 Companies received technical support for the EnMS and SO implementation in compliance with ISO 50001 15 companies were ISO certified 14 companies are ISO compliant 	<ul style="list-style-type: none"> ✓ ✓ ~✓
5.2a Number of detailed assessments conducted	<ul style="list-style-type: none"> Detailed assessments in 15 companies 	<ul style="list-style-type: none"> SMART Output 	<ul style="list-style-type: none"> 70 Companies received technical support for the EnMS and SO implementation in compliance with ISO 50001 The project has achieved 1,247 GWh equivalent to 3.58 MtCO2eq in 10 years 	<ul style="list-style-type: none"> ✓
5.2b Number of demonstration projects implemented	<ul style="list-style-type: none"> Demo activities designed and implemented targeting at 10 medium-to-large enterprises The associated energy and CO2+ savings are given in indicator A) and B) Info exchange about demos 	<ul style="list-style-type: none"> SMART Output SMART Output 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> ✓ ✓

Source: IEE Egypt (2011), IEE Egypt (2015), IEE Egypt (2018).

2.1.7 Results on effectiveness

Evaluation Criteria C2) Effectiveness	
Functioning of a development intervention: The extent to which the development intervention’s objectives were achieved, or are expected to be achieved, taking into account their relative importance.	
<ul style="list-style-type: none"> - What are the main results (mainly outputs and outcomes) of the project? What have been the quantifiable results of the project? - To what extent did the project achieve their objectives (outputs and outcomes), against the original/revised target(s)? - What are the reasons for the achievement/non-achievement of the project objectives? - What is the quality of the results? How do the stakeholders perceive them? What is the feedback of the beneficiaries and the stakeholders on the project effectiveness? - To what extent is the identified progress result of the project attributable to the intervention rather than to external factors? - What can be done to make the project more effective? - Were the right target groups reached? 	
Summary of findings	
<p>The Project achieved or exceeded all the output-level targets for its capacity building components. The Project met or nearly met its SMART outcome-level targets and direct impact-level targets for the Implementation of EnMS and SO component, in that it yielded:</p> <ul style="list-style-type: none"> • Greenhouse gas (GHG) emission reductions: 358 kt CO2/year (target: 292 kt CO2/year) • Energy savings: 1,247 GWh/year (target: 1,277 GWh/year) • Mobilised IEE investment: USD 18.46 million (target: USD 18.9 million) • Companies having working ISO-certified or -compliant EnMSs: 29 companies (target: 30 companies) 	
Rating	
C2) Effectiveness	Satisfactory (S)

2.2 Progress towards impact

2.2.1 Achievements on outcome and impact levels

The Project achieved or nearly achieved three of its outcome-level targets and both of its impact-level targets. No estimate of indirect GHG emission reduction impact was reported.

- Outcome: 15 companies having working ISO-certified EnMSs and 14 companies having working ISO-compliant EnMSs (target: 30 companies having working ISO-compliant EnMSs)
- Outcome: 70 Companies received technical support for the EnMS and SO implementation in compliance with ISO 50001

(target: Energy management plans and operational improvements made in 50 companies)

- **Outcome:** USD 18.46 million of mobilised investment in IEE projects [5.16 self-financed investment; 13.3 million Egypt SEFF loan]
(target: USD 18.9 million)
- **Direct Impact:** 358 kt CO₂/year of GHG emission reductions [assuming an average 10-year life of energy investment, 3.85 Mt CO₂ cumulatively]
(target: 292 kt CO₂/year)
- **Direct Impact:** 1,246 GWh/year of energy savings
(target: 1,277 GWh/year)
- **Indirect Impact:** Estimate of achievement not reported
(target: Cumulative indirect emission reduction due to project's capacity building and TA activities ranging from 8.75 Mt CO₂ (bottom-up approach) to 44.8 Mt CO₂ (top-down))

There were five additional outcome targets, each associated with one of the five components (see **Error! Reference source not found.**). The targets themselves did not fulfil all the criteria for good operational indicators targets (i.e. Specific, Measurable, Achievable, Realistic and Time-bound (SMART)) and achievement towards them was not measured or reported directly. However, the output-level achievements for the capacity building components (1,2,3 and 4), and the outcome- and impact-level achievements for the direct implementation component (5), suggest that the Project made progress to impact for these five outcome targets.

- **Outcome, Component 1:** Supportive policy and policy instruments for delivering energy efficiency in industry
- **Outcome, Component 2:** Widespread awareness on energy efficiency and energy management in industry
- **Outcome, Component 3:** A cadre of available energy management and system optimization experts is certified by UNIDO
- **Outcome, Component 4:** Outcome: Increased awareness of available energy efficiency financial assistance
- **Outcome, Component 5:** State-of-the-art energy management practices and energy efficiency measures are implemented and demonstrated

Direct outcomes and impacts

The Project planned to achieve 292 ktCO₂ annual emission reductions, 1,277 GWh annual energy savings and USD 18.9 million of investments. The actual results were 358 ktCO₂ annual emission reductions, 1,247 GWh annual energy savings and USD 18.46 million of investment (USD 5.16 million private sector-mobilized investment; USD 13.3 million Egypt SEFF loan), which nearly met or exceeded the respective targets.

Over 95% of the Project's direct GHG emission reductions and energy savings were the result of the 28 EnMS interventions (see Table 6 and Source: IEE Egypt (2018)).

Table 7) that the project supported directly. The 10 motor systems optimization (MSO) interventions generated the second largest block of GHG emission reductions and energy savings; the four compressed air systems optimization (CASO) interventions accounted for the smallest block of direct GHG and energy impacts. The largest single intervention – EnMS work within Al-Ezz Dekheila Steel Co. (EZDK) – alone accounted for 61% of the Project’s direct GHG emission reductions and 65% of its energy savings. Apart from this large intervention, the largest contributors to GHG emission reductions and energy savings were the petrochemical (7 companies, 14.0% of total GHG reductions, 11.7% of total energy savings), cement (3 companies, 10.2% GHG, 11.5% energy) and other iron and steel (2 companies, 10.6% GHG, 9.4% energy) plants (see Table 8 and Table 9). About 91% of GHG emission reductions came from EZDK and 6 of the other 32 demonstration plants; about 97% of energy savings came from EZDK and 8 other facilities. The size distribution of the demonstration projects’ direct impacts is shown in tables in Annex VII.

The profile of the mobilized investment for IEE projects is shown in **Error! Reference source not found.** The large intervention by EZDK accounted for 94% of the reported mobilized private investment. EZDK invested 95% of its reported EGP 43.3 million investment on a Static VAR Compensator (SVC) power factor compensation system. A major recipient, El Amreyah Cement Co, of the USD 13.3 million Egypt SEFF loan has yet to start implementing their action plan.

Table 6: Number of demonstration projects, direct energy savings and GHG emission reductions

	EnMS	MSO	CASO	Total
Companies implementing project recommendations (number)	28	10	4	33
Implemented GHG reductions (ktCO2/10yr)	3,436	113	34	3,583
Implemented energy savings (GWh/year)	1,220	21	6	1,247

Source: IEE Egypt (2018).

Table 7: EnMS demonstration projects – status, direct energy savings and GHG emission reductions

EnMS status	Number of plants	Number of plants with reported energy savings	Implemented energy savings (GWh/year)	Implement-ed GHG reductions (ktCO2eq/ 10year)
ISO Certified	15	11	1,070	2,829
ISO Compliant	11	8	121	498
Partial EnMS	2	2	6	33
Partial Implementation	1	0	-	-
Implementation Phase	9	6	21	67
Completed Planning	3	1	2	9
Planning Phase	5	0	-	-
On Hold*	7	0	-	-
Grand Total	53	28	1,220	3,436

Note: "On Hold" this reflects poor commitment from the company's side. Support from the project could proceed in the case where the company shows higher commitment to EnMS implementation.

Source: IEE Egypt (2018).

Table 8: Direct GHG emission reductions in demonstration projects, by type and sector (ktCO₂eq/10yr)

	EnMS		MSO		CASO		Total		Plants in Total (number)
Iron and Steel	2,486	69.4%	69	1.9%	23	0.6%	2,578	71.9%	3
<i>EZDK</i>	2,198	61.3%					2,198	61.3%	1
<i>Other I&S</i>	289	8.1%	69	1.9%	23	0.6%	380	10.6%	2
Petrochemicals	464	12.9%	34	0.9%	5	0.1%	503	14.0%	7
Cement	365	10.2%					365	10.2%	3
Engineering	45	1.3%					45	1.3%	7
Chemicals	33	0.9%	<0.5	<0.05%			33	0.9%	3
Ceramics	24	0.7%					24	0.7%	2
Fertilizers	12	0.3%	2	0.1%			14	0.4%	3
Glass			8	0.2%	6	0.2%	14	0.4%	1
Building Materials	3	0.1%					3	0.1%	1
Food	2	0.1%			<0.5	<0.05%	2	0.1%	2
Textiles	2	0.1%					2	0.1%	1
Grand Total	3,436	95.9%	113	3.1%	34	0.9%	3,583	100.0%	33

Source: IEE Egypt (2018).

Table 9: Direct energy savings in demonstration projects, by type and sector (GWh/year)

	EnMS		MSO		CASO		Total		Plants in Total (number)
Iron and Steel	914	73.3%	13	1.0%	4	0.3%	931	74.7%	3
<i>EZDK</i>	814	65.3%					814	65.3%	1
<i>Other I&S</i>	100	8.0%	13	1.0%	4	0.3%	117	9.4%	2
Petrochemicals	138	11.1%	6	0.5%	1	0.1%	145	11.7%	7
Cement	143	11.5%					143	11.5%	3
Engineering	11	0.8%					11	0.8%	7
Chemicals	6	0.5%					6	0.5%	3
Ceramics	4	0.3%					4	0.3%	2
Fertilizers	2	0.2%	<0.5	<0.05%			3	0.2%	3
Glass			1	0.1%	1	0.1%	3	0.2%	1
Building Materials	1	0.0%					1	0.0%	1
Food	<0.5	<0.05%			<0.5	<0.05%	<0.5	<0.05%	2
Textiles	<0.5	<0.05%					<0.5	<0.05%	1
Grand Total	1,220	97.8%	21	1.7%	6	0.5%	1,247	100.0%	33

Source: IEE Egypt (2018).

Impact (or progress to impact)	Rating: Satisfactory (S) (5)
Definition: Positive and negative, primary and secondary long-term effects produced by a development intervention, directly or indirectly, intended or unintended, including redirecting trajectories of transformational process and the extent to which conditions for trajectory change are being put into place.	
Direct Impacts: <ul style="list-style-type: none"> The Project’s achievements for GHG emission reductions (358 ktCO₂/year), energy saved (1,246 GWh/year) and IEE investment mobilised (USD 18.46 million) met or nearly met the respective targets. Capacity Building: <ul style="list-style-type: none"> The Project increased the government’s capacity for IEE policymaking, through benchmarking studies and training and policy consultation on strategy and action plans. It increased industrial top management’s interest in having in-house EnMS and SO expertise. It then developed that expertise in industrial energy managers and EE service providers. It also developed EE project financing expertise in bankers. However, the Project did not measure or estimate the indirect GHG emission reduction and energy savings impacts of these activities. 	

2.2.2 Behavioural change

The Project advanced **economic competitiveness** mainly through the reduction of energy use and costs. The desire to reduce costs was mentioned by interviewees as the primary reason for industry’s interest in implementing EnMS and SO projects. Improvements to environmental, social and governance (ESG) reputation coming from being ISO-certified was also mentioned as a competitiveness factor for some companies.

The Project helped **safeguard the environment** through the reduction of energy use and the associated GHG emission reductions and the reduced environmental degradation (e.g. water use, air pollution, and land, vegetation and habitat disturbance) from the energy supply system. In addition, SO practices seek to improve general resource efficiency – leading to reductions in the use of materials, chemicals and water, as well as energy.

Though **creating shared prosperity through social inclusion** was not a part of the Project design at the outset, there was clearly an emphasis on including women in the implementation of the Project, despite the technology/engineering sectors being predominately male led.

2.2.3 Broader adoption

The Project sought broader adoption and impact of IEE practices – primarily EnMS and SO implementation, benchmarking, and external IEE financing – after Project closure, through the pathways described in Table 10.

Table 10: Pathways to broad adoption and impact

Pathway name	Pathway description
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Mainstreaming	Information, lessons learned, or specific results of UNIDO are incorporated into broader stakeholder mandates and initiatives such as laws, policies, regulations, and programs. This may occur through governments and/or through development organizations and other sectors.
Replication	UNIDO-supported initiatives are reproduced or adopted at a comparable administrative or ecological scale, often in another geographical area or region.
Scaling-up	UNIDO-supported initiatives are implemented at larger geographical scale, often expanded to include new aspects or concerns that may be political, administrative or ecological in nature
Market change	UNIDO-supported initiatives help catalyse market transformation by influencing the supply of and/or demand for goods and services that contribute to global environmental, economic and social benefits. This may encompass technological changes, policy and regulatory reforms, and financial instruments.

Source: UNIDO (2018)

The Project's efforts to support the **replication and scaling up pathways** – through institutionalised post-project continuation of project activities (Reconstructed Theory of Change implicit intended outcome ⑫) – are encompassed in the “Post Project Strategy and Updated Logframe” report. (IEE Egypt, 2015) The document sets out the agreed upon responsibilities of each national co-operating partner in continuing the activities carried out by the Project (cf. Table 11).

Table 11: Post-Project responsibilities on national co-operating partners

National co-operating partner	Post-Project responsibilities
Egyptian Environmental Affairs Agency (EEAA)	With its main function of development and implementation of sustainable environmental policy function, EEAA should lead the coordination efforts, and lobby with MIFT, for policies resulting from the policy strategy developed by the project. This would include revisions to these policies in a timely manner. EEAA should also monitor and document demonstration projects as a part of its role to raise awareness on EE.
Egyptian National Cleaner Production Centre (ENCPC), MoTI	ENCPC, established by MIFT in 2005, for technical assistance and technology transfer specifically for cleaner energy in industry, will coordinate and collaborate with IDA on the benchmarking activities, specifically with verification and auditing functions.
Egyptian Organization for Standardization and Quality (EOS), MoTI	With its monitoring and certification function, EOS would continue to conduct awareness raising, assessments and testing of ISO conformity. It has also been suggested by EOS to move awareness sessions to industrial zones for a more targeted audience.
Industrial Development Authority (IDA), MoTI	With its function to link industry with scientific research, IDA should house the benchmarking database. This will include conducting periodic updates of data for the 35,000 factories in its current database. These may increase or decrease over time.
Industrial Modernisation Centre (IMC), MoTI	With its technical development function for SMEs, IMC would continue its work on awareness raising, training, auditing activities in the SME sector. IMC can coordinate with relevant syndicates in collaboration with FEI. IMC with FEI can play a significant role in strengthening public/private partnerships.
Federation of Egyptian Industries (FEI), Environmental Compliance Office (ECO)	With its function as the main champion for private sector business, FEI should focus on intensive awareness raising and technical training for the private sector. As importantly, FEI should play a focal role in advertising and making industries aware of the sources of funding for IEE.

Source: UNIDO (2015)

The Project’s work on policy recommendations, sector strategies and benchmarking sought to broaden impact through the **mainstreaming pathway**. The main output of the policy component was an IEE strategy (and vision) and policy recommendations. The process tried to foster consensus and ownership in the outcome and aimed at ensuring the central role and commitment of MoTI in carrying out the strategy and recommendations (IEE Egypt 2018). In line with the IEE policy recommendations, a Policy Unit was created in the MoTI in late 2015. It was envisioned that Policy Unit should own the proposed IEE policy document, detail and update the IEE strategy and policies and report to the Egyptian Energy Planning Authority that will identify the status of energy efficiency on the national level and not just on the ministerial level. The Unit reports directly to the Minister of Trade and Industry. While MoTI and its Policy Unit should lead the ongoing policy effort, the Post Project Strategy states that “EEAA should lead the coordination efforts, and lobby with MoTI, for policies resulting from the policy strategy developed by the project. This would include revisions to these policies in a timely manner. EEAA should also monitor and document demonstration projects as a part of its role to raise awareness on EE.”

The Project also supported the creation of an integrated benchmarking system, which could be used to support IEE policy tools, such as enterprise ratings, best techniques definitions, best practices exchange, best performers awards, sectoral savings potentials, sectoral EE road maps,

investment subsidies for best technologies and information support for recommendations on development programs.

These improvements – in the form of greater inter-ministry/inter-agency communications and consensus, strategy foundations, and benchmarking tools – increase the likelihood, but do not ensure, the government's development of effective IEE policies that will mainstream the Project's work.

The Project also sought to broaden its impact through the **market change pathway** via the training and continuing financial support of the cadre of national EnMS and SO experts. The existing national experts act as champions and advisors for the implementation of EnMS and SO practices in industry. They will also play a key role in training the additional personnel that will be necessary for full implementation of EnMS and SO by Egyptian industry. At some point, there needs to be a national certification system for qualifying energy managers and energy management to give the market confidence in the quality of the experts' skills.

The trained national experts act as champions, advisors and trainers for the implementation of EnMS and SO practices in industry. To fulfil these roles, the existing experts (and the additional ones that will be necessary for full implementation these practices by Egyptian industry) need a strong market for their services. The market for EE services depends on energy prices and policy incentives (both of which are uncertain), and also on the willingness of industry to pay for EE services. At present, persisting industrial expectations of free TA services from donor programmes limits their willingness to pay commercial rates for EE services.

The Sustainability Fund is intended to support (for 3 years) early market demand for commercial EE services. The fund's idea is to allocate an amount of money to support the work of the trained energy experts until such time the market dynamics are active, and the market is able on its own to support the services of those experts in the industrial energy management activities. To aid in the transition to commercial fee rates for national experts, the Fund partially subsidizes the rates – with subsidies of 80% the first year, 60% the second year and 40% the third and final year.

2.2.4 Results on progress toward impact

<p>Evaluation Criteria A) Impact (or progress toward impact)</p> <p>Positive and negative, primary and secondary long-term effects produced by a development intervention, directly or indirectly, intended or unintended.</p>	
<ul style="list-style-type: none"> - <i>Mainstreaming</i>: To what extent information, lessons or specific results of the project are incorporated into broader stakeholder mandates and initiatives such as laws, policies, regulations and project? - <i>Replication</i>: To what extent the project’s specific results (e.g. methodology, technology, lessons and etc) are reproduced or adopted - <i>Scaling-up</i>: To what extent the project’s initiatives and results are implemented at larger geographical scale? - What difference has the project made to the beneficiaries? - What is the change attributable to the project? To what extent? - What are the social, economic, environmental and other effects, either short-, medium- or long-term, on a micro- or macro-level? - What effects are intended or unintended, positive or negative? <p>The three UNIDO impact dimensions are:</p> <ul style="list-style-type: none"> - <i>Safeguarding environment</i>: To what extent the project contributes to changes in the status of environment? - <i>Economic performance</i>: To what extent the project contributes to changes in the economic performance (finances, income, costs saving, expenditure and etc) of individuals, groups and entities? - <i>Social inclusiveness</i>: To what extent the project contributes to changes in capacity and capability of individuals, groups and entities in society, including vulnerable groups, and hence generating employment and access to education and training? 	
<p>Summary of findings</p> <p>Direct Impacts. The Project’s achievements for GHG emission reductions (358 ktCO2/year), energy saved (1,246 GWh/year) and IEE investment mobilised (USD 18.46 million) met or nearly met the respective targets.</p> <p>Capacity Building. The Project increased the government’s capacity for IEE policymaking, through benchmarking studies and training and policy consultation on strategy and action plans. It increased industrial top management’s interest in having in-house EnMS and SO expertise. It then developed that expertise in industrial energy managers and EE service providers. It also developed EE project financing expertise in bankers. However, the Project did not measure or estimate the indirect GHG emission reduction and energy savings impacts of these activities.</p>	
<p>Rating</p>	
<p>Impact (or progress toward impact)</p>	<p>Satisfactory (S)</p>

3. Project’s quality and performance

This section assesses the quality and performance of the Project according to: project design, relevance, effectiveness, efficiency, sustainability of benefits and gender mainstreaming.

3.1 Design

3.1.1 Overall design

The Project’s design was similar to those of UNIDO Industrial Energy Efficiency (IEE) projects in other countries, with the core work being: 1) raising general IEE awareness, 2) technical training on Energy Management Systems (EnMS) and Systems Optimization (SO) for users and experts, 3) improving financing capacity for IEE investments and 4) implementing EnMS and SO in select industrial facilities to demonstrate the concepts and to provide practical training for the experts. The Project also did work on developing policy and strategies, benchmarking and fostering the market for IEE consultation

A budgeted M&E plan with clear timelines, roles, and responsibilities was put in place. The risk assessment was adequate, though it did not include prevalence of energy subsidies as critical bottleneck for wider EE implementation.

3.1.2 Results on overall design

<p>Evaluation Criteria B) project design</p> <p>Formulation of the intervention, the plan to achieve a specific purpose: Assessment of the design in general.</p> <ul style="list-style-type: none"> - The problem, need or gap to be addressed by the project is clearly identified, with clear target beneficiaries? - The project design was adequate to address the problems at hand? - Is the project consistent with the Country's priorities, in the work plan of the lead national counterpart? Does it meet the needs of the target group? Is it consistent with UNIDO's Inclusive and Sustainable Industrial Development? Does it adequately reflect lessons learnt from past projects? Is it in line with the donor's priorities and policies? - Is the applied project approach sound and appropriate? Is the design technically feasible and based on best practices? Does UNIDO have in-house technical expertise and experience for this type of intervention? - To what extent the project design (in terms of funding, institutional arrangement, implementation arrangements...) as foreseen in the project document still valid and relevant? - Does it include M&E plan and adequate budget for M&E activities? - Risk management: Are critical risks related to financial, social-political, institutional, environmental and implementation aspects identified with specific risk ratings? Are their mitigation measures identified? Where possible, are the mitigation measures included in project activities/outputs and monitored under the M&E plan? <p>Summary of findings</p>
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Evaluation Criteria B) project design	
Formulation of the intervention, the plan to achieve a specific purpose: Assessment of the design in general.	
The Project's design was very similar to those of UNIDO IEE projects in other countries, with added work (at government request) on developing a policy framework for IEE and on training government staff on IEE. Overall, the Project was well designed, but required some adaptive changes during the inception phase to align with the government's priorities, and again after the Mid-term Review to reflect the re-defined scope of the financing component. A Working Group, consisting of representatives from partner agencies was formed in the inception phase "to ensure that all project partners were engaged to the project and provided necessary inputs in order to help the project move forward". (IEE Egypt, 2018). The Working Group was "very useful to ensure the country ownership and involvement of all relevant stakeholders in identifying the real needs and defining the interventions to be made". (IEE Egypt, 2018).	
Rating	
B) project design	Satisfactory (S)

3.1.3 Logframe

The logframe was revised (in response to recommendations in the Mid-term Review) in 2015 to better reflect the Project's work and expectations arising from the changes made in the inception phase and the re-defined scope of the financing component. The indicators and targets were revised accordingly, and in many cases re-phrased to be made more tangible.

The revised logframe has a clear logic and is consistent with a realistic theory of change.

The Project logframe contains reasonably specific descriptions of the Project's **intended outputs**⁹ – with operational **indicators** and **targets** for setting ambition levels and later assessing effectiveness. All output-level indicators and targets are Specific, Measurable, Achievable, Realistic and Time-bound (SMART). For example, one target of Component 3 was "55 experts trained in implementing EnMSs at expert level [assumed by end of Project]". See Table 12.

The Project logframe is also clear about the **intended direct impacts** – stated in terms of GHG emission reductions and energy savings – of the Project's component 5 work on direct implementation of EnMS and SO in partner facilities. The indicators and targets for these "Quantitative Outcomes" are all fully SMART. The logframe contains an indicator/target for the Project's **intended indirect impacts** – GHG emission reductions due to capacity building and TA

⁹ **Outputs** are the products, capital goods and services which result from a development intervention; may also include changes resulting from the intervention which are relevant to the achievement of outcomes. **Outcomes** are the likely or achieved short-term and medium-term effects of an intervention's outputs. **Impacts** are the positive and negative, primary and secondary long-term effects produced by a development intervention, directly or indirectly, intended or unintended. **Indicators** are quantitative or qualitative factors or variables that provide simple and reliable means to measure achievement, to reflect the changes connected to an intervention, or to help assess the performance of a development actor. **Targets** are the specified values that indicators should reach by a specific date in the future. See the Glossary for definitions of other evaluation-related terms.

activities – which is not fully SMART, and for which no estimates of achievements were reported. However, the implementation of EnMS through the SIDPEC-led P2P network yielded energy indirect savings of 21,457 GWh/year of electricity and 90,428 GWh/year of natural gas.

The presentation of the Project’s **intended outcomes** is mixed. Some (i.e. those on mobilised investment, companies having ISO-compliant EnMSs and companies having energy management plans and operational improvements) are formulated in fully SMART terms. Others (i.e. those describing the goal of the components) are not SMART. Achievements for these outcomes were reported only in terms of the underlying output targets.

Table 12: Profile of indicators and targets

	Output-level Indicators/Targets	Outcome-level Indicators/Targets	Impact-level Indicators/Targets
Capacity Building			Indirect Impacts
Component 1: Benchmarks and IEE policy	<ul style="list-style-type: none"> 10 indicators all [SMART] 	<ul style="list-style-type: none"> Supportive policy and policy instruments [SMART] (achievement reported only for underlying output targets) 	<ul style="list-style-type: none"> Cumulative indirect emission reduction due to project’s capacity building and TA activities ranging from 8.75 Mt CO2 (bottom-up approach) to 44.8 Mt CO2 (top-down) [SMART], but achievement not reported
Component 2: Awareness raising in industry	<ul style="list-style-type: none"> 14 indicators all [SMART] 	<ul style="list-style-type: none"> Widespread awareness in industry [SMART] (achievement reported only for underlying output targets) 	
Component 3: Technical capacity on EnMS and SO	<ul style="list-style-type: none"> 4 indicators all [SMART] 	<ul style="list-style-type: none"> Cadre of EnMS and SO experts [SMART] (achievement reported only for underlying output targets) 	
Component 4: Financing IEE	<ul style="list-style-type: none"> 7 indicators all [SMART] 	<ul style="list-style-type: none"> Awareness of EE finance [SMART] (achievement reported only for underlying output targets) 	
Direct Implementation			Direct Impacts
Component 5: Direct implementation of EnMS and SO	<ul style="list-style-type: none"> 4 indicators all [SMART] 	<ul style="list-style-type: none"> EnMS and EE measures are implemented and demonstrated [SMART] (achievement reported for underlying output/outcome/impact targets) Investment: USD 18.9 million [SMART] 30 companies having working ISO-compliant energy management systems [SMART] Energy management plans and operational improvements made in 50 companies [SMART] 	<ul style="list-style-type: none"> Direct emission reduction: 292 kt CO2/year (assuming an average 10-year life of energy investment, 2.92 Mt CO2 cumulatively) [SMART] Energy savings: 1277 GWh/year [SMART]

SMART = Specific, Measurable, Achievable, Realistic and Time-bound. A greyed-out letter indicates that the indicator/target lacks that criterion.

Source: IEE Egypt (2018).

3.1.4 Results on logframe

<p>Evaluation Criteria for B2) Logframe</p> <p>Formulation of the intervention, the plan to achieve a specific purpose: Assessment of the logical framework aimed at planning the intervention.</p>	
<ul style="list-style-type: none"> - <i>Expected results:</i> Is the expected result-chain (impact, outcomes and outputs) clear and logical? Does impact describe a desired long-term change or benefit to a society or community (not as a means or process), do outcomes describe change in target group's behaviour/performance or system/institutional performance, do outputs describe deliverables that project will produce to achieve outcomes? Are the expected results realistic, measurable and not a reformulation or summary of lower level results? Do outputs plus assumptions lead to outcomes, do outcomes plus assumptions lead to impact? Can all outputs be delivered by the project, are outcomes outside UNIDO's control but within its influence? - <i>Indicators:</i> Do indicators describe and specify expected results (impact, outcomes and outputs) in terms of quantity, quality and time? Do indicators change at each level of results and independent from indicators at higher and lower levels? Do indicators not restate expected results and not cause them? Are indicators necessary and sufficient and do they provide enough triangulation (cross-checking)? Are they indicators sex-disaggregated, if applicable? Are the indicators SMART? - <i>Sources of verification:</i> Are the sources of verification/data able to verify status of indicators, are they cost-effective and reliable? Are the sources of verification/data able to verify status of output and outcome indicators before project completion? - <i>Assumptions:</i> Are key assumptions properly summarized and reflecting the proper level in the results chain in the logframe? 	
<p>Summary of findings</p> <p>The Project logframe has a clear logic and is consistent with a realistic theory of change. All output level indicators were Specific, Measurable, Achievable, Relevant and Time-bound (SMART). There were too few outcome indicators – only some of which were fully SMART. The logframe could have benefited from additional SMART outcome indicators.</p>	
<p>Rating</p>	
<p>B2) Logframe</p>	<p>Moderately Satisfactory (MS)</p>

3.2 Relevance

The Project started during a period of great political and economic turmoil in Egypt. The political instability from the 2011 revolution delayed the start of the Project. There were also energy shortages during 2011–14, which once the Project started and entered its inception phase, prompted the Egyptian government to request changes to the work programme. At this point, the Project took on additional work – developing a policy framework for IEE in Egypt and training state agency personnel on the potential benefits of IEE – and changed the implementation focus from small- and medium enterprises (SMEs) to larger energy-intensive industries.

The Project addressed an urgent need of the Egyptian government and the country's industrial companies. Energy shortages, followed by rapidly rising energy bills during the Project period, led

both government and industry to be more concerned with issues pertaining to energy efficiency (EE) and energy management. The Project was holistic and attempted to solve some of the challenges provided by energy scarcity through raising awareness and building local IEE technical and financing capacities).

The Project was aligned, in a period of intense partner engagement, to new government strategies and regulations promoting energy efficiency in industrial sector (i.e. Energy Strategy 2035, Electricity Law #87). Though originally designed to include neither a policy element, nor a focus on large energy intensive industries, the Project was revised to include these government priorities in the inception phase, enhancing its relevance for resolving local challenges even further.

The Project fit well with the UNIDO IEE Programme's approaches and goals for improving industrial energy efficiency (UNIDO IEE Unit flyer), in that it:

- combined policy and normative development support services with capacity building for all relevant market players, demonstration and deployment of best available technologies with platforms for replication and scaling-up.
- aimed at removing key barriers to energy efficiency improvement in industries and ultimately transforming the market for industrial energy efficiency.

It encompassed some aspects of all three of the UNIDO IEE Unit's strategic areas of focus (UNIDO IEE Unit brochure):

- Policy development and standards
 - **Technical regulations**
 - Voluntary standards
 - Fiscal and other incentives
 - **Benchmarking**
 - Public-private partnership agreements
 - **Information and education**
 - Recognition
 - Monitoring, verification and reporting
 - Personnel certification
- Energy management, technology demonstration and upscaling
 - **Energy management systems**
 - **Energy systems optimization**
 - Low-carbon process technologies
 - **Energy-efficient manufacturing**
 - Energy-efficient industrial equipment and appliances
 - Carbon capture and storage for industrial applications
 - Low-emission transport systems
- Capacity-building and awareness-raising and upscaling
 - Energy efficiency agencies/centres and service providers
 - Energy efficiency knowledge networks
 - **Financing schemes**
 - Technology innovation platforms
 - Supply chain
 - Power utilities

The Project also fit with the strategic objectives and strategic programmes of GEF-4’s Climate Change Focal Area: Strategic Program 2: Promoting Energy Efficiency in the Industrial Sector (GEF, 2007):

- GEF Strategic Objective and Program: To promote energy-efficient technologies and practices in industrial production and manufacturing processes
- GEF Expected Outcomes: Improved energy efficiency of industrial production

3.2.1 Results on relevance

Evaluation criteria for C1) Relevance	
Functioning of a development intervention: The extent to which the aid activity is suited to the priorities and policies of the target group, recipient and donor.	
<ul style="list-style-type: none"> - How does the project fulfil the urgent target group needs? - To what extent is the project aligned with the development priorities of the country (national poverty reduction strategy, sector development strategy)? - How does project reflect donor policies and priorities? - Is the project a technically adequate solution to the development problem? Does it eliminate the cause of the problem? - To what extent does the project correspond to UNIDO’s comparative advantages? - Are the original project objectives (expected results) still valid and pertinent to the target groups? If not, have they been revised? Are the revised objectives still valid in today’s context? 	
Summary of findings	
The Project was well aligned, through close partner engagement, to government strategies and regulations promoting IEE. The Project is fully relevant to UNIDO and policies and relevant to the GEF focal area of climate change.	
Rating	
C1) Relevance	Highly Satisfactory (HS)

3.3 Efficiency

The Project’s expenditure (USD 3.81 million as of end June 2018) was in line with the total budget (USD 3.95 million). The implementation phase started later than anticipated due to the political circumstances of the Egyptian revolution and the shift in government priorities in the period between the Project’s CEO endorsement and its inception phase. However, the duration of the Project’s implementation phase was only slightly longer than projected in the Project document. Given that the Project achieved (or nearly achieved) all its output, outcome and direct impact targets within budget and nearly within expected timeframes, the Project was satisfactorily efficient in its use of resources.

The Project saved money by using national (rather than international) experts to teach the second and third rounds of the EnMS and SO courses and factory visits. International experts were used to teach the technical courses and lead factory visits only in the initial round. Their contribution to

later rounds was through remote consultations. The national experts, trained in the early rounds, taught the second and third rounds. This Train-the-Trainer (TOT) technique also helps prepare teachers for potential post-project training sessions.

There was some inefficiency of effort in the early round of training and factory implementation, as some companies devoted too little staff resources to implementing the EnMSs, which slowed progress considerably. The first round lasted around 15 months. Some first-round companies were asked to leave the Project midway through the implementation phase, because of their lack of commitment. This reflects the view of some companies that donor-funded activities offered free of charge means that they are also free of internal resource obligations. This inefficiency was corrected in the later rounds of the Project training and factory implementation through more selective choices of participant companies. The later rounds were thus shorter, lasting around nine months. Some interviewees suggested that company commitment could be increased by offering services for pay.

3.3.1 Results on efficiency

Evaluation Criteria C3) Efficiency	
Functioning of a development intervention: A measure of how economically resources/inputs (funds, expertise, time, etc.) are converted to results.	
<ul style="list-style-type: none"> - How economically are the project resources/inputs (concerning funding, expertise, time...) being used to produce results? - To what extent were expected results achieved within the original budget? If no, please explain why. - Are the results being achieved at an acceptable cost? Would alternative approaches accomplish the same results at less cost? - What measures have been taken during planning and implementation to ensure that resources are efficiently used? Were the project expenditures in line with budgets? - Could more have been achieved with the same input? - Could the same have been achieved with less input? - How timely was the project in producing outputs and outcomes? Comment on the delay or acceleration of the project's implementation period. - To what extent were the project's activities in line with the schedule of activities as defined by the project Team and annual Work Plans? - Have the inputs from the donor, UNIDO and government/counterpart been provided as planned, and were they adequate to meet the requirements? 	
Summary of findings	
The Project carried its work within budget. The Project start was delayed almost 2 years because of the political instability associated with the Egyptian Revolution. The implementation period was extended, ultimately ending 2 years and 9 months after the planned end date. The project duration was 11 months greater than planned.	
Rating	
C3) Efficiency	Satisfactory (S)

3.4 Sustainability of benefits

The Project basically achieved its short-term targets, but the outlook for its lasting benefits is less clear. The probability of long-term benefits is tied to the resilience of the Project's direct outcomes and their broader adoption pathways to financial, socio-political, institutional framework and governance, and environmental risks.

Resilience to financial risks – likely. No negative financial consequences of the Project's activities are foreseen.

Resilience to socio-political risks – moderately unlikely. The Post Project Strategy document sets out the agreed upon responsibilities of each national co-operating partner in continuing the activities carried out by the Project. At the time of the Project's closure, it was not clear whether the national government counterparts will take on their agreed to roles in the Post Project Strategy to sustain and fully leverage the Project's outputs. The lack of a national champion for this project after the end of the UNIDO involvement indicates that the project will face challenges in terms of sustainability. The Project was instrumental in the creation of the Policy Unit within MoTI, but that unit is under-staffed and has been given a wide-ranging portfolio of policy responsibilities, so it is unclear how much attention it will pay to IEE issues. There might be some role for other ongoing or planned UNIDO projects (e.g., Egypt Solar Heating for Industrial Process (SHIP)) to help sustain some of the Project's TA activities if the national counterparts are still not ready.

Resilience to institutional framework and governance risks – moderately unlikely. The Project's work on policy recommendations, sector strategies and benchmarking (and the associated inter-ministry/inter-agency communications and consensus) strengthened the Egyptian government's capacity to develop policy supporting or mandating improved IEE practices. This capacity increases the likelihood, but do not ensure, the government's development of effective IEE policies that will mainstream the Project's work. Thus far, there been no new or strengthened IEE policy measures. Without refresher training, study updates and/or a working integrated benchmarking system, the capacity will diminish in time through personnel turnover, skills degradation and out-of-date benchmarks and policy documents. The longer the government waits to develop effective IEE policy, the less likely the Project's policy work will be useful.

In addition, a healthy market for EE services will require confidence in the skills of the energy experts. At some point, the government will need to establish a national certification system for energy managers and energy auditors.

Resilience to environmental risks – likely. No negative environmental consequences of the Project's activities are foreseen.

3.4.1 Results on sustainability of benefits

<p>Evaluation Criteria C4) Sustainability of benefits</p> <p>Functioning of a development intervention: The continuation of benefits from a development intervention after major development assistance has been completed. The probability of continued long-term benefits. The resilience to risk of the net benefit flows over time.</p>	
<ul style="list-style-type: none"> - Will the project results and benefits be sustained after the end of donor funding? - Does the project have an exit strategy? C6: To what extent have the outputs and results been institutionalized? - <i>Financial risks:</i> What is the likelihood of financial and economic resources not being available once the project ends? - <i>Socio-political risks:</i> Are there social or political risks that may jeopardize the 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? - <i>Institutional framework and governance risks:</i> Do the legal framework, policies, and governance structures and processes within which the project operates pose risks that may jeopardize the sustainability of project benefits? Are requisite systems for accountability, transparency and required technical know-how in place? - <i>Environmental risks:</i> Are there environmental risks that may jeopardize the sustainability of project outcomes? Are there project outputs or higher level results that are likely to have adverse environmental impacts, which in turn might affect the sustainability of project benefits? 	
<p>Summary of findings</p> <p>The resilience of the Project's outcomes and the pathways to their broader adoption socio-political risks (partners fulfilling their roles in the Post Project Strategy), and institutional framework and governance risks (national champion and promulgation of more effective IEE policy in near future) is moderately unlikely. Resilience to financial and environmental risks is likely,</p>	
<p>Rating</p>	
<p>C4) Sustainability of benefits</p>	<p>Moderately Unlikely (MU)</p>

3.5 Gender mainstreaming

The Project design did not consider gender mainstreaming neither did the monitoring framework include indicators to track gender, establish a baseline or a needs assessment. UNIDO's gender policy was issued in 2015 and has not been included as a part of Project activities retrospectively. However, there was clearly an emphasis on including women in all stages of the process, even though technology/engineering sectors are predominately male led. There was a significant number of females in the trainings provided by UNIDO, as well as a female consultant hired to lead benchmarking reports.

3.5.1 Results on gender mainstreaming

Evaluation criteria for D1) Gender mainstreaming	
<ul style="list-style-type: none"> - Did the project design adequately consider the gender dimensions in its interventions? Was the gender marker assigned correctly at entry? - Was a gender analysis included in a baseline study or needs assessment (if any)? Were there gender related project indicators? - Are women/gender-focused groups, associations or gender units in partner organizations consulted/ included in the project? - How gender-balanced was the composition of the project management team, the Steering Committee, experts and consultants and the beneficiaries? - Do the results affect women and men differently? If so, why and how? How are the results likely to affect gender relations (e.g., division of labour, decision-making authority)? - To what extent were socioeconomic benefits delivered by the project at the national and local levels, including consideration of gender dimensions? 	
Summary of findings	
UNIDO's gender policy was issued after the Project began and was not included in the logframe retrospectively. However, there was clearly an emphasis on including women in all stages of the project.	
Rating	
D1) Gender mainstreaming	Moderately Satisfactory (MS)

4. Performance of partners

4.1 UNIDO

The **UNIDO** Project Manager provided excellent supervision and support to the PMU. However, the PMU’s progress and efficiency could have probably benefited from initial training from UNIDO headquarters and structured interaction with PMUs in other countries to learn of best practices and innovative approaches and to share experiences. [Results on performance of UNIDO](#)

Evaluation criteria for E1) Performance of partners: UNIDO	
Assessment of partners’ roles and responsibilities engaged in the intervention: UNIDO.	
<ul style="list-style-type: none"> - Mobilization of adequate technical expertise for project design - Inclusiveness of project design (with national counterparts) - Previous evaluative evidence shaping project design - Planning for M&E and ensuring sufficient M&E budget - Timely recruitment of project staff - Project modifications following changes in context or after the Mid-Term Review - Follow-up to address implementation bottlenecks - Role of UNIDO country presence (if applicable) supporting the project - Engagement in policy dialogue to ensure up-scaling of innovations - Coordination function - Exit strategy, planned together with the government - Review overall effectiveness of project management as outlined in the project document. Have changes been made and are they effective? Are responsibilities and reporting lines clear? Is decision-making transparent and undertaken in a timely manner? Recommend areas for improvement. - To what extent the project has a proper and operational governance system (e.g. PSC with clear roles and responsibilities)? - Review whether 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-based management, coordination, monitoring, quality control and technical inputs have been efficient, timely and effective (e.g. problems identified timely and accurately; quality support provided timely and effectively; right staffing levels, continuity, skill mix and frequency of field visits)? 	
Summary of findings	
UNIDO provided excellent supervision and support to the Project, but the PMU’s efficiency could have benefited from additional document templates and structured communication with PMU colleagues in other countries.	
Rating	
E1) Performance of partners: UNIDO	Highly Satisfactory (HS)

4.2 National counterparts

Overall, the **National Counterparts** were well engaged in the supervision of the Project through the PSC. However, there were instances where the counterparts could have been more supportive of Project activities or where they did not follow through on entrusted tasks. For example, IMC agreed to organize an annual event to recognize the companies who implement EnMS or ISO 50001, outlined in the “Post Project Strategy and updated logframe” (IEE Egypt, 2015), on an-going basis. The event has not been held since the Project organized it as the closing event of the Kafa’a campaign in April 2016.

4.2.1 Results on performance of national counterparts

Evaluation criteria for E2) Performance of partners: National Counterparts	
Assessment of partners’ roles and responsibilities engaged in the intervention: National Counterparts	
<ul style="list-style-type: none"> - Design: Responsiveness to UNIDO’s invitation for engagement in designing the project - Implementation: Ownership of the project - Implementation: Counterpart funding - Implementation: Provide financial contribution as planned (cash or in-kind) - Implementation: Support to the project, based on actions and policies - Implementation: Internal government coordination - Implementation: Facilitation of the participation of Non-Governmental Organizations(NGOs), civil society and the private sector where appropriate - Implementation: Suitable procurement procedures for timely project implementation - Implementation: Engagement with UNIDO in policy dialogue to promote the up-scaling or replication of innovations - Implementation: Exit strategy, planned together with UNIDO, or arrangements for continued funding of certain activities 	
Summary of findings	
National cooperating partners were well engaged in Project supervision via the PSC, but could have been more supportive in helping the Project carry out its activities.	
Rating	
E2) Performance of partners: National Counterparts	Moderately Satisfactory (MS)

4.3 Donor

The Donor, GEF, made disbursements as planned.

4.3.1 Results on performance of donor

Evaluation criteria for E3) Performance of partners: Donor	
Assessment of partners' roles and responsibilities engaged in the intervention: Donor	
<ul style="list-style-type: none"> - Timely disbursement of project funds - Feedback to progress reports, including Mid-Term Review, if applicable - Support by the donor's country presence (if applicable) supporting the project for example through engagement in policy dialogue 	
Summary of findings	
GEF disbursed funds as planned.	
Rating	
E3) Performance of partners: Donor	Satisfactory (S)

5. Factors facilitating or limiting the achievement of results

During the Project implementation phase, energy prices rose rapidly (beginning in 2016) due to ongoing de-subsidization measures. These energy price increases, and the memory of earlier energy shortages, sharply focused the attention of government on energy and energy efficiency issues and industry on fuel switching, renewables and energy efficiency measures. In this environment, the Project was able to get the attention of government and industrial decisionmakers, as well as of working engineers, more easily than might have otherwise been the case. The Project benefited from a climate where people were generally receptive to the IEE messages, practices and technologies that UNIDO was delivering.

In the early round of training and factory implementation, some companies devoted too little staff resources to implementing the EnMSs, which slowed progress considerably. In some cases, the implementation projects were abandoned. While the lack of staff resources can sometimes be caused by priority shifts coming from unexpected business challenges, they can also be caused by a general lack of management commitment. Some companies seem to take the view that donor-funded activities offered free of charge means that they are also free of internal resource obligations.

Frequent turnover of government officials – with the accompanying policy priority changes, institutional memory losses, and learning curve repetitions – slowed progress of the Project.

5.1 Monitoring and evaluation

The Project's monitoring and evaluation (M&E) system adequately tracked all the SMART activity indicators contained in the logframe.

The Mid-term Review was conducted in August 2014, relatively early in the Project's implementation phase, which began in May 2013. In response to the Mid-term Review's recommendations, the logframe and its output indicators and targets were revised to better reflect the Project's changed work and expectations. Many indicators were also re-phrased to be made more tangible, or more SMART.

Though the PMU kept close contact with the various Project participants (national expert trainees, demonstration companies, etc.), there were no formal follow-up surveys to monitor ongoing progress of participants (e.g. asking national experts or partner companies about interventions they have undertaken) since their direct involvement with the Project.

5.1.1 Results on monitoring and evaluation

Evaluation criteria for D2) Monitoring & Evaluation

Refers to all the indicators, tools and processes used to measure if a development intervention has been implemented according to the plan (monitoring) and is having the desired result (evaluation).

M&E design

- Was the M&E plan included in the project document? Was it practical and sufficient at the point of project approval?
- Did it include baseline data and specify clear targets and appropriate indicators to track environmental, gender, and socio economic results?
- Did it include a proper M&E methodological approach; specify practical organization and logistics of the M&E activities including schedule and responsibilities for data collection;
- Does the M&E plan specify what, who and how frequent monitoring, review, evaluations and data collection will take place? Is the M&E plan consistent with the logframe (especially indicators and sources of verification)?
- Does it allocate adequate budget for M&E activities?

M&E implementation

- How was the information from M&E system used during the project implementation? Was a M&E system in place and did it facilitate timely tracking of progress toward project results by collecting information on selected indicators continually throughout the project implementation period? Did project team and manager make decisions and corrective actions based on analysis from M&E system and based on results achieved?
- Are annual/progress project reports complete, accurate and timely?
- Was the information provided by the M&E system used to improve performance and adapt to changing needs? Was information on project performance and results achievement being

Evaluation criteria for D2) Monitoring & Evaluation	
Refers to all the indicators, tools and processes used to measure if a development intervention has been implemented according to the plan (monitoring) and is having the desired result (evaluation).	
<p>presented to the Project Steering Committee to make decisions and corrective actions? Do the project team and managers and PSC regularly ask for performance and results information?</p> <ul style="list-style-type: none"> - Are monitoring and self-evaluation carried out effectively, based on indicators for outputs, outcomes and impact in the logframe? Do performance monitoring and reviews take place regularly? - Were resources for M&E sufficient? - How has the logframe been used for Monitoring and Evaluation purposes (developing M&E plan, setting M&E system, determining baseline and targets, annual implementation review by the Project Steering Committee...) to monitor progress towards expected outputs and outcomes? - How well have risks outlined the project document and in the logframe been monitored and managed? How often have risks been reviewed and updated? Has a risk management mechanism been put in place? 	
Summary of findings	
The Project's M&E system adequately tracked all the SMART indicators in the logframe. All output-level indicators/targets were SMART; 3 of the 8 outcome-level indicators/targets were SMART; 2 of the 3 impact-level indicators/ targets were SMART.	
Rating	
D2) Cross-cutting performance criteria: Monitoring & Evaluation - Design and implementation	Design: Moderately Satisfactory (MS) Implementation: Satisfactory (S)

5.2 Results-based management

The Project Steering Committee (PSC), with representation of all the national partners, was established to provide strategic guidance for the project, approval of progress reports, approval of major changes, ensuring sustainability, avoid duplication of activities, mobilize stakeholders and partners, and provide recommendations to the project in terms of specific priorities not foreseen in the original project document. The PSC met every four months for the first year of project implementation and every six months afterwards. There were eight PSC meetings over the lifetime of the Project.

The Project submitted technical and financial progress reports every six months to the PSC, as well as quarterly financial reports to EEAA. A monthly progress report was requested by the EEAA CEO in September 2017 and was submitted on a regular basis. A quarterly technical report in addition to a six months financial report is submitted to MoTI.

An interviewee mentioned that this high level of engagement by the PSC and the national partners was, in part, because of the government's desire for better oversight of donor projects generally.

5.2.1 Results on results-based management

<p>Evaluation Criteria for D3) Results-based Management</p> <p>Assessment of issues related to results-based work planning, results-based M&E and reporting based on results.</p>	
<p><i>Results-Based work planning</i></p> <ul style="list-style-type: none"> - Review any delays in project start-up and implementation, identify the causes and examine if they have been resolved. - Are there any annual work plans? Are work-planning processes results-based? Has the logframe been used to determine the annual work plan (including key activities and milestone)? - Examine the use of the project’s results framework/ logframe as a management tool and review any changes made to it since project start. <p><i>Results-based monitoring and evaluation</i></p> <ul style="list-style-type: none"> - Verify whether an M&E system is in place and facilitated timely tracking of progress toward project objectives by collecting information on selected indicators continually throughout the project implementation period; - Review the monitoring tool currently being used: Do they provide the necessary information? Do they involve key partners? Are they aligned or mainstreamed with national systems? Do they use existing information? Are they efficient? Are they cost-effective? Are additional tools required? How could they be made more participatory and inclusive? - Do project team and manager make decisions and corrective actions based on analysis from M&E system and based on results achieved? Is information on project performance and results achievement being presented to the Project Steering Committee to make decisions and corrective actions? Do the project Team and managers and PSC regularly ask for performance and results information? <p><i>Results-based reporting</i></p> <ul style="list-style-type: none"> - Assess how adaptive management changes have been reported by the project management and shared with the PSC. - Assess how well the project Team and partners undertake and fulfil donor and UNIDO reporting requirements (i.e. how have they addressed delays or poor performance, if applicable?) - Assess how results and lessons derived from the adaptive management process have been documented, shared with key partners and internalized by partners. 	
<p>Summary of findings</p>	
<p>The Project was well managed, with good oversight by the Project Steering Committee (PSC).</p>	
<p>Rating</p>	
<p>D3) Results-based Management</p>	<p>Highly Satisfactory (HS)</p>

5.3 Overarching assessment and rating table

Overall, the Project was relevant, effective, efficient, and well monitored and managed. It addressed an urgent need of the Egyptian government and the country's industrial companies. Energy bills rose sharply during the Project implementation period, leading both government and industry to be more concerned with issues pertaining to energy efficiency (EE) and energy management. So while the Project's relevance was high during the design phase of the project, it became even more relevant as the implementation progressed. This has caused a wider impact than expected, where 70 companies received EnMS and SO technical support in comparison to the planned target of 50 companies due to increased market demand during the energy crisis and subsidies gradual removal. The Project was also relevant to UNIDO and GEF. The sustainability of the Project's benefits is assessed as moderately unlikely.

5.3.1 Results on overall assessment

Evaluation Criteria F) Overall assessment	
- Overarching assessment of the project, drawing upon the analysis made under project performance and Progress to Impact criteria above but not an average of ratings	
Summary of findings	
Overall, the Project was relevant, effective, efficient, and well monitored and managed. It addressed an urgent need of the Egyptian government and the country's industrial companies. Energy bills rose sharply during the Project implementation period, leading both government and industry to be more concerned with issues pertaining to energy efficiency (EE) and energy management. So while the Project's relevance was high during the design phase of the project, it became even more relevant as the implementation progressed. This has caused a wider impact than expected, where 70 companies received EnMS and SO technical support in comparison to the planned target of 50 companies due to increased market demand during the energy crisis and subsidies gradual removal. The Project was given exceptional opportunities, which it pursued fully, to play an instrumental role in developing IEE policy in Egypt. While the development of effective IEE policies is not yet complete, the Project's contributed valuable improvements – in the form of greater inter-ministry/inter-agency communications and consensus, strategy foundations, and benchmarking tools – to further policy work. The Project was also relevant to UNIDO and GEF. The sustainability of the Project's benefits is assessed as moderately unlikely.	
Rating	
F) Overall assessment	Satisfactory (S)

Table 13: Project evaluation criteria

#	Evaluation criteria	Justification of ratings	Rating in the Terminal Evaluation	Rating in the Mid-term Review
A	Impact (or progress toward impact)	<p>Direct Impacts: The Project's achievements for GHG emission reductions (358 ktCO₂/year), energy saved (1,246 GWh/year) and IEE investment mobilised (USD 18.46 million) met or nearly met the respective targets.</p> <p>Capacity Building: The Project increased the government's capacity for IEE policymaking, through benchmarking studies and training and policy consultation on strategy and action plans. It increased industrial top management's interest in having in-house EnMS and SO expertise. It then developed that expertise in industrial energy managers and EE service providers. It also developed EE project financing expertise in bankers. However, the Project did not measure or estimate the indirect GHG emission reduction and energy savings impacts of these activities.</p>	S	
B	Project design			
1	<ul style="list-style-type: none"> Overall design 	The Project's design was very similar to those of UNIDO IEE projects in other countries, with added work (at government request) on developing a policy framework for IEE and on training government staff on IEE. Overall, the Project was well designed, but required some adaptive changes during the inception phase to align with the government's priorities, and again after the Mid-term Review to reflect the re-defined scope of the financing component. A Working Group, consisting of representatives from partner agencies was formed in the inception phase "to ensure that all project partners were engaged to the project and provided necessary inputs in order to help the project move forward". (IEE Egypt, 2018). The Working Group was "very useful to ensure the country ownership and involvement of all relevant stakeholders in identifying the real needs and defining the interventions to be made". (IEE Egypt, 2018).	S	MS
2	<ul style="list-style-type: none"> Logframe 	The Project logframe has a clear logic and is consistent with a realistic theory of change. All output level indicators were Specific, Measurable, Achievable, Relevant and Time-bound (SMART). There were too few outcome indicators – only some of which were fully SMART. The logframe could have benefited from additional SMART outcome indicators.	MS	
C	Project performance			
1	<ul style="list-style-type: none"> Relevance 	The Project was well aligned, through close partner engagement, to government strategies and regulations promoting IEE. The Project is fully relevant to UNIDO and policies and relevant to the GEF focal area of climate change.	HS	HS
2	<ul style="list-style-type: none"> Effectiveness 	The Project achieved or exceeded all the output-level targets for its capacity building components. The Project met or nearly met its SMART	S	S

#	Evaluation criteria	Justification of ratings	Rating in the Terminal Evaluation	Rating in the Mid-term Review
		<p>outcome-level targets and direct impact-level targets for the Implementation of EnMS and SO component, in that it yielded:</p> <ul style="list-style-type: none"> Greenhouse gas (GHG) emission reductions: 358 kt CO2/year (target: 292 kt CO2/year) Energy savings: 1,247 GWh/year (target: 1,277 GWh/year) Mobilised IEE investment: USD 18.46 million (target: USD 18.9 million) <p>Companies having working ISO-certified or -compliant EnMSs: 29 companies (target: 30 companies)</p>		
3	<ul style="list-style-type: none"> Efficiency 	The Project carried its work within budget. The Project start was delayed almost 2 years because of the political instability associated with the Egyptian Revolution. The implementation period was extended, ultimately ending 2 years and 9 months after the planned end date. The project duration was 11 months greater than planned.	S	MS
4	<ul style="list-style-type: none"> Sustainability of benefits 	The resilience of the Project's outcomes and the pathways to their broader adoption socio-political risks (partners fulfilling their roles in the Post Project Strategy), and institutional framework and governance risks (national champion and promulgation of more effective IEE policy in near future) is moderately unlikely. Resilience to financial and environmental risks is likely.	MU	ML
D	Cross-cutting performance criteria			
1	<ul style="list-style-type: none"> Gender mainstreaming 	UNIDO's gender policy was issued after the Project began and was not included in the logframe retrospectively. However, there was clearly an emphasis on including women in all stages of the Project.	MS	
2	<ul style="list-style-type: none"> M&E: <ul style="list-style-type: none"> M&E design M&E implementation 	The Project's M&E system adequately tracked all the SMART indicators in the logframe. All output-level indicators/targets were SMART; 3 of the 8 outcome-level indicators/targets were SMART; 2 of the 3 impact-level indicators/ targets were SMART.	MS (design) S (implementation)	MS (design) HS (implementation)
3	<ul style="list-style-type: none"> Results-based Management (RBM) 	The Project was well managed, with good oversight by the Project Steering Committee (PSC).	HS	HS
E	Performance of partners			
1	<ul style="list-style-type: none"> UNIDO 	UNIDO provided excellent supervision and support to the Project, but the PMU's efficiency could have benefited from additional document templates and structured communication with PMU colleagues in other countries.	HS	HS
2	<ul style="list-style-type: none"> National counterparts 	National cooperating partners were well engaged in Project supervision via the PSC, but could have been more supportive in helping the Project carry out its activities.	MS	

#	Evaluation criteria	Justification of ratings	Rating in the Terminal Evaluation	Rating in the Mid-term Review
3	• Donor	GEF disbursed funds as planned.	S	
F	Overall assessment	Overall, the Project was relevant, effective, efficient, and well monitored and managed. It addressed an urgent need of the Egyptian government and the country's industrial companies. Energy bills rose sharply during the Project implementation period, leading both government and industry to be more concerned with issues pertaining to energy efficiency (EE) and energy management. So while the Project's relevance was high during the design phase of the project, it became even more relevant as the implementation progressed. This has caused a wider impact than expected, where 70 companies received EnMS and SO technical support in comparison to the planned target of 50 companies due to increased market demand during the energy crisis and subsidies gradual removal. The Project was given exceptional opportunities, which it pursued fully, to play an instrumental role in developing IEE policy in Egypt. While the development of effective IEE policies is not yet complete, the Project's contributed valuable improvements – in the form of greater inter-ministry/inter-agency communications and consensus, strategy foundations, and benchmarking tools – to further policy work. The Project was also relevant to UNIDO and GEF. The sustainability of the Project's benefits is assessed as moderately unlikely.	S	S

Table 14: Project evaluation rating criteria

Score		Definition	Category
6	Highly satisfactory (HS)	Level of achievement clearly exceeds expectations and there is no shortcoming.	SATISFACTORY
5	Satisfactory (S)	Level of achievement meets expectations (indicatively, over 80-95 per cent) and there is no or minor shortcoming.	
4	Moderately satisfactory (MS)	Level of achievement more or less meets expectations (indicatively, 60 to 80 per cent) and there are some shortcomings.	
3	Moderately unsatisfactory (MU)	Level of achievement is somewhat lower than expected (indicatively, less than 60 per cent) and there are significant shortcomings.	UNSATISFACTORY

2	Unsatisfactory (U)	Level of achievement is substantially lower than expected and there are major shortcomings.	
1	Highly unsatisfactory (HU)	Level of achievement is negligible and there are severe shortcomings.	

Table 15: Project sustainability evaluation rating criteria

Score	Probability of continued long-term benefits is tied to the Project outcomes and their resilience to financial, socio-political, institutional framework and governance, and environmental risks.)
6	Highly likely (HL)
5	Likely (L)
4	Moderately likely (ML)
3	Moderately unlikely (MU)
2	Unlikely (U)
1	Highly unlikely (HU)

6. Conclusions, recommendations, lessons learned and good practices

6.1 Conclusions

Overall, the Project was well designed and well executed. It was relevant, effective, efficient, well monitored and managed. The sustainability of the Project's benefits is considered moderately unlikely.

The Project's workplan and logframe were relevant and realistic to Egypt's needs, but required some adaptive changes during the inception phase to align with the government's priorities and after the Mid-term Review to reflect the re-defined scope of the financing component. The Working Group, convened during the inception phase, was crucial to orienting the Project to government priorities and ensuring ownership by the national co-operating partners.

The logframe contains SMART indicators and targets at the output level for all components and at the outcome and impact levels for the direct Implementation of EnMS and SO component (Component 5). It lacks, however, SMART indicators and targets for the outcomes of the capacity building components.

The Project was relevant to the Egypt's industry and government, as well as to UNIDO and GEF. It addressed industry's need to cope with rising energy prices, energy shortages and pressure to reduce GHG emissions. It was made and kept consistent with the government's priorities, first through the Working Group in the inception phase and then later through the active oversight of the PSC. It fit well with the UNIDO IEE Programme's approaches and goals for improving industrial energy efficiency and GEF-4's Climate Change Focal Area strategic objectives and strategic programmes for Promoting Energy Efficiency in the Industrial Sector.

The Project achieved or exceeded all the output-level targets for its capacity building components. The Project met or nearly met its SMART outcome-level targets and direct impact-level targets for the Implementation of EnMS and SO component, in that it yielded:

- Greenhouse gas (GHG) emission reductions: 358 kt CO₂/year
(target: 292 kt CO₂/year)
- Energy savings: 1,247 GWh/year
(target: 1,277 GWh/year)
- Mobilised IEE investment: USD 18.46 million
(target: USD 18.9 million)
- Companies having working ISO-certified or -compliant EnMSs: 29 companies
(target: 30 companies)

The progress to impact (at outcome or impact levels) of the capacity building components was not measured or estimated in its own right, achievements were reported only for the underlying output targets.

The Project carried its work within budget. The Project start was delayed almost 2 years because of the political instability associated with the Egyptian Revolution. The implementation period was extended, ultimately ending 2 years and 9 months after the planned end date. The project duration was 11 months greater than planned.

The resilience of the Project's outcomes and the pathways to their broader adoption socio-political risks (partners fulfilling their roles in the Post Project Strategy), and institutional framework and governance risks (national champion and promulgation of more effective IEE policy in near future) is moderately unlikely. Resilience to financial and environmental risks is likely.

The Project's monitoring and evaluation (M&E) system adequately tracked all the SMART indicators in the logframe. All output-level indicators/targets were SMART; 3 of the 8 outcome-level indicators/targets were SMART; 2 of the 3 impact-level indicators/ targets were SMART. The Project was well managed, with good oversight by the Project Steering Committee (PSC).

The Project design did not consider gender mainstreaming. UNIDO's gender policy was issued after the Project began and was not included in the logframe retrospectively. However, there was clearly an emphasis on including women in all stages of the project.

The Project's capacity building activities created a good foundation for ongoing improvement in Egypt's IEE, but the sustainability of the Project's benefits is considered only moderately unlikely. The Project was given exceptional opportunities, which it pursued fully, to play an instrumental role in developing IEE policy in Egypt. The Projects contributed valuable improvements – in the form of greater inter-ministry/inter-agency communications and consensus, strategy foundations, and benchmarking tools – to further policy work. However, government agencies have not yet taken these improvements forward and operationalised them, so further development of effective IEE policies has stalled.

The market for commercial IEE advisory services was bolstered by the Project's training of national experts and will receive ongoing short-term support from the Project's Sustainability Fund. However, the market is still in a nascent stage and is being hampered by weak IEE policies – unambitious and unenforced, despite the Project's substantial work on improving the policy framework – and persisting industrial expectations of receiving free TA services from donor programmes. The general energy market, even with price increases raising attention to the benefits of EE, cannot alone push industry to implement EnMS, SO and other IEE concepts to the extent consistent with Egypt's goals for a transition to clean and renewable energy sources. Egypt needs, but lacks, an adequately-resourced national champion to continue the push for the additional elements necessary to motivate and enable IEE improvement: awareness raising; performance recognition; benchmarking; and policy adoption and enforcement; user and expert training; and financing system support. The Project planned for its sustainability in its Post Project Strategy (IEE Egypt, 2015). However, at the time of the Project's closure, it is not clear whether the national government counterparts will undertake their agreed to roles in the strategy to sustain and fully leverage the Project's outputs.

6.2 Recommendations

6.2.1 Recommendations for Government of Egypt

The evaluation team notes the many accomplishments of the Project, but it also sees room for additional work by the Egyptian government to build upon the Project's work.

- **Project sustainability/broader adoption.** The Project's national government counterparts should undertake their agreed to roles outlined in the **Post Project Strategy** (IEE Egypt, 2015). The Project's Post Project Strategy (IEE Egypt, 2015) was endorsed by all the project partners. The Strategy lays out the partners' individual roles and responsibilities in keeping the Projects' materials, initiatives and momentum going.
 - The **Egyptian Environmental Affairs Agency (EEAA)** should lead the coordination efforts, and lobby with the **Ministry of Trade and Industry (MoTI)**, for policies resulting from the policy strategy developed by the project.
 - The **Industrial Development Authority (IDA)** should house the benchmarking database. This will include conducting periodic updates of data for the 35,000 factories in its current database.
 - The **Egyptian National Cleaner Production Centre (ENCPC)** should coordinate and collaborate with IDA on the benchmarking activities, specifically with verification and auditing functions.
 - The **Egyptian Organization for Standards (EOS)** should continue to conduct awareness raising, assessments and testing of ISO conformity.
 - The **Industrial Modernization Center (IMC)** should continue its work on awareness raising, training, auditing activities in the SME sector. It should also develop, host and expand a Portal for IEE, containing the Project's information, training manuals, Toolkit, names and contacts of certified consultants, and their organisations.
 - The **Federation of Egyptian Industries (FEI)** should focus on intensive awareness raising and technical training for the private sector, and play a focal role in advertising and making industries aware of the sources of funding for IEE.

So far, the partners have not undertaken their roles to sustain and fully leverage the Project's outputs.

- **Broader adoption.** Egypt should establish an adequately-resourced national EE champion to lead the country's effort to improve IEE, including the coordination of the Post Project elements in the previous recommendation.

Egypt has no government agency or other institution serving to keep government and industry focused on EE and its role in reducing GHG emissions and improving cost competitiveness. MoTI's Policy Unit could act as the EE champion, but lacks the EE staffing and capacity to adequately support EE issues within the ministry.

The energy shortages and price increases during the Project period helped focus attention on EE, but discoveries of natural gas in Egypt in 2015 and 2018 will erode the perceived necessity and urgency of pursuing EE in coming years. A national champion with an institutional mandate to promote and facilitate EE is vital.

The champion organisation should address:

- Post-Project Strategy – The champion organisation should be responsible for ensuring the sustainability and further development of the capacity built by the Project. For example, it should act as a central data repository for the Project’s case studies and sectoral guidelines. It could also work with universities, technical schools and training centres to explore using the Project’s EnMS and SO materials in their courses, with a view to establishing new courses consistent with the Project’s user-level and expert-level training. It could develop a quality-controlled roster of energy consultants (starting with the Project’s national experts) to raise industry’s confidence in the EE market’s service providers.
 - EE institutional setup – Currently, several governmental organisations (ENCPC, IMC, EOS, etc) provide similar EE services as each other. There should be a concerted effort refine their roles – with a focus area for each organisation – to improve their specialities and avoid waste and working at cross purposes.
 - National EE law – The agency should seek a comprehensive approach to integrating IEE measures with other policies (e.g. export subsidies). In addition, it should explore ways to realistically adapt the EnMS concept to industrial SME’s and to commercial and institutional buildings. Full compliance with ISO 50001 is costly and probably out of reach for most of these smaller energy-using facilities, but implementation of some aspects of EnMS could lead to important GHG emission reductions, energy savings and development benefits in these sectors.
- **Project sustainability.** Egypt should develop a national certification scheme for energy consultants, managers and auditors to strengthen industry’s confidence in the EE services market. Certification is also necessary to maintain the credibility of compliance with the energy manager provisions of the new electricity law. Because of institutional accreditation prerequisites, such a national certification scheme for competence could not be established in the government within the Project period.

6.2.2 Recommendations for UNIDO

- **Theory of Change, logframe and M&E.** UNIDO projects should:
 - Develop an explicit Theory of Change – including stakeholders; outputs; intended immediate, intermediate and higher-level outcomes; broader adoption pathways; and intended impacts – underlying the interventions.
 - Develop their logframes in a manner consistent with the Theory of Change.
 - Pay more attention to SMART outcome indicators (and the supporting M&E systems) in the logframe to better assess sustainability factors, broader adoption pathways and potential impacts, and to inform adaptive management.

Constructing outcome-level indicators –SMART and consistent with an explicit Theory of Change – and monitoring them during the implementation timeframe would raise projects’ attention to the sustainability of benefits. In particular, future projects should identify replication channels and monitor the strength of their outreach.

Monitoring the outcome-level indicators would also support adaptive management. If poorer-than-expected outcomes are observed early enough, remedial actions and/or alternative future approaches can be taken. Better-than-expected outcomes could point to additional opportunities for advantageous actions.

- **Broader adoption.** Demonstration/pilot facilities should be selected, not only for their interest, commitment and potential GHG and energy impacts, but also for their ability and willingness to share their experiences publicly and through networks and to influence other companies in their company group, sector or supply chain. There should be a focus on facilities/enterprises that are recognised as national/regional/sectoral leaders, that influential within a larger corporate group, or that have supply chain influence. PMUs should set out clear expectations (e.g. through memoranda of understanding) to secure company managers' commitment to devoting sufficient resources and support for the timely completion of demonstration projects, and for disseminating and promoting the results of the intervention to their peers.

Several demonstration/pilot companies in Egypt lacked commitment and dropped out after the initiation of the EnMS or did not proceed with implementation. Others, such as SIDPEC, developed into strong champions of EnMS and SO. The Project took advantage of this champion as a project resource, using it to promote peer-to-peer-based training and implementation within SIDPEC's corporate group (ECHEM). And following this P2P model, the Project provided technical support for 19 companies from the petroleum sector on Motor System Optimization. SIDPEC received a 2016 Clean Energy Ministerial (CEM) Energy Management Insight Award, which recognizes ISO 50001-certified organizations for providing a case study to share insights on the benefits of energy management systems through a campaign for energy management.

- **Broader adoption.** National experts should be recruited and trained as "on-the-ground" IEE champions and conduits for broad adoption of IEE practices and technologies in the post-project period. Their training should develop their technical skills, but also equip them to run sustainable advisory businesses, to teach others EnMS and SO skills, and to influence top industrial managers on IEE issues.
- **Project sustainability.** UNIDO projects should start developing crucial academic ties early in the project cycle. Universities and technical schools are important potential post-project training providers, but curriculum development in some of these institutions (e.g. public universities) can take many years and require support from high level officials. Early involvement of the academic community would increase the likelihood that EnMS and SO topics become part of their institutions' course offerings.
- **Gender mainstreaming.** To become an inspiring example of gender equality, UNIDO should increase its efforts to deploy female international training experts into partner countries and augment its support to female trainees.
- **PMU support.** UNIDO HQ should further support operational efficiency and innovation of PMUs by providing additional document templates and structured communication with their PMU colleagues in neighbouring countries. This support would boost the sense of collegiality and common purpose and would quicken the communication of project best practices and innovative approaches. The interaction with peers/ colleagues could take various forms, including regional PMU workshop or virtual information sessions. It could include a joint cloud repository for surveys and how-to guidelines.

6.3 Lessons learned

- **External finance.** The real and perceived needs, and corporate predisposition, for external finance for IEE projects vary among enterprises in Egypt. Many, if not most, early projects emanating from EnMSs and SO assessments are no-cost, low-cost EE projects and can be funded from internal company budgets, i.e. without external financing. In time, EnMS and SO may lead to higher cost (and presumably higher impact) projects, but the desire to use external financing depends on company situations and culture.
The IEE Egypt Project raised the awareness of senior financial managers of the need for EE financing and its specific requirements (through the awareness events, the study tour to Tunisia and the Kafa'a campaign), but at this point there is no evidence that they are motivated to finance IEE and are actually disbursing funds for this purpose.
- **Demonstration/pilot facilities selection.** Demonstration/pilot facilities have greater impact if they have the ability and willingness to share their experiences publicly and through networks and to influence other companies in their company group, sector or supply chain. (see Recommendations for Government of Egypt section)

6.4 Good practices

- The roles and responsibilities of the National Cooperating Partners were documented early in project in the Operational Manual.
- The Project's Post Project Strategy, completed just after the Mid-Term Review, was endorsed by all the project partners. The Strategy lays out the partners' individual agreed-upon roles and responsibilities in keeping the Projects' materials, initiatives and momentum going. While the success of this sustainability approach in Egypt is still uncertain, it was important to plan and document post-project activities and expectations early in the project cycle to foster a sustainability mindset among the national partners. It sent the signal that the government was expected to carry out maintenance, replication and scaling up activities after the project ended, and not to assume that donor-funded projects will push the program components forward indefinitely.
- The Project's national information campaign (Kafa'a) structure and strategy were based on a rapid assessment, carried out to guarantee maximum campaign impact and ensure that the expected outputs were realistic and valid. The rapid assessment aimed at understanding the overall situation of the industrial energy efficiency challenges and opportunities to ensure that the campaign approach would address real issues.
- The Project's Sustainability Fund was created to provide short-term support for the commercial IEE advisory services market for in the post-project period. The fund allocates money to support the work of the trained energy experts until such time the market dynamics are active, and the market is able on its own to support the services of those experts in the industrial energy management activities. The Fund will be an interest-bearing deposit account for three (3) years which will be used as a financial instrument that will, by utilizing accrued interest, subsidize the hiring of individual experts or companies to deliver technical services for industrial energy efficiency in Egypt.

Annexes

Annex I. Evaluation Terms of Reference



UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

TERMS OF REFERENCE

Independent terminal evaluation of UNIDO project:

Industrial Energy Efficiency in Egypt

UNIDO project ID: 100349 GEF project ID: 3742

April 2018

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I. PROJECT BACKGROUND AND CONTEXT¹⁰

1. Project factsheet

Project factsheet:

Project title	Industrial Energy Efficiency in Egypt
UNIDO project ID	100349
GEF ID	3742
Region	Middle East and North Africa (MENA)
Country	Arab Republic of Egypt
Project donor(s)	GEF
Project approval date	January 2011
Project implementation start date	March 2011
Expected duration at project approval	60 months
Estimated completion date	30/09/2018
GEF Focal Area	Climate Change
Implementing agency	UNIDO
Expected implementation end date	February 2016
Executing partners	Egyptian Environmental Affairs Agency (EEAA)
Donor funding	USD 3,950,000
Co-financing:	USD 24,121,000
Total project cost (USD)	USD 28,071,000
Planned terminal evaluation date	May/August 2018

(Source: Project document)

2. Project context

The impressive real GDP growth rate level achieved by Egypt by the time the project was designed in 2010/11 created the issue of ensuring a stable supply of energy to meet future economic growth targets. At the same time, specific energy consumption is above international expectations for most industries in Egypt, whose industrial scenario is strongly dominated by a large majority of SMEs.

Energy efficiency has always been a low priority of the industry due to low energy prices supported by subsidies, and preference for second-hand equipment. Given this culture of lack of regard for energy conservation, there exist numerous barriers that stand in the way of financing and implementing energy efficiency options.

The GEF-UNIDO project builds upon these circumstances, and tries to overcome the major barriers faced by the Egyptian industrial sector, in particular: i) Corporate decision making and management; ii) Lack of

¹⁰ Data in this chapter is to be validated by the Consultant against the project document and any changes should be reflected in the evaluation report.

data for policy formulation; iii) Lack of awareness; iv) Lack of capacity to design, evaluate and implement EE management and optimization.

3. Project objectives:

The objective of the UNIDO project is to “facilitate energy efficiency improvements in the industrial sector (with a focus on small and medium enterprises) through supporting the development and implementation of a national energy management standard and energy efficiency services for Egyptian industry as well as the creation of demonstration projects”.

The final project’s target is the reduction of the energy consumption compared to business as usual, resulting in correspondent GHG emissions reductions: 1,277 GWh per year and corresponding greenhouse gas emissions reductions of 291.6kt CO₂ annually. The general idea is that energy efficiency represents a significant opportunity for energy savings as a way to bridge the gap between expected energy demand and energy supply in the country.

The main project components and related expected outputs as described in the project document are:

1. National program to define energy benchmarks and implement ISO-compatible Energy Management Standard (EnMS) for industry

Outputs: 1.1) EnMS developed and adopted (compatible with ISO 50001 EnMS)

1.2) Structure in place for measurement and verification (M&V) of compliance with EnMS

1.3) Industrial energy database developed and energy consumption benchmarks developed

1.4) UNIDO’s guide on implementation of ISO 50001 developed with contribution from Egypt

1.5) Post-project action plan

2. Awareness raising on industrial EE and management in industry

Outputs: 2.1) Peer-to-peer network established (to assist companies in energy management plan design and implementation)

2.2) National information campaign

2.3) Monitoring and evaluation of project achievements; and knowledge sharing

3. Capacity Building for Energy Efficiency Services

Outputs: 3.1) Energy management training provided

3.2) Systems optimization training provided

3.3) Vendor training provided

4. Access to finance for industrial EE improvement

Outputs: 4.1) Awareness raised on source of IEE financing and EE project financing

4.2) Support existing financial institutions and government- sponsored incentive programs in the technical evaluation of industrial energy efficiency projects

5. Implementation

Outputs: 5.1) Energy management plans formulated and implemented

5.2) Industrial systems assessed and demo system optimization projects designed and implemented

4. Project implementation arrangements

The project implementation has been managed on a daily basis by the Project Management Unit (PMU). In addition to the Project Manager (PM), the PMU benefitted by the help of an Administration and Finance (A&F) Assistant and a Technical Assistant as well as support staff provided by the counterpart organizations.

A Project Steering Committee (PSC) was established at the inception of the project to provide strategic guidance on the project implementation, and to facilitate the coordination of various Government authorities, institutions and the industries. Among the main responsibilities:

- 1) Approve progress reports, including the inception report;
- 2) Approve and provide strategic guidance for the work plan for the coming six months;
- 3) Approve major changes in the project document in terms of outcomes, outputs, and budgets;
- 4) Take initiative to ensure sustainability and avoid duplication of activities;
- 5) Take initiative to mobilise all relevant stakeholders and partners;
- 6) Provide recommendations to the project in terms of relation to specific priorities not foreseen; at the time of writing this project document.

Egyptian Environmental Affairs Agency (EEAA):

- 1) Designate a senior official as the National Project Director (NPD), to ensure that the project implementation is fully in line with the Government priorities and strategic guidance, and local inputs and participation in the project implementation are in time and adequate;
- 2) Raise awareness on sources of finance for energy efficiency (such as existing government sponsored incentive programs);
- 3) Establish peer-to-peer network to assist companies in energy management plan, design and implementation;
- 4) Conduct a national information campaign on the benefits of energy efficiency and energy management;
- 5) Conduct monitoring and evaluation of project results
- 6) Develop energy management training tools
- 7) Provide energy management and systems optimization training
- 8) Develop training tools for equipment vendors
- 9) Provide training and build capacity of equipment vendors
- 10) Develop post-project action plan

Industrial Development Authority (IDA)

- 1) Provide general industrial data and statistics;
- 2) Provide industrial production and consumption data; 3) Develop the industrial energy database; 4) Develop the energy consumption benchmarks.

Egyptian Organization for Standardization and Quality (EOS)

- 1) Develop Energy Management Standards (EnMS) compatible with ISO50001;
- 2) Develop Measurement and Verification structure for the developed EnMS;
- 3) Develop training tools for equipment vendors;
- 4) Provide training and build capacity of equipment vendors.

Federation of Egyptian Industries (FEI)

- 1) Participate in the awareness raising on sources of finance for energy efficiency (such as existing government sponsored incentive programs);
- 2) Participate in the assessment of industrial systems;

- 3) Participate in the design and implementation of system optimization audits.

Industrial Modernisation Centre (IMC)

- 1) Participate in the development of UNIDO guide on implementation of ISO5001, EnMS
- 2) Participate in the development of training tools for equipment vendors
- 3) Participate in providing training and building capacity of equipment vendors;
- 4) Participate in the assessment of industrial systems;
- 5) Participate in the design and implementation of system optimization audits.

5. Budget information:

Table 1. Financing plan summary - Outcome breakdown

Project outcomes/components	Donor (\$)	Co-Financing (\$)	Total (\$)
1. National program to define energy benchmarks and implement ISO-compatible Energy Management Standard (EnMS) for industry	460,000	2,200,000	2,660,000
2. Awareness raising on industrial EE	335,460	500,000	835,460
3. Technical capacity building on EE services	579,540	750,000	1,329,540
4. Access to finance for EE improvement projects	345,000	750,000	1,095,000
5. Implementation of energy management plans and system optimization	1,850,000	18,910,000	20,760,000
Project management	380,000	1,011,000	1,391,000
Total project costs	3,950,000	24,121,000	28,071,000

Source : Project document

Table 2. Co-Financing source breakdown

Name of Co-financier (source)	Classification	Type	Total Amount (\$)
Egyptian Environmental Affairs Agency (EEAA)	Government	In-kind	1,110,000
Egyptian Environmental Affairs Agency (EEAA)	Government	Cash	15,000,000
Federation of Egyptian Industries (FEI)	Private sector	Cash	3,550,000

Federation of Egyptian Industries (FEI)	Private sector	In-kind	1,400,000
Industrial Modernisation Centre (IMC)	Government	Cash	2,000,000
Industrial Modernisation Centre (IMC)	Government	In-kind	700,000
Private sector	Private sector	Cash	361,000
Total			24,121,000

Source : Project document

Table 3. UNIDO budget execution (starting from 2012)

Item	2012	2013	2014	2015	2016	2017	Total Expenditure (\$)
Contractual Services		313,291	284,380	6,300	132,193	619,736	1,355,900
Equipment		3,696		21,903	75,882		97,785
International Meetings						9,186.15	9,186.15
Local travel		23,609.20	75,733	68,974	90,454	52,772	311,542.2
Nat.Consult./Staff		89,588.26	266,283	205,586	254,725	68,609	884,791.26
Other Direct Costs	9,471.8	27,676	17,385.68	11,273	14,499	3,853	84,158.48
Staff & Intern Consultants		47,841	134,865	116,809	165,288	163,383	628,186
Staff Travel		4,492.34	8,966.18	4,855.99	3,758.41	4,985.18	27,058.1
Train/Fellowship/Study		19,549	20,647.68	32,227	23,566	34,135	130,124.68
Premises		18,659.19	17,205.6	17,508.81	18,060		71,433.6
Grand Total	9,471.8	548,402	825,466	485,436.8	779,425.41	956,659.33	3,600,165.47

Source: UNIDO. ERP database, January 2017

II. Evaluation purpose and scope

The purpose of the evaluation is to independently assess the project to help UNIDO improve performance and results of future programmes and projects.

The evaluation has two specific objectives:

- (i) Assess the project performance in terms of relevance, effectiveness, efficiency, sustainability and progress to impact;
- (ii) Develop a series of findings, lessons and recommendations for enhancing the design of new and implementation of ongoing projects by UNIDO.

The independent terminal evaluation (TE) will cover the whole duration of the project from their starting date in 1/3/2011 to the estimated completion date in 31/09/2018.

III. Evaluation approach and methodology

The TE will be conducted in accordance with the UNIDO Evaluation Policy¹¹ and the UNIDO Guidelines for the Technical Cooperation Project and Project Cycle¹².

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

The evaluation will use a theory of change approach and mixed methods to collect data and information from a range of sources and informants. It will pay attention to triangulating the data and information collected before forming its assessment. This is essential to ensure an evidence-based and credible evaluation, with robust analytical underpinning.

The theory of change will identify causal and transformational pathways from the project outputs to outcomes and longer-term impacts, and drivers as well as barriers to achieve them. The learning from this analysis will be useful to feed into the design of the future projects so that the management team can effectively manage them based on results.

1. Data collection methods

Following are the main instruments for data collection:

- (a) **Desk and literature review** of documents related to the project, including but not limited to:
 - The original project document, monitoring reports (such as progress and financial reports, mid-term review report, output reports, back-to-office mission report(s), end-of-contract report(s) and relevant correspondence.
 - Notes from the meetings of committees involved in the project.
- (b) **Stakeholder consultations** will be conducted through structured and semi-structured interviews and focus group discussion. Key stakeholders to be interviewed include: □ UNIDO Management and staff involved in the project; and □ Representatives of donors and counterparts.
- (c) **Field visit** to project sites in Cairo, Egypt and project management in Vienna, UNIDO HQ.
- (d) **Company-level survey.**

¹¹ UNIDO. (2015). Director General's Bulletin: Evaluation Policy (UNIDO/DGB/(M).98/Rev.1)

¹² UNIDO. (2006). Director-General's Administrative Instruction No. 17/Rev.1: Guidelines for the Technical Cooperation Programme and Project Cycle (DGAI.17/Rev.1, 24 August 2006)

2. Evaluation key questions and criteria

The key evaluation questions are the following:

- (a) What are the key drivers and barriers to achieve the long term objectives? To what extent has the project helped put in place the conditions likely to address the drivers, overcome barriers and contribute to the long term objectives?
- (b) How well has the project performed? Has the project done the right things? Has the project done things right, with good value for money?
- (c) What have been the project's key results (outputs, outcome and impact, if possible)? To what extent have the expected results been achieved or are likely to be achieved against the project design? To what extent the achieved results will sustain after the completion of the project?
- (d) What lessons can be drawn from the successful and unsuccessful practices in designing, implementing and managing the project?

The evaluation will assess the likelihood of sustainability of the project results after the project completion. The assessment will identify key risks (e.g. in terms of financial, socio-political, institutional and environmental risks) and explain how these risks may affect the continuation of results after the project ends. Table 1 below provides the key evaluation criteria to be assessed by the evaluation. The details questions to assess each evaluation criterion are in annex 2.

Table 1. Project evaluation criteria

#	<u>Evaluation criteria</u>	<u>Mandatory rating</u>
A	Impact (or progress toward impact)	Yes
B	Project design	Yes
1	<input type="checkbox"/> Overall design	Yes
2	<input type="checkbox"/> Logframe	Yes
C	Project performance	Yes
1	<input type="checkbox"/> Relevance	Yes
2	<input type="checkbox"/> Effectiveness	Yes
#	<u>Evaluation criteria</u>	<u>Mandatory rating</u>
3	<input type="checkbox"/> Efficiency	Yes
4	<input type="checkbox"/> Sustainability of benefits	Yes
D	Cross-cutting performance criteria	
1	<input type="checkbox"/> Gender mainstreaming	Yes
2	<input type="checkbox"/> M&E: ✓ M&E design ✓ M&E implementation	Yes
3	<input type="checkbox"/> Results-based Management (RBM)	Yes
E	Performance of partners	
1	<input type="checkbox"/> UNIDO	Yes

2	<input type="checkbox"/> National counterparts	Yes
3	<input type="checkbox"/> Donor	Yes
F	Overall assessment	Yes

3. Rating system

In line with the practice adopted by many development agencies, the UNIDO Independent Evaluation Division uses a six-point rating system, where 6 is the highest score (highly satisfactory) and 1 is the lowest (highly unsatisfactory) as per Table 2.

Table 2. Project rating criteria

Score		Definition	Category
6	Highly satisfactory	Level of achievement clearly exceeds expectations and there is no shortcoming.	SATISFACTO
5	Satisfactory	Level of achievement meets expectations (indicatively, over 80-95 per cent) and there is no or minor shortcoming.	
4	Moderately satisfactory	Level of achievement more or less meets expectations (indicatively, 60 to 80 per cent) and there are some shortcomings.	
3	Moderately unsatisfactory	Level of achievement is somewhat lower than expected (indicatively, less than 60 per cent) and there are significant shortcomings.	INSATISFACTO
2	Unsatisfactory	Level of achievement is substantially lower than expected and there are major shortcomings.	
1	Highly unsatisfactory	Level of achievement is negligible and there are severe shortcomings.	

IV. Evaluation process

The evaluation will be implemented in five phases which are not strictly sequential, but in many cases iterative, conducted in parallel and partly overlapping:

- i. Inception phase: The evaluation team leader will prepare the inception report providing details on the methodology for the evaluation and include an evaluation matrix with specific issues for the evaluation; the specific site visits will be determined during the inception phase.
- ii. Desk review and data analysis;
- iii. Interviews, survey and literature review;
- iv. Field visits;
- v. Data analysis and report writing.

V. Time schedule and deliverables

The evaluation is scheduled to take place from May to August 2018. The evaluation field mission to Cairo, Egypt is tentatively planned for June 2018. At the end of the field mission, there will be a presentation of the preliminary findings for all stakeholders involved in this project.

After the evaluation field mission, the evaluation team leader will visit UNIDO HQ for debriefing and presentation of the preliminary findings of the terminal evaluation. The draft TE report will be submitted to UNIDO 3 weeks after the end of the mission. The draft TE report is to be shared with the UNIDO IEV, UNIDO Project Manager, the GEF and other stakeholders for comments and verification of factual and interpretation errors. The TE leader is expected to revise the draft TE report based on the comments received, edit the language and form and submit the final version in accordance with UNIDO ODG/EIO/IED standards.

Table 3. Tentative schedule

Timelines	Tasks
May 2018	Desk review and preparation of inception report
May 2018	Briefing with UNIDO Project Manager and experts based in Vienna – through Skype
June 2018	Field visits
June 2018	Debriefing in Vienna Preparation of first draft evaluation report
July 2018	Preparation of first draft evaluation report Internal peer review of the report by the UNIDO ODG/EIO/IED and other stakeholders comments to draft evaluation report
August 2018	Final evaluation report

VI. Evaluation team composition

The project will be evaluated together with a package of a total of four Industrial Energy Efficiency projects covering Thailand, Indonesia, Iran and Egypt and will be part of the ongoing Impact Evaluation of UNIDOs Industrial Energy Efficiency related programmes. The team will be led by a senior evaluation expert with at least 15 years of relevant experience. The field missions will be conducted by evaluation team members selected by the team leader. The team members are expected to possess a minimum of 7 years of relevant strong experience and expertise on evaluation and industrial energy efficiency, and have relevant qualifications in economics, engineering, development or related disciplines. The team will be supported by a national evaluation consultant, who will be separately contracted by UNIDO in each country.

According to UNIDO Evaluation Policy, members of the evaluation team must not have been directly involved in the design and/or implementation of the project under evaluation.

An evaluation manager from UNIDO ODG/EIO/IED will provide technical backstopping to the evaluation team and ensure the quality of the evaluation and will take part in the evaluation mission - as part of the conduct of the UNIDO Impact Evaluation on Industrial Energy Efficiency Programmes. The UNIDO Project Manager and national project teams will act as resourced persons and provide support to the evaluation team and the evaluation manager. The UNIDO Project Manager and the project team will provide logistical and administrative support the evaluation team to prepare for the field visits. The project team will provide a proposed list of stakeholders (e.g. government officials, private sector representatives and other relevant individuals) to the evaluation team who will make the final decision on who to consult. The

project team will arrange the meetings and prepare field visit schedule for the evaluation team, following their request, prior to the field visit.

The evaluation team will maintain close liaison with the representatives of UNIDO, other UN agencies as well as with the concerned national agencies, and with national and international project staff. The evaluation team is free to discuss with the authorities concerned anything relevant to its assignment. However, it is not authorized to make any commitments on behalf of the Government, the donor or UNIDO.

VII. Reporting

Inception report

This Terms of Reference (ToR) 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 Team Leader will prepare, in collaboration with the team member, 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 Manager.

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 team leader and team members; mission plan, including places to be visited, people to be interviewed and possible surveys to be conducted and a debriefing and reporting timetable¹³.

Evaluation report format and review procedures

The draft report will be delivered to ODG/EIO/IED (the suggested report outline is in Annex 4) 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 TE 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. 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, with an executive summary in English, and follow the outline given in annex 1.

¹³ The evaluator will be provided with a Guide on how to prepare an evaluation inception report prepared by the UNIDO ODG/EIO/IED.

VIII. Quality assurance

All UNIDO evaluations are subject to quality assessments by UNIDO ODG/EIO/IED. Quality assurance and control is exercised in different ways throughout the evaluation process (briefing of consultants on methodology and process of UNIDO ODG/EIO/IED, providing inputs regarding findings, lessons learned and recommendations from other UNIDO evaluations, review of inception report and evaluation report by UNIDO ODG/EIO/IED).

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 ODG/EIO/IED 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 ODG/EIO/IED, which will submit the report to the donor and circulate it within UNIDO together with a management response sheet.

Annex 1: Project Results Framework

The detailed Monitoring and Evaluation Plan, and Risk Assessment Plan, which were both developed and implemented for this project will be shared with the evaluation expert once recruited.

	Indicator	Baseline	Targets End of Project	Source of verification	Risks and Assumptions
Project Objective To facilitate energy efficiency improvements in the industrial sector (with a focus on small and medium enterprises) through supporting the development of a national energy management standard and energy efficiency services for Egyptian industry as well as the creation of demonstration projects	A) Average number of investment and resulting energy savings increased	<ul style="list-style-type: none"> Technical energy savings potential in industry estimated at around 15-30%. Electricity consumption of 37,045 GWh (2009) 	<ul style="list-style-type: none"> Investment in EE technology and processes of USD 18.9 million (energy management, system optimization and implementation of EE measures and demonstration), resulting in energy savings of 1,277 GWh per year (energy and fuel) Number of companies having ISO-certified energy management plans and doing 	<ul style="list-style-type: none"> As given under the various Outcomes Surveys 	<ul style="list-style-type: none"> Willingness of industry to invest
	B) Direct and indirect emission reduction	<ul style="list-style-type: none"> GHG emissions from industry were around 41,082 ktCO₂ in 2009 	<ul style="list-style-type: none"> Direct emission reduction (associated with above-mentioned energy savings) of 291.6k tCO₂ p.a. and (assuming an average 10-year life of energy investment), 2.91 MtCO₂ cumulatively Cumulative indirect emission reduction due to project's capacity building and TA activities over ranging from 8.75 MtCO₂ (bottom-up approach) to 44.8 MtCO₂ (top-down) 	<ul style="list-style-type: none"> As given under the various outcomes 	<ul style="list-style-type: none"> Willingness of industry during and after the project
Outcome 1 Supportive policy instruments (EnMS, benchmarks) for	1) Status of adoption of National Energy Management Standard	<ul style="list-style-type: none"> No EnMS defined. 	<ul style="list-style-type: none"> EnMS adopted and promulgation of EnMS Guidelines issued for 	<ul style="list-style-type: none"> Official publication EnMS user 	<ul style="list-style-type: none"> Government-level support to define and promulgate

delivering EE in industry and contribute to international competitiveness	(EnMS) (output 1.1)		implementation of EnMS	guide • Progress report	EnMS
	2) Status of M&V structure (output 1.2)	• N/A	• Accreditation of EnMS experts and EnMS recognition scheme established • Energy reporting structure in place	•	•
	3) Comprehensiveness of energy-related databases (output 1.3)	• Basic energy consumption data gathering	• 2 training and follow-up events on information supported by project • Information on energy use of about 1,000 industries is updated and expanded and put in the databases	• Data input format • Database output and statistical reports • Progress report	• Willingness of industries to provide such data (which sometimes can be considered confidential)
	4) Availability of benchmark data (output 1.5)	• Benchmark data are available for some sectors	• 2 information and follow-up events on benchmarking supported by project • Benchmark data are available per sector and size of industry and made available on the web info portal	• Web portal • Progress report • Seminar presentations	• Sufficient sectoral and technology data can be gathered to be able to define benchmarks
	5) Status of UNIDO guide on ISO 50001 implementation (output 1.4)	• Work in progress	• Egyptian representatives have participated in formulation of the guide	• Mission and progress reports • UNIDO Guide, final version	• Willingness to participate
	6) Status of post-project action plan (output 1.5)	• N/A	• Final project report consolidating the results and lesson learnt from the implementation of the project, as well as post-project strategy	• Action plan • Project report	• Willingness of implementing agencies and partners to work together in future
Outcome 2 Widespread awareness on EE and energy management in industry	7) Status of networking amongst industrial decision-makers (output 2.1)	• No formal or informal network existing	• Peer-to-peer network established (to assist companies in info exchange, energy management plan	• Minutes of meeting • Progress reports	• Willingness to network within industry or subsectors amongst

			design and implementation)		decision-makers and managers
	8) Status of national information campaign (output 2.2)	<ul style="list-style-type: none"> Some awareness created by previous projects, such as USAID, EEIGGR, etc. 	<ul style="list-style-type: none"> Number and quality of info materials developed and type of media (radio, TV, documentaries, newspaper, leaflets, booklets) Info campaign developed on energy management, system optimization and EE in industry in general 150 companies participating recognition scheme established for participating companies Decision makers are informed through 9-18 events (workshops, seminars, meetings) attended by at least 300-600 industry owners and managers on EE industry 	<ul style="list-style-type: none"> Information materials Progress reports 	<ul style="list-style-type: none"> Support given by media in Egypt
	9) Improved information services (output 2.2)	<ul style="list-style-type: none"> Some info available on project websites and that of institutions 	<ul style="list-style-type: none"> Upgraded and inter-linked websites (e.g. of EEAA, MIT, ECPC, etc.) to provide integrated info on EE Project newsletter 	<ul style="list-style-type: none"> Web sites Project newsletter 	<ul style="list-style-type: none"> Implementing agencies coordinate the content of their websites on EE aspects
	10) Monitoring and evaluation carried out and knowledge captured (output 2.8)	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Monitoring (quarterly and annually) Mid-term and final evaluation Audit reports Number of case studies, lessons learned from (inter-) national sources and number of brochures and booklets 	<ul style="list-style-type: none"> Regular project progress reports Evaluation reports Reports, booklets, brochures on EE 	<ul style="list-style-type: none"> Adequate documentation, reporting and filing of documents
Outcome 3 A cadre is available of specialized / certified energy	11) Enhanced awareness in industry on energy management and	<ul style="list-style-type: none"> Insufficient awareness 	<ul style="list-style-type: none"> Energy managers, energy service providers and other technical staff are trained at 	<ul style="list-style-type: none"> Presentation at events Project 	<ul style="list-style-type: none"> Willingness of the targeted public to benefit from the
management and system optimization experts	energy auditing (output 3.1)		10-15 events (workshops, seminars, courses) attended by 200-450 people at various places in Egypt on energy management	<ul style="list-style-type: none"> progress report Project website 	<ul style="list-style-type: none"> training and supporting materials
	12) Enhanced awareness in industry on systems optimization (output 3.2)	<ul style="list-style-type: none"> Technical capacity and awareness needs improvement 	<ul style="list-style-type: none"> Energy managers, energy service providers and other technical staff are trained at 10-15 events (workshops, seminars, courses) attended by 200-450 people at various places in Egypt on systems optimization, and EE technologies 		
	13) Enhanced awareness in industry on systems optimization (output 3.3)	<ul style="list-style-type: none"> Technical capacity and awareness needs improvement 	<ul style="list-style-type: none"> Managers and technical staff from vendors trained at 3-6 events (workshops, seminars, courses) attended by 260-180 people 		
Outcome 4 Increased access to financial assistance for implementing EE projects	14) Enhanced awareness on sources of IEE financing (output 4.1)	<ul style="list-style-type: none"> Sources of public and private funding support available, but not fully accessed 	<ul style="list-style-type: none"> 10-20 information and consultation events on financial mechanisms supported by the project attended by 200-600 people 	<ul style="list-style-type: none"> Presentation at events Project progress report Project website 	<ul style="list-style-type: none"> Willingness of the targeted public to benefit from the training and supporting materials
	15) Status of TA support to existing financial loan and credit guarantee schemes (output 4.2)	<ul style="list-style-type: none"> Existing schemes do not provide loans for EE in industry due to lack of technical evaluation capacity 	<ul style="list-style-type: none"> Number of institutions supported and number of projects evaluated 	<ul style="list-style-type: none"> Financial institutions leaflets and reports Evaluation reports 	<ul style="list-style-type: none"> Willingness and need of financial schemes to receive TA support by the project and/or trained experts
Outcome 5 State-of-the-art energy management practices and EE measures are implemented and demonstrated	16) Number and quality of energy management plans implemented (output 5.1)	<ul style="list-style-type: none"> Basic audit capacity exists in consulting firms; few energy management plans except in 	<ul style="list-style-type: none"> Standardized audit procedures in line with EnMS 50001 Pre-audits, energy management plans and operational improvements 	<ul style="list-style-type: none"> Audit assessment report Energy management plans 	<ul style="list-style-type: none"> Selected companies are willing to have (pre-)audits and EnMS implemented

		large industry	made in 150 companies (associated energy and CO ₂ savings are given in indicator A) and B) <ul style="list-style-type: none"> ISO 50001-compliant energy management plans fully implemented in 50 companies 	<ul style="list-style-type: none"> Project progress report Project website 	
	17) Status of in-depth assessment conducted (output 5.2)	<ul style="list-style-type: none"> N.A 	<ul style="list-style-type: none"> Detailed energy audits in 50 companies 	<ul style="list-style-type: none"> Case studies Audit reports and feasibility studies Project progress report 	<ul style="list-style-type: none"> Selected companies are willing to have detailed audits
	18) Demonstration projects designed and developed (outputs 5.2)	<ul style="list-style-type: none"> EE technologies are implemented in some sectors, but needs to be demonstrated to a wider audience of large and especially SMEs 	<ul style="list-style-type: none"> Demo activities designed and implemented targeting at 30 medium to large enterprises (at about USD 0.5 million per company), the associated energy and CO₂ savings are given in indicator A) and B) Info exchange about demos 	<ul style="list-style-type: none"> Case studies Design and financial plans Monitoring reports Project progress report Project website 	<ul style="list-style-type: none"> Selected companies are willing to investment in EE improvements, based on investment-grade feasibility analysis Macro-economic environment is conducive for investments by private sector

Annex 2: Detailed questions to assess evaluation criteria

The evaluation team will assess the project performance guided by the questions below. It should be noted that these are the guiding questions. In the inception report, the evaluator will specify key issues and key questions for the evaluation to focus on.

#	Evaluation criteria
A	<p>Progress to impact</p> <ul style="list-style-type: none"> ✓ Mainstreaming: To what extent information, lessons or specific results of the project are incorporated into broader stakeholder mandates and initiatives such as laws, policies, regulations and project? ✓ Replication: To what extent the project's specific results (e.g. methodology, technology, lessons and etc) are reproduced or adopted ✓ Scaling-up: To what extent the project's initiatives and results are implemented at larger geographical scale? ✓ What difference has the project made to the beneficiaries? ✓ What is the change attributable to the project? To what extent? ✓ What are the social, economic, environmental and other effects, either short-, medium- or long-term, on a micro- or macro-level? ✓ What effects are intended or unintended, positive or negative? <p>The three UNIDO impact dimensions are:</p> <ul style="list-style-type: none"> ✓ Safeguarding environment: To what extent the project contributes to changes in the status of environment? ✓ Economic performance: To what extent the project contributes to changes in the economic performance (finances, income, costs saving, expenditure and etc) of individuals, groups and entities? ✓ Social inclusiveness: To what extent the project contributes to changes in capacity and capability of individuals, groups and entities in society, including vulnerable groups, and hence generating employment and access to education and training?
B	<p>Project design</p>
1	<p><input type="checkbox"/> Overall design</p> <ul style="list-style-type: none"> ✓ The problem, need or gap to be addressed by the project is clearly identified, with clear target beneficiaries? ✓ The project design was adequate to address the problems at hand? ✓ Is the project consistent with the Country's priorities, in the work plan of the lead national counterpart? Does it meet the needs of the target group? Is it consistent with UNIDO's Inclusive and Sustainable Industrial Development? Does it adequately reflect lessons learnt from past projects? Is it in line with the donor's priorities and policies? ✓ Is the applied project approach sound and appropriate? Is the design technically feasible and based on best practices? Does UNIDO have in-house technical expertise and experience for this type of intervention? ✓ To what extent the project design (in terms of funding, institutional arrangement, implementation arrangements...) as foreseen in the project document still valid and relevant? ✓ Does it include M&E plan and adequate budget for M&E activities? ✓ Risk management: Are critical risks related to financial, social-political, institutional, environmental and implementation aspects identified with specific risk ratings? Are their mitigation measures identified? Where possible, are the mitigation measures included in project activities/outputs and monitored under the M&E plan?
2	<p><input type="checkbox"/> Logframe</p> <ul style="list-style-type: none"> ✓ Expected results: Is the expected result-chain (impact, outcomes and outputs) clear and logical? Does impact describe a desired long-term change or benefit to a society or community (not as a mean or process), do outcomes describe change in target group's behaviour/performance or system/institutional

	<p>performance, do outputs describe deliverables that project will produce to achieve outcomes? Are the expected results realistic, measurable and not a reformulation or summary of lower level results? Do outputs plus assumptions lead to outcomes, do outcomes plus assumptions lead to impact? Can all outputs be delivered by the project, are outcomes outside UNIDO's control but within its influence?</p> <ul style="list-style-type: none"> ✓ Indicators: Do indicators describe and specify expected results (impact, outcomes and outputs) in terms of quantity, quality and time? Do indicators change at each level of results and independent from indicators at higher and lower levels? Do indicators not restate expected results and not cause them? Are indicators necessary and sufficient and do they provide enough triangulation (cross-checking)? Are they indicators sex-disaggregated, if applicable? Are the indicator SMART? ✓ Sources of verification: Are the sources of verification/data able to verify status of indicators, are they cost-effective and reliable? Are the sources of verification/data able to verify status of output and outcome indicators before project completion? ✓ Are key assumptions properly summarized and reflecting the proper level in the results chain in the logframe?
C	Project performance
1	<p><input type="checkbox"/> <u>Relevance</u></p> <ul style="list-style-type: none"> ✓ How does the project fulfil the urgent target group needs? ✓ To what extent is the project aligned with the development priorities of the country (national poverty reduction strategy, sector development strategy)? ✓ How does project reflect donor policies and priorities? ✓ Is the project a technically adequate solution to the development problem? Does it eliminate the cause of the problem? ✓ To what extent does the project correspond to UNIDO's comparative advantages? ✓ Are the original project objectives (expected results) still valid and pertinent to the target groups? If not, have they been revised? Are the revised objectives still valid in today's context?
2	<p><input type="checkbox"/> <u>Effectiveness</u></p> <ul style="list-style-type: none"> ✓ What are the main results (mainly outputs and outcomes) of the project? What have been the quantifiable results of the project? ✓ To what extent did the project achieve their objectives (outputs and outcomes), against the original/revised target(s)? ✓ What are the reasons for the achievement/non-achievement of the project objectives? ✓ What is the quality of the results? How do the stakeholders perceive them? What is the feedback of the beneficiaries and the stakeholders on the project effectiveness? ✓ To what extent is the identified progress result of the project attributable to the intervention rather than to external factors? ✓ What can be done to make the project more effective? ✓ Were the right target groups reached?
3	<p><input type="checkbox"/> <u>Efficiency</u></p> <ul style="list-style-type: none"> ✓ How economically are the project resources/inputs (concerning funding, expertise, time...) being used to produce results? ✓ To what extent were expected results achieved within the original budget and timeframe? If no, please explain why. ✓ Are the results being achieved at an acceptable cost? Would alternative approaches accomplish the same results at less cost? ✓ What measures have been taken during planning and implementation to ensure that resources are efficiently used? Were the project expenditures in line with budgets? ✓ Could more have been achieved with the same input? ✓ Could the same have been achieved with less input?

	<ul style="list-style-type: none"> ✓ How timely was the project in producing outputs and outcomes? Comment on the delay or acceleration of the project's implementation period. ✓ To what extent were the project's activities in line with the schedule of activities as defined by the
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	<p>Project Team and annual Work Plans?</p> <ul style="list-style-type: none"> ✓ Have the inputs from the donor, UNIDO and Government/counterpart been provided as planned, and were they adequate to meet the requirements?
4	<p><input type="checkbox"/> <u>Sustainability of benefits</u></p> <ul style="list-style-type: none"> ✓ Will the project results and benefits be sustained after the end of donor funding? ✓ Does the project have an exit strategy? ✓ To what extent the outputs and results have been institutionalized? <p><i>Financial risks:</i></p> <ul style="list-style-type: none"> ✓ What is the likelihood of financial and economic resources not being available once the project ends? <p><i>Socio-political risks:</i></p> <ul style="list-style-type: none"> ✓ Are there any social or political risks that may jeopardize the 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? <p><i>Institutional framework and governance risks:</i></p> <ul style="list-style-type: none"> ✓ Do the legal frameworks, policies, and governance structures and processes within which the project operates pose risks that may jeopardize the sustainability of project benefits? ✓ Are requisite systems for accountability and transparency and required technical know-how in place? <p><i>Environmental risks:</i></p> <ul style="list-style-type: none"> ✓ Are there any environmental risks that may jeopardize the sustainability of project outcomes? ✓ Are there any project outputs or higher level results that are likely to have adverse environmental impacts, which, in turn, might affect the sustainability of project benefits?
D	Cross-cutting performance criteria

1	<p>□ <u>Gender mainstreaming</u></p> <ul style="list-style-type: none"> ✓ Did the project design adequately consider the gender dimensions in its interventions? Was the gender marker assigned correctly at entry? ✓ Was a gender analysis included in a baseline study or needs assessment (if any)? Were there gender-related project indicators? ✓ Are women/gender-focused groups, associations or gender units in partner organizations consulted/included in the project? ✓ How gender-balanced was the composition of the project management team, the Steering Committee, experts and consultants and the beneficiaries? ✓ Do the results affect women and men differently? If so, why and how? How are the results likely to affect gender relations (e.g., division of labour, decision-making authority)? ✓ To what extent were socioeconomic benefits delivered by the project at the national and local levels, including consideration of gender dimensions?
2	<ul style="list-style-type: none"> ○ <u>M&E:</u> ○ M&E design ○ Was the M&E plan included in the project document? Was it practical and sufficient at the point of project approval? ○ Did it include baseline data and specify clear targets and appropriate indicators to track environmental, gender, and socio economic results? ○ Did it include a proper M&E methodological approach; specify practical organization and logistics of the M&E activities including schedule and responsibilities for data collection; ○ Does the M&E plan specify what, who and how frequent monitoring, review, evaluations and data collection will take place? Is the M&E plan consistent with the logframe (especially indicators and sources of verification)? ○ Does it allocate adequate budget for M&E activities?

	<ul style="list-style-type: none"> ○ M&E implementation ○ How was the information from M&E system used during the project implementation? Was an M&E system in place and did it facilitate timely tracking of progress toward project results by collecting information on selected indicators continually throughout the project implementation period? Did project team and manager make decisions and corrective actions based on analysis from M&E system and based on results achieved? ○ Are annual/progress project reports complete, accurate and timely? ○ Was the information provided by the M&E system used to improve performance and adapt to changing needs? Was information on project performance and results achievement being presented to the Project Steering Committee to make decisions and corrective actions? Do the Project team and managers and PSC regularly ask for performance and results information? ○ Are monitoring and self-evaluation carried out effectively, based on indicators for outputs, outcomes and impact in the logframe? Do performance monitoring and reviews take place regularly? ○ Were resources for M&E sufficient? ○ How has the logframe been used for Monitoring and Evaluation purposes (developing M&E plan, setting M&E system, determining baseline and targets, annual implementation review by the Project Steering Committee...) to monitor progress towards expected outputs and outcomes? ○ How well have risks outlined in the project document and in the logframe been monitored and managed? How often have risks been reviewed and updated? Has a risk management mechanism been put in place?
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3	<ul style="list-style-type: none"> ○ <u>Results-based management (RBM)</u> <p><i>Results-Based work planning</i> ○ Review any delays in project start-up and implementation, identify the causes and examine if they have been resolved.</p> <ul style="list-style-type: none"> ○ Are there any annual work plans? Are work-planning processes results-based? Has the logframe been used to determine the annual work plan (including key activities and milestone)? ○ Examine the use of the project’s results framework/ logframe as a management tool and review any changes made to it since project start. <i>Results-based monitoring and evaluation</i> ○ Verify whether an M&E system is in place and facilitated timely tracking of progress toward project objectives by collecting information on selected indicators continually throughout the project implementation period; ○ Review the monitoring tool currently being used: Do they provide the necessary information? Do they involve key partners? Are they aligned or mainstreamed with national systems? Do they use existing information? Are they efficient? Are they cost-effective? Are additional tools required? How could they be made more participatory and inclusive? ○ Do project team and manager make decisions and corrective actions based on analysis from M&E system and based on results achieved? Is information on project performance and results achievement being presented to the Project Steering Committee to make decisions and corrective actions? Do the Project team and managers and PSC regularly ask for performance and results information? <i>Results-based reporting</i> ○ Assess how adaptive management changes have been reported by the project management and shared with the PSC. ○ Assess how well the Project Team and partners undertake and fulfil donor and UNIDO reporting requirements (i.e. how have they addressed delays or poor performance, if applicable?) ○ Assess how results and lessons derived from the adaptive management process have been documented, shared with key partners and internalized by partners.
E	Performance of partners
1	<ul style="list-style-type: none"> ○ <u>UNIDO</u> ○ Mobilization of adequate technical expertise for project design ○ Inclusiveness of project design (with national counterparts) ○ Previous evaluative evidence shaping project design ○ Planning for M&E and ensuring sufficient M&E budget ○ Timely recruitment of project staff ○ Project modifications following changes in context or after the Mid-Term Review ○ Follow-up to address implementation bottlenecks ○ Role of UNIDO country presence (if applicable) supporting the project ○ Engagement in policy dialogue to ensure up-scaling of innovations ○ Coordination function ○ Exit strategy, planned together with the government ○ Review overall effectiveness of project management as outlined in the Project Document. Have changes been made and are they effective? Are responsibilities and reporting lines clear? Is decision-making transparent and undertaken in a timely manner? Recommend areas for improvement. ○ To what extent the project has a proper and operational governance system (e.g. PSC with clear roles and responsibilities)? ○ Review whether 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-based management, coordination, monitoring, quality control and technical inputs have been efficient, timely and effective (e.g. problems identified timely and accurately; quality support provided timely and effectively; right staffing levels, continuity, skill mix and frequency of field visits)?

2	<p><input type="checkbox"/> <u>National counterparts</u></p> <p>✓ Design</p> <ul style="list-style-type: none"> ○ Responsiveness to UNIDO’s invitation for engagement in designing the project <p>✓ Implementation</p> <ul style="list-style-type: none"> ○ Ownership of the project ○ Provide financial contribution as planned (cash or in-kind) ○ Support to the project, based on actions and policies ○ Counterpart funding ○ Internal government coordination ○ Exit strategy, planned together with UNIDO, or arrangements for continued funding of certain activities ○ Facilitation of the participation of Non-Governmental Organizations(NGOs), civil society and the private sector where appropriate ○ Suitable procurement procedures for timely project implementation ○ Engagement with UNIDO in policy dialogue to promote the up-scaling or replication of innovations
3	<p><input type="checkbox"/> <u>Donor</u></p> <ul style="list-style-type: none"> ✓ Timely disbursement of project funds ✓ Feedback to progress reports, including Mid-Term Evaluation, if applicable ✓ Support by the donor’s country presence (if applicable) supporting the project for example through engagement in policy dialogue
F	<p>Overall assessment</p> <ul style="list-style-type: none"> ✓ Overarching assessment of the project, drawing upon the analysis made under Project performance and Progress to Impact criteria above but not an average of ratings.

Annex 3- Outline of an in-depth project evaluation report Executive summary (maximum 5 pages)

Evaluation purpose and methodology

Key findings

Conclusions and recommendations

Project ratings

Tabular overview of key findings – conclusions – recommendations

1. Introduction

1.1. Evaluation objectives and scope

1.2. Overview of the Project Context

1.3. Overview of the Project

1.4. Theory of Change

1.5. Evaluation Methodology

1.6. Limitations of the Evaluation

2. Project's contribution to Development Results - Effectiveness and Impact

2.1. Project's achieved results and overall effectiveness

2.2. Progress towards impact

2.2.1. Behavioral change

2.2.1.1. Economically competitive - Advancing economic competitiveness

2.2.1.2. Environmentally sound – Safeguarding environment

2.2.1.3. Socially inclusive – Creating shared prosperity

2.2.2. Broader adoption

2.2.2.1. Mainstreaming

2.2.2.2. Replication

2.2.2.3. Scaling-up

3. Project's quality and performance

3.1. Design

3.2. Relevance

3.3. Efficiency

3.4. Sustainability

3.5. Gender mainstreaming

4. Performance of Partners

4.1. UNIDO

4.2. National counterparts

4.3. Donor

5. Factors facilitating or limiting the achievement of results

5.1. Monitoring & evaluation

5.2. Results-Based Management

5.3. Other factors

5.4. Overarching assessment and rating table

6. Conclusions, recommendations and lessons learned

6.1. Conclusions

6.2. Recommendations

6.3. Lessons learned

6.4. Good practices

Annexes (to be put online separately later)

- Evaluation Terms of Reference
- Evaluation framework
- List of documentation reviewed
- List of stakeholders consulted
- Project logframe/Theory of Change
- Primary data collection instruments: evaluation survey/questionnaire
- Statistical data from evaluation survey/questionnaire analysis

Annex 4: Checklist on evaluation report quality

Project Title:

UNIDO project ID:

Evaluation team:

Quality review done by:

Date:

Report quality criteria	UNIDO IED assessment notes	Rating
a. Was the report well-structured and properly written? (Clear language, correct grammar, clear and logical structure)		
b. Was the evaluation objective clearly stated and the methodology appropriately defined?		
c. Did the report present an assessment of relevant outcomes and achievement of project objectives?		
d. Was the report consistent with the ToR and was the evidence complete and convincing?		
e. Did the report present a sound assessment of sustainability of outcomes or did it explain why this is not (yet) possible? (Including assessment of assumptions, risks and impact drivers)		
f. Did the evidence presented support the lessons and recommendations? Are these directly based on findings?		
g. Did the report include the actual project costs (total, per activity, per source)?		
h. Did the report include an assessment of the quality of both the M&E plan at entry and the system used during the implementation? Was the M&E sufficiently budgeted for during preparation and properly funded during implementation?		
i. Quality of the lessons: were lessons readily applicable in other contexts? Did they suggest prescriptive action?		
j. Quality of the recommendations: did recommendations specify the actions necessary to correct existing conditions or improve operations ('who?' 'what?' 'where?' 'when?'). Can these be immediately implemented with current resources?		
k. Are the main cross-cutting issues, such as gender, human rights and environment, appropriately covered?		
l. Was the report delivered in a timely manner? (Observance of deadlines)		

Rating system for quality of evaluation reports

A rating scale of 1-6 is used for each criterion: Highly satisfactory = 6, Satisfactory = 5, Moderately satisfactory = 4, Moderately unsatisfactory = 3, Unsatisfactory = 2, Highly unsatisfactory = 1, and unable to assess = 0.

Annex II. Project evaluation criteria definitions

Project evaluation criteria definitions

#	Evaluation criteria	Definition
A	Progress to impact	Positive and negative, primary and secondary long-term effects produced by a development intervention, directly or indirectly, intended or unintended, including redirecting trajectories of transformational process and the extent to which conditions for trajectory change are being put into place.
B	Project design	Formulation of the intervention, the plan to achieve a specific purpose.
1	• Overall design	Assessment of the design in general.
2	• Logframe	Assessment of the logical framework aimed at planning the intervention.
C	Project performance	Functioning of a development intervention.
1	• Relevance	The extent to which the aid activity is suited to the priorities and policies of the target group, recipient and donor.
2	• Effectiveness	The extent to which the development intervention's objectives were achieved, or are expected to be achieved, taking into account their relative importance.
3	• Efficiency	A measure of how economically resources/inputs (funds, expertise, time, etc.) are converted to results.
4	• Sustainability of benefits	The continuation of benefits from a development intervention after major development assistance has been completed. The probability of continued long-term benefits. The resilience to risk of the net benefit flows over time.
D	Cross-cutting performance criteria	Other important criteria that cut across the UNIDO intervention.
1	• Gender mainstreaming	The extent to which UNIDO interventions have contributed to better gender equality and gender related dimensions were considered in an intervention.
2	• M&E: <ul style="list-style-type: none"> ○ M&E design ○ M&E implementation 	Refers to all the indicators, tools and processes used to measure if a development intervention has been implemented according to the plan (monitoring) and is having the desired result (evaluation).
3	• Results-based Management (RBM)	Assessment of issues related to results-based work planning, results based M&E and reporting based on results.
E	Performance of partners	Assessment of partners' roles and responsibilities engaged in the intervention.
1	• UNIDO	Assessment of the contribution of partners to project design, implementation, monitoring and reporting, supervision and backstopping and evaluation. The performance of each partner will be assessed individually, based on its expected roles and responsibilities in the project life cycle.
2	• National counterparts	
3	• Donor	
F	Overall assessment	Overarching assessment of the project, drawing upon the analysis made under Project performance and Progress to Impact criteria above but not an average of ratings.

Project evaluation rating criteria

Score		Definition	Category
6	Highly satisfactory (HS)	Level of achievement clearly exceeds expectations and there is no shortcoming.	SATISFACTORY
5	Satisfactory (S)	Level of achievement meets expectations (indicatively, over 80-95 per cent) and there is no or minor shortcoming.	
4	Moderately satisfactory (MS)	Level of achievement more or less meets expectations (indicatively, 60 to 80 per cent) and there are some shortcomings.	
3	Moderately unsatisfactory (MU)	Level of achievement is somewhat lower than expected (indicatively, less than 60 per cent) and there are significant shortcomings.	UNSATISFACTORY
2	Unsatisfactory (U)	Level of achievement is substantially lower than expected and there are major shortcomings.	
1	Highly unsatisfactory (HU)	Level of achievement is negligible and there are severe shortcomings.	

Project sustainability evaluation rating criteria

Score	Probability of continued long-term benefits is tied to the Project outcomes and their resilience to financial, socio-political, institutional framework and governance, and environmental risks.)
6	Highly likely (HL)
5	Likely (L)
4	Moderately likely (ML)
3	Moderately unlikely (MU)
2	Unlikely (U)
1	Highly unlikely (HU)

Annex III. List of documentation reviewed

Ahram (2015). "Energy crisis was expected", Al-Ahram Weekly, Issue 1237, 12 - 18 March 2015.
Link: <http://weekly.ahram.org.eg/News/10651.aspx>

CAPMAS (2016). "Egypt in Numbers". Central Agency for Public Mobilization and Statistics (CAPMAS), year 2016 issue.

GEF (2007). Focal Area Strategies and Strategic Programming for GEF-4, GEF Policy Paper, October 2007

IEE Egypt (2011). Project Document

IEE Egypt (2013). Project Operational Manual

IEE Egypt (2014). Independent Mid-Term Evaluation

IEE Egypt (2015). Post Project Strategy and Updated Logframe

IEE Egypt (2018). Final Report (PIR)

IFC (2016). "Unlocking value: Alternative Fuels for Egypt's Cement Industry". International Finance Cooperation (IFC), World Bank Group. Accessed Online: <https://www.ifc.org/wps/wcm/connect/e72160cd-e60e-4f98-b5b4-4ae3acb60393/IFC+AFR+Report++final+24-10-2016.pdf?MOD=AJPERES>

IISD (2014). "Energy Subsidy Country Update: Assessing Egypt's Energy Subsidy Reforms". International Institute for Sustainable Development, Global Subsidies Initiative, August 2014.

IMF (2014). "Energy Subsidies in the Middle East and North Africa: Lessons for Reform". International Monetary Fund (IMF), March 2014.

Sakr (2016). "Diffusion of Cleaner Technologies and Practices in the Middle East and North Africa Region: With a Special Focus upon Egypt", by Dalia Sakr. Thesis Erasmus University, Faculty of Social Sciences, International Off-Campus PhD Program in Cleaner Production, Cleaner Products, Industrial Ecology and Sustainability, Rotterdam, Netherlands.

UNIDO (2005). Analysis of the current situation in Egypt, Programme for the establishment of National Cleaner Production Centre (NCPC) in Egypt, United Nations Industrial Development Organization (UNIDO), March 2005.

UNIDO (2018). Evaluation Manual, UNIDO Independent Evaluation Division, Vienna

World Bank (2009). "Tapping a Hidden Resource: Energy Efficiency in the Middle East and North Africa". Washington, DC: World Bank.

Annex IV. List of stakeholders consulted

List of interviewees

Organisation/ Institution	Contact
National counterparts of Steering Committee and other government agencies	
Ministry of Environment, Egyptian Environmental Affairs Agency (EEAA)	<ul style="list-style-type: none"> • Mr. M. Shehab Abdel Wahab Chief Executive Officer • Eng. Sherif Abdel Rahim Head of Climate Change Central Department UNFCCC Focal Point IPCC Focal Point IEE National Project Director
Ministry of Trade and Industry (MoTI), Egyptian National Clean Production Center (ENCPC)	<ul style="list-style-type: none"> • Eng. Ali Abo Senna ENCPC Director Secretary of Global RECP Network, Arab Region Representative
Ministry of Trade and Industry (MoTI), Policy Unit	<ul style="list-style-type: none"> • Ms. Gihan Khattab
Ministry of Trade and Industry (MoTI), Egyptian Organization for Standardization and Quality (EOS)	<ul style="list-style-type: none"> • Eng. Ashraf Ismail Afify Chairman • Eng. Abeer Abdel Monem mohamed Sadik General Manager of Technical Relations Department • Eng. Esraa Abdel Aziz Technical Engineer (IEE trainee)
Ministry of Trade and Industry (MoTI), Industrial Development Authority (IDA)	<ul style="list-style-type: none"> • Eng. Amany Moemen Chairman's Counselor for Strategies and International Cooperation • Dr. Sabry Ibrahim Elshafie General Manager of Policies and Legislative Studies • Dr. Aisha Mohamed Abou Laban Director of the Central Department for Industrial Approvals and Registration (IEE EnMS trainee while on staff at EEAA) • 5-6 staff engineers (IEE benchmarking trainees)
Ministry of Trade and Industry (MoTI), Industrial Modernization Centre (IMC)	<ul style="list-style-type: none"> • Dr. Amr Taha Deputy Executive Director • Aziza Gamal El Saqqa Business Development Specialist • Eng. Hashem Abdel Kader Competitiveness Program Sr. Manager (IEE trainee)
Federation of Egyptian Industries (FEI), Environmental Compliance Office (ECO)	<ul style="list-style-type: none"> • Eng. Wafaa Ismail Abdalla Energy Sector Head (IEE trainee)
UNIDO National Project Coordinator	<ul style="list-style-type: none"> • Dr. Gihan Bayoumi
UNIDO Representative	<ul style="list-style-type: none"> • Ms. Giovanna Ceglie UNIDO Representative in Egypt and Director of the Regional Office

Organisation/ Institution	Contact
UNDP	<ul style="list-style-type: none"> • Ayman Mostafa Elzahaby TEST Technical Manager (Egypt) Switch Med – MED TEST II project
National Ozone Unit	<ul style="list-style-type: none"> • Dr. Ezzat Louis Ozone Officer, Montreal Protocol Projects coordinator Ministry of Environment, • Egyptian Environmental Affairs Agency (EEAA), National Ozone Unit • Eng. Shahenaz Fouad National Expert for ODS and GEF Projects UNIDO • Eng. Ahmed A. ElKorashy Senior Projects Engineer Ministry of Environment, Egyptian Environmental Affairs Agency (EEAA), National Ozone Unit
Pilot companies	
El-Araby Group of Companies	<ul style="list-style-type: none"> • Eng. Gameel Abd el Hamid Allam Quality, H&S Group General Manager • Ahmed Samy Elshaboury Maintenance Senior Manager
Sidi Kerir Petrochemicals Company (Sidpec)	<ul style="list-style-type: none"> • Eng. Mohamed Mohamed Ibrahim Quality General Manager • Eng. Mohamed Salaheldin Quality Assurance Sector Manager
Training recipients, project consultants, certification body	
Chemonix Egypt Consultants (consulting company); Assistant professor, Electrical Power and Machines Department, Faculty of Engineering, University of Cairo	<ul style="list-style-type: none"> • Dr. Ahmed Huzayyin Manager of the Eco-Industrial Unit (national expert and trainer on EnMS/SO)
Enviglobe (consulting company); Professor, Mechanical Engineering, University of Cairo	<ul style="list-style-type: none"> • Dr. Fatheya A. Soliman Founder and Managing Director of Enviglobe (fertilizer industry benchmarking consultant; ceramics industry benchmarking teacher)
Environics Inc. (consulting company)	<ul style="list-style-type: none"> • Eng. Yasser Sherif Managing Director of Environics (IEE policy consultant)
Independent energy management consultant	<ul style="list-style-type: none"> • Eng. Samir Khafagui (national expert and trainer EnMS/SO)
Independent management and banking consultant	<ul style="list-style-type: none"> • Ms. Hoda K. Sabry (IEE Senior financial consultant)
Independent consultant	<ul style="list-style-type: none"> • Eng. Ayman El Zahaby (steel industry benchmarking consultant; national expert EnMS/SO)

Organisation/ Institution	Contact
Integral Environmental Solutions (consulting company)	<ul style="list-style-type: none"> • Dr. Amr Osama Abdel-Aziz President of Integral (cement industry benchmarking consultant; ceramics industry benchmarking teacher; IEE consultant on “Roadmap for operational benchmarking system and strategy”) • Dr. Ahmad Wafiq Technical Team Lead • Eng. Esraa elMitainy Senior Environmental Specialist (EnMS trainee)
Masader Environmental and Energy Services (consulting company)	<ul style="list-style-type: none"> • Dr. Abdelhamid Beshara Director of Masader (national expert and trainer on EnMS/SO)
Tabbin Institute for Metallurgical Studies (TIMS)	<ul style="list-style-type: none"> • Eng. Rabab Manee (national expert and trainer on EnMS/SO)
TÜV NORD Egypt (certification body)	<ul style="list-style-type: none"> • Mr. Ramy Marei Business Development Manager

Source: Terminal Evaluation Mission Plan.

Annex V. Project logframe, CEO endorsement 2011

Applicable GEF Strategic Objective and Program: To promote energy-efficient technologies and practices in industrial production and manufacturing processes					
Applicable GEF Expected Outcomes: Improved energy efficiency of industrial production					
Applicable GEF Outcome Indicators: Efficiency of industrial energy use (energy use / \$ GDP); GHG emissions from industry (tons CO ₂ eq/ \$ GDP); and \$/ t CO ₂ eq					
	Indicator	Baseline	Targets End of Project	Source of verification	Risks and Assumptions
Project Objective To facilitate energy efficiency improvements in the industrial sector (with a focus on small and medium enterprises) through supporting the development of a national energy management standard and energy efficiency services for Egyptian industry as well as the creation of demonstration projects	A) Average number of investment and resulting energy savings increased	<ul style="list-style-type: none"> Technical energy savings potential in industry estimated at around 15-30%. Electricity consumption of 37,045 GWh (2009) 	<ul style="list-style-type: none"> Investment in EE technology and processes of USD 18.9 million (energy management, system optimization and implementation of EE measures and demonstration), resulting in energy savings of 1,277 GWh per year (energy and fuel) Number of companies having ISO-certified energy management plans and doing 	<ul style="list-style-type: none"> As given under the various Outcomes Surveys 	<ul style="list-style-type: none"> Willingness of industry to invest
	B) Direct and indirect emission reduction	<ul style="list-style-type: none"> GHG emissions from industry were around 41,082 ktCO₂ in 2009 	<ul style="list-style-type: none"> Direct emission reduction (associated with above-mentioned energy savings) of 291.6k tCO₂ p.a. and (assuming an average 10-year life of energy investment), 2.91 MtCO₂ cumulatively Cumulative indirect emission reduction due to project's capacity building and TA activities over ranging from 8.75 MtCO₂ (bottom-up approach) to 44.8 MtCO₂ (top-down) 	<ul style="list-style-type: none"> As given under the various outcomes 	<ul style="list-style-type: none"> Willingness of industry during and after the project
Outcome 1 Supportive policy instruments (EnMS, benchmarks) for	1) Status of adoption of National Energy Management Standard	<ul style="list-style-type: none"> No EnMS defined 	<ul style="list-style-type: none"> EnMS adopted and promulgation of EnMS Guidelines issued for 	<ul style="list-style-type: none"> Official publication EnMS user 	<ul style="list-style-type: none"> Government-level support to define and promulgate
delivering EE in industry and contribute to international competitiveness	(EnMS) (output 1.1)		implementation of EnMS	guide <ul style="list-style-type: none"> Progress report 	EnMS
	2) Status of M&V structure (output 1.2)	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Accreditation of EnMS experts and EnMS recognition scheme established Energy reporting structure in place 		
	3) Comprehensiveness of energy-related databases (output 1.3)	<ul style="list-style-type: none"> Basic energy consumption data gathering 	<ul style="list-style-type: none"> 2 training and follow-up events on information supported by project Information on energy use of about 1,000 industries is updated and expanded and put in the databases 	<ul style="list-style-type: none"> Data input format Database output and statistical reports Progress report 	<ul style="list-style-type: none"> Willingness of industries to provide such data (which sometimes can be considered confidential)
	4) Availability of benchmark data (output 1.3)	<ul style="list-style-type: none"> Benchmark data are available for some sectors 	<ul style="list-style-type: none"> 2 information and follow-up events on benchmarking supported by project Benchmark data are available per sector and size of industry and made available on the web info portal 	<ul style="list-style-type: none"> Web portal Progress report Seminar presentations 	<ul style="list-style-type: none"> Sufficient sectoral and technology data can be gathered to be able to define benchmarks
	5) Status of UNIDO guide on ISO 50001 implementation (output 1.4)	<ul style="list-style-type: none"> Work in progress 	<ul style="list-style-type: none"> Egyptian representatives have participated in formulation of the guide 	<ul style="list-style-type: none"> Mission and progress reports UNIDO Guide, final version 	<ul style="list-style-type: none"> Willingness to participate
	6) Status of post-project action plan (output 1.5)	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Final project report consolidating the results and lesson learnt from the implementation of the project, as well as post-project strategy 	<ul style="list-style-type: none"> Action plan Project report 	<ul style="list-style-type: none"> Willingness of implementing agencies and partners to work together in future
Outcome 2 Widespread awareness on EE and energy management in industry	7) Status of networking amongst industrial decision-makers (output 2.1)	<ul style="list-style-type: none"> No formal or informal network existing 	<ul style="list-style-type: none"> Peer-to-peer network established (to assist companies in info exchange, energy management plan 	<ul style="list-style-type: none"> Minutes of meeting Progress reports 	<ul style="list-style-type: none"> Willingness to network within industry or subsectors amongst

			design and implementation)		decision-makers and managers
	8) Status of national information campaign (output 2.2)	<ul style="list-style-type: none"> Some awareness created by previous projects, such as USAID, EEIGGR, etc. 	<ul style="list-style-type: none"> Number and quality of info materials developed and type of media (radio, TV, documentaries, newspaper, leaflets, booklets) Info campaign developed on energy management, system optimization and EE in industry in general 150 companies participating recognition scheme established for participating companies Decision makers are informed through 9-18 events (workshops, seminars, meetings) attended by at least 300-600 industry owners and managers on EE industry 	<ul style="list-style-type: none"> Information materials Progress reports 	<ul style="list-style-type: none"> Support given by media in Egypt
	9) Improved information services (output 2.2)	<ul style="list-style-type: none"> Some info available on project websites and that of institutions 	<ul style="list-style-type: none"> Upgraded and inter-linked websites (e.g. of EEAA, MIT, ECPC, etc) to provide integrated info on EE Project newsletter 	<ul style="list-style-type: none"> Web sites Project newsletter 	<ul style="list-style-type: none"> Implementing agencies coordinate the content of their websites on EE aspects
	10) Monitoring and evaluation carried out and knowledge captured (output 2.3)	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Monitoring (quarterly and annually) Mid-term and final evaluation Audit reports Number of case studies, lessons learned from (inter-) national sources and number of brochures and booklets 	<ul style="list-style-type: none"> Regular project progress reports Evaluation reports Reports, booklets, brochures on EE 	<ul style="list-style-type: none"> Adequate documentation, reporting and filing of documents
Outcome 3 A cadre is available of specialized / certified energy	11) Enhanced awareness in industry on energy management and	<ul style="list-style-type: none"> Insufficient awareness 	<ul style="list-style-type: none"> Energy managers, energy service providers and other technical staff are trained at 	<ul style="list-style-type: none"> Presentation at events Project 	<ul style="list-style-type: none"> Willingness of the targeted public to benefit from the
management and system optimization experts	energy auditing (output 3.1)		10-15 events (workshops, seminars, courses) attended by 200-450 people at various places in Egypt on energy management	<ul style="list-style-type: none"> progress report Project website 	<ul style="list-style-type: none"> training and supporting materials
	12) Enhanced awareness in industry on systems optimization (output 3.2)	<ul style="list-style-type: none"> Technical capacity and awareness needs improvement 	<ul style="list-style-type: none"> Energy managers, energy service providers and other technical staff are trained at 10-15 events (workshops, seminars, courses) attended by 200-450 people at various places in Egypt on systems optimization, and EE technologies 		
	13) Enhanced awareness in industry on systems optimization (output 3.3)	<ul style="list-style-type: none"> Technical capacity and awareness needs improvement 	<ul style="list-style-type: none"> Managers and technical staff from vendors trained at 3-6 events (workshops, seminars, courses) attended by 260-180 people 		
Outcome 4 Increased access to financial assistance for implementing EE projects	14) Enhanced awareness on sources of IEE financing (output 4.1)	<ul style="list-style-type: none"> Sources of public and private funding support available, but not fully accessed 	<ul style="list-style-type: none"> 10-20 information and consultation events on financial mechanisms supported by the project attended by 200-600 people 	<ul style="list-style-type: none"> Presentation at events Project progress report Project website 	<ul style="list-style-type: none"> Willingness of the targeted public to benefit from the training and supporting materials
	15) Status of TA support to existing financial loan and credit guarantee schemes (output 4.2)	<ul style="list-style-type: none"> Existing schemes do not provide loans for EE in industry due to lack of technical evaluation capacity 	<ul style="list-style-type: none"> Number of institutions supported and number of projects evaluated 	<ul style="list-style-type: none"> Financial institutions leaflets and reports Evaluation reports 	<ul style="list-style-type: none"> Willingness and need of financial schemes to receive TA support by the project and/or trained experts
Outcome 5 State-of-the-art energy management practices and EE measures are implemented and demonstrated	16) Number and quality of energy management plans implemented (output 5.1)	<ul style="list-style-type: none"> Basic audit capacity exists in consulting firms; few energy management plans except in 	<ul style="list-style-type: none"> Standardized audit procedures in line with EnMS 50001 Pre-audits, energy management plans and operational improvements 	<ul style="list-style-type: none"> Audit assessment report Energy management plans 	<ul style="list-style-type: none"> Selected companies are willing to have (pre-)audits and EnMS implemented

		large industry	made in 150 companies (associated energy and CO ₂ + savings are given in indicator A) and B) <ul style="list-style-type: none"> ISO 50001-compliant energy management plans fully implemented in 50 companies 	<ul style="list-style-type: none"> Project progress report Project website 	
	17) Status of in-depth assessment conducted (output 5.2)	<ul style="list-style-type: none"> N.A 	<ul style="list-style-type: none"> Detailed energy audits in 50 companies 	<ul style="list-style-type: none"> Case studies Audit reports and feasibility studies Project progress report 	<ul style="list-style-type: none"> Selected companies are willing to have detailed audits
	18) Demonstration projects designed and developed (outputs 5.2)	<ul style="list-style-type: none"> EE technologies are implemented in some sectors, but needs to be demonstrated to a wider audience of large and especially SMEs 	<ul style="list-style-type: none"> Demo activities designed and implemented targeting at 30 medium to large enterprises (at about USD 0.5 million per company); the associated energy and CO₂+ savings are given in indicator A) and B) Info exchange about demos 	<ul style="list-style-type: none"> Case studies Design and financial plans Monitoring reports Project progress report Project website 	<ul style="list-style-type: none"> Selected companies are willing to investment in EE improvements, based on investment-grade feasibility analysis Macro-economic environment is conducive for investments by private sector

Annex VI. Project logframe, revised 2015

Applicable GEF Strategic Objective and Program: To promote energy-efficient technologies and practices in industrial production and manufacturing processes					
Applicable GEF Expected Outcomes: Improved energy efficiency of industrial production					
Applicable GEF Outcome Indicators: Efficiency of industrial energy use (energy use / \$ GDP); GHG emissions from industry (t CO ₂ e/ \$ GDP); and \$/ t CO ₂ e					
	Indicator	Baseline	Targets End of Project	Source of verification	Risks and Assumptions
Project Objective To facilitate energy efficiency improvements in the industrial sector through supporting the development of a national energy management standard and energy efficiency services for Egyptian industry as well as the creation of demonstration projects in large and medium sized businesses	A) Average number of investments and resulting energy savings increased	<ul style="list-style-type: none"> Technical energy savings potential in industry estimated at around 15-30%. Industrial electricity consumption of 42,000 GWh (2012) 	<ul style="list-style-type: none"> Investment in EE technology and processes of USD 18.9 million (energy management, system optimization and implementation of EE measures and demonstration projects) resulting in energy savings of 1277 GWh per year 30 companies having working ISO-compliant energy management systems. 	<ul style="list-style-type: none"> See below under the various Outcomes Surveys Verification of compliance in report by international consultant 	<ul style="list-style-type: none"> Willingness of industry to invest during project
	B) Direct and indirect emission reduction	<ul style="list-style-type: none"> GHG emissions from industry were around 41 Mt CO₂ in 2009 	<ul style="list-style-type: none"> Direct emission reduction (associated with above-mentioned energy savings) of 292 kt CO₂ p.a. and (assuming an average 10-year life of energy investment) 2.92 Mt CO₂ cumulatively Cumulative indirect emission reduction due to project's capacity building and TA activities ranging from 8.75 Mt CO₂ (bottom-up approach) to 44.8 Mt CO₂ (top-down) 	<ul style="list-style-type: none"> See below under the various outcomes 	<ul style="list-style-type: none"> Willingness of industry to invest during and after the project
Outcome 1 Supportive policy and policy instruments for delivering EE in industry	1) EnMS concepts promoted by relevant governmental stakeholders <i>(output 1.1)</i>	• N/A	<ul style="list-style-type: none"> TOT to 20 governmental professionals 3 awareness raising workshops conducted by governmental entities and attended by 60 representatives from industrial enterprises 	<ul style="list-style-type: none"> Project progress Reports List of participants and attendance records 	<ul style="list-style-type: none"> Lack of interest
	2) M&V mechanism developed and adopted by relevant institutions <i>(output 1.2)</i>	• N/A	<ul style="list-style-type: none"> M&V protocol developed and implemented by EOS 	<ul style="list-style-type: none"> M&V guide developed 	<ul style="list-style-type: none"> Lack of interest
	3) Energy database developed and available for evidence based policy dialogue <i>(output 1.3)</i>	<ul style="list-style-type: none"> Basic energy consumption data gathering 	<ul style="list-style-type: none"> 2-3 day training workshops on benchmarking methodology and data analysis supported by project Databases designed and operational Benchmark data are available per sector and size of industry, at IDA and ENCPC, for four industrial sectors, and made available on web info portal 	<ul style="list-style-type: none"> Database output and statistical reports Progress report Web portal displaying benchmarking databases Use of benchmarking reports at decision-making level 	<ul style="list-style-type: none"> Willingness of industries to provide such data (which sometimes can be considered confidential) Allocation of responsible unit within MIFT, to ensure continued data collection
	4) UNIDO guide on ISO 50001 implementation available as reference <i>(output 1.4)</i>	<ul style="list-style-type: none"> Guide published but not translated 	<ul style="list-style-type: none"> Guide translated, distributed and available on web 	<ul style="list-style-type: none"> Mission & progress report UNIDO Guide in Arabic 	<ul style="list-style-type: none"> Guide not contextual
	5) Post-project action plan developed and implemented <i>(output 1.5)</i>	• N/A	<ul style="list-style-type: none"> Final project report consolidating results & lessons learnt from project implementation, as well as post-project strategy Post project action plan endorsed by partners 	<ul style="list-style-type: none"> Action plan Project report 	<ul style="list-style-type: none"> Willingness of implementing agencies and stakeholders to work together in future Willingness of

	Indicator	Baseline	Targets End of Project	Source of verification	Risks and Assumptions
					partners to commit to certain tasks
	6) Effective IEE strategy and action plan developed <i>(output 1.6)</i>	• No strategy in place	• Recommendations for policy directives developed and agreed upon by all partners	• Mission & progress report • Strategy Document • Minutes of Steering Committee	• Willingness of government to drive policy
Outcome 2 Widespread awareness on EE and energy management in industry	7) Established network between industrial decision-makers <i>(output 2.1)</i>	• No network for Energy Management or Energy Efficiency existing	• At least 2 Peer-to-peer networks established (to assist companies in info exchange, energy management plan design and implementation)	• Progress reports	• Willingness to network within industry or subsectors amongst decision-makers and managers
	8) National information campaign developed and widely disseminated <i>(output 2.2)</i>	• Some awareness created by previous projects, such as USAID, EEIGGR, EPAP etc.	• Info campaign developed on energy management, system optimization and EE in industry in general • 30 companies participating in recognition scheme for participating companies • Decision makers informed through 9-18 events (workshops, seminars, meetings) attended by over 300 industry owners and managers on EE in industry in which project participates	• Information materials • Progress reports • Attendance records	• Support given by media in Egypt
	9) Improved information services on IEE available at partner institutions <i>(output 2.2)</i>	• Some info available on project & institutional websites	• Upgraded and inter-linked websites (e.g. of EEAA, MIT, ECPC, etc.) to provide integrated info on EE • Project newsletter • Published best cases of energy savings • Publications of proven demonstration projects	• Web sites • Project newsletter • Reports, booklets, EE brochures as outputs of project and partner activities	• Implementing agencies coordinate the content of their websites on EE aspects
	Indicator	Baseline	Targets End of Project	Source of verification	Risks and Assumptions
	10) Monitoring and evaluation carried out and knowledge captured <i>(output 2.3)</i>	• N/A Any annual EE reports, value of new technologies/systems introduced in industry	• Monitoring (quarterly and annually) • Mid-term review & final evaluation • Factory Assessment reports • Benchmarking data collection and reports • Collation and publication of case studies, lessons learned from (inter-) national sources • Self-reporting mechanisms in place and utilized in partner institutions	• Regular progress reports • Reporting by partners on assessments and activities conducted • Evaluation reports	• Adequate documentation, reporting and filing of documents
Outcome 3 A cadre of available energy management and system optimization experts is certified by UNIDO	11) Number of persons trained on energy management and energy auditing <i>(output 3.1)</i>	• Technical capacity and awareness needs improvement	• 55 experts trained in implementing EnMs at expert level • 300 industrial professionals trained in EnMS implementation (2 day User Training) • 30 government agency personnel trained in EnMS implementation (2 day User Training)	• Project progress report • Training sign-in sheets and attendance • UNIDO certificate issues to trained consultants	• Willingness of the targeted public to benefit from the training and supporting materials • Availability of appropriate expert trainees
	12) Number of persons trained on systems optimization <i>(output 3.2)</i>	• Technical capacity and awareness needs improvement	• Training on 2 systems conducted for 40 industry personnel and consultants per system		

	Indicator	Baseline	Targets End of Project	Source of verification	Risks and Assumptions
Outcome 4 Increased awareness of available EE financial assistance	13) Enhanced awareness on sources of IEE financing <i>(output 4.1)</i>	<ul style="list-style-type: none"> Sources of public and private funding support available, but not fully accessed 	<ul style="list-style-type: none"> 1-2 workshops held on available sources of finances for IEE in industry 	<ul style="list-style-type: none"> Presentation at events Project progress report Attendance records 	<ul style="list-style-type: none"> Willingness of the targeted public to benefit from the training and supporting materials
	14) TA support available to industry and existing financial and loan and credit schemes <i>(output 4.2)</i>	<ul style="list-style-type: none"> Existing schemes do not provide loans for EE in industry due to lack of technical evaluation capacity 	<ul style="list-style-type: none"> Trained experts are able to extend TA to industry and financial institutions Two workshops held for financial institutions detailing available TA and available trained experts 	<ul style="list-style-type: none"> Financial institutions leaflets and reports Evaluation reports 	<ul style="list-style-type: none"> Willingness and need of financial schemes to receive TA support from the project and/or trained experts
Outcome 5 State-of-the-art energy management practices and EE measures are implemented and demonstrated	15) Number and quality of energy management plans implemented <i>(output 5.1)</i>	<ul style="list-style-type: none"> Basic audit capacity exists in consulting firms; few energy management plans except in large industry 	<ul style="list-style-type: none"> Standardized energy performance monitoring in line with EnMS 50001 Energy management plans and operational improvements made in 50 companies (associated energy and CO₂- savings are given in indicator A and B) ISO 50001-compliant energy management plans fully implemented in 30 companies 	<ul style="list-style-type: none"> Audit assessment report Energy management plans Project progress report Project website ISO 50001 certifications 	<ul style="list-style-type: none"> Lack of interest Co-funding mobilization
	16) Number of detailed assessments conducted <i>(output 5.2)</i>	<ul style="list-style-type: none"> N.A 	<ul style="list-style-type: none"> Detailed assessments in 15 companies 	<ul style="list-style-type: none"> Case studies Audit reports and feasibility studies 	<ul style="list-style-type: none"> Selected companies are willing to have detailed audits
	Indicator	Baseline	Targets End of Project	Source of verification	Risks and Assumptions
	17) Number of Demonstration projects implemented <i>(outputs 5.2)</i>	<ul style="list-style-type: none"> EE technologies are implemented in some sectors 	<ul style="list-style-type: none"> Demo activities designed and implemented targeting at 10 medium to large enterprises The associated energy and CO₂- savings are given in indicator A) and B) Info exchange about demos 	<ul style="list-style-type: none"> Project progress report Case studies Design and financial plans Monitoring reports Project progress report Project website 	<ul style="list-style-type: none"> Lack of interest Macro-economic environment is conducive for investments by private sector

Annex VII. Additional data

Size distribution of pilot projects, by direct GHG emission reductions (ktCO₂eq/10yr)

Nominal range of GHG emission reductions (ktCO ₂ /10yr)	Actual range of GHG emission reductions (ktCO ₂ /10yr)	Number of companies	Companies in sectors	Portion of total GHG emission reductions
>1,000	2197.6	1	1 Iron & Steel	61.3%
100-1,000	106.7-244.1	6	2 Cement 2 Iron & steel 2 Petrochemicals	29.9%
10-100	13.0-87.4	9	1 Cement 1 Ceramics 1 Chemicals 2 Engineering 1 Glass 3 Petrochemicals	7.6%
1-10	1.8-9.0	12	1 Building Materials 1 Ceramics 1 Chemicals 4 Engineering 3 Fertilizer 1 Food 1 Textiles	1.1%
0-1	0.1-1.0	5	1 Chemicals 1 Engineering 1 Food 2 Petrochemical	0.1%

Size distribution of pilot projects, by direct energy savings (MWh/year)

Nominal range of energy savings (MWh/year)	Actual range of energy savings (MWh/year)	Number of companies	Companies in sectors	Portion of total energy savings
>100,000	814,000	1	1 Iron & Steel	65.3%
10,000-100,000	18,648-87,391	8	2 Cement 2 Iron & steel 4 Petrochemicals	32.0%
1,000-10,000	1,659-5,600	8	1 Cement 1 Ceramics 1 Chemicals 2 Engineering 1 Fertilizer 1 Glass 1 Petrochemicals	2.2%
100-1,000	110-867	13	1 Building Materials 1 Ceramics 2 Chemicals 4 Engineering 2 Fertilizer 1 Food 1 Petrochemicals 1 Textiles	0.5%
0-100	13-53	3	1 Engineering 1 Food 1 Petrochemical	<0.5%