



# GEF-6 PROJECT IDENTIFICATION FORM (PIF)

PROJECT TYPE: FSP

TYPE OF TRUST FUND:GEFTF

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## PART I: PROJECT INFORMATION

Project Title:	Egyptian Programme for Promoting Industrial Motor Efficiency		
Country(ies):	Egypt	GEF Project ID: <sup>1</sup>	9423
GEF Agency(ies):	UNIDO	GEF Agency Project ID:	160007
Other Executing Partner(s):	Ministry of Industry, Trade and SMEs Egyptian National Cleaner Production Center (ENCPC) Federation of Egyptian Industries	Submission Date:	03/04/2016
		Resubmission Date:	03/21/2016
		Resubmission Date:	04/06/2016
		Resubmission Date:	08/01/2016
		Resubmission Date:	08/22/2016
GEF Focal Area(s):	Climate Change	Project Duration (Months)	48
Integrated Approach Pilot	IAP-Cities <input type="checkbox"/> IAP-Commodities <input type="checkbox"/> IAP-Food Security <input type="checkbox"/>	Corporate Program: SGP <input type="checkbox"/>	
Name of parent program:	[if applicable]	Agency Fee (\$)	261,250

## A. INDICATIVE FOCAL AREA STRATEGY FRAMEWORK AND OTHER PROGRAM STRATEGIES<sup>2</sup>

Objectives/Programs (Focal Areas, Integrated Approach Pilot, Corporate Programs)	Trust Fund	(in \$)	
		GEF Project Financing	Co-financing
CCM-1 Program 1	GEFTF	2,750,000	16,800,000
<b>Total Project Cost</b>		<b>2,750,000</b>	<b>16,800,000</b>

## B. INDICATIVE PROJECT DESCRIPTION SUMMARY

<b>Project Objective:</b> The project aims to reduce GHG emissions by facilitating and supporting market penetration of highly energy efficient motor systems in the industrial sector in Egypt.						
Project Components	Financing Type <sup>3</sup>	Project Outcomes	Project Outputs	Trust Fund	(in \$)	
					GEF Project Financing	Co-financing
Component 1: Conducive Policy and Legal Environment for EE Motors	TA	1.1 Legislative and regulatory frameworks for EE motors developed	1.1.1 Benchmarks of identified sectors holding greatest potential are conducted 1.1.2 Policy recommendations and roadmap on the phase out of old motors and deployment of EE motors are developed including ESCO's incentive models	GEFTF	250,000	800,000

<sup>1</sup> Project ID number will be assigned by GEFSEC and to be entered by Agency in subsequent document submissions.

<sup>2</sup> When completing Table A, refer to the excerpts on [GEF 6 Results Frameworks for GETF, LDCF and SCCF](#).

<sup>3</sup> Financing type can be either investment or technical assistance.

			1.1.3 An action plan to support local industries in the development of EE and clean technology for motors is developed			
Component 2: Awareness and Capacity Building on Energy Efficiency Motors	TA	2.1 Key stakeholders trained and awareness campaign conducted on EE motors	2.1.1 National awareness campaign on the benefits of Electric Motor Driven Systems (EMDS) in the industrial sector designed and conducted 2.1.2. Peer to peer platform for information exchange, cooperation and partnerships among seekers and providers of services and information on EE motors is developed 2.1.3. Information gained through the 20 demonstration projects is disseminated 2.1.4. 20 qualified System Optimization practitioners trained 2.1.5.50 vendors of motor systems trained on the benefits of EE motors 2.1.6.100 industrial enterprises personnel trained on motor systems' efficiency measures	GEFTF	550,000	2,300,000
Component 3: Technical Assistance for Technology Demonstration and Upscaling	TA	3.1 Technology demonstrations and mechanism to support wide-scale deployment are in place	3.1.1. Detailed motor efficiency audits for 30 selected enterprises conducted 3.1.2 Technical and business advisory services for 20 pilot and business projects development facilitated	GEFTF	300,000	1,800,000

	INV		3.1.3. System optimization for EMDS implemented and EE motors installed in 20 enterprises		500,000	3,500,000
	TA		3.1.4. Feasibility for establishing an ESCO model assessed 3.1.5. ESCO developed and established 3.1.6. Public private partnerships with international suppliers developed to accelerate the deployment of EE motors		900,000	7,200,000
Component 4: Monitoring and Evaluation	TA	4.1 Project monitoring and evaluation	4.1.1. Project Implementation Reports (PIRs), Mid-term Review (MTR) and Terminal Evaluation (TE) conducted in timely manner	GEFTF	75,000	400,000
Subtotal					2,575,000	16,000,000
Project Management Cost (PMC) <sup>4</sup>				GEFTF	175,000	800,000
<b>Total Project Cost</b>					<b>2,750,000</b>	<b>16,800,000</b>

For multi-trust fund projects, provide the total amount of PMC in Table B, and indicate the split of PMC among the different trust funds here: (The PMC costs exceeds 5% for projects above 2 million as the project duration is over a 4 year period and the budget is still below US\$ 3 million. Sufficient resources need to be allocated for the management of the project on the ground to ensure successful results for all the project components)

### C. INDICATIVE SOURCES OF **CO-FINANCING** FOR THE PROJECT BY NAME AND BY TYPE, IF AVAILABLE

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Amount (\$)
GEF Agency	UNIDO	In-kind	220,000
GEF Agency	UNIDO	Grant	80,000
Private Sector	Industrial companies and enterprises	Grant	5,000,000
Recipient Government	Ministry of Trade and Industry	In-kind	1,000,000
Private Sector	Federation of Egyptian Industries	Loans	2,500,000
Others	Financial Institutions (EBRD- Sustainable Energy Financing Facility (SEFF)/ National Bank of Egypt (NBE) and other national banks	Loans	8,000,000
<b>Total Co-financing</b>			<b>16,800,000</b>

<sup>4</sup> For GEF Project Financing up to \$2 million, PMC could be up to 10% of the subtotal; above \$2 million, PMC could be up to 5% of the subtotal. PMC should be charged proportionately to focal areas based on focal area project financing amount in Table D below.

**D. INDICATIVE TRUST FUND RESOURCES REQUESTED BY AGENCY(IES), COUNTRY(IES) AND THE PROGRAMMING OF FUNDS <sup>a)</sup>**

GEF Agency	Trust Fund	Country/ Regional/ Global	Focal Area	Programming of Funds	(in \$)		
					GEF Project Financing (a)	Agency Fee (b) <sup>b)</sup>	Total (c)=a+b
UNIDO	GEFTF	Egypt	Climate Change		2,750,000	261,250	3,011,250
<b>Total GEF Resources</b>					<b>2,750,000</b>	<b>261,250</b>	<b>3,011,250</b>

a) Refer to the [Fee Policy for GEF Partner Agencies](#).

**E. PROJECT PREPARATION GRANT (PPG)<sup>5</sup>**

Is Project Preparation Grant requested? Yes  No  If no, skip item E.

**PPG AMOUNT REQUESTED BY AGENCY(IES), TRUST FUND, COUNTRY(IES) AND THE PROGRAMMING OF FUNDS**

Project Preparation Grant amount requested: \$50,000					PPG Agency Fee: 4,750		
GEF Agency	Trust Fund	Country/ Regional/Global	Focal Area	Programming of Funds	(in \$)		
					PPG (a)	Agency Fee <sup>6</sup> (b)	Total c = a + b
UNIDO	GEF TF	Egypt	Climate Change	(select as applicable)	50,000	4,750	54,750
<b>Total PPG Amount</b>					<b>50,000</b>	<b>4,750</b>	<b>54,750</b>

<sup>5</sup> PPG requested amount is determined by the size of the GEF Project Financing (PF) as follows: Up to \$50k for PF up to \$2m (for MSP); up to \$100k for PF up to \$3m; \$150k for PF up to \$6m; \$200k for PF up to \$10m; and \$300k for PF above \$10m. On an exceptional basis, PPG amount may differ upon detailed discussion and justification with the GEFSEC.

<sup>6</sup> PPG fee percentage follows the percentage of the Agency fee over the GEF Project Financing amount requested.

## F. PROJECT'S TARGET CONTRIBUTIONS TO GLOBAL ENVIRONMENTAL BENEFITS<sup>7</sup>

Provide the expected project targets as appropriate.

Corporate Results	Replenishment Targets	Project Targets
1. Maintain globally significant biodiversity and the ecosystem goods and services that it provides to society	Improved management of landscapes and seascapes covering 300 million hectares	<i>Hectares</i>
2. Sustainable land management in production systems (agriculture, rangelands, and forest landscapes)	120 million hectares under sustainable land management	<i>Hectares</i>
3. Promotion of collective management of transboundary water systems and implementation of the full range of policy, legal, and institutional reforms and investments contributing to sustainable use and maintenance of ecosystem services	Water-food-ecosystems security and conjunctive management of surface and groundwater in at least 10 freshwater basins;	<i>Number of freshwater basins</i>
	20% of globally over-exploited fisheries (by volume) moved to more sustainable levels	<i>Percent of fisheries, by volume</i>
4. Support to transformational shifts towards a low-emission and resilient development path	750 million tons of CO <sub>2e</sub> mitigated (include both direct and indirect)	<b>Direct:</b> 480,000 tCO <sub>2e</sub> <b>Indirect:</b> 1.44 million tCO <sub>2e</sub> <b>Total:</b> 1.92 million tCO <sub>2e</sub> <sup>8</sup>
5. Increase in phase-out, disposal and reduction of releases of POPs, ODS, mercury and other chemicals of global concern	Disposal of 80,000 tons of POPs (PCB, obsolete pesticides)	<i>metric tons</i>
	Reduction of 1000 tons of Mercury	<i>metric tons</i>
	Phase-out of 303.44 tons of ODP (HCFC)	<i>ODP tons</i>
6. Enhance capacity of countries to implement MEAs (multilateral environmental agreements) and mainstream into national and sub-national policy, planning financial and legal frameworks	Development and sectoral planning frameworks integrate measurable targets drawn from the MEAs in at least 10 countries	<i>Number of Countries:</i>
	Functional environmental information systems are established to support decision-making in at least 10 countries	<i>Number of Countries:</i>

## PART II: PROJECT JUSTIFICATION

### 1. Project Description.

#### 1) Global environmental problems and/or adaptation problems, root causes and barriers that need to be addressed

- Given recent demographic trends and the pace of industrialization, the demand for electricity production is increasingly surpassing the supply. Therefore, apart from increasing global electricity supply sustainably, it is important to consider how electricity is utilized by end-users. Recent studies by the International Energy Agency (IEA) have shown that Electric Motor Driven Systems (EMDS) have a great potential for energy saving opportunities as they represent the single largest electricity end-user globally; especially for the industrial sector which consumes the largest amount of electricity worldwide.
- EMDS used by the industrial sector, mainly medium and large motors, represent 64% of the total EMDS electricity consumption which accounts for about 4,488 TWh/year. These motors have a significant impact on

<sup>7</sup> Provide those indicator values in this table to the extent applicable to your proposed project. Progress in programming against these targets for the projects per the *Corporate Results Framework* in the [GEF-6 Programming Directions](#), will be aggregated and reported during mid-term and at the conclusion of the replenishment period. There is no need to complete this table for climate adaptation projects financed solely through LDCF and/or SCCF.

<sup>8</sup> These emission reductions were calculated under the assumption of a 10% saving scenario.

the total energy operating cost for industry representing more than 97% of total motor operating costs over the motor's lifetime. In fact, it has been estimated that it is technically plausible and cost-effective to save about 20-30% of the global electric motor industrial energy demand which is equivalent to 897–1,346 TWh. Apart from electricity savings, the adoption of EE motors can produce other benefits including GHG emissions and water consumption reductions, air and gas losses decrease as well as automation and process management. Without comprehensive energy efficiency measures in place, global energy consumption from EMDS will rise to 13,360 TWh representing more than a 60% increase, will produce 8,570 Mt of CO<sub>2</sub>eq emissions and will cost almost USD 900 billion per year by 2030.<sup>9</sup>

3. Following the global trend, Egypt's electricity consumption is increasing much faster than capacity expansions. The increase in energy demand has been met primarily by intensifying the use of fossil fuels which have led to a high energy and carbon intensive economy. In fact, Egypt's greenhouse gas (GHG) emissions have been growing exponentially placing Egypt among the 11 fastest GHG emitters in the world. According to the 2010 NEEDS assessment, in order to meet Egypt's growing energy demand, an additional 2.7GW of generation capacity every year through 2020 are required.<sup>10</sup>
4. Like other emerging economies, Egypt faces the challenge of ensuring industrial growth while keeping input resources costs competitive and safeguarding the environment. The industrial sector consumed 40,725 GWh - almost 30%- of the national electricity consumption which represented 143, 204 GWh in 2013 and produced 25.05 MtCO<sub>2e</sub> –almost 10%- of the total GHG emissions which reached 288.19 MtCO<sub>2e</sub> in 2012.<sup>11</sup> Over the last decade, industrial energy productivity in Egypt has not improved at the same rate nor received the same attention as labor and material productivity partly because of the significant government subsidies which resulted in low energy prices. According to the *Egypt: Improve Efficiency* report of the World Bank, most industrial processes and equipment in Egypt consume 20% or more energy than international best practices. Yet as the energy subsidies are being phased out, there is a strong interest and potential for energy efficiency technologies within the Egyptian industrial sector, in particular in the manufacturing industry and energy intensive sectors.<sup>12</sup>
5. In this regard, the adoption of EE motors in the industrial sector represents one of the highest impact opportunity areas to promote industrial productivity while combating climate change. In 2013, motors consumed 60-70 % of the total industrial electricity demand in Egypt accounting for approximately 28,507 GWh. Nevertheless, the adoption of EE motors is still significantly low as industries enjoyed subsidized energy prices which are being gradually removed as well as low labour and high material costs which make it more attractive to rewind old motors than to buy more efficient although costlier motors. Besides, there is a lack of national standards and the necessary testing facilities for motor efficiency in addition to limited general awareness regarding the benefits of utilizing EE electrical motors and financial schemes for up-grading current industrial processes. In fact, the initial investment on EE EMDS remains significantly high, particularly for small and medium industries (SMIs).
6. Considering the above mentioned, the Egyptian government has recognized that a programme targeting motor efficiency in the country presents a cost-effective opportunity to significantly lower future energy demands, reduce potential supply shortages and improve energy security. Furthermore as a high percentage of electricity is consumed by industry, it is highly relevant to aim at saving opportunities within the industrial sector.

<sup>9</sup> OECD/IEA (2011), *Energy-efficiency policy opportunities for electric motor-driven systems*, [https://www.iea.org/publications/freepublications/publication/EE\\_for\\_ElectricSystems.pdf](https://www.iea.org/publications/freepublications/publication/EE_for_ElectricSystems.pdf), (March, 2016).

<sup>10</sup> Nachmany M., Fankhauser S., Davidová J., et al, *The 2015 Global Climate Legislation*, <http://www.lse.ac.uk/GranthamInstitute/legislation/countries/egypt/>, (March, 2016).

<sup>11</sup> IEA, *Egypt Balances for 2013*, <https://www.iea.org/statistics/statisticssearch/report/?year=2013&country=Egypt&product=Balances> (Feb. 2016).

<sup>12</sup> The World Bank (2010), *Egypt: Improve Energy Efficiency*, [http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2012/06/05/000427087\\_20120605093931/Rendered/PDF/693100ESWOP1210WB0EE0September02010.pdf](http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2012/06/05/000427087_20120605093931/Rendered/PDF/693100ESWOP1210WB0EE0September02010.pdf) (March, 2016).

Finally, the programme will support the national efforts to reduce GHG emission without compromising economic development as committed in the its Intended Nationally Determined Contributions (INDCs) under the U.N. Framework Convention on Climate Change (UNFCCC) Conference of the Parties (COP21) in Paris in December 2015.<sup>13</sup>

## 2) The baseline scenario of any associated baseline projects

### 2.1 Baseline scenario

7. In 2015, Egypt's electricity generating capacity was about 31.45 GW from which 70% was fueled by natural gas.<sup>14</sup> Since Egypt struggles with natural gas shortages, the country has been forced to import fuel to cover the shortfall as the political and social unrest has impeded the government's plan to expand power generation capacity by 30 GW by 2020. As such, the additional demand could be fulfilled by either continue importing fuels at a great cost to the economy, introducing other energy sources to the energy mix or by undertaking an ambitious national program to reduce the energy demand through energy efficiency and best utilization of available resources.
8. As EE becomes a higher national priority, several codes and plans targeting various aspects of EE have been issued and are currently under implementation including the Mandatory EE Code for residential (2006), commercial (2009) and governmental (2011) buildings, the National Energy Efficiency Action Plan (2012-2015) as well as MEPS and labeling schemes for selected equipment and appliances.<sup>15</sup>
9. In 2015, the Egyptian Electricity Law was adopted including a chapter on EE with provisions related to cogeneration, standards and labelling which targets to improve 20% EE by 2020, considering 2008 as the baseline. Furthermore, the law includes but is not limited to expanding the label and standards program for equipment and appliances as well as developing a phase out plan for inefficient equipment.<sup>16</sup> The program covers refrigerators, air conditioners, washing machines, electric water heaters and CFLs and accredits the Energy Efficiency Testing Laboratories established at the New and Renewable Energy Authority premises.<sup>17</sup>
10. Also in 2015, Egypt actively participated in the COP 21 of the UNFCCC. Even though, Egypt only contributes with 288.19 MtCO<sub>2</sub> –the equivalent of 0.6% of the total CO<sub>2</sub> emissions worldwide– the country is one of the fastest growing emitters in the world and one of the most vulnerable places to climate change damage. Therefore, national efforts have been made to reduce GHGs emissions in different sectors including energy, transportation and industry. In its INDCs, Egypt targets to improve EE through a combination of behavioral changes and rapid adoption of stringent efficiency regulations, technology standards, and environmental externality pricing to mitigate rebound effects. The introduction of new EE legislation is expected to increase industrial productivity, create numerous opportunities for the EE market and support the eventual emergence and development of EE technologies local value chain.<sup>18</sup>
11. Even if Egypt's economy has not fully recovered since the 2011 revolution, the national electricity consumption reached 143, 204 GWh in 2013 from which almost 30% accounted for the industrial sector energy consumption.<sup>19</sup> Currently, the industrial sector is composed of about 42,000 licensed establishments distributed all over the country with 57% of Egyptian industries classified as medium size, 34% as micro or

<sup>13</sup> Climate Investment Funds, *Egypt Overview*, <https://www-cif.climateinvestmentfunds.org/country/egypt>, (January, 2016).

<sup>14</sup> The rest being fueled by petroleum and renewable energy (mostly hydroelectricity), slightly higher than the expected peak demand in 2015 of 30 GW, according to the Middle East Economic Survey (MEES).

<sup>15</sup> RCREEE (2015), *Arab Future Energy Index™(AFEX) Energy Efficiency 2015*, [http://www.rcreee.org/sites/default/files/afex\\_ee\\_2015\\_english\\_web\\_0.pdf](http://www.rcreee.org/sites/default/files/afex_ee_2015_english_web_0.pdf), (January, 2016).

<sup>16</sup> Hafez A. El-Salmawy, *Egyptian Power Sector Reform and New Electricity Reform and New Electricity Law*, <http://www.ecrc.org.eg/backend/uploads/documents/Dr.Hafez%20El-Salmawy%20-%20EgyptEra.pdf>, (February, 2016).

<sup>17</sup> Ibrahim Yassin Mahmoud, *Development in Egyptian Energy Efficiency Policy*, [http://www.eeigr.com/CONFERENCES/04\\_Sudan/EE%20POLICIES%20mod2.pdf](http://www.eeigr.com/CONFERENCES/04_Sudan/EE%20POLICIES%20mod2.pdf), (January, 2016).

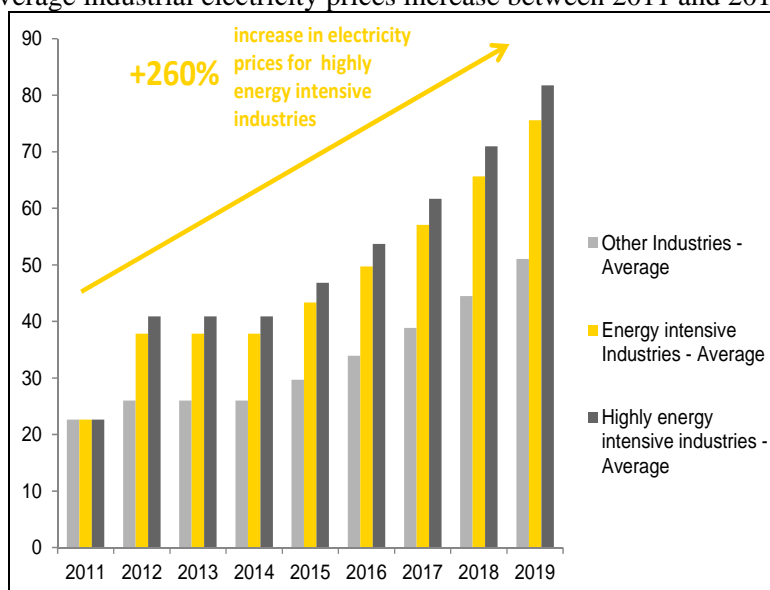
<sup>18</sup> UNIDO, *Industrial Energy Efficiency in Egypt*, <https://open.unido.org/api/documents/3081067/download/Project%20Document%20100349.pdf>, (January, 2016).

<sup>19</sup> *Idem*.

small industries and only 9% as large industries. The electricity consumption of the industrial sector is expected to keep growing following last decade's trend when it exponentially increased from 24,552 GWh in 2000 to 40,725 GWh in 2013.<sup>20</sup> In fact, Egypt has the highest energy intensity industry in the MENA region mainly because of outdated industrial systems, predominance of state-owned factories and energy subsidies.<sup>21</sup> Egyptian industries, especially the energy intensive ones, benefited for several decades from low energy prices which accounted in average to a 73% subsidy on their electricity bill. With energy subsidies habitually driving a large and structural fiscal deficit as well as constant electricity shortages, low energy prices started to be widely considered as a luxury that Egypt could no longer afford. In 2007, the Government undertook a major energy reform to reduce the massive public spending destined to energy subsidies, which was regarded as the first step in a longer process of energy reform.

12. Still in 2013, energy subsidies reached approximately \$16 billion, representing more than 20% of the national budget expenditures.<sup>22</sup> As such in 2014, the Egyptian Government introduced a plan to completely phase out electricity subsidies by 2019 causing electricity prices to progressively double over 5 years. The highest impact has been perceived by energy intensive industries such as iron, steel, aluminum, copper, fertilizers and petrochemicals which represent only 420 industries or 1% of the total but 65% of the industrial sector energy share accounting for 26,471 GWh in 2013. Nevertheless, the growing costs of electricity have not only impacted the energy intensive industries. According to the World Bank (WB) Survey, 36% of the 42,000 licensed industrial establishments distributed all over the country identified electricity as a major business constraint in 2014 compared to only 14% in 2008.<sup>23</sup> Therefore, the transition to international market prices can advance the Egyptian industries interest in investing in EE technologies and equipment in order to maintain their profit margin, offer competitive market prices and strengthen the sector against global increases in energy prices.

Estimated average industrial electricity prices increase between 2011 and 2019 in \$/MWh<sup>24</sup>



13. According to the energy saving potential analysis conducted under the GEF-4 UNIDO Industrial Energy Efficiency project, electric motors were one of the highest impact opportunity areas to accelerate EE as motors

<sup>20</sup> IEA, *Egypt Balances for 2013*.

<sup>21</sup> RCREEE (2015), *Arab Future Energy Index™(AFEX) Energy Efficiency 2015*, [http://www.rcreee.org/sites/default/files/afex\\_ee\\_2015\\_english\\_web\\_0.pdf](http://www.rcreee.org/sites/default/files/afex_ee_2015_english_web_0.pdf), (January, 2016).

<sup>22</sup> IFC (2015), *Energy Efficient Industries - Market and Investment Opportunities in Egypt*.

<sup>23</sup> The World Bank Group (2015), *Climate Efficient Industries – Opportunities And Barriers In Mena The Case Of Egypt*,

<http://di.dk/SiteCollectionDocuments/DIBD/AE-Network/Working%20Group%20Meetings%202015/Dead%20Sea%20October%202015/4.0%20IFC%20Farid%20Tadros%20Green%20Competitiveness%20in%20Egypt.pdf>, (March, 2016).

<sup>24</sup> IFC (2015), *Energy Efficient Industries - Market and Investment Opportunities in Egypt*, Report in preparation. (February, 2016).



consume 60-70 % of the total industrial electricity demand in Egypt accounting for 24,435- 28,507 GWh in 2013. The high industrial energy consumption can be partly explained by the usage of outdated electric motors which are often not optimized in terms of input/output requirements and the installed production units which very often are oversized and have none or very simple control systems.<sup>25</sup> Furthermore, as in most developing countries, low labor and high material costs in Egypt make it more attractive to rewind old motors than to purchase more efficient, although more expensive ones. In fact, it is estimated that more than 50% of electric motors are rewound in certain industrial sectors and that some motors are rewound 5 to 6 times before they are finally scrapped. From an energy efficiency point of view, rewinding avoids the adoption of EE motors maintaining old and inefficient motors operational while losing 1-3% of motor efficiency with each rewinding process.<sup>26</sup>

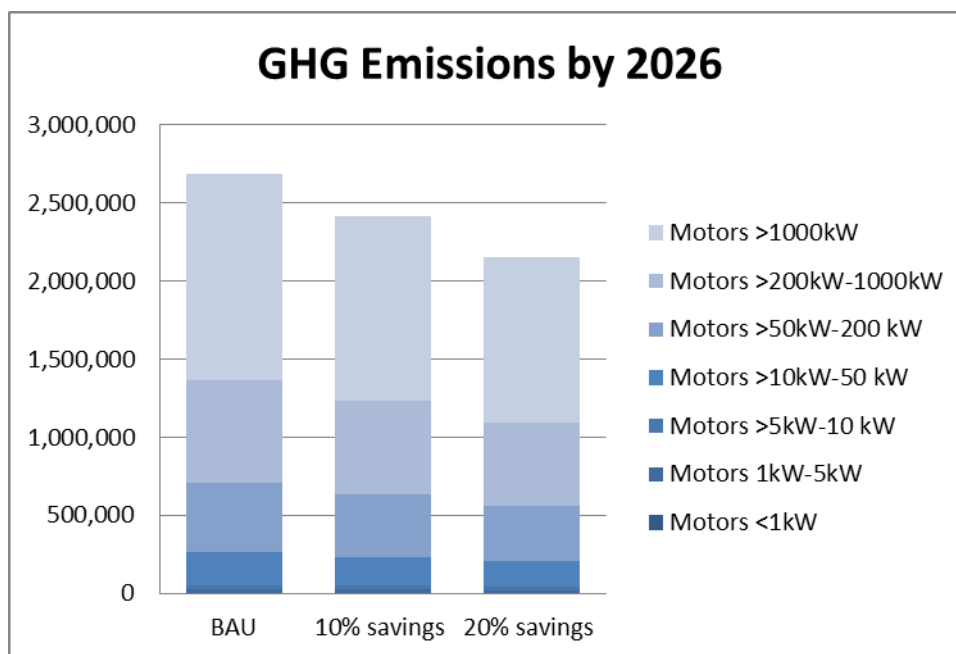
14. Furthermore, the GEF-4 UNIDO Industrial Energy Efficiency project through several energy assessments collected information on the electrical consumption and related GHG emissions resulting from the operation of 2,729 motors in 11 large energy intensive industries in Egypt. The table below presents the baseline scenario as well as the potential savings on the basis of 10-20% by motor type and size. Due to the lack of national information, this sample shall be considered as representative for the motor population on the energy intensive industrial sector in Egypt until more information is available.

Motors			Baseline			Potential savings			
			Electricity Consumption		GHG emissions	10% potential savings scenario		20 % potential savings scenario	
						Electricity consumption	GHG emissions	Electricity consumption	GHG emissions
Size	#	% from total	MWh p.a.	% from total	t CO2eq per 10 yrs.	MWh p.a.	tCO2eq per 10 yrs	MWh p.a.	tCO2eq per 10 yrs
Motors <1kW	756	28%	584.79	0.10%	2,722	58.47	272.22	116.95	544.44
Motors 1kW-5kW	798	29%	4,761.88	0.83%	22,167	476.18	2,216.65	952.37	4,433.31
Motors >5kW-10 kW	303	11%	6,131.75	1.06%	28,543	613.17	2,854.33	1,226.35	5,708.66
Motors >10kW-50 kW	550	20%	44,750.14	7.75%	208,312	4,475.01	20,831.19	8,950.02	41,662.38
Motors >50kW-200 kW	245	9%	95,217.69	16.50%	443,238	9,521.76	44,323.83	19,043.53	88,647.67
Motors >200kW-1000kW	54	2%	141,858.19	24.58%	660,350	14,185.81	66,034.98	28,371.63	132,069.97
Motors >1000kW	23	1%	283,889.22	49.18%	1,321,504	28,388.92	132,150.43	56,777.84	264,300.86
<b>Total</b>	<b>2,729</b>	<b>100%</b>	<b>577,193.68</b>	<b>100%</b>	<b>2,686,837</b>	<b>57,719.36</b>	<b>268,683.65</b>	<b>115,438.73</b>	<b>537,367.31</b>

<sup>25</sup> *Idem.*

<sup>26</sup> UNIDO (2011), *Energy Efficiency in electric motor systems: Technical potentials and policy approaches for developing countries*, [https://www.unido.org/fileadmin/user\\_media/Services/Research\\_and\\_Statistics/WP112011\\_Ebook.pdf](https://www.unido.org/fileadmin/user_media/Services/Research_and_Statistics/WP112011_Ebook.pdf), (March, 2016).

15. Under the business as usual scenario (BAU), the GHG emissions will reach 2,686,837 t CO<sub>2</sub>eq in 10 yrs. Nevertheless by conducting this project, it is expected that 10-20% of GHG direct emissions can be avoided as shown in the chart below.



16. Likewise, the Smart Technology and Energy Efficient Production (STEP) project currently being implemented by International Finance Corporation (IFC) identified the most relevant industrial sectors and types of EE technologies to be targeted through a competitiveness assessment determining the investment potential on each sector and technology. In this regard, EE motors and Variable Speed Drives (VSD) have been designated as competitive EE technologies for the following sectors: food and beverages, chemicals and chemical products (with a focus on fertilizers and petrochemicals), and non-metallic mineral products (with a focus on cement and ceramics). It is expected that the selected industrial sectors will achieve high energy savings and CO<sub>2</sub> reductions as well as short payback period and high internal rates of return. The table below presents detailed information on the aforementioned sectors.<sup>27</sup>

Competitiveness assessment for EE motors and VSD

Industrial Sector	Energy Efficiency Technologies	Level of Investment	Payback Period	Internal Rate of Return	Technical Performance	Energy Savings	CO <sub>2</sub> Reduction
Food & beverages	High Efficient Motors and VSD	Medium	2-3 years	15%	Enhanced performance	10-20%	<5%
Chemicals and chemical products	High Efficient Motors and VSD	Medium	2-3 years	20%	Enhanced performance	5-10%	<5%
Non-metallic mineral products	Variable frequency drivers on conveyor motors	High	3-5 years	20%	Enhanced performance	5-10%	<5%

<sup>27</sup> IFC (2015), *Energy Efficient Industries - Market and Investment Opportunities in Egypt*, Report in preparation. (February, 2016).

17. As such, in order to improve the energy efficiency of motors, three major means can be pursued: replacing old motors by properly sized and EE electric motors, installing Variable Speed Drives (VSD) to match motor speed and torque to load requirements and/or conducting complete system optimizations. Nevertheless, the market penetration of EE motors in Egypt has remained significantly low in all industrial sectors. In 2015, the highest market penetration rate of 5% was recorded for the chemicals and chemical products sector; however, for the rest of the sectors was much lower. Furthermore, it has been observed that the majority of the replacements have been on small motors ranging 0.75 kW 3 phase or less than 1 kW single phase which utilize only 58 MWh p.a. which is equivalent to 0.1% or of the total electricity consumption. It has been estimated that the cumulated market potential by 2020 of EE motors could be \$101 M if the penetration rate of EE motors reaches 30%.<sup>28</sup> Nevertheless under the business as usual scenario, the replacement rate will remain low and will not reach the 30% market penetration target by 2020.
18. Hence, UNIDO will build on these preceding projects' findings to catalyze the adoption of EE motors in the industrial sector as it possesses significant economic and environmental benefits. The project can be categorized under the GEF focal area Climate Change Mitigation 1 (CCM-1) Programme 1 as it will support Egypt in making transformational shifts towards a low emission and resilient development through the accelerated adoption of EE EMDS and its related strategic policy and regulatory frameworks. In order to do so, the project aims at supporting the Egyptian government to overcome several barriers that are currently hindering the adoption of EE motors in the industrial sector while reducing the GHG emissions. A detailed description of the identified barriers is provided in the table below.

Barrier	Description and component which will address this barrier
Policy and regulatory barriers	<p><i>Lack of conducive policy and legal environment for EE motors</i></p> <p>While a variety of policies and strategies have been developed and adopted for EE in Egypt, the majority of EE legislation has been focused on EE in buildings and none has targeted EE motors yet. Presently, recommendations on MEPs for EE motors are being jointly developed by the Ministry of Trade and Industry of Egypt and the International Finance Corporation (IFC) under the STEP project. It is expected that these recommendations will be integrated into the official EE policy in order to guarantee sustainability. As these MEPs regulate new EE motors; further policy and regulatory efforts are needed for the replacement and local manufacture of EE motors. Therefore, Component 1 seeks to support the phase out of old motors and facilitate EE motors adoption by overcoming policy and legal barriers as well as by developing an action plan to promote the local manufacture of EE motors and ESCOs.</p>
Awareness barrier	<p><i>Limited awareness among motor end-users of the potential energy and cost savings of EE motors as well as their technical feasibility</i></p> <p>Whilst many Egyptian industries are aware of the cost saving benefits of EE in general, industries' top management have limited awareness on the benefits and feasibility for replacing old electric motors. Consequently, purchasing decisions often favor first cost electric motors, even if they have a lower efficiency. Therefore, Component 2 aims at removing awareness barriers to induce sustainable structural and behavioral changes in Egypt through national awareness campaigns, a peer to peer platform, and success stories dissemination.</p>

<sup>28</sup> *Idem.*

Barrier	Description and component which will address this barrier
Information barrier	<p><i>Lack of national readily baseline information to showcase the benefits of EE motors in industry</i></p> <p>The majority of the companies do not know or are sceptic about existing technical and financial opportunities related to EE motors. One reason could be that there have not been demonstration projects showcasing the potential of EE motors across different industrial applications within the country. Therefore, Component 3 provides technical assistance to pilot the multiple benefits of using EE EMDS at enterprise level. As demonstrations are carried out, the risks and benefits of adopting EE motors will be better understood by the relevant stakeholders who are often reluctant to integrate new technology. It is expected that these demonstrations will pave the way for other enterprises, with similar characteristics, to incorporate EE EMDS. The figures collected from these demonstrations will be used for the awareness campaigns conducted under Component 2 providing actual data to make the case for EE EMDS more realistic and convincing.</p> <p><i>Lack of national industrial statistics on motors and EE motors</i></p> <p>Little readily baseline information is available on EE motors cost savings potential across different industrial applications. Therefore, Component 1 will benchmark the sectors holding greatest potential to support informed decision-making in industrial policy related to EE motors.</p> <p>Furthermore, a baseline study and scoping exercise at the PPG phase will be used to identify the penetration rate of EE, non-efficient electrical motors, energy consumption data, among others.</p>
Technical capacity barriers	<p><i>Lack of national technical capacity specialized on EE motors</i></p> <p>While there is a sound base of national EE technicians, Egyptian industries often do not have sound expertise to identify and address opportunities related to EE motors. Therefore, Component 2 will build national capacity through detailed trainings targeting different stakeholders including SO practitioners, local vendors and industry's staff. The exact number of trainees will be validated during the PPG as well as the appropriate institution (academic or vocational) to host the trainings. UNIDO's training modules on system optimization for industrial motors developed by UNIDO-GEF 4 project will be translated into Arabic and adapted for local conditions and target groups.</p>
Financial barriers	<p><i>Lack of appropriate incentive schemes and financial mechanisms to foster the adoption of EE motors</i></p> <p>One of the major barriers to replace old motors are the inherent costs incurred during the identification, purchase and shut down period required to service or replace motors. Without financial support, EE motors will not be widely adopted as few industries have the financial means to do so without any additional funding. Currently, financial mechanisms to support wide-scale deployment of EE EMDS remain restricted in Egypt. Therefore, Component 3 will analyse the feasibility of Energy Service Companies (ESCOs) as a sustainable mechanism to deliver upfront financing support of EE projects in liaison with the financial instruments already in place in Egypt.</p>

## 2.2 Baseline projects

19. Over the years, a number of projects have been implemented by different stakeholders to encourage industrial EE in Egypt. Relevant baseline projects include but are not limited to:

- Renewable Energy, EE and Environment Protection Project - Industrial Modernization Centre (IMC)

The project aims at limiting polluting emissions and reducing the specific energy consumption per product unit without any negative impact on its quality or quantity; in terms of EE. To reach these goals, IMC provides technical support to the industrial sector through performing Preliminary Energy Audits (PEA) and delivering energy efficiency Technical Assistance (TA) services as well as by fostering the implementation of energy management systems. The project has conducted more than 600 energy audits and TA services in the field of EE. Furthermore, it has encouraged a favorable technology transfer environment to enhance technological and non-technological innovation while stimulating the set-up of a supply chain in the EE sector.<sup>29</sup> It is expected that this project will continue through the duration of the EE motors project.

- Smart Technology and Energy Efficient Production (STEP)- International Finance Corporation (IFC), World Bank

The ongoing project assists the Government of Egypt to increase industrial energy security and improve their international competitiveness by moving towards EE motor systems and clean technologies. To do so, the project is developing standards and labels for EE motors, encouraging the use of energy efficient technologies, and increasing their availability through investment in manufacturing and feeding industries. Until now, the project has carried out a diagnostic study looking at opportunities to increase the up-take of energy efficient equipment through a Standards & Labelling program and a workshop with the Egyptian National Competitiveness Council (ENCC) on Industrial Energy Efficiency. UNIDO and IFC have been working closely to ensure a coordinated approach as it is expected that this project will continue through the duration of the EE motors project.

- Egypt Sustainable Energy Financing Facility (EgyptSEFF) – European Bank for Reconstruction and Development (EBRD)

The EgyptSEFF project is a new credit line dedicated to EE and renewable energy private sector investments in Egypt. Apart from providing multicurrency and flexible loans worth up to five million dollars, EgyptSEFF offers free technical assistance and investment incentive grants to assist Egyptian businesses in managing their energy consumption. Therefore, its objective is to offer a one-stop-shop solution to the nation's energy conscious business community wishing to develop supply and/or demand sustainable energy initiatives. The project is collectively managed by MWH Global and the Regional Center for Renewable Energy and Energy Efficiency (RCREEE). It is expected that this project will continue through the duration of the EE motors project.

### **3) The proposed alternative scenario, with a brief description of expected outcomes and components of the project**

20. Until recently, EE was considered a low priority for Egyptian industries due to subsidised energy prices and preference for second-hand equipment and rewinding. However after major energy subsidies reforms, the historically energy intensive industries are starting to seek for alternative solutions to maintain their profit margin while offering competitive market prices. This shift could potentially open a window of opportunity for the EE market and could support the emergence and development of EE technologies local value chain.<sup>30</sup> In this regard, the proposed project aims to reduce GHG emissions in Egypt by accelerating the market penetration of high EE motor systems in the industrial sector. This objective will be achieved by strengthening the domestic legislative and regulatory framework related to EE motors; conducting a comprehensive public awareness programme; building local technical capacity; developing demonstration projects; and by promoting

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<sup>29</sup> IMC, Vision and Mission, <http://www.imc-egypt.org/index.php/en/imc>, (February, 2016).

<sup>30</sup> UNIDO (2011), *Energy Efficiency in electric motor systems: Technical potentials and policy approaches for developing countries*.

EE motors deployment. A detailed description of the means by which the project will accelerate the deployment of EE electric motors is found below.

- **Component 1: Conducive Policy and Legal Environment for EE Motors**

21. This component seeks to further overcome policy and legal barriers by supporting the phase out of old motors and facilitate EE motors adoption as well as an action plan to promote the local manufacture of EE motors. In order to do so this component is divided in three outputs:

22. Output 1.1.1. Benchmarks of identified sectors holding greatest potential are conducted

There is a solid potential for EE motors adoption within the Egyptian industrial sector, in particular food and beverages; chemicals and chemical products; and non-metallic mineral products.<sup>31</sup> Therefore, this output will benchmark energy efficiency potential for 10 sub-sectors to support informed decision-making in industrial policy.

23. Output 1.1.2. Policy recommendations and roadmap on the phase out of old motors and deployment of EE motors are developed including ESCO's incentive models

This output will provide necessary technical assistance to draft and adopt new policies that regulate MEPS as well as a road map and other policy and regulatory adjustments – including ESCO's incentives - to accelerate the deployment of EE motors.

24. Output 1.1.3. An action plan to support local industries in the development of EE and clean technology for motors is developed

While the EE market in Egypt is expected to grow in the near future, the local supply of EE and clean technology for motors remains underdeveloped as several barriers are faced by potential EE motor manufacturers. In fact, Egyptian players are not yet able to manufacture EE Motors and VSDs locally. Under the business as usual scenario, no EE Motors and VSDs manufacturing is expected in Egypt within the next years. As such, this output will develop an action plan to support local manufacturers in the development of EE motors.

- **Component 2: Awareness and Capacity Building on Energy Efficiency Motors**

25. This component aims at removing information barriers to induce sustainable structural and behavioral changes in Egypt. Furthermore, it builds capacity to create local market for EE motors in high impact opportunity sectors as identified by Output 1.1.1. This component is divided in six outputs:

26. Output 2. 1. 1. National awareness campaign on the benefits of EMDS in the industrial sector conducted

This output will focus on increasing awareness among manufacturers, industrial end-users and the general public on the technical and economic benefits of EE EMDS. It is expected that once the knowledge on EE EMDS benefits is disseminated, investment in the sector will increase.

27. Output 2.1. 2. Peer to peer platform for information exchange, cooperation and partnerships among seekers and providers of services and information on EE motors is developed

Peer to peer learning is often a powerful driver for companies to implement EE technologies and reap the productivity or competitive advantages their peers have enjoyed from similar investments. The development of a platform that links technology seekers and providers with their peers will facilitate information exchange, cooperation and partnerships.

28. Output 2.1.3. Information gained through the 20 demonstration projects is disseminated

Once the demonstration projects under component 3 have been implemented, the results will be extensively documented and disseminated. The success stories and lessons learnt will facilitate the replicability of EE EMDS adoption.

29. Output 2.1.4. 20 qualified System Optimization practitioners trained

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<sup>31</sup> *Idem.*

International experts will train 20 local SO experts for 7 days. This intensive training will be followed with coaching over a 12 months period. After completing their training, these local experts will assist industry in implementing SO within their facilities and will advise businesses which are implementing SO as part of the project.

30. Output 2.1.5. 50 vendors of motor systems trained on the benefits of EE motors

Selected vendors of motor systems will be trained in SO to enable them to offer the service to their clients. Engineers within the industry will receive a 2 day user training in SO to enable them to implement SO within their business. Throughout the project, 50 vendors will be trained.

31. Output 2.1.6. 100 industrial enterprises personnel trained on motor systems' efficiency measures

A 2 day user course will be provided to 100 staff of industrial companies on SO to support the implementation of SO-related measures. The course will be carried out by the SO experts trained through output 2.1.4.

- **Component 3: Technical Assistance for Technology Demonstration and Upscaling**

32. This component will provide technical assistance to demonstrate the multiple benefits of adopting EE EMDS at enterprise level. In addition, it analyses the feasibility and facilitates the establishment of Energy Service Companies (ESCOs) as a sustainable mechanism to deliver upfront financing support of EE motor projects. This component is divided in six outputs:

33. Output 3.1.1. Detailed motor efficiency audits for 30 selected enterprises conducted

This output will focus on identifying and selecting enterprises where the demonstration projects will have the highest potential impact. The criteria for the selection process will be defined during the PPG phase. From the potential enterprises identified, 30 will be supported to conduct detailed energy audits for EMDSs. The audits will identify the list of measures to be implemented in each of the enterprises.

34. Output 3.1. 2. Technical and business advisory services for 20 pilot and business projects development facilitated

This output will provide technical and business expertise to develop pilot projects involving EE motors for 20 out of the 30 enterprises. One of the criteria for the selection of the 20 pilot companies would be a minimum installed capacity of electric motors of around 250 kW. The energy savings are estimated for a replacement rate of around 20%. The assistance offered will include: technical feasibility, financial analysis, selection of technologies, assessment and reduction of risk as well as support in the development of bankable projects or/and preparation of applications for projects.

35. Output 3.1.3. System optimization for EMDS and EE motors implemented and installed in 20 enterprises

System optimization measures will be implemented in 20 enterprises to showcase the technical and economic benefits of EE EMDS. It is foreseen that an ESCO will be engaged in the installation work for the 20 demonstration projects. The results of the demonstration projects will create critical mass of credibility and willingness to replicate.

36. Output 3.1.4. Feasibility for establishing an ESCO model assessed

There are a number of smaller ESCOs that are operational in Egypt which focus on financing small investments related to EE lighting. During the PPG phase, an assessment of those ESCOs will be conducted to determine how to support ESCOs to expand their business into financing and installation of larger energy efficiency investments such as motor efficiency. The challenges for ESCOs operating in Egypt will be identified and activities to support a conducive market environment for the operation of ESCOs will be proposed during the PPG phase. Furthermore, the best practices of ESCO's from high-level international companies will be analyzed as some international manufacturers have established their own ESCOs combining engineering expertise, local support services, and performance contracting experience with equipment manufacturing. This combination has allowed these ESCOs to install their own equipment while saving customers one level of markup and installation service cost.

#### 37. Output 3.1.5. ESCO developed and established

The contracting model and business plan development have been among the recurrent challenges faced by ESCOs worldwide. Therefore, the project will provide technical assistance to develop an appropriate business plan and will work on standardizing the operational modalities including contracting issues. Following the aforementioned business plan, an ESCO will be established and is expected to be operational by the end of the project.

#### 38. Output 3.1.6. Public private partnerships with international suppliers developed to accelerate the deployment of EE motors

It is of utmost importance to integrate market actors to achieve the greatest possible policy impacts and encourage innovation. Establishing partnerships with and between government agencies, producers of motor systems and sales companies, experts, installers, service companies and energy consultants is central for the programme success as well as for the mobilization of financial resources that are required for the full deployment of EE motors. In Egypt, the project will explore the means to create a national programme for the replacement of inefficient motors which includes the development of an appropriate financial model for the Egyptian market that engages international suppliers with local industries under the umbrella of public private partnerships.

### **Component 4: Monitoring and Evaluation**

39. This component has one output.

#### 40. Output 4.1. 6.1. Project Implementation Reports (PIRs), Mid-term Review (MTR) and Terminal Evaluation (TE) are conducted in timely manner

The project will go through a project preparatory phase, in which the detailed operational procedures and other implementation issues will be specified and prescribed. During the project implementation, the PIRs will be prepared to monitor the progress achieved since the start of the project or previous reporting periods. Furthermore, the project will undergo an independent Mid-term Review (MTRs) at the mid-point of project implementation. The MTR will determine the progress being made toward the achievement of outcomes and will identify course correction if needed. Finally, an independent TE will take place three months prior to the end of the project and will be undertaken in accordance with UNIDO and GEF guidance. The final evaluation will focus on the delivery of the project's results as initially planned and at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefits/goals.

### **4) Incremental/additional cost reasoning and the expected contributions from the baseline, the GEFTE, LDCF/SCCF and co-financing**

41. The Government of Egypt has recently started to integrate EE principles in national initiatives and has implemented major energy subsidies reforms. The phase out of energy subsidies will significantly impact the private sector, especially the energy intensive industries, which might be at risk of losing competitiveness. As energy prices increase and MEPs are adopted for more appliances, the industrial sector should consider EE technologies as a plausible mean to fulfill with the new regulations and maintain their profit margin and competitiveness. However, low labor and high material costs have made it more attractive to rewind old motors that to purchase new EE motors. In addition, current low international fossil fuel prices have decreased the effect of the energy subsidies in the industrial production costs while the oligopoly market structure that most of the energy intensive industries in Egypt face has allowed industries to raise their product prices more than the increase in energy inputs to keep high profit margins. This combination of factors has decelerated the market penetration of EE technologies.<sup>32</sup>

42. It is expected that EE motors will be slowly introduced and eventually will replace the old energy inefficient motors. Yet, the process is anticipated to be very lengthy, costly and cumbersome as there are still

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<sup>32</sup> Elboghdadly, Ibrahim et al (2015), *Energy Prices and the Competitiveness of Energy Intensive Industries in Egypt*, <http://www.wbiworldconpro.com/uploads/paris-conference-2015/economics/1427794434.pdf>, (March, 2016).



several barriers that need to be addressed. In order to facilitate and accelerate the deployment of EE EMDS in Egypt, the proposed project will take a systematic approach to overcome current barriers through the coverage of the following incremental costs. The GEF grant will be used to provide:

- a. Technical assistance to properly benchmark sub-sectors holding greatest EE motors potential as well as policy recommendations to phase out of old motors and support the development of local EE motors feed-in industries. The incremental costs of this component focus on supporting the development of EE policy recommendations related to EE EMDS.
  - b. Development and implementation of a national awareness campaign on the benefits of EMDS as well as a platform for information exchange, cooperation and partnerships among EMDS seekers and providers. The incremental costs of this component focus on organizing an awareness campaign through workshops, conferences, seminars, newsletters, trade fairs, etc.
  - c. Training of key stakeholders on EE motors in order to build national capacity. The stakeholders will be chosen from national experts, vendors of motor systems and industry staff. The project will cover the costs of stakeholders' formal training as well as on-the-job training in Egypt and abroad.
  - d. Technical and financial assistance to pilot and demonstrate advanced EE EMDS ends users' benefits. The project will cover the initial costs of implementing energy audits and pilots in 20 enterprises as there is a need to develop more success stories to engender confidence within industries to invest in such projects on their own financial merit.
  - e. Financial and business assistance to develop and establish an appropriate mechanism to support wide-scale deployment of EE motors. The project will cover the costs of analyzing ESCOs' model and developing a business plan for the selected mechanism as well as the development of public-private partnerships to mitigate financial risks related to EE motors deployment.
43. The co-financing covers some of the baseline activities that justify the need for the GEF project. Further co-financing will be allocated to attract new investments that support the deployment of EE motors. In the absence of this project, the penetration rate of EE motor technologies will not occur at the pace needed to overcome the predicted energy gap. Moreover, there is a risk of adopting inappropriate policies due to insufficient knowledge, competencies and analysis of EE motors.

##### **5) Global Environmental Benefits (GEFTF) and/or adaptation benefits (LDCE/SCCF)**

44. Currently, the Egyptian industry is misutilizing the available energy resources as the final energy consumption per unit of output in the most important industries is 10-50% higher than the international average.<sup>33</sup> Moreover, electrical motors in Egyptian industries use 60-70% of the total electricity consumption which can be considered as Significant Energy Users (SEUs). The general adoption of EE motors in the industrial sector at a national level will significantly reduce the industrial electricity consumption which reached 40,725 GWh in 2013.<sup>34</sup> According to UNIDO's working paper on EE in electric motor systems, the saving potential of electric motor systems in Egypt is 4,479 GWh or 11% of the industrial electricity consumption representing 20.59 MT CO<sub>2</sub>. Nonetheless, this saving potential can be reached only if ambitious EE measures are introduced in a cost effective manner over the next 10 to 20 years.<sup>35</sup>
45. In order to promote and facilitate the replacement of old motors, 20 demonstration projects will be implemented. These demonstration projects will produce annual energy savings ranging from 104,944.31 MWh under the 10% savings scenario to 209,888.61 MWh under the 20% saving scenario. Considering that the grid emission factor in Egypt is 0.4655 tCO<sub>2</sub>eq/MWh, the expected direct GHG emission reductions from

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<sup>33</sup> UNIDO(2014), *UNIDO Activities in Egypt*, [https://www.unido.org/fileadmin/user\\_media\\_upgrade/Who\\_we\\_are/Structure/Director-General/UNIDO\\_2014\\_Report\\_Egypt\\_updated.pdf](https://www.unido.org/fileadmin/user_media_upgrade/Who_we_are/Structure/Director-General/UNIDO_2014_Report_Egypt_updated.pdf), (February, 2016).

<sup>34</sup> IFC (2015), *Energy Efficient Industries - Market and Investment Opportunities in Egypt*.

<sup>35</sup> UNIDO (2011), *Energy Efficiency in electric motor systems: Technical potentials and policy approaches for developing countries*.

the demonstration projects range from 0.4 to 0.97 MtCO<sub>2</sub> over the next 10 years. Assuming a replication factor of 3, the indirect emission reductions from the demonstration projects range from 1.46 to 2.93 MtCO<sub>2</sub> over the next 10 years. These preliminary estimates are based on the 11 energy intensive industries audited by the GEF-4 UNIDO IEE project and assume that the 20 demonstration projects are carried out in similar industries. The detailed direct, indirect and post-direct emission reductions will be recalculated during the PPG phase, once more information is available.

46. Through these energy savings, the project supports Egypt's commitments to improve energy efficiency by 20% by 2020 and to significantly reduce GHG emissions. Additional indirect global benefits will arise from enhanced standards schemes and innovative EE policies as well as sound management of resources for the implementation of globally beneficial EE measures. The activities conducted under the project will continue to foster mitigation actions through increased application of EE motor technologies after the completion of the project.

## **6) Innovativeness, sustainability and potential for scaling up**

47. The project proves its innovativeness, sustainability and potential for scaling up through its strategic components:
- **Innovation** – The innovativeness of the project relies on its targeted technology as EE motors have been relatively neglected. While some governments are very proactive on EE, few have put in place the resources or policy processes likely to realize substantial energy savings by introducing EE motors. Apart from targeting innovative technology, the project will analyze the current barriers faced by ESCOs in Egypt in order to design innovative business plans and operational modalities that maximize their interventions on larger EE investments such as process-related systems (EE motors) and motor systems (pumps, compressors, fans and other systems). By involving ESCOs in EE interventions without adding unnecessary costs and complexities, the project is expected to produce a behavioral change on the end-users of motors. As such, industries that would have been discouraged to adopt EE technologies due to large up-front investments will have the possibility to convert energy inefficiencies into future cash flows while paying the energy saving investments from savings resulting from the ESCOs intervention.
  - **Market transformation** – The project aims at supporting long term EE motors market transformation. On the demand side, the project will conduct a national awareness campaign to achieve a higher acceptance, understanding and support for EE motors, especially from the top management of the industrial sector. As the level of acceptance increases and standard business practices change, the scaling up efforts will be facilitated. On the supply side, the project will encourage the development of a local value chain for EE motors and VSDs by removing the barriers that are currently hindering local manufacturing, particularly the local technical capacity.
  - **Sustainability** – The sustainability of the project will be ensured through the active involvement of national institutions as well as the sound transition of activities and responsibilities taking place during the implementation phase. The project will develop policy recommendations enabling a conducive policy environment and a national awareness campaign leading to lasting changes in the energy efficient motors market. Besides, the 20 pilots are expected to broadly document and disseminate the knowledge gained in order to encourage all potential end-users – not merely those participating directly in the demonstration projects – to incorporate EE EMDS in their industrial operations. Finally, the project will train a plethora of experts from diverse sectors on energy efficiency measures related to EMDS in order to expand the national talent pool of experts. After concluding their training and as the demand for specialized services increases, trainees will have sound knowledge that can be used as a source of expertise for the sustainable implementation of further national or regional projects.

- Potential for scaling-up – The project has a high scaling-up potential for the widespread adoption of EE motors in the industrial sector as the motors efficiency base as well as the market penetration of EE motors remains significantly low, and rewinding practices persist in the sector. Under this baseline, the project addresses the barriers that are currently hindering the large scale deployment of EE motors through developing a national programme for the widespread adoption of EE motors in the industrial sector while promoting an enabling environment for its effective implementation after project completion. The demonstration projects under Component 3 will demonstrate the technical feasibility and commercial viability of EE motors for potential investors and will provide crucial information for decision makers in the industrial and governmental sectors. Besides, the establishment of ESCOs will be of adamant importance as they will facilitate the upfront financing that is often needed to adopt EE motor projects.

6. Stakeholders. Will project design include the participation of relevant stakeholders from civil society organizations (yes  /no ) and indigenous peoples (yes  /no )? If yes, identify key stakeholders and briefly describe how they will be engaged in project preparation.

48. As the project is expected to have technology transfer and deployment components, an Environmental and Social Management Plan will be developed during the PPG phase to guarantee that environmental and social elements are integrated into the project design. This Plan will be carried out in close consultation with the relevant stakeholders including governmental and civil society organizations as well as the private sector. For this project, the Federation of Egyptian Industries (FEI), which is a group of industrial associations, will act as a CSO to make sure that the interests and needs of its members are taken into consideration. Due to the nature of the project, it will not have any impact on indigenous people.

49. An initial stakeholder’s analysis was conducted by UNIDO which will act as implementing agency of the project. A detailed description of the key stakeholders is provided in the table below.

Stakeholder	Role
Egypt National Cleaner Production Centre (ENCPC) of the Ministry of Trade and Industry	The Ministry of Trade and Industry, represented by the ENCPC, will act as the executing agency for the project. ENCPC provides the Egyptian industrial sector technical assistance for technology transfer in the fields of resource efficiency, industrial waste valorization as well as energy efficiency and renewable energy applications. In addition, the ENCPC implements Innovative Designs and supports companies to carry out constant product development.
Egyptian Environmental Affairs Agency (EEAA)	EEAA represents the executive arm of the Egyptian Ministry of State for Environmental Affairs. The Administrative Council of the Agency is composed of the Minister of Environmental Affairs as Chairman, with the EEAA Chief Executive Officer as Vice Chairman, plus representatives from the ministries involved in environmental issues, non-governmental organizations (NGOs), the State Council, the public business sector, universities and scientific research centers. The main functions of EEAA include: <ul style="list-style-type: none"> <li>• Formulating environmental policies.</li> <li>• Preparing the necessary plans for environmental protection and environmental development projects, following up their implementation, and undertaking pilot projects.</li> </ul> In addition, EEAA is the National Authority in charge of promoting environmental relations between Egypt and other countries, as well as regional and international organizations. The Agency is the national focal point for all GEF projects and activities.
Industrial Development Authority (IDA)	IDA is responsible for the implementation of industrial policies developed by the Ministry of Trade and Industry and its affiliated entities. It’s also in charge of promoting industrial investments, setting and implementing land development policies for industrial purposes by making these lands available to investors as

Stakeholder	Role
	well as by facilitating the industrial permits for them. IDA's mission is to enhance Egypt's growth rate through cooperation and coordination with its partners to facilitate industrial expansion, enable the private sector to develop industrial zones and ensure an effective, organized and friendly business environment.
Egyptian Organization for Standardization and Quality (EOS)	EOS is the 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. EOS is a member of the International Organization for Standardization (ISO).
Federation of Egyptian Industries (FEI)	<p>FEI is a group of industrial associations which mission is to drive industrial economic growth in the domestic and export markets. It has 16 Chambers and 17 Decision Support Committees that are constantly developing programs and services to facilitate and support the various industrial associations within Egypt. FEI's business agenda is:</p> <ul style="list-style-type: none"> <li>• To directly represent members' interests before governmental and legislative bodies, as well as other local and international associations.</li> <li>• To participate in developing policies and legislations that result in encouraging investment and developing suitable environments conducive to rapid growth of national economy.</li> <li>• To advocate structural reform that leads to transparency in governmental legislative and enforcement practices.</li> <li>• To contribute to the development of Egyptian industry by adopting new technology and international quality.</li> </ul> <p>Currently FEI is hosting the Industrial Modernization Centre which is implementing a wide scale national energy efficiency project.</p>
General Organization for Import and Export Control	<p>The General Organization for Import and Export Control is an authority directly affiliated to the Minister of Economy and Foreign Trade which main functions are:</p> <ul style="list-style-type: none"> <li>• Import and Export Control</li> <li>• Issuance of Certificates of Origin</li> </ul> <p>Its role in the project will be to guarantee that the imported motors fulfill the requirements in place.</p>
Energy Efficiency Unit (EEU) of the Egyptian Ministry of Electricity and Renewable Energy	The mandate of the Ministry is to provide electricity to all consumers over the country. EEU has the responsibility to implement, monitor and evaluate the progress of the National Energy Efficiency Action Plan (NEEAP) of Electricity Sector (2012 -2015).
Egyptian Energy Efficiency Council (EEEC)	EEC is a voluntary consortium of public and private sector organizations associated with the generation, distribution, and use of energy resources in Egypt. It was formed to foster inter-agency cooperation for promoting and guiding EE practices in Egypt. The main goal of the Council is to create an enabling framework that allows a wide adoption of EE in Egypt.
Energy Efficiency Unit (EEU) of the Independent Decision Support Center (IDSC)	The IDSC acts as the Egyptian Cabinet Think Tank. Its mission is to impartially support the government decisions through advice on best policy scenario mix and analytical research to improve the socio-economic well-being of the Egyptian society. The EEU was created to coordinate activities across different sectors and continues to be the 'go-to' entity for the Cabinet on EE related issues under the current government.

3. *Gender Equality and Women's Empowerment.* Are issues on [gender equality](#) and women's empowerment taken into account? (yes /no ). If yes, briefly describe how it will be mainstreamed into project preparation (e.g. gender analysis), taking into account the differences, needs, roles and priorities of women and men.

50. Gender equality and the empowerment of women have a significant positive impact on sustained economic growth and inclusive industrial development, which are key drivers of poverty alleviation and social progress. The commitment of UNIDO towards gender equality and women's empowerment is demonstrated in its policy on Gender Equality and the Empowerment of Women (2015), which provides overall guidelines for establishing a gender mainstreaming strategy. Moreover, UNIDO has developed an operational energy-gender guide to support gender mainstreaming of its sustainable energy initiatives.

51. UNIDO recognizes that energy interventions are expected to have an impact on people and are, therefore, not gender-neutral. In fact, due to diverging needs and rights regarding energy consumption and production women and men are expected to be affected differently by the project (in terms of their rights, needs, roles, opportunities, etc.).

52. In 2011, the Global Gender Gap Report ranked Egypt 122nd out of 135 countries in terms of women's economic participation and opportunity. This is due in large part to women's marked disadvantage in the Egyptian labor market. The level of economic activity among female youth is strikingly low relative to their male peers. In 2012, 6.5 million female youth were neither in school nor working representing a significant underuse of Egypt's human capital.<sup>36</sup> The public sector accounts for a much larger share of female than male employment; nevertheless, the participation of females in most activities is particularly low compared to males. In the formal private sector, women have found limited job opportunities. According to the World Bank, female employees in industry represented only 5% in 2013<sup>37</sup>. The Egyptian Government constituted the country's 'only genuine equal opportunity employer' as some studies have reported that the private sector offers a challenging environment for women in the country.

53. The project aims to demonstrate good practices in mainstreaming gender aspects into energy efficiency projects to strengthen the economy in Egypt towards a low carbon development path, wherever possible and avoid negative impacts on women or men due to their gender, ethnicity, social status or age. Consequently, it will be considered to systematically include the gender dimension during the whole project cycle. During the preparatory phase, the project will conduct a gender analysis to identify the specific circumstances of women and youth and provide a basis of how the priorities and need for these vulnerable groups will be integrated in the implementation of the project, which will be reflected on the project log-frame.

54. The project will aim to ensure that both women and men are provided equal opportunities to access participate in and benefit from the project, without compromising the technical quality of the project results, in particular:

- Efforts will be made to promote participation of women in training activities, both at managerial and technical levels, as participants and facilitators.
- Gender-sensitive recruitment will be practiced at all levels where possible, especially in selection of project staff.
- All decision-making processes will consider gender dimensions. At project management level, Project Steering Committee meetings will invite observers to ensure that gender dimensions are represented. Also, at the level of project activity implementation, effort will be made to consult with stakeholders focusing on gender equality and women's empowerment issues. This is especially relevant in policy review and formulation. Hence, the policy work foreseen in this project as well as when selecting the pilot enterprises special attention will be paid to promote gender equality and integration of youth.

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<sup>36</sup> Maia Sieverding (2014), *Female Disadvantage in the Egyptian Labor Market: A Youth Perspective*, [http://egypt.unfpa.org/Images/Publication/2015\\_06/6be3baf2-61e3-4de4-bc9b-221f5180cd18.pdf](http://egypt.unfpa.org/Images/Publication/2015_06/6be3baf2-61e3-4de4-bc9b-221f5180cd18.pdf), (January, 2016).

<sup>37</sup> The World Bank (2016), *Indicators 2011-2015: Employment in industry, female*, <http://data.worldbank.org/indicator/SL.IND.EMPL.FE.ZS/countries> (March, 2016).

- When data-collection or assessments are conducted as part of project implementation, sex-disaggregated data will be collected.

55. In sum, the project design will acknowledge the differences of energy access impacts considering distribution of economic activities and social roles between women and men in Egypt, in line with GEF Gender Guidelines.

4. *Risks.* Indicate risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and, if possible, propose measures that address these risks to be further developed during the project design (table format acceptable).

<b>Risk</b>	<b>Level</b>	<b>Description and Mitigation</b>
Policy recommendations are not approved or effectively enforced by relevant authorities	Low	The project will develop policy recommendations in close collaboration with all relevant stakeholders including: policy makers, industrial sector representatives and motors manufacturers. By reaching final recommendations in an inclusive manner, it is expected that the recommendations are adopted appropriately.
Users of old motors do not want to purchase EE motors	Medium	End users of electric motor technology may not want to replace their old motors especially if they are still functional. The project will include comprehensive dissemination and promotion activities to ensure that end users fully understand the benefits of EE motors, especially from an energy and cost savings perspective.
ESCOs local market remains underdeveloped	Medium	The ESCO market in Egypt is underdeveloped as there are limited expertise, awareness and service supply in the country. To mitigate this risk, the project will identify the challenges faced by local ESCOs and will provide technical support to develop a business plan and operational modalities. It is expected that the ESCOs market will expand and the industrial sector will be eager to seek ESCOs services.
The TA recipient might not be able to come up with the required co-financing.	Medium	Industries, especially SMIs, might not be able to cover the required co-financing. This could cause delays in the demonstration projects, limiting the opportunity to disseminate success stories and to develop case studies. The demonstration projects can be designed so that reached milestones can be documented and disseminated with the aim of encouraging knowledge sharing and peers dialogue. In order to mitigate the cost and risk factors, the project will promote public private partnerships to accelerate investments in EE motors deployment and ESCOs.
Climate Change Risk	Low	The project supports the industries in becoming resilient to climate change by managing their energy demand and reducing their emissions.
Socio-economic risk Industrial Enterprise owners lose interest in the programme due to lower energy prices and longer payback periods.	Low	The Government of Egypt has a five year plan to phase the subsidies, which still makes the overall cost of energy higher. Further the security of the energy supply for industrial consumers has become a major driver for EE. The project will highlight the benefits both financial and social of energy efficient motors as a means to mitigate the risk.

5. *Coordination.* Outline the coordination with other relevant GEF-financed and other initiatives.
56. The project will be developed and implemented by UNIDO in close collaboration with the Ministry of Trade and Industry, represented by the ENCPC, which will act as the executing agency for the project. Also, the Ministry of Industry and Trade will act as the governmental project counterpart of UNIDO for this project. Other local partners are expected to be actively involved including the Independent Decision Support Center (IDSC), Egyptian Energy Efficiency Council (EEEC), the Egyptian Organization for Standardization (EOS), the Egyptian Federation of Industries (FEI) and other institutions and industries to be identified later on for the successful implementation of the project components.
57. Over the years, a number of GEF initiatives have been developed to encourage industrial EE in Egypt. This project will coordinate and build on the GEF 4 project “Industrial Energy Efficiency in Egypt” which is currently being implemented by UNIDO. The project aims at reducing GHG emissions by establishing a policy environment that enables and supports sustainable adoption of EE technologies and management as an integral part of industries’ business practices. The project has prepared a policy proposal to accelerate the rate of EE in the industrial sectors. Moreover, it developed a cadre of well-trained and equipped experts in SO and energy management that can assist industries in developing and implementing future EE projects. It is expected that the project will finalize by the end of 2016 or mid-2017.
6. *Consistency with National Priorities.* Is the project consistent with the National strategies and plans or reports and assessments under relevant conventions? (yes  /no  ). If yes, which ones and how: NAPAs, NAPs, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, etc.
58. In 2013, Egypt’s contribution to the world CO<sub>2</sub> emissions was at about 3.3 t CO<sub>2</sub> eq. per capita representing less than the world’s average but much more than Africa’s one. Electricity generation is the biggest GHG emitter and the industrial sector represents 19.3% of the total electrical energy consumption in Egypt. According to the IEA, without GHG mitigation policies in place, national GHG emissions are likely to grow negatively affecting air quality in cities and increasing the burden on the Egyptian economy.
59. At the COP 21 in Paris, Egypt recognized in its INDCs that energy efficiency is the cornerstone to be targeted to decouple demand on energy and economic growth. Furthermore, Egyptian authorities currently focus on increasing awareness of key stakeholders on energy-related matters and improving the legal frameworks to promote sustainable and decentralized development. In line with its international commitments, the Government has adopted several measures to increase both rational use of energy and renewables in the energy supply mix including the Mandatory EE Code for residential (2006), commercial (2009) and governmental (2011) buildings, the National Energy Efficiency Action Plan (2012-2015), Electricity Law (2015) as well as MEPs and labeling schemes for selected equipment and appliances.<sup>38</sup> It also established the Supreme Energy Council (SEC) headed by the Prime Minister that aims at revising national energy policies including energy efficiency measures, incentives for renewable energy, private sector investment in energy services and revise energy prices for large industrial facilities and other end-users.
60. Furthermore, a comprehensive set of industrial energy efficiency strategies and policies have been jointly developed by UNIDO and the Government of Egypt through EEAA, MIFT and FEI and will shortly be presented to the Cabinet of Ministers for adoption. The aim of these strategies and policies is to drive the industrial sector demand for industrial EE, to ensure responsive supply and to enable the government on EE related matters. Therefore, the project is aligned with Egypt’s national priorities as it will support the country in achieving its EE goals through the promotion of an enabling political and technical environment that successfully integrates EE motors in the Egyptian industrial sector.

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<sup>38</sup> RCREEE, *Egypt Country Profile 2013*.

7. *Knowledge Management.* Outline the knowledge management approach for the project, including, if any, plans for the project to learn from other relevant projects and initiatives, to assess and document in a user-friendly form, and share these experiences and expertise with relevant stakeholders.
61. The project will build on previous industrial energy efficiency interventions which are part of the UNIDO Programme on Energy Management System Implementation in Industry and are currently active in 17 developing countries and emerging economies. Particularly, the project will consider the lessons learnt and knowledge acquired through the “Industrial Energy Efficiency in Egypt” GEF 4 project currently implemented by UNIDO.
62. During and after the project, the data and knowledge collected will be constantly shared with a wide range of stakeholders to promote replicability of best practices. This exercise will add on to the ongoing efforts being made by UNIDO to create a database which aggregates statistics on energy efficiency interventions including the overall energy savings achieved and the specific ESO measures and trainings carried out to achieve them. To guarantee that the acquired knowledge is properly disseminated within and beyond the project intervention zone, UNIDO’s Open Data Platform will be used. The platform will collect relevant project reports including technical demonstrations to facilitate information exchange, cooperation and partnerships. Besides, the project will carry out targeted awareness campaigns to reach different audiences and tailored trainings to expand the national experts’ pool.



**PART III: APPROVAL/ENDORSEMENT BY GEF OPERATIONAL FOCAL POINT(S) AND GEF AGENCY(IES)**


**A. RECORD OF ENDORSEMENT<sup>39</sup> OF GEF OPERATIONAL FOCAL POINT (S) ON BEHALF OF THE GOVERNMENT(S):**

(Please attach the [Operational Focal Point endorsement letter](#)(s) with this template. For SGP, use this [SGP OFP endorsement letter](#)).

NAME	POSITION	MINISTRY	DATE (MM/dd/yyyy)
Ahmed Abou Elseoud	CEO	EGYPTIAN ENVIRONMENTAL AFFAIRS AGENCY	02/20/2016

**B. GEF AGENCY(IES) CERTIFICATION**

**This request has been prepared in accordance with GEF policies<sup>40</sup> and procedures and meets the GEF criteria for project identification and preparation under GEF-6.**

Agency Coordinator, Agency name	Signature	Date (MM/dd/yy yy)	Project Contact Person	Telephone	Email
Mr. Philippe R. Scholtés, Managing Director, Programme Development and Technical Cooperation, UNIDO-GEF focal point		08/22/2016	Rana Ghoneim, Industrial Development officer, Energy Department, UNIDO	+43-1-26026-4356	r.ghoneim@unido.org

<sup>39</sup> For regional and/or global projects in which participating countries are identified, OFP endorsement letters from these countries are required

even though there may not be a STAR allocation associated with the project.

<sup>40</sup> GEF policies encompass all managed trust funds, namely: GEFTF, LDCF, and SCCF

## ANNEX I – EMISSION REDUCTION CALCULATIONS

### Direct emission reduction

The project expects to implement system optimization for EMDS and to install EE motors in 20 energy intensive industries which represent around 5,000 motors. At this point, the selection criteria is to have a minimum installed capacity of around 200 – 250 kW of electric motors with a substitution rate of around 20%. The project with an estimated investment of almost USD 20 million (including GEF contribution and co-financing) is expected to result in annual energy savings ranging from 104,944.31 to 209,888.61 MWh per year. Besides, cumulative GHG emission reductions considering the emission factor of 0.4655 (tCO<sub>2</sub>eq/MWh) range from 0.48 to 0.97 Mt CO<sub>2</sub> over the next 10 years. The preliminary estimates for energy savings are based on the 11 energy intensive industries audited under the GEF-4 UNIDO Industrial Energy Efficiency project as stated under the section baseline scenario.

		Baseline		Potential savings			
Industries	Motors	Electricity Consumption	GHG emissions	10% potential savings scenario		20 % potential savings scenario	
				Electricity consumption	GHG emissions	Electricity consumption	GHG emissions
	#	MWh p.a.	tCO <sub>2</sub> eq per 10 yrs	MWh p.a.	tCO <sub>2</sub> eq per 10 yrs	MWh p.a.	tCO <sub>2</sub> eq per 10 yrs
11	2729	577,193.68	2,686,837	57,719.36	268,683.65	115,438.73	537,367.31
20	4962	1,049,443.05	4,885,157.41	104,944.31	488,515.74	209,888.61	977,031.48

### Indirect emission reduction

There will be significant amount of indirect CO<sub>2</sub> emission reduction, due to implementation of the GEF-supported activities, as detailed in the ‘outcomes and outputs’ section. Using the GEF bottom-up methodology, indirect emission reductions attributable to the project range from 1.44 to 2.91 MtCO<sub>2</sub> over the average lifetime of the investments of 10 years. The GEF bottom-up approach implies the replication of the project demonstration investments to other industrial companies in Egypt over the GEF project influence period of 10 years and is calculated with the following formula:

$$\text{CO}_2 \text{ indirect BU} = \text{CO}_2 \text{ direct} * \text{RF}$$

Where:

CO<sub>2</sub> direct = estimate for total direct emission reductions

RF = replication factor

For RF the value of ‘3’ has been chosen as a conservative estimate for the industry sector as a whole based on the market transformation and demonstration approach of the project. Thus, applying the above formula, indirect emission reductions (bottom-up) are estimated at:

$$0.48 \text{ MtCO}_2 * 3 = 1.44 \text{ MtCO}_2 \text{ (10\%)}$$

$$0.97 \text{ MtCO}_2 * 3 = 2.91 \text{ MtCO}_2 \text{ (20\%)}$$