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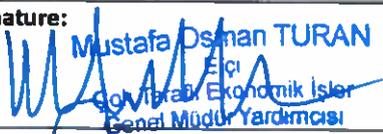


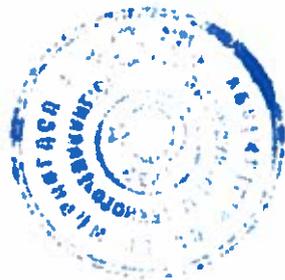
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<b>Project title:</b> Promoting Energy-Efficient Motors in Small and Medium Sized Enterprises (PEEMS)	
<b>Country:</b> Turkey	<b>Implementing Partner:</b> Directorate General of Productivity (DGP) under the Ministry of Science Industry and Technology (MoSIT)
<b>Management Arrangements:</b> National Implementation Modality (NIM)	
<b>UNDAF/Country Programme Outcome:</b> 1.1 By 2020 legal and policy framework improved, institutional capacities and accountability mechanisms enhanced to enable more competitive, inclusive, innovative environment for sustainable, equitable, job rich growth and development	
<b>UNDP Strategic Plan Output:</b> Output 1.5: Inclusive and sustainable solutions adopted to achieve increased energy efficiency and universal modern energy access (especially off-grid sources of renewable energy)	
<b>UNDP Social and Environmental Screening Category:</b> moderate	<b>UNDP Gender Marker:</b> 1
<b>Atlas Proposal/Award ID:</b> 89899	<b>Atlas output Project ID:</b> 95939
<b>UNDP-GEF PIMS ID:</b> 5285	<b>GEF ID:</b> 9081
<b>Planned start date:</b> January 2017	<b>Planned end date:</b> December 2021
<b>LPAC date:</b> 10 January 2017	
<b>Brief project description:</b> The project aims to promote significant additional investment in industrial energy efficiency in Turkey by transforming the market for energy efficient motors used in small and medium sized enterprises. This objective will be achieved by strengthening the legislative and regulatory framework related to both new and existing EE motors in Turkey, developing appropriate governance and information infrastructure, upgrading test laboratories at the Turkish Standards Institute (TSI), launching a "one-stop shop" sustainable financial support mechanism (FSM), and developing and implementing a comprehensive public awareness and training programme.	
<b>FINANCING PLAN</b>	
GEF Trust Fund	USD 3,750,000
UNDP TRAC resources	USD 80,000
Cash co-financing to be administered by UNDP	



(1) Total Budget administered by UNDP	USD 3,830,000
<b>PARALLEL CO-FINANCING</b>	
UNDP (in-kind)	USD 220,000
Government (MoSIT)	USD 2,500,000
Government (TSI)	USD 3,350,000
NGO (ASO)	USD 2,000,000
NGO (ISO)	USD 190,000
Private Sector: GAMAK	USD 5,000,000
Private Sector: ARÇELİK	USD 5,000,000
Private Sector: VOLT	USD 5,000,000
Private Sector: AEMOT	USD 5,000,000
(2) Total co-financing	USD 28,260,000
(3) Grand-Total Project Financing (1)+(2)	USD 32,090,000
Direct Project Costs (Annex Q)	USD 100,000

<b>SIGNATURES</b>		
Signature:  Mustafa Dsınan TURAN E.Çİ Genel Müdür Yardımcısı Dış İlişkiler ve Ekonomik İşler	Agreed by Government Ministry of Foreign Affairs	Date/Month/Year: 06/07/2017
Signature:  Anıl YILMAZ Director General Directorate General for Productivity	Agreed by implementing Partner  Directorate General of Productivity (DGP) under the Ministry of Science, Industry and Technology (MoSIT)	Date/Month/Year: 06/03/2017
Signature:  	Agreed by UNDP	Date/Month/Year: 1/3/17



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## List of Acronyms and Abbreviations

ACI	Ankara Chamber of Industry
ADCO	EU Administrative Corporation
BPPS	Bureau for Policy and Programme Support
CBA	Community-based Adaptation
CBD	Convention on Biological Diversity
CO	Country Office
CPAP	Country Programme Action Plan
DGP	Directorate General of Productivity
DGSIIP	Directorate General of Safety and Inspection of Industrial Products
EE	Energy efficiency
EEC	Energy efficiency consultant
EEM	Energy efficient motors
EMAP	Efficient Motor Assessed Potential
EMDS	Electric motor-driven system
EMU	Energy management unit
EnMS	Energy Management Systems
ErP	Energy related products
ESCO	Energy service company
EVD	Local energy efficiency consultants (as referred to in legislation)
EU	European Union
FSP	Full Sized Project
GDP	Gross domestic product
GEF	Global Environment Facility
GEFSEC	Global Environment Facility Secretariat
GHG	greenhouse gas
HVAC	heating, ventilation and air conditioning
ICI	Istanbul Chamber of Industry
IEEI	UNDP-GEF project entitled "Improving Energy Efficiency in Industry"
INDC	Intended Nationally Determined Contributions
ISG	Inclusive and Sustainable Growth (a portfolio within UNDP Turkey)
KOSGEB	Small and Medium Enterprises Development Organization of Turkish Republic, a public organization affiliated with the Ministry of Science, Industry and Trade
kWh	Kilowatts Hour
MoENR	Ministry of Energy and Natural Resources
MoEU	Ministry of Environment and Urbanization
MoSIT	Ministry of Science, Industry and Technology
MSP	Medium Sized Project
MV&E	Monitoring, verification and enforcement
MWh	Megawatt hour
OIZ	Organized industrial zone

PAC	Project Appraisal Committee
PIF	Project Identification Form
PIR	GEF Project Implementation Report
PMC	Project Management Cost
POPP	Programme and Operations Policies and Procedures
PPG	Project Preparation Grant
SEEFM	Sustainable energy efficiency financing mechanism
SME	Small to medium enterprise
STAP	GEF Scientific Technical Advisory Panel
SWOT	Strengths, weaknesses, opportunities and threats
ToR	Terms of Reference
TSI	Turkish Standards Institute
TÜBITAK	Turkish Scientific and Technical Research Institution
TWG	Technical working group
UNDP	United Nations Development Programme
UNDP-GEF	UNDP Global Environmental Finance
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organization
VSD	Variable speed drive

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## 1. DEVELOPMENT CHALLENGE

1. The growth of GHG emissions in Turkey has been globally one of the highest, increasing from 188 million tonnes CO<sub>2</sub> in 1990 to 459 million tonnes CO<sub>2</sub> in 2013. According to Turkey's INDC, this can be attributed to the 230% increase of Turkey's GDP between 1992 and 2012, a 30% increase in its population since 1990, and annual increases in energy demand of 6 to 7%. According to the Ministry of Energy and Natural Resources (MoENR) of the Government of Turkey (GoT), demand for electricity power has been steadily increasing for the past decade; electricity demand in 2014 was 255.5 TWh, an increase of 3.7% from 2013. Moreover, the electricity growth forecast of Turkish Electric Transmission Company (TEIAS) is an electricity consumption increase of 72% from 2013 to 2023. With limited domestic reserves of fossil fuels, Turkey is highly dependent on energy imports with more than 70% of its energy needs and 60% of its electricity based on fossil fuel consumption.
2. While Turkey was a party to the Kyoto Protocol, it did not have targets due to the fact that it is not in Annex B, and that its national conditions include rapid industrialization and urbanization and a low per capita GHG emission rate. In the successor agreement to the Kyoto Protocol, adopted in Paris in 2015, Turkey's INDC states that the country will adopt GHG emission reduction targets along with all other nations that will include a 21% reduction in GHG emissions from the business-as-usual (BAU) level by 2030 that will enable the country to adopt low carbon development initiatives to limit the increasing global temperatures below 2°C. One of these low carbon development initiatives will be the implementation of the Strategy on Energy Efficiency (SEE), or more specifically, the National Strategy and Energy Efficiency Improvement Action Plan under 10<sup>th</sup> Development Plan that targets the industrial sector. Another important plan to be implemented under the INDC is to increase energy efficiency in industrial installations and provide financial support to energy efficiency projects<sup>1</sup>.
3. By increasing energy efficiency in Turkey's industrial sector, the GoT will also work towards achieving its goal of further decreasing the country's energy imports and current account deficit. Efforts to increase energy efficiency in Turkey have intensified over the past 15 years. While there have been gains in decreasing the energy intensity of the industrial sector, the sector has been the highest energy consuming sector in Turkey for many years. This has been the case notwithstanding reductions in industrial outputs from the economic crisis. Since 1990, industrial primary energy consumption has increased an average of 4% per annum, a growth rate higher than the country's overall energy consumption.
4. In Turkey, 47% of net electricity consumption is from the industrial sector<sup>2</sup>, with an estimated 70% of this energy consumption from electric motor-driven systems (EMDS), 90% of which use 3-phase squirrel cage asynchronous motors as defined in the EU Eco-design Implementing Measure 640/2009 on electric motors as amended by Implementing Measure 4/2014<sup>3</sup>. Electric motors in Turkey, in general, are not energy efficient. Moreover, it is estimated that electric motors in Turkey vary considerably in efficiencies; for example, there can be a 3-5% difference between the efficiencies of an IE1 and IE3 15 kW motors assuming the IE1 motor has not been rewound<sup>4</sup>. Based on DGP's 2015 motor inventory analysis<sup>5</sup>, industrial IE1 motors are generally rewound 2 to 3 times (likely from old or burnt out wires) at local shops with a loss of 2 to 5% per re-winding, raising the difference of efficiencies between the IE1 and IE3 motors to 5 to 15%. In this case, these motors may consume an amount of energy equivalent to its purchase cost in about 5 to 6 months (assuming an 8-hour daily operation of the motor)<sup>6</sup>. A typical electric motor causes an energy cost of more

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<sup>1</sup> [http://www4.unfccc.int/submissions/INDC/Published%20Documents/Turkey/1/The\\_INDC\\_of\\_TURKEY\\_v.15.19.30.pdf](http://www4.unfccc.int/submissions/INDC/Published%20Documents/Turkey/1/The_INDC_of_TURKEY_v.15.19.30.pdf)

<sup>2</sup> TEDC (TEDAS), Electricity Distribution and Consumption Statistics of Turkey, 2015

<sup>3</sup> These are defined in Communiqué on Eco-Design Requirements for Electric Motors (OG No. 28197 of 7 February 2012)

<sup>4</sup> IEC 60034-30 Efficiency Table

<sup>5</sup> DGP Electric Motor Inventory – Preliminary Analysis Report from December 2015

<sup>6</sup> For motors that are used less than 2,000 hours annually, price of the motor would be equivalent to the electricity consumed

than 50 times its purchase cost during its 20 years of service life. This means that energy-efficiency is an extremely important consideration in the decision on which motor to purchase as illustrated in Table K.3 in Annex K that provides a detailed profile of industrial motors in Turkey.

5. The GoT recognizes the opportunity to transform the market for electric motors towards energy efficient electric motors (EE motors) and electric motor driver systems (EMDS), and has made energy efficiency a priority of industry, development and climate change policy. The new Strategy on Energy Efficiency (SEE), in this context, sets an overall target of reducing Turkey's energy intensity (energy consumption per unit of GDP) by 20% by Year 2023 from the levels of 2011. Promoting EE in Turkey's industrial and service sectors is among the top-priority actions outlined in the SEE. In addition, the GoT has adopted and transposed the EU Directive 2012/19/EU on waste electrical and electronic equipment (WEEE) into Turkish regulations that obligates electric motor manufacturers to recycle discarded inefficient motors. Details of applicable legislation and ongoing government initiatives to encourage EE motor adoption are provided in Annex L.
6. The developmental challenge for Turkey on this proposed GEF project, is to achieve substantial energy savings in an industrial sector where more than 90% of the enterprises are SMEs<sup>7</sup>. SMEs in Turkey have traditionally had difficulties in obtaining access to finance primarily due to their creditworthiness, inability to provide sufficient collateral, and their lack of capacity to articulate their specific needs for financing to banks. Turkish commercial banks have historically been reluctant to offer EE financing product lines since they associated such funding with higher transaction cost and higher risk. Moreover, these banks typically had limited internal capacity to properly assess, develop, and EE market financing instruments.
7. GoT have had and currently operate support programs to assist SMEs to improve their access to loans at concessional interest rates from banks contracted with KOSGEB<sup>8</sup>, and the involvement of the Credit Guarantee Fund (KGF) that is supported by the Turkish Treasury (KGF provides guarantees up to 80% of the loan amount). Despite these programs, these de-risked credit support schemes have been underutilized by industrial SMEs for the purposes of financing EE motor investments. Primary barriers to the wider adoption of EE electric motors in Turkey include:
  - The low level of awareness amongst SME personnel on the benefits of energy efficiency. As a result, there is a lack of importance placed on energy efficiency by most SMEs. Decisions by these personnel on motor investments almost always involves lowest cost options (not life cycle costs)<sup>9</sup>, and optimizing production through minimization of downtime risks;
  - The general lack of liquidity of SMEs to pay up front and financing costs for energy efficient motor investments. Most SMEs do not have available cash for such investments, and are unable to make any down payments on new equipment;
  - SME aversion on the use of external engineers such as ESCOs and equipment suppliers to improve their energy efficiency. Many of these engineers are generally linked to preferred equipment suppliers. As such, general SME perceptions are that these engineers may not offer the best solutions for their operations. In addition, they feel that there are higher risks of operational disruptions if the equipment replacement does not function as designed. Overcoming this barrier will require the development of a trusting relationship between a trusted and independent equipment supplier and the end-user SME;
  - Inefficient coordination in the implementation of the EE Law that slows the pace of legislative changes. Since the majority of institutional effort to implement the EE Law falls under the responsibilities of MoSIT (who in this instance have oversight of industrial issues and implementing EE), improving the coordination between MoSIT and other line agencies such as MENR is required; this would ensure

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over a much longer period (3 years or more), making the installation of an EE motor less feasible.

<sup>7</sup> The KOSGEB definition of an SME is "an enterprise with up to 249 employees and an annual turnover of up to 40 million Turkish Lira."

<sup>8</sup> Small and Medium Enterprises Development Organization of Turkish Republic, a public organization affiliated with MoSIT

<sup>9</sup> Most industrial SMEs are reluctant to give up their inefficient motors, either selling them for scrap metal or re-wiring them for continued usage in their processes.

efficient development and implementation of EE policies, regulations and government supported programs.

A more comprehensive discussion existing barriers to transforming the market and widespread usage of EE motors in the industrial sector in Turkey can be found in Annex M. Details of the available financial products available for SMEs can be found in Annex P.

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## 2. STRATEGY

8. A Theory of Change (TOC) has been developed for the PEEMS Project to overcome the developmental challenges outlined in Section 1 and accelerate market transformation of the EE motors market in the Turkish industrial sector. The key 5-step strategy to achieving the changes encapsulated in the Project objective of *“promoting significant additional investment in industrial energy efficiency in Turkey by transforming the market of EE motors used in SMEs”* will be i) strengthening the enforcement framework that includes an improved MV&E strategy, market surveillance, trained field inspectors; ii) improving capacity of relevant stakeholders to promote the benefits of EE motors; iii) improving capacity for monitoring, verification and enforcement for better compliance of electric motors supply chain through upgrading test laboratories at the Turkish Standards Institute as well as improved MV&E strategy and training of field inspectors of MoSIT; iv) launching of an operational and sustainable “one-stop-shop” for financing motor replacement programmes; and v) increasing the availability of EE motor information to raise stakeholder awareness on the benefits of EE motors and to sustain motor market transformation.
9. There are a number of baseline conditions that serve as drivers of change on which the Project can provide incremental assistance to augment the capacities or efforts of ongoing initiatives to achieve the Project objective:
  - the GoT’s commitment to improve the competitiveness of Turkish industries through alignment with EU standards as reflected in their Energy Efficiency Law in 2007, the adoption of Turkey’s Energy Efficiency Strategy 2012 – 2023, and implementation of an “Energy Efficiency Improvement Program” action plan that was developed as a part of the 10<sup>th</sup> Development Plan (2014 – 2018). Details of the Strategy and other relevant EE legislation are provided in Annex I;
  - a small group of locally-based electric motor manufacturers who have knowledge of EU eco-design standards for motors to advance the Government’s EE agenda to meet national targets, and to which EE standards can be applied in Turkey. The issue for these manufacturers are the poor sales of IE2 with VSD and IE3 motors in Turkey that indicate low compliance to the Government’s EE agenda;
  - local energy experts with knowledge on planning and implementing motor replacement programmes. The relationship of these experts with industrial SMEs, however, needs to be improved. Industrial SME perceptions of these experts is that they are linked with local motor manufacturers or multi-national companies, and perceived to be unable to provide impartial advice on equipment to be purchased in a motor replacement program; and
  - the global industrial sector (including the global electric motor industry) that would force the Turkish industrial sector to further address energy efficiency as a means of maintaining its competitiveness in global markets.
10. By the end of project (EOP), there will still be key external drivers to exert a positive influence on the Project outcomes and the Project goal of reduced GHG emissions from the industrial sector of Turkey. This would include the improved energy efficiencies of the motors used in industrial SMEs, and continued Government support to encourage the use of EE motors that will support Turkey’s INDC plan and policy to reduce industrial emission intensities and support energy efficiency. By the EOP, Project outputs will serve as internal drivers towards market transformation including adoption of upcoming EU eco-design measures for motors, increased availability of information on best international practices for energy efficiency, and increased awareness amongst end users and policy makers on the benefits of EE motors.

11. For the proposed Project interventions to succeed, a number of assumptions have been made including:
- Continued economic growth in Turkey that will fuel the desire of industries to review and change their energy consumptive patterns;
  - Achieving consensus between competing electric motor manufacturers to establish a national electric motor manufacturers association. The formation of such an association would allow local motor manufacturers to more effectively promote the sale and use of EE motors in the industrial sector;
  - Industrial SMEs accept technical assistance from the Project and its designated partners that includes Organized Industrial Zones (OIZs) and their Energy Management Units (EMUs);
  - OIZs and SMEs comply to conditions for PEEMS Project support that includes allowing the PEEMS Project to monitor their progress and energy savings for the purposes of disseminating pilot project information to other OIZs and SMEs;
  - EMUs have absorptive capacity for training on the management of motor replacement programmes with SMEs;
  - Industrial SMEs become genuinely interested in EE motors as a result of public awareness campaigns supported by the Project.
12. To achieve the long-term outcomes and Project sustainability, a number of assumptions have also been made including:
- sustained government support of their INDC commitments to reduce industrial energy intensity;
  - OIZs and industrial SMEs have absorptive capacities to comprehend and undertake EE motor investments;
  - the continued involvement of financial institutions with sufficient funds to provide financing and risk guarantees for motor replacement programmes involving SMEs;
  - the effectiveness of OIZs and their EMUs to involve all SMEs in motor replacement programmes;
  - motor manufacturers are stimulated by enabling regulatory framework to increase their volume of manufacturing of EE motors; and
  - banks and EECs will use experience, tools and lessons learned from the pilot demonstration on a “one-stop-shop” for financial support mechanisms and apply them to other OIZs and industrial SME clients.
13. A strength of the Project strategy will be the involvement of stakeholders that are key to market transformation of the motors market in the industrial sector of Turkey. Key stakeholders in this group include three General Directorates under MoSIT, the Turkish Standards Institute, KOSGEB, the Kredit Guarantee Fund, electric motor manufacturers, OIZs, and energy efficiency consultants. A complete listing of stakeholders is provided in Table O.1. The baseline activities involving these stakeholders are provided in detail in Section O.4: Project Approach in Annex O.
14. The key change that will be provided by the Project activities will be the creation of an enabling environment for market transformation for EE motors for the Turkish industrial sector. With the 5-step strategy outlined in Para 8, the key change that the Project will facilitate will be the increased willingness of industrial SMEs to replace their existing inefficient motors with EE motors. The innovation of the PEEMS Project design is to involve energy management units (EMUs) within OIZs and strengthen their existing and trusting relationship with industrial SMEs (as illustrated on Flowchart 1 on page 120) to the extent that they can manage implementation of an EE motor replacement program. The creation of this enabling environment involves the Project’s capacity building activities and technical assistance to improve the technical knowledge of EMUs to promote and implement EE replacement programmes. The Project will also support the recruitment of qualified EE consultants who can provide the engineering and energy expertise required to prepare an “efficient motor assessed potential” (EMAP)<sup>10</sup> and a motor energy efficiency investment program (MEEIP) for each industrial SME. The MEEIP will inform the industrial SME of which motors should be replaced, the cost and the payback period based on electricity savings.

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<sup>10</sup> An assessment of the potential motors to be replaced within an industrial SME. More details are in Component 4 in Para 26.

15. To overcome SME difficulties in obtaining access to finance for implementing an MEEIP, the Project will provide resources to develop a “pilot one-stop-shop” (to be managed by energy management units (EMUs) within OIZs) for industrial SMEs to identify the potential for EE motor replacements, design and prepare an MEEIP, and improve SME access to available financial products as well as new ones to be introduced by the Project. This will allow industrial SMEs to receive impartial technical advice through the EMU (a more trusted entity), and access to financing for an MEEIP with the knowledge that their investment can be paid back within a reasonable amount of time of under 2 years. The financial support mechanisms will include: a) direct finance to the SMEs; b) OIZ portfolio finance; c) vendor finance; and d) leasing. Project budget is allocated to pay for legal and other third party expenses to assist with further design of the financial model(s).
16. All financial support mechanisms mentioned in Para 15 will involve de-risking of SME financing through the involvement of loan guarantee funds that currently exist to protect borrowers of bank funds including motor manufacturers, leasing companies, OIZs and industrial SMEs. The risk of SMEs defaulting on their monthly payment is too restrictive for banks, OIZ, motor manufacturers or leasing companies. To make these finance structures less risky, a guarantee will need to be provided, which will pay out when an SME defaults on a payment, possibly from the Credit Guarantee Fund (KGF). This fund is already providing guarantees to support SME finance. However, for a pilot (or demonstration) program under the PEEMS Project, a guarantee would be tailored to the required needs of all stakeholders involved, such as a partial guarantee for a full demonstration (instead of specific guarantees that would be unique for each case)<sup>11</sup>. In all cases, the SMEs would pay a fixed monthly fee for the use of the electric motors and the installation of the equipment. This fixed fee would be based on estimated electricity cost savings, whereby the fee should be lower than the electricity cost savings with a longer tenure than the payback period. This would allow the SME to immediately benefit from the motor replacements. To further enhance the attractiveness of the scheme as a demonstration, the OIZ (with the assistance of their EMUs) will take central role in awareness creation amongst SMEs in the zone. A campaign to raise awareness of all industrial SMEs in Turkey will be organised with support from the Project. These financial support mechanisms are further explained in Annex P, Paras P.31-P.36 and illustrated on Flowcharts 2 to 5 on page 121.
17. The PEEMS Project design is innovative in the fact that the design provides more involvement of the EMU, a trusted entity of most industrial SMEs. Prior projects and existing financial products (as detailed in Paras O.27 to O.35 in Annex O) have not taken advantage of this relationship, leaving the industrial SME to voluntarily undertake EE motor investments provided they are able to meet collateral and liquidity requirements of the lenders. For the SME, financial products for energy efficiency investments are available from a number of sources including KOSGEB, state development banks as well as private commercial banks all of whom have a number of credit lines, which can be used for the finance of EE motor investments. *However, industrial SMEs who already have limited knowledge of the benefits of EE motors, are not highly motivated to initiate these investments given that they need to make the voluntary effort to access one of these credit lines.* Additional difficulties for industrial SMEs includes qualifying for loan guarantees that can potentially reduce collateral requirements for these loans; loan guarantees from the KGF cover 80%. Furthermore, the administrative paperwork required to access these loan guarantees has been deemed onerous by many of the applicants. To date, there has not been significant uptake of these financial products for financing EE motor investments to the extent that the market is transformed. The strengthening of the industrial SME-EMU relationship to promote EE motor investments and the involvement of the credit loan guarantee funds increases the likelihood of an industrial SME implementing an MEEIP.

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<sup>11</sup> Proper assessment of the feasibility of the proposed models will require pricing and modelling of replacement of the electric motors. This will require undertaking analyses of information and data collected from electric motor manufacturers on motors, their efficiencies, costs and savings. Data will be averaged out, aggregated and used as best guess data for the modelling cost and savings, and eventually modelling of the finance structured and presented in a MEEIP baseline report.

18. The strengthening of the EMUs within the OIZs builds on the work being undertaken by the sister GEF project “Improving Energy Efficiency in Industry” (IEEI) in Turkey. Further details of the IEEI project are provided on Paras 28 and 29.
19. The PEEMS Project design is borrowing approaches from the Swiss Government’s EASY programme between 2010 and 2014, consisting of a 4-step methodology and financial incentive program to encourage Swiss mid-sized industrial factories to implement energy efficiency improvements of electric motor systems<sup>12</sup>. One of the components of the EASY program was the analysis of over 4,000 motors for their age, operating hours, size and use of variable frequency drives (VFD), similar to DGP’s ongoing survey on electric motor usage (for more details, see Annex O, para O.13). On the EASY program, over 100 motor systems were thoroughly analyzed providing valuable information on the current state of electric motors in Switzerland<sup>13</sup>. The 4-step methodology could be adopted by the PEEMS Project including an assessment of the efficiency potential of an industrial SME, creating a list of long-running motors that consume more than 70% of all electricity in the industrial SME, conducting on-site tests of motors from this list, and implementation of the motor replacements. Details of the EASY programme can be found in Annex K, Paras K.10 to K.13.
20. The PEEMS project is also borrowing approaches from the ongoing UNDP GEF Orkoy Solar PV Project where early adopters of solar PV technology would be eligible for 100% grant financing from GEF for the first 200 Kw in return for allowing the Project to be used for awareness raising purposes. Such an activity would certainly attract industrial SMEs to come forward and participate on the PEEMS Project to demonstrate the energy savings and operations cost reductions from the EE motors.

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### 3. RESULTS AND PARTNERSHIPS

#### 3.1 Expected results

21. Five components and outcomes have been developed to enhance stakeholder synergies to catalyze market transformation from inefficient electric motors to IE3 and IE4 motors within the Turkish industrial sector. The key Project output will be the development of a one-stop-shop mechanism within an OIZ and the provision of stronger de-risking measures to assist industrial SME investment into EE motors. The DGP under MoSIT who are in charge of developing and implementing policies, strategies and action plans according to the EE Law will implement the PEEMS Project.
22. By developing a one-stop-shop mechanism within OIZs, the Project will also enhance the awareness and knowledge of SMEs and EMUs of the benefits of EE motors, augment existing EE motor policies and standards to increase the confidence of all stakeholders in the transformation of the EE motors market, improve market surveillance activities to prevent the entry of noncompliant motors onto the market, and increase the availability of promotional materials related to EE motors that are designed to sustain market transformation.

#### 3.2 Project Outcomes and Outputs

23. **Component 1: Strengthened legislative and regulatory and policy framework for EE motors in Turkey.** The outputs from this component will lead to the outcome of strengthened policies, regulations and standards that are applicable to EE motors and harmonized with the EU commission regulation (EC) number 640/2009 that is designed to increase the energy efficiency of the electric motors. A direct benefit of the GEF project

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<sup>12</sup> [http://www.eemods15.info/midcom-serveattachmentguid-1e55dd80cd6f5b45dd811e5a58751853169d036d036/energy\\_management\\_rolf\\_tieben.pdf](http://www.eemods15.info/midcom-serveattachmentguid-1e55dd80cd6f5b45dd811e5a58751853169d036d036/energy_management_rolf_tieben.pdf)

<sup>13</sup> One of the findings of the programme was that motor usage characteristics in Switzerland reflected similar data scatter in the context of motor usage within industrial enterprises. The EASY program then formulated a rule based on this data that by improving the energy efficiency of the frequently used motors (in the order of 20% of all installed motors), more than 80% of the potential energy savings could be realized, leading to the use of a “20-80 rule”. The programme also found that less than 20% of all motors in Switzerland were equipped with VFD, similar to findings in the DGP electric motor usage survey.

to the Government of Turkey will be its strengthened capacity to adopt EU directives that will continually improve the efficiency of electric motors. The intended outcome of this component will be strengthened legislative and regulatory framework related to both new and existing EE motors in Turkey. The following outputs will contribute to the achievement of the stated outcome:

- ***Output 1.1: Augmented baseline survey on industrial SME electric motor usage.*** This output is intended to augment the DGP national survey that was commenced in 2015 on electric motor usage that falls under an Implementing Measure of the 10<sup>th</sup> Development Plan (survey details are provided in O.13 and O.14 in Annex O). As of March 2016, a total of 93,139 AC electric motors with a power rate 7.5 kW or above were in the survey covering 887 industrial enterprises (annual energy consumption greater than 50 toe) with information on the distribution of motor power ratings, service hours, number of rewindings, brand name, age, and estimates of efficiency including the energy-efficiency class (survey findings are summarized in Para K.9 in Annex K). With national estimates on the number of electric motors in Turkey ranging from 12 to 18 million, there is a need to increase the sample size of DGPs survey to increase the confidence level for a national motors survey. As such, the Project will provide resources to accelerate the survey to increase the number of motors to the extent that there are higher confidence levels of the survey that can serve as a basis for setting targets policies and standards related to EE motor market transformation. This will be delivered through outsourcing for the required professional services to augment the DGP survey of electric motor usage within industrial SMEs. To deliver this output, the following activities will be carried out:
  - During Year 1, review the progress being made by DGP on their motors the survey which was commenced in 2015, and design activities that would upgrade their survey into a national survey that can be used to set national targets on EE motor market transformation. The survey should cover as many OIZs and SMEs that will provide a 90 to 95% confidence level of the survey findings;
  - Drafting of the terms of reference (ToRs) for the survey within Year 1 that will include sufficient time survey a large number of SMEs and their electric motor usage to provide a higher confidence level in its findings. The ToRs shall include provisions for the survey team to focus on SMEs within OIZs, and to obtain information on the number of electric motors and their sizes within SMEs, the daily usage of these motors, their actions in the event of motor breakdown, monthly electric costs and their general attitudes towards EE motors;
  - Conduct a stakeholder workshop to include activities to define motor market structures, market actors, trade companies, annual turnover and market movements, characterize the second-hand motor market and services for motor rewinding, solicit perceptions of users of electric motors, and conduct a SWOT analysis of the electric motors market. The results of this workshop can be added to DGP's electric motor survey;
  - Conducting the survey on electric motor usage within industrial SMEs survey using an established database software or existing database programmes already setup by DGP with their current motors survey and inventory by Year 2;
  - Delivery of baseline survey report to the DG Productivity for analysis and its use in amending the current action plan of MoSIT for market transformation of EE motors in Turkey by Year 2. This may include amended dates for the phasing out of electric motors that do not reach levels of efficiency for IE3 motors or IE2 motors with variable speed drive.

GEF support is needed for technical assistance during Years 1 and 2 in augmenting the ongoing DGP baseline survey on electric motor usage.

- ***Output 1.2: Supportive policies for EE electric motors that are harmonized with international best practices.*** The delivery of this output involves coordination and technical assistance to identify key applicable international electric motor policies and regulations for implementation and enforcement (including motor replacement programmes), and to transpose these policies and regulations for adoption in Turkey. To deliver this output, the following activities will be carried out:

- Provide assistance during Years 1 and 2 to disseminate information emanating from discussions that are taking place at EU Administrative Corporation (ADCO) Meetings to resolve the grey issues of EU standards related to EE motors;
- Provide support measures throughout Project implementation for accelerated adoption of revised and/or new eco-design implementing measures as well as any possible energy efficiency related regulatory measures on electric motors as well as electric motor driven energy products (ErPs) such as water pumps, industrial fans, and compressors into Turkish legislation by elaborating final draft regulations;
- Provide assistance during Year 2 in conceptualizing proposing new measures for phasing out of old motors based on progress in the EU legislation as well as information from the baseline survey of Output 1.1;
- Provide assistance and information workshops for market players (manufacturers, suppliers, importers and users) during Years 1 and 2 and in close collaboration with MoENR on establishing minimum energy performance standards (MEPS) that are in line with EU directives and best international practices and will strengthen the enabling investment environment for electric motors; and
- Design and implementation of a recycling program for phased out energy inefficient motors<sup>14</sup> in close collaboration with MoEU.

GEF support is required for all of the above activities with the exception of the recycling program for the design and implementation of the recycling program which will be implemented by DGP.

- **Output 1.3: Strengthened institutional coordination mechanism.** The delivery of this output will involve assistance to streamline coordination of all key stakeholders in the management of the programme for EE motors, and an acceleration of the acceptance and adoption of a MEPS for EE motors and market surveillance activities. To deliver this output, the following activities will be carried out:
  - Under the lead of DG Productivity, set up a functional Project Board (PB) during Year 1 that will foster cooperation between the Directorate General of Renewable Energy (under MoENR), the proposed electric motor manufacturers association, motor manufacturing enterprises, the EMUs within OIZs, and representatives from SME manufacturing associations, and others who can be invited on an ad-hoc basis as required. The PB will also be set up to agree on the Project work plan and budget and take necessary decisions on implementation; these PB functions are detailed on Paras 66 and 67;
  - Conduct PB meetings on a biannual basis or more frequently if required;
  - Set up a technical working group (TWG) during Year 1 and conduct bi-annual meetings throughout the duration of the project as a platform for discussion of changes in policies and regulations applicable to EE motors. Members of the TWG could include TEMMA, motor manufacturing enterprises, and TSE; and
  - Prepare PB and TWG minute meeting notes that are distributed with follow-up actions that can be monitored at subsequent PSC or TWG meetings.

GEF support is required for coordination activities designed to foster cooperation between all key stakeholders, particularly between the motor manufacturers, the SME end users, and the Government.

24. **Component 2: Capacity building for relevant stakeholders to promote the benefits of EE motors.** This component is intended to address the barriers associated with the need for improved capacity within the local EE motors manufacturing industrial sector, OIZs and their EMU management personnel and industrial SME end-users. The intended outcome of this component will be the improved capacity of these relevant

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<sup>14</sup> This must be consistent with the Commission Regulation 640/2009 that requires new motors have information relevant for the recycling or disposal of the motor at end-of-life as well as EU Directive 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE Directive). Inefficient motors will be recycled in a manner consistent with this information and best international practices for motor recycling that may include a collective scheme and accredited motor recycling plant financed by several motor manufacturing companies.

stakeholders to promote the benefits of EE motors. This will be implemented in tandem with ongoing efforts by DGP to increase the number of accredited motor recycling facilities where members of TEMMA can meet their obligations for recycling electric motors as per EU Directive 2012/19/EU. DGP will provide the financing for this recycling programme as part of their co-financing commitment to the project. The following outputs will contribute to the achievement of this outcome:

- *Output 2.1: Technical assistance delivered for building the capacity of newly established Turkish electric motors manufacturers association (TEMMA).* The delivery of this output will involve coordination and technical assistance to facilitate an agreement amongst major electric motor manufacturers in Turkey. GEF support will be provided during Years 1 and 2 and consist of:
  - meetings and legal assistance and the development of a charter for the Association that will define its role in the EE electric motors market, preparing business plans, and improving its outreach to its members and end-users of EE motors through more effective preparation of its messaging and promotional material to OIZs, EMUs, and industrial SME end-users;
  - strengthening the linkages of TEMMA with the DGP to maximize cooperation between the public and private sectors (likely within a TWG as in Output 1.3). This will include TEMMA cooperation on setting MEPS, amending the MoSIT action plan for EE motors, and using TSI testing facilities for new electric motor designs;
  
- *Output 2.2: Technical training workshops on designing and implementing EE motor replacement programmes:* Delivery of this output entails the identification of target entities for EE motor replacement program training, preparation of training materials, and delivery of 20 technical training workshops to these stakeholders. To deliver this output, the following activities will be carried out:
  - Identification of stakeholder groups during Year 1 involved with EE motor replacement programmes and an assessment of their absorptive capacities for training on EE motor replacement programmes;
  - delivery of 20 technical training workshops on EE motor replacements in the industrial sector and other sectors in Turkish society for SMEs. This would include, in addition, technical training on motor recycling programs, paid for by the DGP as part of their co-financing, and facilities that are to be an integral part of the motor replacement program. This will assist members of TEMMA to comply with EU directive 2012/19/EU that obligates them to finance and recycle inefficient motors that are replaced by IE3 motors;
  - preparing technical materials during Years 1 and 2 related to EE motor design, EE motor manufacturing in compliance with the latest MEPS, EE motor regulations, motor product testing and certification requirements, basic financial analyses to introduce life cycle analysis of true electric motor replacement costs, and electric motor systems purchasing and management practices. This may include quick tool software to prepare “standard motor testing reports” (SMTRs) for definition of motor characteristics of SMEs and “Motor Energy Efficiency Investment Plans” (MEEIPs) that are being used in Outputs 4.1 and 4.2;
  - delivery of 10 EE motor replacement training workshops and seminars (2 annually over the entire duration of the Project) targeting OIZ management and EMU personnel, EECs, and industrial SME end-users. The workshops and seminars conducted during Years 3, 4 and 5 will disseminate lessons learned from Outputs 4.1, 4.2, and 4.3 to encourage other OIZs to implement a one-stop-shop for financing support mechanisms;
  - solicitation of feedback from workshop participants on the effectiveness of the training aspects of the workshop, and the incorporation of those comments to improve workshops.

GEF support is required for all of the above activities in this output with the exception of the recycling programmes which will be paid for by the DGP.

25. **Component 3: Upgraded Turkish Standards Institute (TSI) test laboratory and strengthened monitoring, verification and enforcement.** This component is intended to address the barriers associated with the need for improved capacity to undertake market surveillance programs related to electric motors. The intended outcome of this component is to have upgraded motor testing capacities of TSI and a strengthened program for monitoring, verification and enforcement of compliance with eco-design implementing measure 640/2009 (or future amendments future amendments). The following outputs will contribute to the achievement of this outcome:

- **Output 3.1: Completed assessment of Monitoring, Verification and Enforcement (MV&E) needs.** The delivery of this output will be a review of existing activities and capacities during Year 1 of all related stakeholders to monitoring, verification and enforcement for market surveillance for motors within the industrial sector of Turkey. While there are ongoing activities within the DG of Safety and Inspection of Industrial Products (DSIIP) to undertake a proactive market surveillance program (PMSP) for domestic appliances, activities related to surveillance of electric motors being used in the industrial sector within this PMSP have not yet been well scoped. Furthermore, motor testing protocols within TSI have not yet been established despite the setting of MEPS as described in Para 22. Project resources will be utilized during Year 1 to tailor the activities of this component to the current needs of both DGSIIP and TSI;
- **Output 3.2: Upgraded electric motor testing facility:** Delivery of this output will entail the planning and implementation of the planned TSI investment for a facility to test electric motors between 90 and 375 kW. The investment will require a large area to house large equipment for testing of these motors. Delivery of this output will entail the following activities:
  - Conduct overview of the TSI feasibility report on the proposed testing facility during Year 1;
  - Propose design and implementation measures to construct facility and install testing equipment during Years 1, 2 and 3;
  - Provide USD 1.2 million towards investment into the upgraded motor testing facility and pilot testing programme as well as oversight of its installation and subsequent operation during Years 1, 2 and 3;
  - Provide training workshops for TSI personnel during Years 3 and 4 on new testing protocols for motor sizes ranging from 90 to 375 kW;
- **Output 3.3: Developed plans for enforcement and market surveillance.** The delivery of this output will entail the following activities:
  - Develop and implement a pilot motor testing programme for new motors for the purpose of upgrading the MV&E and market surveillance strategy of DGSIIP and also for building motor testing capacity at TSI;
  - Conducting a workshop during Year 3 or 4 to develop a PMSP tailored for EE motors in the Turkish industrial sector. Using lessons learned from similar developments in the UNDP-GEF EE Appliances Project, this workshop can be designed using best international practices that assist the DGSIIP to comply with EU directives.

GEF support is required for the above activities.

26. **Component 4: One-stop-shop for financial support mechanisms.** This component is intended to address two barriers: i) Lack of financial liquidity of SMEs to pay up front and financing costs for energy efficient motor investments; and ii) SME aversion on the use of external engineers such as ESCOs and equipment suppliers to improve their energy efficiency. Outputs of this component will lead to an outcome of improved to SME access to available financial mechanisms and additional de-risking measures that will facilitate an increase in investments in energy efficient electric motors within industrial SMEs. Project resources in this component will be focused on building the capacity of the OIZs and its EMU to become lead entities in managing a motor replacement programmes that would include a one stop shop for financial support mechanisms for industrial SMEs. Project resources used towards building EMU capacity will enable them to comprehend and prepare

an “efficient motor assessed potential” or EMAP that will provide an assessment of the potential motors to be replaced within an Industrial SME. With an EMAP in place, the SME can target certain motors for a standard motor testing report (SMTR) that will provide recommended improvements not just to the electric motor itself, but to the entire electric motor drive system. From this information, a “Motor Energy Efficiency Investment Plan” (MEEIP) can be prepared to include: (i) a technical component, which will include the proposed electric motors (brand, capacity and efficiency) with limited amount of associated equipment to fully benefit from potential cost savings (such as a pump, fan or compressor); and (ii) a financial component, which will include the cost savings, payback period, monthly fee calculation with a simple sensitivity analysis. The MEEIP can serve as the basis on which financing (or leasing as the case may be) will be arranged and therefore will be shared with relevant parties, such as banks for financing or with leasing company in case of leasing. The following outputs will contribute to the achievement of this outcome:

- **Output 4.1: Completed efficient motor assessed potential (EMAP).** The delivery of this output will entail the following activities:
  - Conduct formal discussions during Year 1 with the selected chambers of industry to select the 3 OIZs who will undertake the pilot activities for the EMAP, and other activities leading to the piloting of the one-stop-shop financial support mechanism. These discussions should include criteria for the selection of OIZs to pilot the one-stop shop financial support mechanism<sup>15</sup>;
  - Recruitment of an international EEC during Year 1 to technically support an EMU within an OIZ in formulating and managing a program for inefficient electric motor replacements;
  - Assist the EMU during Years 1, 2 and 3 in conducting an assessment on the efficiency potential of all motor systems within an estimated 500 SMEs in 3 to 5 OIZs using an established software tool that can estimate the share of electric motors within the total electricity consumption of an SME<sup>16</sup>. As a means of encouraging SMEs to permit EMAP activities on their premises, the cost of EMAPs during Year 1 will be fully covered by the PEEMS Project up to a maximum of 100 SMEs spread over 3 to 5 OIZs. The cost of EMAPs during Years 2 and 3 will only be 50% covered by the PEEMS Project up to a maximum of 200 SMEs for each year;
  - Assist the EMU in creating a database of relevant motors within an SME during Year 1 using a software tool that incorporates a motor’s operating hours and uses a decision-maker function to select motors with the best potential for energy savings;
  
- **Output 4.2: Standard motor testing reports and MEEIPs:** Delivery of this output will entail the provision of technical assistance to the EMU to:
  - Conduct on-site measurements within 500 SMEs (located within 3-5 OIZs) on their motors during Years 1, 2 and 3 with the best potential for energy efficiency gains;
  - Prepare a standard motor testing report (SMTR) for each of these motors during Years 1, 2 and 3. These reports should include recommendations on the resizing of the motors and its applications adjusted for OIZs to the needs of the industrial process being motorized but based on the findings of the SMTR. In addition, the SMTR should provide sufficient information on recommendations to upgrade the motor system with a VSD as well as other improvements;
  - Collate all SMTR information and prepare a motor EE investment plan (MEEIP) during Years 1, 2 and 3 for replacement of inefficient electric motors to 500 SMEs within 3 to 5 OIZs;
  - Similar to Output 4.1, the cost of conducting SMTRs and preparing MEEIPs will be fully covered by the PEEMS Project during Year 1 up to a maximum of 100 SMEs, and 50% covered during Years 2 and 3 up to a maximum of 200 SMEs per year.

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<sup>15</sup> This should include technical, financial, geographic, social and gender criteria. Under these criteria, the selected OIZs should be advanced in its approaches to these criteria that would include most importantly, their services to SME tenants on reducing their total energy consumption.

<sup>16</sup> An example of such a software tool is described in Paras K.11 to K.13.

- Output 4.3: Pilot EE motor replacements using "one-stop-shop" financing arrangements. The delivery of this output will entail the following activities:
  - Confirm the viable finance models with stakeholders and set up agreements that will enable the 3 to 5 selected OIZs to become the primary management entities of the one-stop shop facility for industrial SMEs to implement motor replacement programmes. This will include agreements to be set up and completed by Year 1 that includes:
    - a motor manufacturer and an OIZ on the procurement details, sourcing and installation of EE motors as well as the motor manufacturer taking back all phased-out inefficient motors that are being replaced to an accredited recycling facility;
    - an SME and an OIZ to allow an OIZs (with their EMUs) to:
      - ✓ conduct an EMAP and SMTRs;
      - ✓ formulate and implement an MEEIP;
      - ✓ take back inefficient motors that are being replaced for the SME; and
      - ✓ be remunerated through monthly annuities to pay for bank debts or use of the EE motors<sup>17</sup>;
    - an EEC and an OIZ to allow an EEC to provide technical assistance in conducting an EMAP, preparing SMTRs and an MEEIP, and other duties as assigned;
  - Facilitate completed agreements between the 3 to 5 selected OIZs, commercial banks, leasing companies and the guarantee facility. This would include amending existing agreements between commercial banks, leasing companies and guarantee facilities, all of whom have templated agreements which can be used for the one-stop shop facility;
  - Provide full support for motor replacements and variable speed drives (VSDs) for an estimated 12 SMEs (over 3-5 OIZs) for the purposes of attracting early adopters and using these early adopters as demonstrations for successful and efficient motor replacement programmes for the purposes of raising awareness. The Project has allocated USD 240,000 for the specific purpose of procurement and installation of electric motors in the range of 0.75 to 375 kW within the efficiency classes of IE 3 and IE 4<sup>18</sup>. Project personnel in close consultation with DGP should decide on the level of support for the early adopters for demonstrations of efficient motor replacement programmes. This support could range from 100% (including procurement and installation of EE motors) to support level as low as 75% depending on what may be best to attract industrial SMEs and raise awareness of the projects EE motors replacement program. An important condition for SME participation in this pilot will be their willingness to surrender their phased-out inefficient motors that are being replaced to the manufacturer for the purposes of recycling and compliance to the EU Directive 2012/19/EU;
  - Providing technical assistance to the 500 SMEs (including the aforementioned 12 SMEs who are early adopters), in the implementing of the MEEIP through obtaining and installation of the EE motor in the SME<sup>19</sup>. This would include 100 SMEs during Year 1, 200 SMEs during Year 2 and 200 SMEs during Year 3. Technical assistance to implement the MEEIP will primarily cover motor replacements (including surrender of inefficient motors to the motor manufacturer) and variable speed drives (VSDs) but not other components of the motor drive system such as pumps or fans;
  - Providing technical assistance during Years 1 and 2 to the 3-5 EMUs on the calculation of monthly energy savings from the installation of EE motors in the SME. The Project will need to obtain the electricity tariffs of each OIZ;

<sup>17</sup> This may include an arrangement between an SME and an OIZ utility on the use of electricity savings as payment for a leasing fee for the motors.

<sup>18</sup> For the purposes of a simplified calculation for targets, the median size of electric motor being used in the Turkish industrial sector is 42.5 kW according to DGP's survey on electric motor usage. In addition, the average cost of a 42.5 kW electric motor was assumed to be TL 3,600 or USD 1,272 (that should cover the cost of a VSD). As such, the number of electric motors that could be procured with full support of the Project funds of USD 240,000 would be 188 motors.

<sup>19</sup> Technical assistance will include consulting services from Energy Efficiency Consultants (EECs) who can source qualified electric motor suppliers and installation personnel to reduce the risks of prolonged production downtime from changing motors.

Annex P provides further details of the financing mechanisms being described under this output, and the nature of the relationships between the OIZs, industrial SMEs, motor manufacturers, commercial banks, leasing companies, and the guarantee facility. In addition to the options detailed in Annex P, the Project will also work out to revise the existing options and/or develop another financing mechanism option considering the needs and circumstances prevailing in Turkey at the time of Project implementation.

- **Output 4.4: Scaled up one-stop-shop for replacing inefficient electric motors.** The delivery of this output will combine the lessons learned from KOSGEB's pilot interest support program at the Kayseri OIZ as well as 2 years of operation of the pilot one-stop-shop from Output 4.3 to re-design and implement a scaled-up one-stop shop for EEM motor replacements. Activities to deliver this output will include:
  - technical assistance during Years 3, 4 and 5 to identify an additional 18-20 OIZs that can support a redesigned one stop shop financial support mechanism with diminishing support of the Project (for EMAPs and MEEIP preparations) and increased support from KOSGEB. This will involve negotiations with KOSGEB during Years 1 to 3 to introduce regulatory improvements regarding the financing of OIZs and capacity building for EMUs and EECs, that would lead to the gradual oversight of the one-stop shop by KOSGEB;
  - technical assistance during Years 2 and 3 to finalize a redesigned one-stop-shop that incorporates lessons learned from the previous 2 years of operation;
  - prepare business models that reflect applied financing structure, to be used to guide selection of financing structure in other OIZs during Years 3, 4 and 5;
  - provision of limited support during Years 3 and 4 for agreements to enable OIZs personnel to manage inefficient motor replacement programmes;
  - provision of limited support during Years 3 and 4 for early entrants to motor replacement programmes for the preparation of EMAPs and implementation of MEEIPs.

GEF support is required for all of the above activities. Table 1 provides a summary the actual number of EMAPs, MEEIPs and motor replacements implemented during the course of the Project.

27. **Component 5: Knowledge management and M&E.** This component is mainly focused on the management of knowledge that will sustain EE motors amongst stakeholders in manufacturing and sales of EE motors, intermediaries such as the OIZs and EMUs to manage motor replacement programmes and the SME end users in the industrial sector. The intended outcome of this component will be the increased availability of EE motor information that raises stakeholder awareness of the benefits of EE motors and sustains market transformation. The following outputs will contribute to the achievement of this outcome:

- **Output 5.1: National EE electric motor database:** Delivery of this output entails the technical assistance required to establish a national EE electric motors database to be hosted by DGP and DGSIIIP jointly for market surveillance purposes. The ownership and management of this database will be taken over by the DGP. This database will provide a valuable tool in general for monitoring, reporting and verification (MRV), but more specifically, for DGP to monitor motor market transformation as well as transformation of other appliances towards energy efficiency, to evaluate transformation progress, and set revised targets and policies<sup>20</sup>. To deliver this output, the following activities will be carried out:
  - By Year 2, review available data on inefficient and efficient motors within the industrial sector from Output 1.1, and efforts to establish an EE motors database from DGP's survey and KOSGEB's Kayseri OIZ interest rate support for EE motors scheme;
  - Prepare ToRs by Year 3 for a consultant or a firm to design and set up a National EE motors database that will incorporate EE motor information generated from the pilot EE motor

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<sup>20</sup> The market monitoring tool developed under UNDP/GEF EE Appliances Project may also be exported and merged into this database

replacement program from Outputs 4.3 and 4.4 and combine it with survey data of inefficient motors in use;

- By the middle of Year 3, recruit consultant or firm for the design and set up of the motors database;

**Table 1: Summary of Component 4 outputs and activities**

Output or activity <sup>21</sup>	Yr1	Yr2	Yr3	Yr4	Yr5	Notes
Output 4.1: EMAPs – no. of SMEs supported	100	200	200			Project support during Yr1 is 100%, while support for Yrs 2 and 3 is only 50%
Output 4.2: MEEIPs - no. of SMEs supported	100	200	200			Project support during Yr1 is 100%, while support for Yrs 2 and 3 is only 50%
Output 4.3: Pilot EE motor replacements – no. of EE motors replacements with full project support for early adopters	188					Project support during Yr1 is 100% including the purchase and installation of 188 EE motors for 12 SMEs (assuming each SME has 15.72 motors for replacement)
Output 4.3: Pilot EE motor replacements – no. of EE motors replacements with technical assistance	1,384	3,145	3,145			Project support during Yr1 is 100%, while support for Yrs 2 and 3 is only 50%
Output 4.4: Scaled-up EE motor replacements – target no. of EE motors replacements			10,000	10,000	10,000	The addition of 10,000 – 42.5 kW EE motors in Turkey’s industrial sector in Yrs. 3, 4 and 5 was based on the following assumptions: i) each OIZ has 100 SMEs willing to participate; ii) an average investment of USD 20,000 is made for each industrial SME; iii) each SME will have 15.72 inefficient motors for replacement; iv) 10,000 motors will be equivalent to EE motor replacements of 6.36 OIZs.
Output 4.4: Scaled-up EE motor replacements - no. of MEEIPs prepared			636	636	636	Assumes each SME has 15.72 EE motors (42.5 kW motor size) at an average investment. Each 42.5 kW EE motor at an assumed cost of USD 1,272

- By early Year 4, train DGP and DGSIIP personnel in the use of the database including population of the database with information and the generation of reports.

- ***Output 5.2: Nationwide public awareness raising campaign for EE motors that targets the general public:***  
This output is designed to raise awareness of the other OIZs and the general public on the benefits of EE motors in the industrial sector. Delivery of this output will entail the following activities:
  - Two spots will be developed in Year 1 and delivered on a weekly basis on radio and TV for the entire 5-year duration of the Project;
  - Development of best practice and case studies brochures and advertisements on the benefits of EE motors and the one-stop shop mechanism that will be displayed on billboards in selected OIZs, posters, and other print media during Years 1, 2 and 3 and the Internet at the commencement of Year 2; and
  - Development of specific EE motor awareness raising messaging towards other OIZs that can be disseminated to OIZs during the scale up phase (Output 4.4) of the one-stop shop during Year 3. This activity is considered to be important and should have the effect of boosting confidence of other OIZs to adopt the one-stop shop mechanism piloted in Output 4.3;

<sup>21</sup> The number of EE motors referred to in the table are 42.5 kW motors that was determined to be the median size of motors used in the Turkish industrial sector in DGP’s ongoing survey of electric motor usage.

- **Output 5.3: EE motors website.** The website will serve as a repository for all promotional and technical information regarding the advancement and promotion of EE motors in the industrial sector in Turkey. Activities to deliver this output will include:
  - Technical assistance to design webpage which includes quick tools for SMEs to check feasibility of motor changes, updated price lists and E-learning tools in Year 2;
  - Technical assistance to assist DGP in setting up the webpage, and to operate and maintain it commencing Year 3.
  
- **Output 5.4: Midterm Review and Terminal Evaluation.** The Midterm Review (MTR) and the Terminal Evaluation (TE) will provide assessments of project performance that will serve the dual purposes of meeting accountability requirements of GEF projects, and promoting operational improvements, learning and knowledge sharing through lessons learned and results. Activities to deliver this output will include:
  - undertaking an MTR at the midpoint or Year 3 of the Project;
  - undertaking a TE 3 months prior to the end of the Project.

GEF support is required for all of the above activities.

### 3.3 Partnerships

28. There is an ongoing UNDP-UNIDO GEF project entitled “Improving Energy Efficiency in Industry (IEEI)” that is being executed by DGRE and aims to improve energy efficiency of Turkish industry by enabling and encouraging companies in the industrial sector to implement various energy efficiency techniques and system optimization. The IEEI project has been under implementation since 2011 with a scheduled terminal date of the third quarter of 2017. Some of the basic pillars of the IEEI Project are developing energy audit methodologies, carrying out energy audits in selected factories, undertaking awareness-raising activities to encourage EE investments in industrial facilities, developing case studies and best practice examples, creating and disseminating technical training materials, establishing and improving energy management units in organized industrial zones, executing activities for empowering local technical consultants (that are referred to in local legislation as EVDs in Turkish legislation), developing a framework for benchmarking studies, performing energy management system (EnMS) trainings and assisting industrial companies for ISO 50001 certification.
  
29. Even though the IEEI project is not specifically focused on the replacement of electric motors but on enhancing overall energy efficiency of the plants, there are numerous overlapping activities. As an EnMS approach basically requires prioritization of “low hanging fruits” for implementation, electric motor replacements are viewed by energy experts as investments with high rates of return. Initial findings of the audit reports mostly include the proposals on more efficient motor replacements. The importance of the topic has been and will be underlined through the produced technical materials and EnMS trainings. This will also involve the improvement of the readiness of EECs and selected OIZs to implement electric motor replacements. Last but not the least, the developed products and completed studies for financial mechanisms in the IEEI project may be used in the support mechanisms that will be designed for electric motors.
  
30. The PEEMS project will complement the IEEI project by undertaking an alternative approach to EnMS and ISO 50001 certification, by adopting the 4-step methodology of the Swiss EASY programme as outlined in paras 44 to 45, and in Annex K, Paras K.10 to K.13. Due to successful implementation of the program between 2010 and 2014, there are certain aspects of the EASY program design that could be replicated on the PEEMS Project including the scoping of the motor replacement program combined with financial incentives. The program was implemented at a cost of USD 1.0 million from the Swiss Government that led to an outcome of led to USD 2.3 million of investments by Swiss mid-sized industrial factories to replace inefficient motors in the

industrial sector; the cost-effectiveness of the program was USD 0.014 incentive paid per kWh saved during the lifetime of the newly installed equipment<sup>22</sup>.

31. The PEEMS Project will collaborate with a proposed GEF project entitled “Leapfrogging Markets to High Efficiency Products” (GEF Program ID 9083) under UNEP. The Global Leapfrogging Programme proposes to countries an integrated policy approach through national pilot projects to be implemented in each country to meet their individual policy needs and priorities. The Global Leapfrogging Program allows for the use of a coherent and consistent integrated approach, providing greater likelihood of success and increased harmonization between countries. Integrated policy approaches (minimum standards, MV&E, communication campaigns and financial mechanisms, and environmentally sound management) have been demonstrated to permanently transition markets to energy efficient products while addressing environmental concerns. This Global Leapfrogging project” which will utilize resources from the SE4ALL Global Project is designed to increase the number of countries committed to advancing energy efficiency products through country assessments. Possible collaborative efforts between these projects may include a national assessment to estimate country savings from EE motor market transformation (complements Output 1.1), support for policy guides for EU directives specifically for motors (complements Output 1.2).
32. The PEEMS Project will collaborate with the European Bank for Reconstruction and Development (EBRD) supported Turkey Private Sector Sustainable Energy Finance Facility or TURSeFF. TURSeFF is a credit line that provides commercial loans, at their own risk, to borrowers with eligible investment opportunities which includes load matching variable speed motor controls. Currently funds available for financing are estimated to be USD 265 million under which one of the eligible types of financing is vendor finance; this would allow a manufacturer (in the context of the PEEMS Project, a motor manufacturer), to borrow money from one of the banks to provide finance for the sale of their equipment. The end-user would pay for the equipment with a monthly annuity payment covering interest and principal repayments until the loan is fully paid off. With SME access to these credit lines being voluntary and approved by commercial banks on a case-by-case basis, SMEs have not accessed these credit lines for motor replacements. With the de-risking measures being set up by the PEEMS Project, there would be an increased likelihood of SME utility of these credit lines for motor replacements.
33. Finally, coordination of the project partnerships will be undertaken by the executing partner of the Project, DGP. Formalization of partnerships between the PEEMS Project and other projects will be done through the Project Board.

### 3.4 Stakeholder Engagement

34. The primary stakeholder beneficiaries of the PEEMS Project includes the motor manufacturers and the industrial SMEs. For motor manufacturers based in Turkey, the PEEMS Project will create a market for their EE motors. Moreover, the Project will create strong linkages with the motor manufacturers through accelerating the development of their association, TEMMA, and strengthening their outreach to the relevant government agencies who set policies for MEPS as well as reducing energy intensities of the industrial sector. In addition, the Project will strengthen their linkages with:
  - government sanctioned testing facilities to ensure that EE motors manufactured in Turkey comply with new and EU driven standards for eco-design motors; and
  - accredited motor recycling facilities where EE motor manufacturers must send the replaced phased-out inefficient motors for the purposes of compliance to EU directive 2012/19/EU for waste electronics and electrical equipment (WEEE).
35. The PEEMS project is also designed to the benefit of industrial SMEs by improving their awareness and increasing their access to EE motors. This will be achieved utilizing Project resources to set up a one stop shop

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<sup>22</sup> <http://aceee.org/files/proceedings/2015/data/papers/6-118.pdf>

to strengthen the abilities of the OIZs and, in particular the EMU, to assist industrial SMEs in determining optimal motor replacements, sourcing the finance for the motor replacements, and sourcing the companies that can supply and install EE motors and dispose of the inefficient motors.

36. Secondary stakeholder beneficiaries of the PEEMS Project would include the OIZs and their EMUs who will be enabled and strengthened to facilitate the replacement of inefficient motors within the premises of the client industrial SMEs. The role of the EMU in OIZ is to provide services to their industrial SME clients with the aim of minimizing their operational costs. The Project will strengthen the capacity of selected EMUs to become the central management entity that will promote, design, and implement a motor replacement program. The involvement of the EMUs in this type of transaction takes advantage of the fact that the EMU is best qualified to provide industrial SMEs with neutral and unbiased technical advice on the types of motor replacements for investment.

### **3.5 Gender Mainstreaming**

37. With the primary objective of the PEEMS Project involving the promotion of energy efficient motors to industrial SMEs, the Project will be gender responsive. Public awareness raising and training activities will be designed to encourage participation of women notably in the criteria for selection of OIZs and SMEs for implementation of demo projects. To facilitate empowerment of women and increase their participation in all stages of the Project cycle, a gendered disaggregated analysis of personnel within SMEs and OIZs will be conducted to identify barriers and differentiate roles that may be more suited to each gender. Gender-disaggregated data will also be obtained through surveys and socioeconomic monitoring to identify potential project impacts on each gender. The surveys should also include gender-disaggregated data throughout the Project life cycle of any industrial sector pilot study to be implemented at OIZs with SMEs.

### **3.6 South-South and Triangular Cooperation (SSTrC)**

38. The PEEMS Project aspires to aligning Turkish legislation with EU directives, and to link best international practices for motor replacement design and implementation to developed countries, notably in the EU. As such, the PEEMS Project will be supporting South-South or Triangular cooperation through successful demonstration of the adoption of best international practices that can be used as inputs into a global knowledge management platform. This platform would be used by other developing countries, thus facilitating South-South and Triangular Cooperation. SSTrC would be further enhanced through the PEEMS Project cooperation with the aforementioned UNEP-GEF supported Global Leapfrogging Project as detailed in Para 31.

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## **4. FEASIBILITY**

### **4.1 Cost effectiveness and efficiency**

39. The PEEMS Project is designed to remove all identified obstacles and barriers to widespread adoption of EE motors within industrial SMEs in Turkey. While there have been a number of attempts by Government and other projects to improve the rate of investments into energy efficiency by industrial enterprises including SMEs, the rate of SME adoption of energy efficiency has not had the intended results. A key aspect to the PEEMS strategy is to overcome the identified barriers to SME investments in motors that includes limited awareness of SMEs to the benefits of EE motor investments; limited technical capacities of SMEs to energy auditing and assessments; industrial SME unwillingness to pay up front costs of an EE motor investment; lack of SME incentive to access available financial products from KOSGEB, state development banks and private banks; and lack of available external experts who can provide an unbiased and cost effective motor replacement plan to industrial SMEs.

40. In addition, the PEEMS strategy will boost confidence in EE motor investments by creating an enabling environment for EE motor investment through:
- improved capacity for motor testing to ensure compliance of new motor market entrants to MEPS and other new standards;
  - strengthening government capacity for market surveillance of motors; and
  - enabling industrial SMEs to clearly identify and secure their financing needs for EE motor investments.
41. By addressing all these barriers in the PEEMS Project design through demonstrating a one-stop shop financial support mechanism under the management of an OIZ through its EMU, an increase is expected in the implementation of EE motor investments by industrial SMEs. The PEEMS Project will build on existing financial support mechanisms undertaken by the GoT and the TurSEFF project, bundle them into the one-stop shop mechanism, and strengthen the mechanism with linkages to loan guarantee funds with KGF. This PEEMS strategy is considered to be most cost effective with the potential to deliver its intended results with the GEF allocation of USD 3.75 million and within a 5-year project duration.
42. The expected global environmental benefits (GEBs) from the PEEMS Project can be summarized as follows: direct lifetime GHG emission reductions are estimated to be 3,092,263 tonnes CO<sub>2</sub>eq over the 7-year lifetime of the EE motors expected to be installed by the Project over its 5-year duration. Indirect lifetime emission reductions are estimated to be 6 million tonnes CO<sub>2</sub>eq. Without the PEEMS Project, the penetration of EE motors into the industrial sector in Turkey is expected to rise from 28.52% in Year 1 to 30.30% in Year 5 or the EOP. With the PEEMS Project, the expected penetration of EE motors in the industrial sector is 30.34%, that is accompanied by an additional 37,861 EE motors that have been installed during the Project through the one-stop shop financial support mechanism managed by OIZ's. Table 2 provides the assumed numbers of the market transformation for EE motors during the Project. Annex D provides further details of the calculation of the GHG reductions from this Project.

**Table 2: Growth of EE Motors Market from Project**

Descriptor	2016	2017	2018	2019	2020	2021
Total number of electric motors on market	17,000,000 <sup>23</sup>	18,020,000	19,101,200	20,247,272	21,462,108	22,749,835
Assumed growth rate of electric motors market (%)	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%
% motors that are EE motors (IE2 with VSD or better)	28.00% <sup>24</sup>	28.52%	29.00%	29.46%	29.89%	30.30%
Assumed baseline growth rate of EE motors (%)		2.1% <sup>25</sup>	2.1%	2.1%	2.1%	2.1%
Number of EE motors operating in industrial SMEs	4,760,000	5,138,420	5,539,545	5,964,738	6,415,442	6,893,189
Number of EE motors added		378,420	401,125	425,193	450,704	477,747
Local manufacturing capacity for EE motors	1,700,000 <sup>25</sup>	1,700,000	1,700,000	1,700,000	1,700,000	1,700,000
Number of EE motors installed by Project each year	0	1,572	3,144	13,145	10,000	10,000
Number of EE motors operating in industrial SMEs (project)		5,139,992	5,542,689	5,977,883	6,425,442	6,903,189
% EE motors that are EE motors (IE3 or better) with project		28.52%	29.02%	29.52%	29.94%	30.34%

<sup>23</sup> Estimate courtesy of ProMotE Araştırma ve Teknoloji Geliştirme A.Ş.

<sup>24</sup> Based on 2015 DGP Motor Inventory Survey

<sup>25</sup> Ibid 23.

<sup>26</sup> Ibid 23.

% increase of EE motors from Project		0.01%	0.02%	0.06%	0.05%	0.04%
Estimated annual GHG reductions from Project (tonnes CO2eq) <sup>27</sup>		16,091	48,268	182,801	285,146	387,491

## 4.2 Risk management

43. The risk log can be found on Table H.1 in Annex H. The most severe risks were rated as moderate, mainly pertaining to financial risks ranging from the lack of willingness of SMEs to purchase EE motors to the risk of financial institutions being unwilling to make loans available to OIZs and SMEs. As per standard UNDP requirements, these risks will be monitored quarterly by the Project Manager. The Project Manager will report on the status of the risks to the UNDP Country Office who will record progress in the UNDP ATLAS risk log. Risks will be reported as critical when the impact and probability are high (i.e. 5). Management responses to critical risks will also be reported to the GEF in the annual PIR.

## 4.3 Social and Environmental Safeguards

44. The PEEMS project has been deemed moderate risk from an environmental and social perspective. Project risks have been identified in the Social and Environmental Screening Procedure (SESP) that is contained in Annex F. These risks are mainly related to the unwillingness of industrial SMEs to purchase energy efficient motors, the one-stop shop financial support mechanism not functioning properly, and a resulting lack of commitment by financial institutions and banks to provide loans for EE motors to OIZs and industrial SMEs. These risks are mitigated through careful design and implementation of a pilot one stop shop financial mechanism to ensure that industrial SMEs can gain financially through the purchase and usage of EE motors. With the successful demonstration of this pilot, these aforementioned risks can be mitigated. The climate change related risks are low considering that even with extreme climatic events, there will not be significant disruptions to the power supply to electric motors used in manufacturing.
45. Environmental and social grievances will be reported to the GEF in the annual PIR.

## 4.4 Sustainability and Scaling Up

46. The PEEMS Project has been designed to remove barriers to sustained replacement of inefficient motors with motors that are IE3 standard and above. One of the primary barriers to sustained market transformation of the Turkish motors market has been the general absence of a trusting relationship between industrial SMEs and professionals related to providing technical assistance advice on energy efficiency; there is demand for impartial technical assistance that is not tied to one particular brand of motors. Another primary barrier is related to the lack of "user friendly" financing products for industrial SMEs. A number of these financing products require some form of collateral, which many SMEs are unable to provide. In addition, many industrial SME applicants are unwilling or unable to navigate through the onerous paperwork required to qualify for these financial products.
47. The PEEMS project is addressing removal of these barriers through supporting pilots for one stop shops in 3 to 5 OIZs. The Project will support pilots for strengthening of selected OIZs to coordinate a motor replacement program, assist SMEs that are early adopters of energy efficiency in preparing motor replacement investment plans with financing mechanisms, and provide additional loan guarantee funds that will increase access to financing for industrial SMEs for motor replacement investments. The successful conclusion of one-stop shop pilots in the 3 to 5 OIZs in Output 4.3 during Years 1 to 3 should catalyze replication of one-stop shops to another 18-20 OIZs in Turkey during Years 3 to 5. The momentum built in Year 5 should sustain and scale-up the use of the one-stop shop mechanisms developed by PEEMS with additional OIZs subscribing to the one-stop shop program.

<sup>27</sup> Detailed GHG calculation is provided in Annex D.

## 4.5 Financial Analysis

48. In general, replacement of inefficient electric motors in Turkish industrial SMEs with more efficient motors is an attractive investment. This is illustrated on Table K.3 for several different sizes of electric motors and several different operating hours. For simple analysis to design the financial model, an average cost of an “average” electric motor and installation<sup>28</sup> was considered at TRL 3,600 (USD 1,272). Such a replacement could generate an average electricity cost saving of TRL 2,913 per year and enable the SME to payback the investment in 15 - 19 months through a variety of financial mechanisms and including bank charges, market interest rates and sharing 10% of the energy savings with the participating SME. These calculations are illustrated on Tables P.1, P.2 and P.4.
49. Still the uptake in electric motor replacements in SMEs is limited. The challenge lies in convincing SMEs to utilize more efficient motors in their industrial processes to save energy as opposed to their current alternative of resorting to the cheapest options of restoring operations of a motor, mainly through the rewinding of the motor.
50. In addition, industrial SMEs experience a lack of liquidity and willingness to use available liquidity or credit to pay the upfront costs for an energy efficient motor investment<sup>29</sup>. If liquidity would be available in a SME, these would typically be directed to investments to increase production capacity. Furthermore, credit from dedicated credits lines, lease solutions and credit guarantee programmes are available to SMEs, but still insignificant in terms of use for electric motor replacements. SMEs are simply unwilling to make these investments. Therefore, any feasible financial mechanism involving an SME investment in an energy efficient motor cannot include a down payment from SMEs. To increase the uptake of electric motor replacements, the Project will need to provide resources to develop a “one-stop-shop” in an Organised Industrial Zone. Such “one-stop-shop”, with a central role for the EMU, is to arrange identification, finance and implementation of the electric motor replacement for SMEs.

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<sup>28</sup> Motor would be in the order of 45 kW for an IE2 motor with 4 poles.

<sup>29</sup> This would also explain the reluctance of all SMEs in the Kayseri OIZ interest rate subsidy scheme to surrender their old inefficient motors as a condition to qualify for interest rate subsidies for the financing of EE motor replacements.

## 5. PROJECT RESULTS FRAMEWORK

<p><b>Intended Outcome as stated in the UNDAF/Country Programme Results and Resources Framework:</b> 1.1 By 2020 legal and policy framework improved, institutional capacities and accountability mechanisms enhanced to enable more competitive, inclusive, innovative environment for sustainable, equitable, job rich growth and development</p>
<p><b>Outcome Indicators as stated in the Country Programme Results and Resources Framework, including baseline and targets:</b></p> <p><b>1.1.1 Systems and Institutions enabled to achieve structural transformation towards sustainable equitable employment and productivity growth</b></p> <p><b>Indicator 1.1.1.2 # of up-scaled UNDP-initiated schemes for improved regional/local economic growth; new systems that promote sustainable production adopted by in less developed regions</b></p> <p><b>Baseline:1; 2</b>  <b>Target:5; 7</b>  <b>Source:</b> Annual Investment Plans, Project Reports</p>
<p><b>1.1.3. Solutions adopted for increased energy efficiency and utilization of renewables</b></p> <p><b>Indicator 1.1.3.2: # of models for enhanced energy efficiency and/or use of renewables adopted by local actors</b></p> <p><b>Baseline: 5</b>  <b>Target: 10</b>  <b>Source:</b> Project Reports</p>
<p><b>1.5.1 Number of New Development Partnerships with funding for improved energy-efficiency and universal modern energy access targeting underserved communities/groups and women.</b></p>
<p><b>Applicable Outputs from the 2014 – 2017 UNDP Strategic Plan:</b></p> <p><b>Output 1.5: Inclusive and sustainable solutions adopted to achieve increased energy efficiency and universal modern energy access (especially off-grid sources of renewable energy)</b></p>
<p><b>Applicable Output Indicators from the UNDP Strategic Plan Integrated Results and Resources Framework: depending on the output chosen above choose one or both of the corresponding output indicators. Please read the detailed methodologies for each indicator before selecting one. These are available at <a href="https://intranet.undp.org/unit/office/exo/IRRF/default.aspx">https://intranet.undp.org/unit/office/exo/IRRF/default.aspx</a> Add the indicators selected to the outcome indicator column next to the project objective below.</b></p>
<p><b>Output 1.5 indicator 1.5.1: Number of new development partnerships with funding for improved energy efficiency and/or sustainable energy solutions targeting underserved communities/groups and women.</b></p>

Project Objective:	Objective and Outcome Indicators	Baseline <sup>30</sup>	Mid-term Target <sup>31</sup>	End of Project Target <sup>32</sup>	Assumptions
To promote significant additional investment in industrial energy efficiency in Turkey by transforming the market for energy efficient motors used in small and medium sized enterprises.	Lifetime direct project CO <sub>2</sub> emission reductions from the replacement of inefficient motors with IE3 motors by end-of-project (EOP), ktonnes CO <sub>2</sub>	0	372 <sup>33</sup>	3,092 <sup>34</sup>	<ul style="list-style-type: none"> <li>• Economic growth in the country will continue</li> <li>• Government support for industrial energy efficiency and energy efficient motors will not change</li> <li>• Targets will be verified through: <ul style="list-style-type: none"> <li>○ Project final report as well as annual surveys of energy savings from EE motor installations on demo projects</li> <li>○ Reports developed by OIZs energy management units on adoption of EE motors within SMEs</li> <li>▪ Willingness of SMEs to give their motors to a recycling centre</li> </ul> </li> <li>• Target would be verified through the completion of a national survey on current motor usage in the SME industrial sector in Turkey</li> <li>• Documentation and resolutions passed during technical working group meetings on EE motor</li> </ul>
	MWh of annual reduced electricity consumption in Turkey through the installation and use of EE motors installed during the Project by EOP	0	302,160	640,499	
	% of SMEs with firm plans to procure and install EE motors by using the financial mechanism developed by the Project by EOP	>0.1%	1	5	
Outcome 1: Strengthened legislative and regulatory framework related to both new and existing EE motors in Turkey	Cumulative number of phased out inefficient electric motors taken into a recycling program by EOP	0 <sup>35</sup>	2,000	5,000	<ul style="list-style-type: none"> <li>• Target would be verified through the completion of a national survey on current motor usage in the SME industrial sector in Turkey</li> <li>• Documentation and resolutions passed during technical working group meetings on EE motor</li> </ul>
	Number of completed national surveys on motors in the industrial sector in Turkey by Year 1	0	1 <sup>36</sup>	1	
	Number of Turkish policies, regulations and standards applicable to motors harmonized with EU Eco-design standards by Year 1	0	1 <sup>37</sup>	2 <sup>38</sup>	

<sup>30</sup> Baseline, mid-term and end of project levels must be expressed in the same neutral unit of analysis as the corresponding indicator.

<sup>31</sup> Expected level of progress by completion of 2<sup>nd</sup> GEF PIR

<sup>32</sup> Expected level when terminal evaluation undertaken

<sup>33</sup> Assumes replacement of 17,861 inefficient (average 42.5 kW) motors by the mid-point of the Project with IE3 motors or IE2 with VSD and a lifetime of 7 years for the investment

<sup>34</sup> Assumes replacement of 57,861 inefficient (average 42.5 kW) motors over a 5-year period of the Project with IE3 motors and a lifetime of 7 years for the investment

<sup>35</sup> There are no known motor recycling centres at the time of writing of this report.

<sup>36</sup> The survey will include an estimate of the number of motors being used in the industrial sector, their energy consumption and the potential for energy savings from the installation of EE motors.

<sup>37</sup> Well elaborated MV&E strategy is in place for eco-design market surveillance for electric motors and updated eco-design regulations.

<sup>38</sup> In addition to the well-elaborated MV&E strategy, the Project will also update the eco-design regulation for electric motors and motor-driven ErPs

	<b>Objective and Outcome Indicators</b>	<b>Baseline<sup>30</sup></b>	<b>Mid-term Target<sup>31</sup></b>	<b>End of Project Target<sup>32</sup></b>	<b>Assumptions</b>
	Number of government officers who are involved with implementing policies and measures for EE motor replacement programmes by EOP	0	10	10	<p>policies, regulations and standards that are harmonized with EU directives</p> <ul style="list-style-type: none"> <li>Officers involved with motor replacement programmes are not moved to another positions in the latter stages of the Project</li> </ul>
<b>Outcome 2: Improved capacity of relevant stakeholders to promote the benefits of EE motors</b>	Number of electric motor manufacturers registered and engaged with promotional activities with an established national motor manufacturer association by EOP	0	3 <sup>39</sup>	6	<ul style="list-style-type: none"> <li>Consensus between competing motor manufacturers has been reached to establish a Turkish Electric Motor Manufacturer Association (TEMMA)</li> <li>Target would be verified through the completion and acceptance by all members of a Charter of TEMMA</li> </ul>
	Number of attendees at 20 technical training seminars on EE motors that are targeted for manufacturers and end-users by EOP	0	250	1,000	<ul style="list-style-type: none"> <li>Government continues its strong support for the promotion of motors in industry</li> <li>Target would be verified through documentation on training sessions for motor manufacturers and end-users that includes participant feedback</li> </ul>
<b>Outcome 3: Improved capacity for monitoring, verification and enforcement of motors market transformation</b>	Number of TSI personnel who are testing compliance with new EE motor eco-design standards by EOP	0	5	5	<ul style="list-style-type: none"> <li>Risk that clarity on EU directives on the types of EE motors that comply with new Turkish EE motor standards to enhance market</li> </ul>

<sup>39</sup> This would include the main motor manufacturers in Turkey: Arcelik, Gamak, Wat Motor, Volt Motor and Aemot

	Objective and Outcome Indicators	Baseline <sup>40</sup>	Mid-term Target <sup>41</sup>	End of Project Target <sup>42</sup>	Assumptions
	Number of DGSIIP personnel who are involved in PMSP for EE motors compliance in industrial SMEs by EOP	0	25	50	<ul style="list-style-type: none"> <li>surveillance activities will not be obtained before EOP</li> <li>Targets will be verified through: <ul style="list-style-type: none"> <li>○ Reports on training curricula and feedback from the participants;</li> <li>○ Established Motor Testing Centre for 90 to 375 kW motors;</li> <li>○ Motor testing reports.</li> </ul> </li> </ul>
	Annual number of motors sent for testing at upgraded TSI motor testing facilities by EOP	0	10	250	
<b>Outcome 4: One-stop shop improves industrial SME access to financing for EE motor investments</b>	Number of motor energy efficiency investment plans (MEEIPs) for industrial SMEs in OIZs by Year 2 and EOP	0	500 <sup>40</sup>	2,408 <sup>41</sup>	<ul style="list-style-type: none"> <li>Acceptance by industrial SMEs for technical assistance from appointed ESCOs working with OIZ EMUs</li> <li>Signed agreements on leased EE motors between industrial SMEs, OIZ utilities and EMUs housed within OIZs by Year 1;</li> <li>Target verified by the participant banks annual reports;</li> <li>EMUs have absorptive capacity for training on the management of motor replacement programmes with SMEs;</li> <li>Targets will be verified through:</li> </ul>
	Cumulative USD investments through an established "one-stop-shop" FSM by EOP	0	22.72 million <sup>43</sup>	47, 92 million <sup>44</sup>	

<sup>40</sup> For calculation purposes for this Project, the assumption is made that there is an average of 15.72 motors per MEEIP with each motor being 42.5 kW in size with an average cost of TL 3,600 (or USD 1,272) for each SME. Each MEEIP was assumed to have an average investment proposal of USD 20,000/SME. Under PEEMS, 100 SMEs would have 100 MEEIPs fully supported by the Project in Year 1, 200 SMEs would have 200 MEEIPs with 50% support in Year 2 for a total of 500 at the mid-point of the Project

<sup>41</sup> In addition to the mid-term target of 500 MEEIPs, there will be another 3x636 MEEIPs for Year 3, Year 4 and Year 5 under the "scaled-up" one-stop shop under Output 4.4.

<sup>43</sup> Corresponds to the procurement of 17,861 EE motors (42.5 kW average size) with an average price of USD 1,272 per EE motor.

<sup>44</sup> The success of this demonstration will lead to 1,572, 3,144 and 3,144 EE motors during Years 1, 2 and 3 respectively followed by 10,000 EE motors during Years 3, 4 or 5 for the scaled-up portion of the Project. This should lead into the target of 37,860 EE motors installed by the EOP.

	Objective and Outcome Indicators	Baseline <sup>30</sup>	Mid-term Target <sup>31</sup>	End of Project Target <sup>32</sup>	Assumptions
					<ul style="list-style-type: none"> <li>o Completed assessments of motor efficiency potential and SMTRs for industrial SMEs<sup>42</sup></li> <li>o Reports on energy savings within industrial SMEs</li> <li>o OIZ monitoring reports on actual investments through the one-stop shop facility</li> </ul>
	% of SMEs where MEEIP investment is paid back in less than 24 months	0	75	90	<ul style="list-style-type: none"> <li>• Assumption: OIZs and SMEs comply with conditions for PEEMS Project support that includes allowing the PEEMS Project to monitor their progress and energy savings for the purposes of disseminating pilot project information to other OIZs and SMEs.</li> </ul>
	Number of financial institutions involved with inefficient motor replacement programmes by EOP	0	3 <sup>45</sup>	6 <sup>46</sup>	<ul style="list-style-type: none"> <li>• Assumption: Participation of the guarantee facility. With no guarantee facility, the risk of other financial institutions not participating is not guaranteed.</li> </ul>
<b>Outcome 5: Availability of EE motor information that raises stakeholder awareness of the benefits</b>	Number of EE motors registered in national motors database hosted and maintained by the DGP by EOP	0	0	37,861 <sup>47</sup>	Targets to be verified through national motor database report outputs and audits prepared by ESCOs and OIZ energy management units

<sup>42</sup> These will be closely aligned with efforts to improve energy audits of industrial SMEs within the sister GEF project "Improving Energy Efficiency in Industry", a Project that focuses on a suite of energy efficiency and conservation measures for larger industries.

<sup>45</sup> Should include a commercial bank, leasing company and a guarantee facility,

<sup>46</sup> Ibid 45

<sup>47</sup> Consistent with the number of motors to be installed on the demonstration program under Outcome 4.

	<b>Objective and Outcome Indicators</b>	<b>Baseline<sup>30</sup></b>	<b>Mid-term Target<sup>31</sup></b>	<b>End of Project Target<sup>32</sup></b>	<b>Assumptions</b>
<b>of EE motors and sustain market transformation</b>	% of industrial SMEs who are aware of the benefits of EE motors by EOP	0	5	25	<ul style="list-style-type: none"> <li>Targets to be verified through surveys on the level of raised awareness of the benefit of EE motors (surveys to be done during Years 1 and 5 of Project)</li> <li>Industrial SMEs become genuinely interested in EE motors as a result of public awareness campaigns supported by the Project</li> </ul>
	Number of hits on the motors website by EOP	0	2,500	10,000	

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## 6. MONITORING AND EVALUATION (M&E) PLAN

51. The project results as outlined in the project results framework will be monitored annually and evaluated periodically during project implementation to ensure the project effectively achieves these results. *Supported by Component Four: Knowledge Management and M&E, the project monitoring and evaluation plan will also facilitate learning and ensure knowledge is shared and widely disseminated to support the scaling up and replication of project results.*
52. Project-level monitoring and evaluation will be undertaken in compliance with standard UNDP requirements as outlined in the [UNDP POPP](#) and [UNDP Evaluation Policy](#). Though these UNDP requirements are not detailed in this section of the project document, the UNDP Country Office will ensure UNDP M&E requirements are met in a timely fashion and to high quality standards. The additional and mandatory GEF-specific M&E requirements as outlined in this section will be undertaken in accordance with the [GEF M&E policy](#) and GEF guidance materials (link to be added)<sup>48</sup>. In addition to these mandatory UNDP and GEF M&E requirements, other M&E activities deemed necessary to support project-level adaptive management, and the exact role of project target groups and other stakeholders in project M&E activities, will be finalized during the Inception Workshop and will be detailed in the Inception Report.
53. **Oversight and monitoring responsibilities:** The primary responsibility for day-to-day project implementation and regular monitoring rests with the Project Implementation Unit (PIU). The PIU will develop annual work plans based on the multi-year work plan included in the annexes, including annual targets at the output level to ensure the efficient implementation of the project. The PIU will ensure that the standard UNDP and GEF M&E requirements are fulfilled to the highest quality. This includes, but is not limited to, ensuring the results framework indicators are monitored annually in time for reporting (i.e. GEF PIR), and reporting to the Project Board at least once a year on project progress. The PIU will inform the Project Board and the UNDP Country Office of any delays or difficulties as they arise during implementation, including the implementation of the M&E plan, so that the appropriate support and corrective measures can be adopted. The PIU will also ensure that all project staff maintain a high level of transparency, responsibility and accountability in monitoring and reporting project results.
54. The UNDP Country Office will support the PIU as needed, including through annual supervision missions. The UNDP Country Office is responsible for complying with all UNDP project-level M&E requirements as outlined in the [UNDP POPP](#). This includes ensuring the UNDP Quality Assurance Assessment during implementation is undertaken annually; that annual targets at the output level are developed, and monitored and reported using UNDP corporate systems; and, updating the UNDP gender marker on an annual basis based on progress reported in the GEF PIR and UNDP ROAR reporting. Any quality concerns flagged by the process must be addressed by project management. Additional M&E and implementation quality assurance and troubleshooting support will be provided by the UNDP-GEF Regional Technical Advisor and the UNDP-GEF Unit as needed. The project target groups and stakeholders including the GEF Operational Focal Point will be involved as much as possible in project-level M&E.
55. **Audit Clause:** The project will be audited according to UNDP Financial Regulations and Rules and applicable audit policies on NIM implemented projects (link to be added)

## 6.1 Additional GEF monitoring and reporting requirements

56. **Inception Workshop and Report**: A project inception workshop will be held within 2 months after the project document has been signed by all relevant parties to: a) re-orient project stakeholders to the project strategy and discuss any changes in the overall context that influence project implementation; b) discuss the roles and responsibilities of the project team, including reporting and communication lines and conflict resolution mechanisms; c) review the results framework and discuss reporting, monitoring and evaluation roles and responsibilities and finalize the M&E plan; d) review financial reporting procedures and mandatory requirements, and agree on the arrangements for the annual audit; e) plan and schedule Project Board meetings and finalize the first year annual work plan. The PIU will prepare the inception report no later than one month after the inception workshop. The final inception report will be cleared by the UNDP Country Office and the UNDP-GEF Regional Technical Adviser, and will be approved by the Project Board.
57. **GEF Project Implementation Report (PIR)**: The PIU, the UNDP Country Office, and the UNDP-GEF Regional Technical Adviser will provide objective input to the annual GEF PIR covering the reporting period July (previous year) to June (current year) for each year of project implementation. The PIU will ensure that the indicators included in the project results framework are monitored annually well in advance of the PIR submission deadline and are reported on accordingly in the PIR. The PIR that is submitted to the GEF each year must also be submitted in English and shared with the Project Board. The UNDP Country Office will coordinate the input of the GEF Operational Focal Point and other stakeholders to the PIR. The quality rating of the previous year's PIR will be used to inform the preparation of the subsequent PIR. The project's terminal PIR along with the terminal evaluation (TE) report and corresponding management response will serve as the final project report package. The final project report package shall be discussed with the Project Board during an end-of-project review meeting to discuss lesson learned and opportunities for scaling up.
58. **GEF Focal Area Tracking Tools**: In line with its objective and the corresponding GEF Focal Areas/ Programs, this project will prepare the following GEF Tracking Tool(s): *list the required GEF Tracking Tool(s), as agreed with the UNDP-GEF RTA*. The baseline/CEO Endorsement GEF Focal Area Tracking Tool(s) – submitted in Annex to this project document – will be updated by the Project Manager/Team (*indicate other project partner, if agreed*) and shared with the *mid-term review consultants* and terminal evaluation consultants before the required *review/evaluation* missions take place. The updated GEF Tracking Tool(s) will be submitted to the GEF along with the completed *Mid-term Review report* and Terminal Evaluation report.
59. **Independent Mid-term Review (MTR)**: An independent mid-term review process will begin after the second PIR has been submitted to the GEF, and the final MTR report will be submitted to the GEF in the same year as the 3<sup>rd</sup> PIR. The MTR findings and responses outlined in the management response will be incorporated as recommendations for enhanced implementation during the final half of the project's duration. The terms of reference, the review process and the final MTR report will follow the standard templates and guidance available on the [UNDP Evaluation Resource Center \(ERC\)](#). Additional quality assurance support is available from the UNDP-GEF Directorate. The final MTR report will be available in English and will be cleared by the UNDP Country Office and the UNDP-GEF Regional Technical Adviser, and approved by the Project Board.
60. **Terminal Evaluation (TE)**: An independent terminal evaluation (TE) will take place before operational closure of the project. The PIU will remain on contract until the TE report and management response have been finalized. The terms of reference, the evaluation process and the final TE report will follow the standard templates and guidance available on the [UNDP Evaluation Resource Center](#). Additional quality assurance support is available from the UNDP-GEF Directorate. The final TE report will be cleared by the UNDP Country Office and the UNDP-GEF Regional Technical Adviser, and will be approved by the Project Board. The TE report will be publically available in English on the UNDP ERC.

**Table 3: Mandatory GEF M&E Requirements and M&E Budget**

GEF M&E requirements	Primary responsibility	Indicative costs to be charged to the Project Budget <sup>49</sup> (US\$)		Time frame
		GEF grant	Co-financing	
Inception Workshop	UNDP CO	USD 10,000	None	Within two months of project document signature
Inception Report	PIU	None	None	Within two weeks of inception workshop
Standard UNDP monitoring and reporting requirements as outlined in the UNDP POPP	UNDP CO	None	None	Quarterly, annually
Monitoring of indicators in project results framework	PIU	Per year: USD 4,000 x 5 yrs = USD 20,000		Annually
GEF Project Implementation Report (PIR)	PIU, UNDP CO and UNDP-GEF team	None	None	Annually
NIM Audit as per UNDP audit policies	UNDP Country Office	Per year: USD 3,000 x 5 yrs = USD 15,000		Annually or other frequency as per UNDP Audit policies
Lessons learned and knowledge generation	PIU	\$15,000		End of Project
Monitoring of environmental and social risks, and corresponding management plans as relevant	PIU UNDP CO	None		On-going
Addressing environmental and social grievances	PIU, UNDP CO-BPPS as needed	None		On-going
Project Board meetings	Project Board, PIU and UNDP CO	None		At minimum annually
Supervision missions	UNDP CO	None <sup>50</sup>		Annually
Oversight missions	UNDP-GEF team	None <sup>50</sup>		Troubleshooting as needed
Knowledge management as outlined in Outcome 5	PIU	37,500 (1% of GEF grant)		On-going
GEF Secretariat learning missions/site visits	UNDP CO, PIU and UNDP-GEF team	None		To be determined.
Mid-term GEF Tracking Tool to be updated by (add name of national/regional institute if relevant)	PIU	USD 2,500		Before mid-term review mission takes place.
Independent Mid-term Review (MTR) and management response	UNDP CO, Project Team and UNDP-GEF team	USD 24,000		Between 2 <sup>nd</sup> and 3 <sup>rd</sup> PIR.
Terminal GEF Tracking Tool to be updated by (add name of national/regional institute if relevant)	PIU	USD 10,000		Before terminal evaluation mission takes place
Independent Terminal Evaluation (TE) included in UNDP evaluation plan, and management response	UNDP CO, Project team and UNDP-GEF team	USD 39,000		At least three months before operational closure
<b>TOTAL indicative COST</b> Excluding project team staff time, and UNDP staff and travel expenses		<b>USD 173,000</b>		

<sup>49</sup> Excluding project team staff time and UNDP staff time and travel expenses.

<sup>50</sup> The costs of UNDP Country Office and UNDP-GEF Unit's participation and time are charged to the GEF Agency Fee.

61. In support of the TE, the Project Implementation Unit (PIU) will prepare two reports prior to the completion of the PEEMS Project:
  - “Lessons learned and knowledge generation” that summarizes best practices implemented by the project that can be shared with project stakeholders, other government and private sector agencies, and other EE practitioners from other regional countries;
  - “Final Project Report” that will provide details of implementation and outcomes of the PEEMS project.
62. The UNDP Country Office will include the planned project terminal evaluation in the UNDP Country Office evaluation plan, and will upload the final terminal evaluation report in English and the corresponding management response to the UNDP Evaluation Resource Centre (ERC). Once uploaded to the ERC, the UNDP Independent Evaluation Office will undertake a quality assessment and validate the findings and ratings in the TE report, and rate the quality of the TE report. The UNDP IEO assessment report will be sent to the GEF Independent Evaluation Office along with the project terminal evaluation report.
63. The UNDP Country Office will retain all M&E records for this project for up to 7 years after project financial closure in order to support ex-post evaluations undertaken by the UNDP Independent Evaluation Office and/or the GEF Independent Evaluation Office.

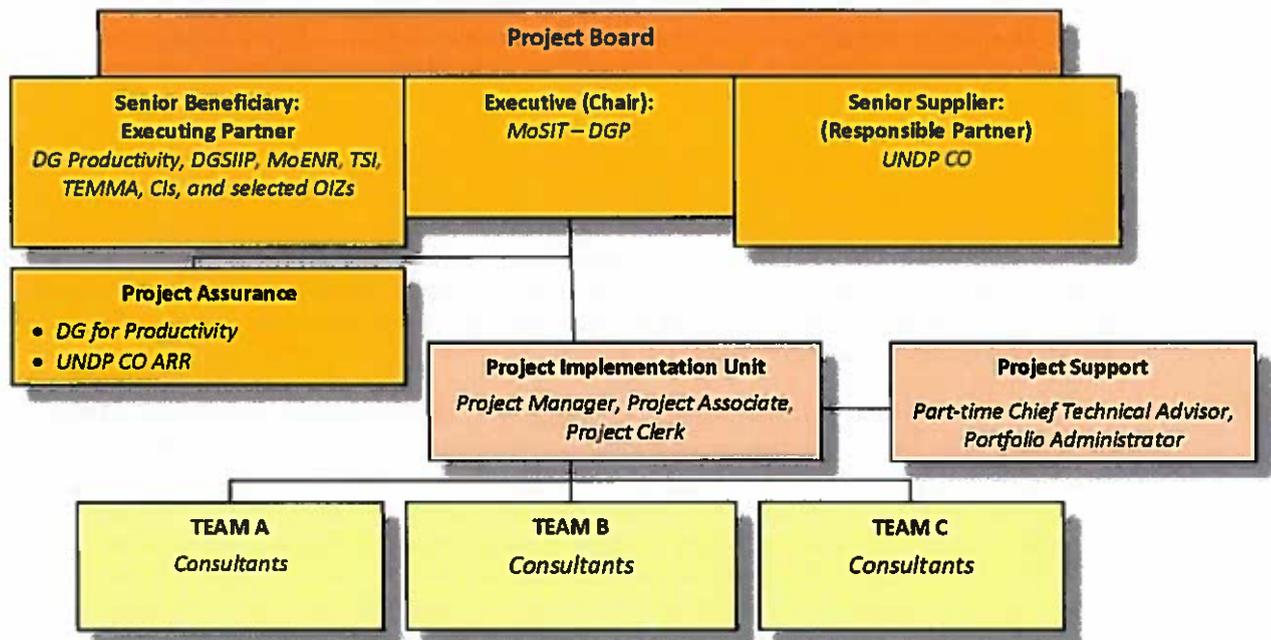
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## 7. GOVERNANCE AND MANAGEMENT ARRANGEMENTS

64. **Roles and responsibilities of the Project’s governance mechanism:** The PEEMS Project will be implemented following UNDP’s national implementation modality, according to the Standard Basic Assistance Agreement between UNDP and the Government of Turkey, and the Country Program Action Plan (CPAP). The Implementing Partner for this Project is the Ministry of Science Industry and Technology (MoSIT). The Implementing Partner is responsible and accountable for managing this project, including the monitoring and evaluation of project interventions, achieving project outcomes, and for the effective use of UNDP resources.
65. The project will be executed by the MoSIT under the overall responsibility of the General Directorate for Productivity (GDP) over a five-year time period. Direct day-to-day oversight of the project will be ensured by the GDP.
66. The UNDP will support and monitor the project’s implementation and achievement of the project outputs, and ensure the proper use of UNDP/GEF funds. The UNDP Country Office (CO) will be responsible for: (i) providing financial and audit services to the project; (ii) recruitment and contracting of project staff; (iii) overseeing financial expenditures against project budgets; (iv) appointment of independent financial auditors and evaluators; and (v) ensuring that all activities, including procurement and financial services, are carried out in strict compliance with UNDP/GEF procedures. The project organization structure will consist of a Project Board, Project Assurance and a Project Implementation Unit (PIU) as illustrated in Figure 1.
67. The Project Board (also called Project Steering Committee) will be responsible for making management decisions for the project including agreeing the annual project work plan, in particular when guidance is required by the Portfolio Manager and where important issues related to adaptive management need to be discussed and agreed. It will play a critical role in project monitoring and evaluations by assuring the quality of these processes and associated products, and by using evaluations for improving performance, accountability and learning. The Project Board will ensure that required resources are committed. It will also arbitrate on any conflicts within the project and negotiate solutions to any problems with external bodies. In addition, it will approve any delegation of its Project Assurance responsibilities. Based on the approved Annual Work Plan, the Project Board can also consider and approve the quarterly plans and also approve any essential deviations from the original plans. In order to ensure UNDP’s ultimate accountability for project results, Project Board decisions

will be made in accordance with standards that shall ensure management for development results, best value money, fairness, integrity, transparency and effective international competition. Members of the Project Board will consist of key national governmental and non-governmental agencies, UNDP, and Project Partners as well as appropriate local level representatives. Representatives of other stakeholder groups may also be included in the Project Board as considered appropriate and necessary.

Figure 1: PEEMS Project Organization Structure



68. The Project Board will contain three distinct roles:

- Senior Executive (Chairman of Project Board) – MoSIT – DG for Productivity: The Senior Executive is ultimately responsible for the project, supported by the Senior Beneficiary and Senior Supplier. This role requires representing the interests of the Ministry of Science Industry and Technology (MoSIT) who will ultimately benefit from the project. The Senior Executive’s primary function within the Board will be to ensure that the project is focused throughout its life cycle on achieving its objectives and delivering outputs that will contribute to higher level outcomes. The Senior Executive has to ensure that the project gives value for money, ensuring a cost-conscious approach to the project, balancing the demands of beneficiary and supplier;
- Senior Beneficiary (Executing Partner) – DG for Productivity: The Senior Beneficiary is responsible for validating the needs and for monitoring that the solution will meet those needs within the constraints of the project. The role represents the interests of all those who will benefit from the project, or those for whom the deliverables resulting from activities will achieve specific output targets. The Senior Beneficiary role monitors progress against targets and quality criteria. The DG for Productivity will appoint a senior official to this role;
- Senior Supplier (Implementing Partner) – UNDP: The Senior Supplier represents the interests of the parties which provide funding and/or technical expertise to the project (designing, developing, facilitating, procuring, implementing). The Senior Supplier’s primary function within the Board will be to provide guidance regarding the technical feasibility of the project. This role will rest with UNDP-Turkey represented by the Resident Representative.

69. The Project assurance role will be provided by the DG for Productivity and UNDP CO Portfolio Manager. The project assurance supports the Project Board by carrying out objective and independent project oversight and monitoring functions. This role ensures appropriate project management milestones are managed and completed. Project Assurance has to be independent of the Project Manager; therefore, the Project Board cannot delegate any of its assurance responsibilities to the Project Manager. The Project Assurance role will rest with combination of several positions.
70. The Project Implementation Unit (PIU) consisting of Project Manager, Project Associate and Project Clerk will run the project on a day-to-day basis on behalf of the Implementing Partner in line with the decisions taken by the Board. The Project Implementation Unit's function will end when the final project terminal evaluation report, and other documentation required by the GEF and UNDP, has been completed and submitted to UNDP (including operational closure of the project).
71. Governance role for Project target groups: Project target groups will include OIZs and their Energy Management Units or EMUs. In the governance of the PEEMS Project, they will be represented on the Project Board by designated senior personnel from OIZs that are undertaking demonstration projects with the "one-stop-shop" as well as representatives from their respective Chambers of Industry. Their presence on the Project Board is important to convey the progress of the one-stop shop and its impact on the level of EE motor investments within their OIZs, and to share lessons learned and other attendant issues that hinder progress of the intended market transformation objectives of the Project.
72. UNDP Direct Project Services as requested by Government: The project is to be managed on the 100% Country Office Cost Recovery basis, upon request of the government, the implementing partner. The estimated cost includes: (i) recruitment and payroll management of project staff; (ii) purchase of goods and equipment as requested; and (iii) hiring of consultants. In accordance with GEF Council requirements, the costs of these services will be part of the executing entity's Project Management Cost allocation identified in the project budget. Direct Project Costs (DPC) would be charged at the end of each year based on the UNDP Universal Pricelist (UPL) or the actual corresponding service cost that is preliminarily identified as i) identification and recruitment of project and programme personnel; ii) identification and facilitation of training activities; and iii) procurement of goods and services. These services and their reimbursement are defined in the draft Letter of Agreement (LoA) as provided in Annex Q. These services will also be a part of annual project operational planning in order for the DPC to be defined and requested during the calendar year, the amount included in the yearly project management budgets and services charged on the basis of actual services provided at the end of that year.
73. Agreement on intellectual property rights and use of logo on the project's deliverables: The GEF logo should be used to accord proper acknowledgement to the GEF for providing funding. The GEF logo should appear together with the UNDP and the Directorate General of Productivity (DGP) under the Ministry of Science Industry and Technology (MoSIT) on all visual and printed communication and promotional materials developed by the project and project hardware. All logos should be placed on the same line and should be visually equal; no one logo should take precedence over the other logos. The GEF and the UNDP logo should be used collocated and the UNDP logo should be placed at the top right-hand corner. The logos will be used in all printed, visual, electronic, and any other materials (including but not limited to web sites, books, brochures, reports, posters, leaflets, banners, promotional materials, infographics for social media, presentations, banners, videos, etc.) produced within the project.
74. Any other partners in the project can use their own logo in conjunction with the logo of the GEF, UNDP and Directorate General of Productivity (DGP) under the Ministry of Science Industry and Technology only on communication materials based on the activity that they will be supporting. If any communication material will be produced by any other partners, all logos should be placed on the same line visually equal; no one logo should take precedence over the other logos of partnering agencies or organizations. There are no exceptions to this rule. In case of need for creating a separate logo for the project, it should be used in conjunction with the logo of the all partners.

75. The standard description given below shall appear in all communications materials: *“Promoting Energy-Efficient Motors in Small and Medium Sized Enterprises” project is implemented by the Directorate General of Productivity under the Ministry of Science Industry and Technology and United Nations Development Programme (UNDP) with the financial assistance of Global Environment Facility (GEF).* If any further information is required on use of logo on project’s deliverables, guidance will be provided by UNDP.
76. **Project management:** the PIU will be located within the premises of the offices of DGP in Ankara. The PIU will consist of an office sufficient to house to full-time PIU personnel that includes the Project Manager, Project Associate and Project Clerk, a half-time Chief Technical Advisor, and visiting consultants. One of the important roles of the PM will be to lead the outreach of the PEEMS Project, and facilitate working partnerships with other projects as listed in Section 3.3.

## 8. FINANCIAL PLANNING AND MANAGEMENT

77. The total cost of the project is *USD 32.09 million*. This is financed through a GEF grant of *USD 3.75 million*, *USD 8.34 million* in cash and in-kind co-financing to be administered by UNDP and *USD 20 million* in parallel co-financing. UNDP, as the GEF Implementing Agency, is responsible for the execution of the GEF resources and the cash co-financing transferred to UNDP bank account only.
78. **Parallel co-financing:** The planned parallel co-financing will be used according to Table 4. The actual realization of project co-financing will be monitored during the mid-term review and terminal evaluation process and will be reported to the GEF.

Table 4: Co-Financing Arrangements

Co-financing source	Co-financing type	Co-financing amount	Planned Activities/Outputs	Risks	Risk Mitigation Measures
UNDP	Cash	USD 80,000	<ul style="list-style-type: none"> <li>To contribute to promotion of EE motors (IE3 and IE4) in SMEs</li> </ul>		
	In-Kind	USD 220,000	<ul style="list-style-type: none"> <li>Contribution of the management of the project through the PIU</li> </ul>		
MoSIT (DGP, DGI, DGSIIP)	Cash	USD 500,000	<ul style="list-style-type: none"> <li>Formulate and strengthen energy efficient motors policy and regulatory packages;</li> <li>Assist the formulation of new business models and financial packages to support energy efficient motor purchase, remanufacture and replacement;</li> <li>Assist in the design and preparation of other technical assistance packages;</li> <li>Develop the framework for energy and technical audit plans;</li> <li>Assist the development of the market tracking system;</li> <li>Chairing the Project Board.</li> <li>Development and implementation of a proactive market surveillance plan and ongoing market monitoring, reporting and verification activities by DGSIIP;</li> </ul>	Insufficient capacity of DGP to provide the stated in-kind co-financing amount	Project capacity building activities provide a lot of focus towards DGP as well as DGI and DGSIIP
	In-kind	USD 2,000,000			

Co-financing source	Co-financing type	Co-financing amount	Planned Activities/Outputs	Risks	Risk Mitigation Measures
			<ul style="list-style-type: none"> <li>• Training of appropriate staff and national awareness campaign by DGSIP;</li> <li>• Design and implementation of a recycling program for phased out energy inefficient motors in close collaboration with MoEU including efforts to increase the number of accredited motor recycling facilities where members of TEMMA can meet their obligations for recycling electric motors as per EU Directive 2012/19/EU</li> </ul>		
TSI	In-kind	USD 350,000	<ul style="list-style-type: none"> <li>• Leading work related to support for the strengthening of test laboratories;</li> <li>• Provide motor testing services needed under Project activities</li> </ul>		
	Cash	USD 3,000,000	<ul style="list-style-type: none"> <li>• Upgrading testing laboratory.</li> </ul>		
Ankara Chamber of Industry (ACI)	In-kind	USD 2,000,000	<ul style="list-style-type: none"> <li>• To strengthen capacity, training, public awareness and PR campaign for EE motors.</li> </ul>		
Istanbul Chamber of Industry (ICI)	In-kind	USD 190,000			
Gamak (Motor Manufacturer)	In-kind	USD 5,000,000	<ul style="list-style-type: none"> <li>• Contribute to promotion of EE motors (IE3 and IE4) in SMEs;</li> <li>• Development of governance and information infrastructure in electric motors industry;</li> <li>• Continue investments for the production of high EE motors;</li> <li>• Development and delivery of detailed training for manufacturers, industry and end-users including the general public and the development of financial support mechanisms.</li> <li>• Support policy formulation and enforcement capacity building activities under the Project</li> </ul>		
ARÇELİK (Motor Manufacturer)	In-kind	USD 5,000,000			
VOLT (Motor Manufacturer)	In-kind	USD 5,000,000			
AEMOT (Motor Manufacturer)	In-kind	USD 5,000,000			

79. **Budget Revision and Tolerance:** As per UNDP requirements outlined in the UNDP POPP, the project board will agree on a budget tolerance level for each plan under the overall annual work plan allowing the project manager to expend up to the tolerance level beyond the approved project budget amount for the year without requiring a revision from the Project Board. Should the following deviations occur, the Project Manager and UNDP Country Office will seek the approval of the UNDP-GEF team as these are considered major amendments by the GEF:
- a) Budget re-allocations among components in the project with amounts involving 10% of the total project grant or more;
  - b) Introduction of new budget items/or components that exceed 5% of original GEF allocation.

Any over expenditure incurred beyond the available GEF grant amount will be absorbed by non-GEF resources (e.g. UNDP TRAC or cash co-financing).

80. **Refund to Donor:** Should a refund of unspent funds to the GEF be necessary, this will be managed directly by the UNDP-GEF Unit in New York.
81. **Project Closure:** Project closure will be conducted as per UNDP requirements outlined in the UNDP POPP. On an exceptional basis only, a no-cost extension beyond the initial duration of the project will be sought from in-country UNDP colleagues and then the UNDP-GEF Executive Coordinator.
82. **Operational completion:** The project will be operationally completed when the last UNDP-financed inputs have been provided and the related activities have been completed. This includes the final clearance of the Terminal Evaluation Report (that will be available in English) and the corresponding management response, and the end-of-project review Project Board meeting. The Implementing Partner through a Project Board decision will notify the UNDP Country Office when operational closure has been completed. At this time, the relevant parties will have already agreed and confirmed in writing on the arrangements for the disposal of any equipment that is still the property of UNDP.
83. **Financial completion:** The project will be financially closed when the following conditions have been met:
  - a) The project is operationally completed or has been cancelled;
  - b) The Implementing Partner has reported all financial transactions to UNDP;
  - c) UNDP has closed the accounts for the project;
  - d) UNDP and the Implementing Partner have certified a final Combined Delivery Report (which serves as final budget revision).

The project will be financially completed within 12 months of operational closure or after the date of cancellation. Between operational and financial closure, the implementing partner will identify and settle all financial obligations and prepare a final expenditure report. The UNDP Country Office will send the final signed closure documents including confirmation of final cumulative expenditure and unspent balance to the UNDP-GEF Unit for confirmation before the project will be financially closed in Atlas by the UNDP Country Office.

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## 9. TOTAL BUDGET AND WORK PLAN

Total Budget and Work Plan		
Atlas <sup>51</sup> Proposal or Award ID:	00089899	Atlas Primary Output Project ID: 00089899
Atlas Proposal or Award Title:	Promoting Energy-Efficient Motors in Small and Medium Sized Enterprises (PEEMS)	
Atlas Business Unit	TUR10	
Atlas Primary Output Project Title	Promoting Energy-Efficient Motors in Small and Medium Sized Enterprises (PEEMS)	
UNDP-GEF PIMS No.	5285	
Implementing Partner	Directorate General of Productivity under MoSIT	

GEF Component/Atlas Activity	Responsible Party/ (Atlas Implementing Agent)	Fund ID	Donor Name	Atlas Budgetary Account Code	ATLAS Budget Description	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Amount Year 4 (USD)	Amount Year 5 (USD)	Total (USD)	See Budget Note:
<b>COMPONENT 1:</b> <i>Strengthened legislative and and policy regulatory framework for EE motors in Turkey</i>	DGP	62000	GEF	71200	International Consultants	8,000	8,000	12,000	0	0	28,000	1
				71300	Local Consultants and Local Staff	16,810	16,810	17,265	5,815	5,815	62,515	2
				72100	Contractual Services- Companies	30,000	32,000			0	62,000	3
				75700	Training, Workshops and Conferences	12,000	12,000	8,000	8,000	8,000	48,000	4
					sub-total GEF	66,810	68,810	37,265	13,815	13,815	200,515	
					sub-total UNDP							
			UNDP		Total Outcome 1	66,810	68,810	37,265	13,815	13,815	200,515	
<b>COMPONENT 2:</b> <i>Capacity building for of relevant</i>	DGP	62000	GEF	71200	International Consultants	8,000	8,000	4,000	4,000	4,000	28,000	5
				71300	Local Consultants	21,350	16,400	15,035	22,400	21,035	96,220	6

<sup>51</sup> See separate guidance on how to enter the TBWP into Atlas





	UNDP	Total GEF Project Management	37,720	34,720	35,580	34,220	36,220	178,460
		sub-total UNDP						
		Total Project Management	37,720	34,720	35,580	34,220	36,220	178,460
		<b>GEF PROJECT TOTAL</b>	<b>1.355.945</b>	<b>1.099.305</b>	<b>839.530</b>	<b>229.340</b>	<b>225.880</b>	<b>3.750.000</b>
		<b>UNDP PROJECT TOTAL</b>	<b>0</b>	<b>20.000</b>	<b>20.000</b>	<b>20.000</b>	<b>20.000</b>	<b>80.000</b>
		<b>TOTAL PROJECT</b>	<b>1.355.945</b>	<b>1.119.305</b>	<b>859.530</b>	<b>249.340</b>	<b>245.880</b>	<b>3.830.000</b>

**Summary of Funds:**

	Amount Year 1	Amount Year 2	Amount Year 3	Amount Year 4	Amount Year 5	Total
GEF	1.355.945	1.099.305	839.530	229.340	225.880	3.750.000
UNDP	0	20.000	20.000	20.000	20.000	80.000
<b>Co-financing:</b>	<b>6.560.000</b>	<b>6.590.000</b>	<b>5.115.000</b>	<b>5.015.000</b>	<b>4.980.000</b>	<b>28.260.000</b>
UNDP	20.000	50.000	50.000	50.000	50.000	220.000
MoSIT	500.000	500.000	500.000	500.000	500.000	2.500.000
TSI	1.600.000	1.600.000	125.000	25.000	0	3.350.000
ACI	400.000	400.000	400.000	400.000	400.000	2.000.000
ICI	40.000	40.000	40.000	40.000	30.000	190.000
GAMAK	1.000.000	1.000.000	1.000.000	1.000.000	1.000.000	5.000.000
ARÇELİK	1.000.000	1.000.000	1.000.000	1.000.000	1.000.000	5.000.000
VOLT	1.000.000	1.000.000	1.000.000	1.000.000	1.000.000	5.000.000
AEMOT	1.000.000	1.000.000	1.000.000	1.000.000	1.000.000	5.000.000
<b>Total:</b>	<b>7.915.945</b>	<b>7.709.305</b>	<b>5.974.530</b>	<b>5.264.340</b>	<b>5.225.880</b>	<b>32.090.000</b>

**Budget notes:**

1. This includes consultancy services for the International Energy Expert (IEE) for 2, 2, and 3 wks for Yrs 1, 2 and 3 respectively;
2. Local consulting services for coordination of workshops and production of training modules, etc. for 6, 6, 2, and 2 weeks for Years 1, 2, 3, 4 and 5 respectively and a Chief Technical Advisor (CTA) for 5, 5, 2 and 2 weeks for Years 1, 2, 3, 4 and 5 respectively;
3. USD 42,000 for motor data collection and data processing from SMEs in OIZs that augments ongoing DGP survey (Output 1.1), USD 20,000 for translation services into Turkish for EU legislation in Yr 2 (Output 1.2);
4. More than 24 workshops assumed to be around USD2,000 per workshop;
5. This includes consultancy services for the IEE for 2, 2, 1, 1, and 1 weeks for Yrs 1, 2, 3, 4 and 5 respectively;

6. Local consulting services including PA for 10 weeks for Year 1, and 7 weeks each for Years 2, 3, 4 and 5, the CTA for 5, 4, 4, 7 and 7 weeks for Years 1, 2, 3, 4 and 5 respectively, and the Project Clerk (PC) for 10 weeks in Year 1, 8 weeks each for Years 2 and 4, 5 weeks for Years 3 and 5;
7. USD 20,000 for ad hoc legal assistance for TEMIMA;
8. Each training and awareness raising workshops at an assumed cost of USD 3,000 per workshop;
9. This includes contractual services for the IEE for 2 weeks and 1 week for Years 1 and 4 respectively;
10. Local consulting services Years 1, 2 and 5 and 2 weeks for Years 3 and 4, the CTA for 2 weeks each for Years 2 and 3,
11. Training workshop for TSI personnel in Year 3 @USD 3,000, and training workshop for PSMP for DGSIIP personnel in Year 4 @ USD 5,000;
12. Equipment for motor testing lab for 90 to 375 kW;
13. This includes consultancy services for the IEE for 2 weeks in Year 1 and 1 week each for Yrs 2, 3, 4 and 5;
14. Local consulting services for Years 1, 2, 3, 4 and 5, the CTA for 12 weeks each for Years 1 and 2, and 11 wks for Yrs 3, 4 and 5, the Financial Expert (FE) for 12 weeks for Years 1, 2 and 3
15. USD 35,100 for ad hoc EE consulting companies for Yr 1, Yr 2 and Yr 3; USD 50,000 for EMAP for Yr 1, Yr 2 and Yr 3; USD 150,000 for MEEIP preparations for Yr 1, Yr 2 and Yr 3; USD 100,000 for legal assistance for OIZ agreements in Yr 1; and USD 40,000, USD 40,000 and USD 40,000 for ad hoc EE consulting companies for scaling up in Output 4.4 in Yr. 3, Yr 4 and Yr 5 respectively;
16. Travel to OIZs;
17. Purchase and installation of EE motors for 12 SMEs spread over 3 to 5 OIZs for demo purposes;
18. For legal and other third party expenses related to further structuring of financial model, including adjusting guarantee from KGF;
19. In Yr 1, USD 20,000 for preparation of OIZ training programme, USD 8,500 for each OIZ training program for 3 OIZs, and USD 30,000 for the preparation of tools for conducting EMAPs and SMTRs;
20. This includes consultancy services for the IEE for 1 week each in Years 1 and 2, and an International Evaluation Specialist (IES) for 6 weeks in Year 3 and 8 weeks in Year 5 for the MTR and TE respectively;
21. Local consulting services 1, 4, 6, 10, and 8 weeks for Years 1, 2, 3, 4 and 5 respectively, the CTA for 1, 3, 3, 2 and 2 weeks for Years 1, 2, 3, 4 and 5, the Awareness Raising Consultant (ARC) for 6, 6 and 3 weeks for Years 1, 2 and 3 respectively, and the PC for 2, 8, 8, 10 and 6 weeks in Years 1, 2, 3, 4 and 5 respectively;
22. For setup of national EE motors database and training of its use in Yrs 4 and 5;
23. Primarily for knowledge management to support awareness raising of EE motors by OIZs targeting their SME tenants;
24. Local consulting services 10 weeks for each year, and the PC for 15 weeks each year throughout the Project;
25. For office equipment;
26. For mobile phone communications;
27. Budget set up for office supplies used in PMU;
28. Budget set up for Project audit;
29. Budget set up for UNDP Cost Recovery Charges for financial services, procurement of goods and services, HR and issuance of contracts, travel, etc. Draft LOA for UNDP support services will be available for review at DOA issuance stage;
30. For Inception Workshop at commencement of Project operations, and terminal workshop at EOP.

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## 10. LEGAL CONTEXT

84. This document, together with the CPAP signed by the Government and UNDP, which is incorporated by reference, constitute together a Project Document as referred to in the SBAA. All CPAP provisions apply to this document.
85. Consistent with Article III of the Standard Basic Assistance Agreement, the responsibility for the safety and security of the implementing partner and its personnel and property, and of UNDP's property in the implementing partner's custody, rests with the implementing partner.
86. The implementing partner shall:
- Put in place an appropriate security plan and maintain the security plan, taking into account the security situation in the country where the project is being carried out;
  - Assume all risks and liabilities related to the implementing partner's security, and the full implementation of the security plan.
87. UNDP reserves the right to verify whether such a plan is in place, and to suggest modifications to the plan when necessary. Failure to maintain and implement an appropriate security plan as required hereunder shall be deemed a breach of this agreement.
88. The implementing partner agrees to undertake all reasonable efforts to ensure that none of the UNDP funds received pursuant to the Project Document are used to provide support to individuals or entities associated with terrorism and that the recipients of any amounts provided by the UNDP hereunder do not appear on the list maintained by the Security Council Committee established pursuant to resolution 1267 (1999). The list can be accessed via <http://www.un.org/Docs/sc/committees/1267/1267ListEng.htm>. This provision must be included in all sub-contracts or sub-agreements entered into under this Project Document.

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## 11. ANNEXES

- Annex A: Multi-Year Workplan
- Annex B: Monitoring Plan;
- Annex C: Evaluation Plan;
- Annex D: GEF Tracking Tool at baseline
- Annex E: Terms of Reference for Project Board, Project Manager, Chief Technical Advisor and other positions as appropriate
- Annex F: UNDP Social and Environmental and Social Screening Template (SESP)
- Annex G: UNDP Project Quality Assurance Report (to be completed by UNDP Country Office)
- Annex H: UNDP Risk Log
- Annex I: Capacity assessment of the project implementing partner and HACT micro assessment (to be completed by UNDP Country Office)
- Annex J: Co-Financing Letters
- Annex K: Profile of Industrial Electric Motors in Turkey
- Annex L: Details of applicable legislation and ongoing Government initiatives to encourage increased use of EE motors
- Annex M: Detailed market barrier analysis
- Annex N: Details of Kayseri OIZs pilot Project for AC motor replacement
- Annex O: Theory of change diagram
- Annex P: Sustainable energy efficiency financing mechanism (SEEFM)
- Annex Q: Direct Project Costs



Task	Responsible Party	Year 1 - 2017				Year 2 - 2018				Year 3 - 2019				Year 4 - 2020				Year 5 - 2021			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
5. Availability of EE motor information raising stakeholder awareness on EE motor benefit																					
5.1 National EE electric motor database	DGP/UNDP																				
5.2 Nationwide public awareness raising campaign for EE motors	DGP/UNDP																				
5.3 EE motors website	DGP/UNDP																				
5.4 Midterm Review and Terminal Evaluation	DGP/UNDP																				
<b>TOTAL</b>																					

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**ANNEX B: MONITORING PLAN**

**Monitoring Plan:** The Project Manager will collect results data according to the following monitoring plan.

Monitoring	Indicators	Description	Data source/Collection Methods	Frequency	Responsible for data collection	Means of verification	Assumptions and Risks
<p><b>Project objective:</b></p> <p>To promote significant additional investment in industrial energy efficiency in Turkey by transforming the market for energy efficient motors used in small and medium sized enterprises</p>	Kilotonnes of CO2 reduced	To determine the lifetime direct project CO <sub>2</sub> emission reductions from the replacement of inefficient motors with IE3 motors	Project consultant will meet regularly with participating OIZs on the progress of completed EMAPs and MEEIPs and the operation of installed EE motors in industrial SMEs. The project consultant will also make occasional visits to SMEs to verify EE motor installations and energy savings.	Quarterly  Reported annually in DO tab of the GEF PIR	Project consultant	Consultant progress report on the OIZ progress of completed EMAPs and MEEIPs and installed EE motors installed for industrial SMEs  National statistics report	Assumption: OIZs and SMEs comply to conditions for PEEMS Project support that includes allowing the PEEMS Project to monitor their progress and energy savings for the purposes of disseminating pilot project information to other OIZs and SMEs
	MWh of annual reduced electricity consumption	To determine the effectiveness of the installation and use of EE motors installed during the Project and the reduced electricity consumption	As above	As above	As above	As above	As above
	% of SMEs with firm plans to procure and install EE motors by using the financial mechanism developed by the Project	To determine the effectiveness of Project efforts to convince SMEs to procure and install EE motors through one-stop shop mechanism setup by the Project	Project consultant will prepare a questionnaire for OIZ distribution to determine the awareness of each SME tenant of the ongoing motor replacement pilot and their interest in implementing a motor replacement program	Annually	As above	Responses to questionnaire from SME tenants and report from the project consultant containing analysis of the responses	Assumption: Questionnaire responses are reflective of future investments by SMEs into EE motor replacement programmes
	Cumulative number of phased out inefficient electric motors taken into a recycling program by EOP	This would only include inefficient motors that have been recycled in compliance with EU directive 2012/19/EU	Collection of information on recycled motors from recycling centres	Annually	Project consultant	Monitoring reports on inefficient motor recycling	Risk: low proportion of SMEs give their motors to a recycling centre

<p><b>Outcome 1:</b> Strengthened legislative and regulatory framework related to both new and existing EE motors in Turkey</p>	<p><b>Indicator 1:</b> Number of completed national surveys</p>	<p>A completed survey will consist of additional motor usage information to be added to the ongoing DGP survey findings that provides a 90 to 95% confidence level</p>	<p>This survey will be conducted in close collaboration with DGP on survey on motor usage in the industrial sector. The extent of the survey will only be during Year 1 to collect sufficient information to ensure the 90 to 95% confidence level</p>	<p>Survey only to be done during first 6 months of the Project in Year 1</p>	<p>Project consultant</p>	<p>2016 DGP report on motor inventory survey</p>	<p>Risk: insufficient information collected for a 90 to 95% confidence level</p>
	<p><b>Indicator 2:</b> Number of Turkish policies, regulations and standards applicable to motors harmonized with EU Eco-design standards</p>	<p>Turkish policies, regulations and standards applicable to motors that have been harmonized with EU Eco-design standards</p>	<p>Policy, regulation and standard circulars issued by government</p>	<p>As above</p>	<p>As above</p>	<p>As above</p>	<p>As above</p>
	<p><b>Indicator 3:</b> Number of government officers who are involved with implementing policies and measures for EE motor replacement programmes by EOP</p>	<p>This would include government officers with oversight over EE motor replacement programmes that are in compliance with EU directive 2012/19/EU</p>	<p>Discussions with DGP management on management of EE motor replacement programmes</p>	<p>Annually</p>	<p>Project consultant</p>	<p>Discussions with DGP management on management of EE motor replacement programmes</p>	<p>Assumption: continued government support for improving industrial energy efficiency</p>
	<p><b>Indicator 1:</b> Number of electric motor manufacturers registered and engaged with promotional activities with an established national motor manufacturer association</p>	<p>This indicator would reflect the number of motor manufacturers engaged with TEMMA activities</p>	<p>Review of official TEMMA registration documents and TEMMA promotional material</p>	<p>Annually</p>	<p>TEMMA personnel and project team</p>	<p>Interviews with TEMMA personnel and review of documents from TEMMA including registration documents and promotional material.</p>	<p>Risk: Delays in the finalization of TEMMA documents</p>
	<p><b>Indicator 2:</b> Number of attendees at 20 technical training workshops</p>	<p>This would be for attendees at technical training workshops on EE motors targeted for</p>	<p>List of training session attendees broken down into attendees from motor manufacturers, OIZs, industrial SMEs, and the EE</p>	<p>After each training workshop and</p>	<p>Project training consultant</p>	<p>Project training reports with curriculum as well as feedback from attendees on the</p>	

		manufacturers and end-users	consulting industry. The data should be further broken down into disaggregation between male and female attendees	summarized for each PIR	effectiveness of the workshops	
<b>Project Outcome 3</b> Improved capacity for monitoring, verification and enforcement of motors market transformation	<i>Indicator 1:</i> Number of TSI personnel who are testing compliance with new EE motor eco-design standards	Actual number of TSI personnel who are trained and working in new motor testing laboratory for motors between 7.5 and 375 kW	Meetings with TSI on their personnel activities with new motor testing laboratory	Annually	Meetings with TSI personnel to confirm their ongoing work with testing motors compliance with eco-design standards	Project team
	<i>Indicator 2:</i> Number of DGSIIIP personnel who are involved in PMSP for EE motors compliance in industrial SMEs by EOP	Actual number of DGSIIIP personnel who are trained to implement PMSP and enforce eco-design standards of motors being used in industrial SMEs	Meetings with DGSIIIP personnel on their PMSP activities	Annually	Meetings with DGSIIIP personnel on their PMSP activities	Project team
	<i>Indicator 3:</i> Annual number of motors sent for testing at upgraded TSI motor testing facilities	These would be the number of motors sent to the TSI motor testing facilities by DGSIIIP from PMSP activities as well as from motor manufacturers testing new motor designs	Meetings with TSI on their new motor testing laboratory	Annually	Motor testing reports by TSI	Project team
<b>Project Outcome 4</b> One-stop shop improves industrial SME access to financing for EE motor investments	<i>Indicator 1:</i> Number of motor energy efficiency investment plans (MEEIPs) for industrial SMEs in OIZs	This would be the cumulative number of MEEIPs done after each year	MEEIP documentation as collected by the OIZs	Quarterly	MEEIP documentation as collected by the OIZs	Project team with OIZ management
			MEEIP documentation as collected by the OIZs		Assumption: OIZs and SMEs comply to conditions for PEEMS Project support that includes allowing the PEEMS Project to monitor their progress and energy savings for the purposes of disseminating pilot project information to other OIZs and SMEs	

	<p><b>Indicator 2:</b> Cumulative USD investments through an established "one-stop-shop" FSM by EOP</p>	<p>This would be the cumulative investments in USD for the procurement and installation of IE3 motors that have been installed in the premises of SME tenants who have used the one-stop shop developed by the Project</p>	<p>EE motor installation reports by OIZ</p>	<p>Quarterly</p>	<p>As above</p>	<p>EE motor installation reports by OIZ</p>	<p>As above</p>
	<p><b>Indicator 3:</b> % of SMEs where MEEIP investment is paid back in less than 24 months</p>	<p>The percentage of SMEs who are able to pay back the loan or lease on an EE motor investment based on the money saved from reduced electricity consumption in less than 24 months</p>	<p>OIZ motor replacement program progress reports in collaboration with project team</p>	<p>Annually starting Year 3</p>	<p>As above</p>	<p>OIZ motor replacement program progress reports in collaboration with project team</p>	<p>As above</p>
	<p><b>Indicator 4:</b> Number of financial institutions involved with inefficient motor replacement programmes by EOP</p>	<p>This would include commercial lending institutions, development banks, leasing companies, and guarantee facilities</p>	<p>Project consultant consultations with OIZs, EMUs and participating financial institutions</p>	<p>Annually</p>	<p>Project consultant</p>	<p>EE motor installation reports by OIZ, and reports from participating</p>	<p>ASSUMPTION: Participation of the guarantee facility. With no guarantee facility, the risk of other financial institutions not participating is not guaranteed.</p>
<p><b>Project Outcome 5</b> Availability of EE motor information that raises stakeholder awareness of the benefits of EE motors and sustain market transformation</p>	<p><b>Indicator 1:</b> Number of EE motors registered in national motors database hosted and maintained by the DGP</p>	<p>This would include all EE motors that have been installed with Project assistance using the one-stop shop mechanism</p>	<p>National DGP motors inventory database</p>	<p>At EOP</p>	<p>Project team in collaboration with DGP</p>	<p>Reports from National DGP motors inventory database</p>	
	<p><b>Indicator 2:</b> % of industrial SMEs who are aware of the benefits of EE motors by EOP</p>	<p>This would include SMEs who have been surveyed who are aware of the benefits of EE motors and who have made</p>	<p>EOP survey of SME awareness of EE motors</p>	<p>At EOP</p>	<p>As above</p>	<p>Reports from EOP survey on SME awareness of EE motors</p>	

		plans for preparing an MEEIP							
	<i>Indicator 3: Number of hits on the motors website by EOP</i>	This would gauge the usefulness of the EE motors website that will be developed by the Project	Internet tools gauging hits on websites	Annually commencing Year 2	As above	As above			
<i>Mid-term GEF Tracking Tool (if FSP project only)</i>	N/A	N/A	Standard GEF Tracking Tool available at <a href="http://www.thegef.org">www.thegef.org</a> Baseline GEF Tracking Tool included in Annex.	After 2 <sup>nd</sup> PIR submitted to GEF	Project consultant	Completed GEF Tracking Tool	Assumption: OIZs and SMEs comply to conditions for PEEMS Project support that includes allowing the PEEMS Project to monitor their progress and energy savings for the purposes of disseminating pilot project information to other OIZs and SMEs		
<b>Terminal GEF Tracking Tool</b>	N/A	N/A	Standard GEF Tracking Tool available at <a href="http://www.thegef.org">www.thegef.org</a> Baseline GEF Tracking Tool included in Annex.	After final PIR submitted to GEF	Project consultant	Completed GEF Tracking Tool	Assumption: OIZs and SMEs comply to conditions for PEEMS Project support that includes allowing the PEEMS Project to monitor their progress and energy savings for the purposes of disseminating pilot project information to other OIZs and SMEs		
<i>Mid-term Review (if FSP project only)</i>	N/A	N/A	To be outlined in MTR inception report	Submitted to GEF same year as 3 <sup>rd</sup> PIR	Independent evaluator	Completed MTR			
<b>Environmental and Social risks and management plans, as relevant.</b>	N/A	N/A	Updated SESP and management plans	Annually	Project Manager UNDP CO	Updated SESP			

**ANNEX C: EVALUATION PLAN**

**Evaluation Plan:**

<b>Evaluation Title</b>	<b>Planned start date Month/year</b>	<b>Planned end date Month/year</b>	<b>Included in the Country Office Evaluation Plan</b>	<b>Budget for consultants<sup>53</sup></b>	<b>Other budget (i.e. travel, site visits etc...)</b>	<b>Budget for translation</b>
Terminal Evaluation	September 2021	December 2021	Mandatory	USD 35,000	USD 2,000	USD 2,000
<b>Total evaluation budget</b>				USD 39,000		

<sup>53</sup> The budget will vary depending on the number of consultants required (for full size projects should be two consultants); the number of project sites to be visited; and other travel related costs. Average # total working days per consultant not including travel is between 22-25 working days.

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## ANNEX D: GEF TRACKING TOOL AT BASELINE

D.1. The following tables are provided in this Annex:

- Figure D.1: Screenshot of the GEF tracking tool;
- Figure D.2: Screenshot of the GEF EE GHG calculation tool; and
- Figure D.3: Baseline scenario project motors added and GHG reductions. This figure has been provided for two reasons:
  - calculation of the baseline growth of EE motors market without the Project, and the growth of EE motors market with the project;
  - computation of GHG reductions and energy savings as a check to the GEF EE GHG calculation tool.

Figure D.1: Screenshot of GEF Tracking Tool



## Tracking Tool for GEF 6 Climate Change Mitigation Projects (At CEO Endorsement)

**Special Notes:** Projects need to report on all indicators that are included in their results framework

**Reporting on lifetime emissions avoided**

**Lifetime direct GHG emissions avoided:** Lifetime direct GHG emissions avoided are the emissions reductions attributable to the investments made during the project's supervised implementation period, totaled over the respective lifetime of the investments.  
**Lifetime direct post-project emissions avoided:** Lifetime direct post-project emissions avoided are the emissions reductions attributable to the investments made outside the project's supervised implementation period, but supported by financial facilities put in place by the GEF project, totaled over the respective lifetime of the investments. These financial facilities will still be operational after the project ends, such as partial credit guarantee facilities, risk mitigation facilities, or revolving funds.  
**Lifetime indirect GHG emissions avoided (top-down and bottom-up):** Indirect emissions reductions are those attributable to the long-term outcomes of the GEF activities that remove barriers, such as capacity building, innovation, catalytic action for replication.  
 Please refer to the following references for Calculating GHG Benefits of GEF Projects:

- [Manual for Energy Efficiency and Renewable Energy Projects](#)
- [Revised Methodology for Calculating Greenhouse Gas Benefits of GEF Energy Efficiency Projects \(Version 1.0\)](#)
- [Manual for Transportation Projects](#)

For LULUCF projects, the definitions of "lifetime direct and indirect" apply. Lifetime length is defined to be 20 years, unless a different number of years is deemed appropriate. For emission or removal factors (tonnes of CO<sub>2</sub>eq per hectare per year), use IPCC defaults or country specific factors.

**Section A. General Data**

		<b>At CEO Endorsement</b>
<b>Project Title</b>	Promoting Energy Efficient Motors in SMEs (PEEMS)	
<b>GEF ID</b>	9081	
<b>GEF Agency</b>	UNDP	
<b>Agency Project ID</b>	5285	
<b>Country</b>	Turkey	
<b>Region</b>	ECA	
<b>Date of Council/CEO Approval</b>	Month DD, YYYY (e.g., May 13, 2014)	
<b>GEF Grant (US\$)</b>	3,750,000	
<b>Date of submission of the tracking tool</b>	Month DD, YYYY (e.g., May 13, 2014)	
<b>Is the project consistent with the priorities identified in National Communications, Technology Needs Assessment, or other Enabling Activities (such as Technology Action Plans, Nationally Appropriate Mitigation Actions (NAMA) under the UNFCCC?)</b>	1   Yes = 1, No = 0	

**Section B. Quantitative Outcome Indicators**

**Target At CEO Endorsement**

<b>Indicator 1: Total Lifetime Direct and Indirect GHG Emissions Avoided (Tons CO<sub>2</sub>eq)</b>	<b>Identify Sectors, Sources and Technologies. Provide disaggregated information if possible. see Special Notes above</b>
Lifetime direct GHG emissions avoided	3,092,263
Lifetime indirect GHG emissions avoided	6,184,528

Figure D.1: Screenshot of GEF Tracking Tool (con'd)

<p>Indicator 2: Lifetime Energy Saved (Million Joules)</p>	<p>16,140,564,000</p> <p>IEA unit converter: <a href="http://www.iea.org/stats/unit.asp">http://www.iea.org/stats/unit.asp</a> Fuel savings should be converted to energy savings by using the net calorific value of the specific fuel. End-use electricity savings should be converted to energy savings by using the conversion factor for the specific supply and distribution system. These energy savings are then totaled over the respective lifetime of the investments.</p>
<p>Indicator 3: Increase in Renewable Energy Capacity and Production Increase in Installed RE capacity per technology (MW)</p>	<p>Disaggregate by type (Wind, Biomass, Geothermal, Hydro, solar, Photovoltaic, Marine power etc)</p>
<p>Lifetime RE production per technology (MWh)</p>	<p>(IEA unit converter: <a href="http://www.iea.org/stats/unit.asp">http://www.iea.org/stats/unit.asp</a>)</p>
<p>Indicator 4: Number of Users of low GHG systems (Number, of which female)</p>	<p>Identify Sector, describe the low GHG system and technologies and explain methodology for estimation</p>
<p>Indicator 5: Number of Hectares under Low GHG Management Practices (Ha.)</p>	<p>Identify source (conservation, avoided deforestation, afforestation/reforestation), type of low GHG Management Practice and describe methodology used for estimation</p>
<p>Indicator 6: Time Saved in adoption of low GHG technology (Percentage)</p>	<p>For technologies and practices to be supported under the project (i) estimate baseline time to deployment (without project support), (ii) estimate expected time to deployment with project support and (iii) calculate % of time saved.</p>
<p>Indicator 7: Volume of investment mobilized and leveraged by GEF for low GHG development (co-financing and additional financing) of which</p>	<p>Expected additional resources implies resources beyond co-financing committed at CEO endorsement.</p> <p>This is a target under Component 4</p>
<p>Public</p>	<p>5,850,000</p>
<p>Private</p>	<p>47,920,000</p>
<p>Domestic</p>	<p>2,190,000</p>
<p>External</p>	<p>300,000</p>

Figure D.1: Screenshot of GEF Tracking Tool (con'd)

<p>Indicator 8: Identify specific GHG reduction target (percent), if any, under any national, sectoral, local plans</p>		<p>Specify plan, area/sector (if subnational), and baseline from which reduction is expected</p>
<p><b>Section C. Qualitative Indicators</b></p>		
<p>Indicator 9: Degree of support for low GHG development in policy, planning and regulations</p>	<p>Baseline Rating (1-10) 3</p>	<p>Target Rating (1-10) 8</p>
<p>Indicator 10: Quality of MRV Systems</p>	<p>Baseline Rating (1-10) 2</p>	<p>Target Rating (1-10) 8</p>
<p>Indicator 11: Degree of strength of financial and market mechanisms for low GHG development</p>	<p>Baseline Rating (1-10) 3</p>	<p>Target Rating (1-10) 9</p>

Figure D.2: Screenshot of GEF EE Calculation Tool

**Step 1: Enter Basic Project Information**

**Project Information**

<b>Project Information</b>		Promoting Energy Efficient Motors in SMEs (PEEMS)	
Project Title	Project ID Number	Country	Region
	9081	Turkey	ECA
GEF Agency	UNDP	GEF Agency	UNDP
Date of Submission of GHG Accounting	20-Apr-16	Contact Name	Roland Wong
First Year of Project	2017	Year of Project Close	2021
GEF Grant Amount (\$)	\$3,750,000	Co-financing Amount (\$)	\$28,540,000

**General Parameters**

	Default	User-Specified
Length of Analysis Period (Years After Project Close)	20	20
First Post-project Year		2022
Last Post-project Year		2041
Maximum Technology / Measure Lifetime (Years)	20	20

Notes


**Fuels and Emission Factors**

	Default	User-Specified
Grid Electricity T&D Loss Rate (%)	10%	14%
Grid Electricity Emissions (CO2/MMh)	N/A	0.6050
Fuel: <a href="#">Click here to select from list</a>	0.0000	0.0000
Fuel: <a href="#">Click here to select from list</a>	0.0000	0.0000
Fuel: <a href="#">Click here to select from list</a>	0.0000	0.0000

Notes

14% indicated on <a href="http://data.worldbank.org/indicator/EG.ELC.LOSS.ZS">http://data.worldbank.org/indicator/EG.ELC.LOSS.ZS</a>

**Step 2: List Activity Components and Select Quantification Module**

**Activity Component**

One-stop shop to improve industrial SME access to financing for EE motor investments
--

**Sector/Subsector**

--

**Logframe Output**

Output 4.3: Pilot EE motor replacements using "one-stop-shop" financing arrangements
--

**Module/Intervention Type**

Demonstration & Diffusion
---------------------------

Figure D.2: Screenshot of GEF EE Calculation Tool (con'd)

Step 3: Model Activity Components

Demonstration/Diffusion Module

Project Information

Project Title	Promoting Energy Efficient Motors in SMEs (PEEMS)
Country	Turkey
Contact Name	Roland Wong
First Year of Project	2017
Last Year of Project	2021

Results: Demonstration/Diffusion Activity Components

	Cumulative					Annual		
	Total	2017-2021	2022-2028	2017	2021	2025	2025	2025
Direct Electricity Savings (MWh)	4,483,490	1,520,377	2,963,113	26,597	640,499	560,711	0	0
	N/A	0	0	0	0	0	0	0
	N/A	0	0	0	0	0	0	0
	N/A	0	0	0	0	0	0	0
Direct Total Energy Savings (GJ)	16,140,564	5,473,358	10,667,207	95,750	2,305,795	2,018,559	0	0
Direct GHG Emission Savings (tCO2)	3,092,263	1,048,604	2,043,659	18,344	441,752	386,722	0	0
Direct Post-project GHG Emission Savings (tCO2)								
Indirect Bottom-up Emission Savings (tCO2)	6,184,526		6,184,526					

Component 1: One-stop shop to improve industrial SME access to financing for EE motor investments -- General Inputs

Component Specifications

	Default	User-Specified	Per Unit	Notes
Annual Electricity Savings (MWh)		17		
Useful Lifetime of Investment	15	7		

Baseline Assumptions

	Default	User-Specified
Percent of Activities Implemented in the Baseline	10%	10%

Indirect Bottom-up Estimate

	Default	User-Specified
Number of s Implemented During Project Period		37,861
Number of Replications Post-project as Spillover		2
Total		75,722



Figure D-3: Baseline Information with Project Motors Added and GHG Reductions

Descriptor	2016	2017	2018	2019	2020	2021	Notes
Total number of electric motors on market	17,000,000	18,020,000	19,101,200	20,247,272	21,462,108	22,749,835	Estimate courtesy of ProMotE Araştırma ve Teknoloji Geliştirme A.Ş.
Assumed growth rate of electric motors market (%)	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	
% motors that are EE motors (IE2 or better)	28.00%	28.52%	29.00%	29.46%	29.89%	30.30%	From 2015 DGP Motors Survey
Assumed baseline growth rate of EE motors (%)	2.1%	2.1%	2.1%	2.1%	2.1%	2.1%	Estimate courtesy of ProMotE Araştırma ve Teknoloji Geliştirme A.Ş.
Number of EE motors operating in industrial SMEs (baseline)	4,760,000	5,138,420	5,539,545	5,964,738	6,415,442	6,893,189	Coincides with actual motor historical EE motors sales data in Turkey
Number of EE motors added (as baseline)	378,420	378,420	401,125	425,193	450,704	477,747	Estimate courtesy of ProMotE Araştırma ve Teknoloji Geliştirme A.Ş.
Local manufacturing capacity for EE motors	1,700,000	1,700,000	1,700,000	1,700,000	1,700,000	1,700,000	
Number of EE motors installed by Project	0	1,572	3,144	13,145	10,000	10,000	
Number of EE motors operating in industrial SMEs (project)		5,139,992	5,542,689	5,977,883	6,425,442	6,903,189	
% EE motors that are EE motors (IE2 or better) with project		28.52%	29.02%	29.52%	29.94%	30.34%	
% increase of EE motors from Project		0.01%	0.02%	0.06%	0.05%	0.04%	
GHG reductions from Project (tonnes CO2eq)		16,091	48,268	182,801	285,146	387,491	
<b>Rough GHG calculation:</b>							
Number of motors at EOP	37,861						
Average size of motors	42.5 kW						from DGP survey (see Para K.9 in ProDoc)
Average annual operating hours	5,456 hrs						from DGP survey (see Para K.9 in ProDoc)
Average load factor	78%						from DGP survey (see Para K.9 in ProDoc)
Assumed average efficiency of EE motors	93.10%						Assumes 45 kW IE2 (4 poles)
Assumed average efficiency of inefficient motors	90.64%						Assumes 63% are IE1, 28% are IE1 and 9% are IEO
Reduced efficiencies from rewiring	5.00%						Assumes 2 rewirings per motor at 2.5% loss for each rewiring
MWh electricity saved in 1 year	640,482 MWh						
kWh electricity saved per motor	16,917 kWh/yr						
MWh electricity saved by mid-point	66,488 MWh						
MWh electricity saved by EOP	879,845 MWh						
Cost of electricity per kWh	0.25 TL/kWh						
Cost of electricity saved per motor	4,229 TL/yr						
Average cost of motor	3,600 TL						
	1,272 USD						
Exchange rate TL/USD	2.83 TL/USD						
Payback on investment (without financing charges)	10 months						
Grid Emission Factor	0.605 tonnes CO2/MWh						
Annual GHG reduction	387,491 tonnes CO2/yr						
Assumed lifetime of motors	7 years						
Lifetime direct GHG reduction (assuming 7 years)	2,712,440 tonnes CO2						(comparable to the 3,092,263 tonnes CO2 in the GEF GHG EE Calculation Tool)
Lifetime direct GHG reduction at midpoint (assuming 7 yrs)	372,326 tonnes CO2						
Cumulative direct GHG saved by EOP from Project Motors	919,798 tonnes CO2						

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## ANNEX E: TERMS OF REFERENCE FOR KEY PROJECT POSITIONS

### 1. Project Manager (PM):

**Duties and Responsibilities:** The incumbent will be responsible for implementation of the project, including mobilization of all project inputs, supervision of project staff, consultants and oversight of sub-contractors. The PA will lead the Project Team (PT) and shall liaise with the government, UNDP, and all stakeholders involved in the Project. S/he will be specifically responsible for (a) overall management of the project, (b) work closely with project stakeholders and ensure the project deliveries as per project document and work plan, (c) ensure technical coordination of the project and the work related to legal and institutional aspects, (d) mobilize all project inputs in accordance with UNDP procedures and GEF principles, (e) finalize the ToR for the consultants and subcontractors and coordinate with UNDP Procurement for recruitment, procurement and contracting, (f) supervise and coordinate the work of all project staff, consultants and sub-contractors, (g) ensure proper management of funds consistent with UNDP requirements, and budget planning and control, (h) prepare and ensure timely submission of monthly reports, quarterly consolidated financial reports, quarterly consolidated progress reports, annual, mid-term and terminal reports, and other reports as may be required by UNDP; (i) submit the progress reports and key issue report to the Project Board, (j) prepare quarterly and annual work plan, (k) provide regular input to UNDP corporate system ATLAS for financial and program management on project progress, financial status and various logs, (l) arrange for audit of all project accounts for each fiscal year (m) undertake field visit to ensure quality of work, and (n) undertake any activities that may be assigned by UNDP and Project Board.

Additional roles and responsibilities include:

- In close collaboration with the CTA, provide a baseline for skills and absorptive capacity within the OIZs to promote and manage motor replacement programmes, and within appropriate government agencies to regulate and enforce compliance with new regulations in eco-design standards for EE motor replacement programmes;
- Consult with relevant institutions, government officers, financial institutions, motor manufacturing industries and EE consulting industry on the knowledge gaps of these stakeholders;
- Provide oversight to the design and delivery of appropriate training materials and workshops on motor replacement programmes, market surveillance of EE motors, and EE motor testing protocols.

**Qualifications and Experience:** The incumbent should have a minimum Bachelor degree in Engineering with MBA/Master degree or Masters in energy/environment or other relevant academic discipline and profession qualifications with at least ten (10) years professional experience at senior level. S/he should have extensive experience and technical ability to manage a large project and a good technical knowledge in the fields related to private sector development, climate change, energy efficiency and institutional development and/or regulatory aspects. S/he must have effective interpersonal and negotiation skills proven through successful interactions with all levels of project stakeholder groups, including senior government officials, financial sectors, private entrepreneurs, technical groups and communities. S/he should have ability to effectively coordinate a complex, multi-stakeholder project and to lead, manage and motivate teams of international and local consultants to achieve results. Good capacities for strategic thinking, planning and management and excellent communication skills in English are essential. The candidate should be based in Turkey with experience on international projects being considered an asset. Knowledge of UNDP project implementation procedures, including procurement, disbursements, and reporting and monitoring will be an added advantage.

### 2. Project Associate (PA)

**Duties and Responsibilities:** The incumbent will be a nationally recruited selected based on an open competitive process. S/he will report to the PM and assist the PM in the coordination of the Project. The PA will oversee support activities in project implementation including procurement, recruitment and operations logistics. The PA will assess support requirements against project objectives and operating environment. S/he will be responsible for (a) assisting the PM in managing the project staff; (b) coordinating the project experts and ensure that their results are delivered on time; (c) Preparing GEF quarterly project progress reports, as well as any other reports requested by the Executing Agency and UNDP; (d) acting as PM in case of his/her absence; (e) providing all necessary support to the PM in implementation of the project; (f) providing general administrative support to ensure the smooth running of the PIU; (g) monitoring the use of non-expendable equipment (record keeping, drawing up regular inventories); (h) performing any other administrative duties as requested by the PM; (i) providing technical assistance and co-ordination for capacity building activities under the Project; (j) assisting PM for technical co-ordination among consultants to be hired.

**Qualifications and Experience:** The incumbent should have at least 3 years of experience in the area of the assistance to the project management at medium and small scale, should be familiar with UNDP and GEF administrative procedures and requirements, should have a good organizational capacity, knowledge in administrative procedures of the Government, good computer skills in common word processing (MS Word), spreadsheet (MS Excel), and accounting software, and should be fluent in English and Turkish, both spoken and written.

### 3. Project Clerk (PC):

**Duties and Responsibilities:** The incumbent will be responsible to provide supportive administration services to the Project such as raising requisition, preparing projects logs, provide information to UNDP Project web, and administrative trouble shooting. S/he will also perform (a) word processing, drafting routine letters, messages, and reports, and sending mail; (b) arrange travel, itinerary preparation for project related travels, (c) arranging workshops, seminars, and training programs; (d) work at reception desk and make appointments and schedule meetings; (e) assist in work-plan and budgeting; (f) photocopying, binding and filing; (g) maintenance of all office equipment and keeping inventory records of supplies and their usage and any other duties assigned by Project Manager or concerned officials.

**Qualifications and Experience:** The incumbent should have at least a Bachelor degree in any discipline from a recognized university. S/he should have at least 3 years relevant working experience with foreign aided projects or international development or organizations. Computer proficiency in MS Office (Word, Excel and PowerPoint) and other common software is a prerequisite. Diploma in computer/secretarial science is desirable but not essential. Basic knowledge in procurement, petty cash handling, logistics supports, and filing systems is a basic requirement. Knowledge of UNDP project implementation procedures, including reporting and monitoring is preferable. Fluent both in written and spoken English is required.

### 4. International/National Consultant: Chief Technical Advisor (CTA)

#### **Duties and Responsibilities:**

- Provide technical and management oversight for Project efforts to accelerate adoption of revised and new EU eco-design implementing measures and other regulatory measures on electric motors as well as other electric motor driven ErPs;
- Serve as a key liaison between the Project and key directors in DGP and other appropriate government agencies to obtain approvals for key policy changes and issuances of DGP circulars on policy changes;
- Serve as key resource in developing Project program to improve DGP outreach to OIZs, and OIZs outreach to SME tenants regarding motor replacement programmes;
- Provide assistance on measures to lowering of barriers to institutional efficiencies for DGP to improve inter-agency and stakeholder cooperation with the Project;
- Serve as a key resource in the design and implementation of the one-stop shop pilots to be located within 3 to 5 OIZs. This would include advice in terms of ensuring maximum buy-in by the SMEs based on OIZs promotion of motor replacement programs, effective performance of the EECs and other technical assistance to complete EMAPs and MEEIPs, implementation of the motor replacement program using best practices, and demonstrable electricity savings based on the motor replacement program.

**Qualifications and Experience:** The incumbent should have a minimum Bachelor's degree in Engineering with MBA/Master degree or Masters in energy/environment or other relevant academic discipline and profession qualifications with at least ten (20) years professional experience at senior level. S/he should have extensive experience, technical ability to manage complex projects and a good technical knowledge in the fields related to private sector industrial development, climate change, energy efficiency and institutional development and/or regulatory aspects. S/he must have effective interpersonal and negotiation skills proven through successful interactions with all levels of project stakeholder groups, including senior government officials, financial sectors, private entrepreneurs, technical groups and communities. S/he should have ability to effectively coordinate a complex, multi-stakeholder project and to lead, manage and motivate teams of international and local consultants to achieve results. Good capacities for strategic thinking, planning and management and excellent communication skills in English are essential. The candidate should be based in Turkey with experience on international projects being considered an asset. Knowledge of UNDP project implementation procedures, including procurement, disbursements, and reporting and monitoring will be an added advantage.

### 5. International Consultant: Energy Expert (IEE)

**Duties and Responsibilities:**

- Provide oversight support on EU policy analysis and regulatory framework, and strategic planning for national motor replacement programmes, exposing the project team and DGP to best international practices;
- Provide oversight assistance to adaptive management of the project to ensure the project can meet its targets especially those related to electricity savings and GHG reductions. This oversight assistance should include measures that have been taken from other successful market transformation projects globally;
- Assist in the evaluation and redesign of one-stop shop and sustainable financial mechanisms for the scale up phase of MEEIPs in Turkey;
- In close collaboration with the PA and CTA as required, design and deliver appropriate training materials and workshops on EE motor market transformation, new motor design trends, and global motor market trends.

**6. National Finance Consultant**

**Duties and Responsibilities:**

- Assess baseline scenario for financial mechanisms for energy efficiency investments by SMEs within OIZs including the status of existing financial products of other government (interest rate support and loan guarantees) and commercial banks;
- Provide recommendations and action plan for implementing the pilot phase of the one-stop shop during Years 1 and 2 that is to be managed by the OIZs, in close collaboration with DGP and the Project Associate;
- Provide advice on OIZs operations of the “one- stop shop” for industrial SMEs that improves their access to financing and subsequent implementation of EE investments. This would include strengthened linkages of awareness raising activities to generate interest with other industrial SMEs and OIZs throughout Turkey;
- Facilitate discussions for sourcing additional financing for EMAPs, SMTRs and MEEIPs in addition to funds that are available within MoSIT.

**7. National Awareness Raising Consultant**

**Duties and Responsibilities:**

- Provide guidance to PIU to characterize baseline knowledge of participating OIZs and industrial SMEs and determine the barriers inhibiting greater acceptance of EE. The barriers may need to be disaggregated into appropriate social groups;
- Provide guidance in preparing a plan for meeting selected OIZs and industrial SMEs to determine a targeted and specific approach to improve the effectiveness of awareness raising materials for energy efficiency;
- Provide guidelines to working with OIZs communication personnel on presentation of communications on EE to SME tenants;
- Set up questionnaire to solicit feedback from industrial SMEs on EE messaging that can be used to adaptively improve the Project communications strategy.

## ANNEX F: UNDP SOCIAL AND ENVIRONMENTAL AND SOCIAL SCREENING (SESP)

Project Information	
<i>Project Information</i>	
1. Project Title	Promoting Energy-Efficient Motors in Small and Medium Sized Enterprises (SMEs)
2. Project Number	5285
3. Location (Global/Region/Country)	Turkey

### Part A. Integrating Overarching Principles to Strengthen Social and Environmental Sustainability

**QUESTION 1: How Does the Project Integrate the Overarching Principles in order to Strengthen Social and Environmental Sustainability?**

*Briefly describe in the space below how the Project mainstreams the human-rights based approach*

The objective of the proposed PEEMS project is to promote significant additional investments in industrial energy efficiency in Turkey. Project activities will raise awareness and encourage industrial SMEs of the benefits, both financial and operational, of replacing inefficient motors with energy efficient motors. The reduction of operational costs resulting from energy savings from the use of EE motors will have an impact on improving the financial situation of SMEs that increases the employment security of personnel within these enterprises. This reinforces the human right to work and protect against unemployment. Moreover, Project participants will disseminate their knowledge of EE motors to other SMEs and other OIZs to improve the financial viability of industrial SMEs throughout Turkey, thereby improving the ability of other industrial SMEs in Turkey to retain their personnel for work and further protect the industrial sector in Turkey against unemployment.

*Briefly describe in the space below how the Project is likely to improve gender equality and women's empowerment*

The PEEMS Project will make efforts to encourage gender equality on all project activities, notably through public awareness raising and training activities. At the commencement of the project, OIZs and SMEs will be selected for the implementation of demonstration projects, which will have criteria designed to encourage the participation of women wherever appropriate. In addition, monitoring and evaluation activities will provide gender disaggregated analysis of personnel with participating OIZs and SMEs that will contribute to adaptive management of the Project to more effectively facilitate gender equality on Project activities.

*Briefly describe in the space below how the Project mainstreams environmental sustainability*

The goal of the PEEMS Project is the reduction of greenhouse gas emissions associated with the operation of inefficient motors in the industrial sector through the increased use of EE motors. The lifetime direct GHG emission reduction targets of the PEEMS Project are set at 1,330 ktonnes CO<sub>2e</sub> and 12,255 ktonnes CO<sub>2e</sub> at the midterm and EOP respectively (assuming a 20 year lifetime investment of an EE motor).

The Project is aligned with Turkey's efforts to mainstream the environmental sustainability of reducing the energy intensity of its industrial sector. The Project explicitly addresses actions required for compliance with the country's 2007 Energy Efficiency Law, the Energy Strategy Plan adopted in 2012, and the accompanying Energy Efficiency Strategy 2012-2023. More specifically, the PEEMS Project addresses Policy 1 of the EE strategy that specifies the replacement of low efficiency AC motors with high efficiency motors. This policy would be achieved through the preparation of an inventory of 7.5 kW and higher capacity AC motors that are used in industry; DGP are currently undertaking the preparation of this inventory with the project to assist in broadening the scope of the inventory to a 90 to 95% confidence level. The PEEMS project is also assisting on this policy by assisting with the establishment of a motor testing laboratory for electric motors between the 90 kW and 375 kW range. The PEEMS Project also addresses Policy 2 to improve support for SMEs in their training, study and consulting services concerning energy efficiency, and Policy 3 where the Project will provide a pilot roll out of EE motors for SMEs in the industrial sector, and support replication of this rollout mechanism. As such, the impact of the PEEMS Project will be to mainstream environmental sustainability with the SME industrial sector, the primary end users of electric motors in Turkey. More information on the applicable legislation and strategic plans for EE in Turkey can be found in Annex L.

**Part B. Identifying and Managing Social and Environmental Risks**

<p><b>QUESTION 2: What are the Potential Social and Environmental Risks?</b></p> <p><i>Note: Describe briefly potential social and environmental risks identified in Attachment 1 – Risk Screening Checklist (based on any “Yes” responses). If no risks have been identified in Attachment 1 then note “No Risks Identified” and skip to Question 4 and Select “Low Risk”. Questions 5 and 6 not required for Low Risk Projects.</i></p>					
<p><b>QUESTION 3: What is the level of significance of the potential social and environmental risks?</b></p> <p><i>Note: Respond to Questions 4 and 5 below before proceeding to Question 6</i></p>					
<b>Risk Description</b>	<b>Impact and Probability (1-5)</b>	<b>Significance (Low, Moderate, High)</b>	<b>Comments</b>	<b>Description of assessment and management measures as reflected in the Project design. If ESIA or SESA is required note that the assessment should consider all potential impacts and risks.</b>	
Hazardous waste to be generated during motor replacement projects	I = 2 P = 1	Low	The old and inefficient motors to be replaced during pilot replacement projects and during dissemination phase may pose a potential risk – even low – to include some hazardous waste.	This risk will be mitigated through implementation of a well-designed waste management (recycling) programme in accordance with the Regulation on Waste Electrical and Electronic Equipment (WEEE) transposing the WEEE Directive of the EU.	
Waste to be generated during motor replacement projects	I = 2 P = 1	Low	The old and inefficient motors to be replaced during pilot replacement projects and during dissemination phase will be a matter of waste management (recycling) in accordance with the Regulation on Waste Electrical and Electronic Equipment (WEEE).	This risk will be mitigated through implementation of a well-designed waste management (recycling) programme in accordance with the Regulation on Waste Electrical and Electronic Equipment (WEEE) transposing the WEEE Directive of the EU.	
<p><b>QUESTION 4: What is the overall Project risk categorization?</b></p>					
<p><b>Select one (see SESP for guidance)</b></p>				<p><b>Comments</b></p>	

	<input type="checkbox"/>	<b>Low Risk</b>	
	<input checked="" type="checkbox"/>	<b>Moderate Risk</b>	From the above analysis, the level of significance of identified social and environmental risks associated with the PEEMS Project is considered moderate. One of the primary risks mitigation activities will be to reduce the likelihood that banks and financial institutions are unwilling to provide financial assistance to OIZs and SMEs. Denial of this financial assistance to OIZs and SMEs would translate into less financially viable industrial SMEs, and the possible loss of employment of its personnel that would contribute to social issues in Turkey
	<input type="checkbox"/>	<b>High Risk</b>	
<b>QUESTION 5: Based on the identified risks and risk categorization, what requirements of the SES are relevant?</b>			
Check all that apply			
<i>Principle 1: Human Rights</i>	<input type="checkbox"/>		
<i>Principle 2: Gender Equality and Women's Empowerment</i>	<input type="checkbox"/>		
<i>Principle 3: Environmental sustainability</i>	<input type="checkbox"/>		
<b>1. Biodiversity Conservation and Natural Resource Management</b>	<input type="checkbox"/>		
<b>2. Climate Change Mitigation and Adaptation</b>	<input type="checkbox"/>		
<b>3. Community Health, Safety and Working Conditions</b>	<input checked="" type="checkbox"/>		The PEEMS Project will provide training under Output 2.2 to EE motor installation personnel that will reduce their occupational health and safety risks during the transport, installation and operation of EE motors within industrial SMEs
<b>4. Cultural Heritage</b>	<input type="checkbox"/>		
<b>5. Displacement and Resettlement</b>	<input type="checkbox"/>		
<b>6. Indigenous peoples</b>	<input type="checkbox"/>		
<b>7. Pollution prevention and resource efficiency</b>	<input checked="" type="checkbox"/>		The PEEMS Project will provide technical assistance under Output 1.2 to DGP to strengthen their measures on the disposal of inefficient motors and enforcement these measures to ensure that inefficient motors are disposed to minimize environmental impact and compliance to best practices that are in line with EU legislation.

Final Sign Off

<b>Signature</b>	<b>Date</b>	<b>Description</b>
QA Assessor Pelin Rodoplu, UNDP Turkey		UNDP staff member responsible for the Project, typically a UNDP Programme Officer. Final signature confirms they have "checked" to ensure that the SESP is adequately conducted.
QA Approver Atila Uras, UNDP Turkey		UNDP senior manager, typically the UNDP Deputy Country Director (DCD), Country Director (CD), Deputy Resident Representative (DRR), or Resident Representative (RR). The QA Approver cannot also be the QA Assessor. Final signature confirms they have "cleared" the SESP prior to submittal to the PAC.
PAC Chair		UNDP chair of the PAC. In some cases PAC Chair may also be the QA Approver. Final signature confirms that the SESP was considered as part of the project appraisal and considered in recommendations of the PAC.

**SESP Attachment 1. Social and Environmental Risk Screening Checklist**

<b>Checklist Potential Social and Environmental Risks</b>		<b>Answer (Yes/No)</b>
<b>Principles 1: Human Rights</b>		
1.	Could the Project lead to adverse impacts on enjoyment of the human rights (civil, political, economic, social or cultural) of the affected population and particularly of marginalized groups?	No
2.	Is there a likelihood that the Project would have inequitable or discriminatory adverse impacts on affected populations, particularly people living in poverty or marginalized or excluded individuals or groups? <sup>54</sup>	No
3.	Could the Project potentially restrict availability, quality of and access to resources or basic services, in particular to marginalized individuals or groups?	No
4.	Is there a likelihood that the Project would exclude any potentially affected stakeholders, in particular marginalized groups, from fully participating in decisions that may affect them?	No
5.	Is there a risk that duty-bearers do not have the capacity to meet their obligations in the Project?	No
6.	Is there a risk that rights-holders do not have the capacity to claim their rights?	No
7.	Have local communities or individuals, given the opportunity, raised human rights concerns regarding the Project during the stakeholder engagement process?	No
8.	Is there a risk that the Project would exacerbate conflicts among and/or the risk of violence to project-affected communities and individuals?	No
<b>Principle 2: Gender Equality and Women’s Empowerment</b>		
1.	Is there a likelihood that the proposed Project would have adverse impacts on gender equality and/or the situation of women and girls?	No
2.	Would the Project potentially reproduce discriminations against women based on gender, especially regarding participation in design and implementation or access to opportunities and benefits?	No
3.	Have women’s groups/leaders raised gender equality concerns regarding the Project during the stakeholder engagement process and has this been included in the overall Project proposal and in the risk assessment?	No
8.	Would the Project potentially limit women’s ability to use, develop and protect natural resources, taking into account different roles and positions of women and men in accessing environmental goods and services? <i>For example, activities that could lead to natural resources degradation or depletion in communities who depend on these resources for their livelihoods and well being</i>	No
<b>Principle 3: Environmental Sustainability: Screening questions regarding environmental risks are encompassed by the specific Standard-related questions below</b>		
<b>Standard 1: Biodiversity Conservation and Sustainable Natural Resource Management</b>		
1.1	Would the Project potentially cause adverse impacts to habitats (e.g. modified, natural, and critical habitats) and/or ecosystems and ecosystem services?  <i>For example, through habitat loss, conversion or degradation, fragmentation, hydrological changes</i>	No

<sup>54</sup> Prohibited grounds of discrimination include race, ethnicity, gender, age, language, disability, sexual orientation, religion, political or other opinion, national or social or geographical origin, property, birth or other status including as an indigenous person or as a member of a minority. References to “women and men” or similar is understood to include women and men, boys and girls, and other groups discriminated against based on their gender identities, such as transgender people and transsexuals.

1.2	Are any Project activities proposed within or adjacent to critical habitats and/or environmentally sensitive areas, including legally protected areas (e.g. nature reserve, national park), areas proposed for protection, or recognized as such by authoritative sources and/or indigenous peoples or local communities?	No
1.3	Does the Project involve changes to the use of lands and resources that may have adverse impacts on habitats, ecosystems, and/or livelihoods? (Note: if restrictions and/or limitations of access to lands would apply, refer to Standard 5)	No
1.4	Would Project activities pose risks to endangered species?	No
1.5	Would the Project pose a risk of introducing invasive alien species?	No
1.6	Does the Project involve harvesting of natural forests, plantation development, or reforestation?	No
1.7	Does the Project involve the production and/or harvesting of fish populations or other aquatic species?	No
1.8	Does the Project involve significant extraction, diversion or containment of surface or ground water? <i>For example, construction of dams, reservoirs, river basin developments, groundwater extraction</i>	No
1.9	Does the Project involve utilization of genetic resources? (e.g. collection and/or harvesting, commercial development)	No
1.10	Would the Project generate potential adverse transboundary or global environmental concerns?	No
1.11	Would the Project result in secondary or consequential development activities which could lead to adverse social and environmental effects, or would it generate cumulative impacts with other known existing or planned activities in the area? <i>For example, a new road through forested lands will generate direct environmental and social impacts (e.g. felling of trees, earthworks, potential relocation of inhabitants). The new road may also facilitate encroachment on lands by illegal settlers or generate unplanned commercial development along the route, potentially in sensitive areas. These are indirect, secondary, or induced impacts that need to be considered. Also, if similar developments in the same forested area are planned, then cumulative impacts of multiple activities (even if not part of the same Project) need to be considered.</i>	No
<b>Standard 2: Climate Change Mitigation and Adaptation</b>		
2.1	Will the proposed Project result in significant <sup>55</sup> greenhouse gas emissions or may exacerbate climate change?	No
2.2	Would the potential outcomes of the Project be sensitive or vulnerable to potential impacts of climate change?	No
2.3	Is the proposed Project likely to directly or indirectly increase social and environmental vulnerability to climate change now or in the future (also known as maladaptive practices)? <i>For example, changes to land use planning may encourage further development of floodplains, potentially increasing the population's vulnerability to climate change, specifically flooding</i>	No
<b>Standard 3: Community Health, Safety and Working Conditions</b>		
3.1	Would elements of Project construction, operation, or decommissioning pose potential safety risks to local communities?	No
3.2	Would the Project pose potential risks to community health and safety due to the transport, storage, and use and/or disposal of hazardous or dangerous materials (e.g. explosives, fuel and other chemicals during construction and operation)?	No
3.3	Does the Project involve large-scale infrastructure development (e.g. dams, roads, buildings)?	No

3.4	Would failure of structural elements of the Project pose risks to communities? (e.g. collapse of buildings or infrastructure)	No
3.5	Would the proposed Project be susceptible to or lead to increased vulnerability to earthquakes, subsidence, landslides, and erosion, flooding or extreme climatic conditions?	No
3.6	Would the Project result in potential increased health risks (e.g. from water-borne or other vector-borne diseases or communicable infections such as HIV/AIDS)?	No
3.7	Does the Project pose potential risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during Project construction, operation, or decommissioning?	Yes
3.8	Does the Project involve support for employment or livelihoods that may fail to comply with national and international labor standards (i.e. principles and standards of ILO fundamental conventions)?	No
3.9	Does the Project engage security personnel that may pose a potential risk to health and safety of communities and/or individuals (e.g. due to a lack of adequate training or accountability)?	No
<b>Standard 4: Cultural Heritage</b>		
4.1	Will the proposed Project result in interventions that would potentially adversely impact sites, structures, or objects with historical, cultural, artistic, traditional or religious values or intangible forms of culture (e.g. knowledge, innovations, practices)? (Note: Projects intended to protect and conserve Cultural Heritage may also have inadvertent adverse impacts)	No
4.2	Does the Project propose utilizing tangible and/or intangible forms of cultural heritage for commercial or other purposes?	No
<b>Standard 5: Displacement and Resettlement</b>		
5.1	Would the Project potentially involve temporary or permanent and full or partial physical displacement?	No
5.2	Would the Project possibly result in economic displacement (e.g. loss of assets or access to resources due to land acquisition or access restrictions – even in the absence of physical relocation)?	No
5.3	Is there a risk that the Project would lead to forced evictions? <sup>56</sup>	No
5.4	Would the proposed Project possibly affect land tenure arrangements and/or community based property rights/customary rights to land, territories and/or resources?	No
<b>Standard 6: Indigenous Peoples</b>		
6.1	Are indigenous peoples present in the Project area (including Project area of influence)?	No
6.2	Is it likely that the Project or portions of the Project will be located on lands and territories claimed by indigenous peoples?	No
6.3	Would the proposed Project potentially affect the human rights, lands, natural resources, territories, and traditional livelihoods of indigenous peoples (regardless of whether indigenous peoples possess the legal titles to such areas, whether the Project is located within or outside of the lands and territories inhabited by the affected peoples, or whether the indigenous peoples are recognized as indigenous peoples by the country in question)?  <i>If the answer to the screening question 6.3 is "yes" the potential risk impacts are considered potentially severe and/or critical and the Project would be categorized as either Moderate or High Risk.</i>	No

<sup>56</sup> Forced evictions include acts and/or omissions involving the coerced or involuntary displacement of individuals, groups, or communities from homes and/or lands and common property resources that were occupied or depended upon, thus eliminating the ability of an individual, group, or community to reside or work in a particular dwelling, residence, or location without the provision of, and access to, appropriate forms of legal or other protections.

6.4	Has there been an absence of culturally appropriate consultations carried out with the objective of achieving FPIC on matters that may affect the rights and interests, lands, resources, territories and traditional livelihoods of the indigenous peoples concerned?	No
6.5	Does the proposed Project involve the utilization and/or commercial development of natural resources on lands and territories claimed by indigenous peoples?	No
6.6	Is there a potential for forced eviction or the whole or partial physical or economic displacement of indigenous peoples, including through access restrictions to lands, territories, and resources?	No
6.7	Would the Project adversely affect the development priorities of indigenous peoples as defined by them?	No
6.8	Would the Project potentially affect the physical and cultural survival of indigenous peoples?	No
6.9	Would the Project potentially affect the Cultural Heritage of indigenous peoples, including through the commercialization or use of their traditional knowledge and practices?	No
<b>Standard 7: Pollution Prevention and Resource Efficiency</b>		
7.1	Would the Project potentially result in the release of pollutants to the environment due to routine or non-routine circumstances with the potential for adverse local, regional, and/or transboundary impacts?	No
7.2	Would the proposed Project potentially result in the generation of waste (both hazardous and non-hazardous)?	Yes
7.3	Will the proposed Project potentially involve the manufacture, trade, release, and/or use of hazardous chemicals and/or materials? Does the Project propose use of chemicals or materials subject to international bans or phase-outs? <i>For example, DDT, PCBs and other chemicals listed in international conventions such as the Stockholm Conventions on Persistent Organic Pollutants or the Montreal Protocol</i>	No
7.4	Will the proposed Project involve the application of pesticides that may have a negative effect on the environment or human health?	No
7.5	Does the Project include activities that require significant consumption of raw materials, energy, and/or water?	No

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**ANNEX G: UNDP PROJECT QUALITY ASSURANCE REPORT**

Available as a separate document

ANNEX H: UNDP RISK LOG

Table H.1: Risk Log

Description	Type	Impact & Probability <sup>57</sup>	Mitigation Measures	Owner	Status
Industrial SME owners of inefficient motors may not want to purchase new or IE 2 or IE 3 motors due to insufficient incentives provided by the financial support system	Financial	P = 2 I = 4 Moderate risk	Mitigation of this risk will include information dissemination and promotion to ensure industrial SMEs understand the lifecycle benefits of EE motors, notably from an energy and cost savings perspective. The Project will also develop tailored financial assistance packages that will make the payback periods attractive to the SMEs as well as other measures that include full coverage of loan guarantees and assistance to streamline the application process for loans and loan guarantees.	Project Manager	
One stop shop financial support mechanism does not properly function	Organizational	P = 3 I = 3 Moderate risk	Mitigation of this risk will be achieved through the pilot testing of the one-stop shop financial support mechanism to be managed by the OIZs and their EMUs during Years 1 and 2. Once the mechanism has been demonstrated successfully, efforts will be made by the Project in Year 3 to scale up the mechanism and increase the number of EE motor investments by industrial SMEs in selected OIZs.	Project manager	
Lack of longer-term incremental investment capital and access to finance	Financial	P = 2 I = 3 Moderate risk	The Project will mitigate this risk by strengthening the Government's knowledge of the motors market and its ability to set firm targets for EE motor replacements as well as to set financial requirements to implement these replacements. In addition, the Project will also have developed a one-stop shop financial support mechanism which facilitate improved access for industrial SMEs to financing for EE motor investments.	Project manager	
Financial institutions and banks unwilling to make loans available to OIZs and SMEs	Financial	P = 2 I = 4 Moderate risk	Mitigation of this risk will be achieved through piloting of the one-stop shop financial mechanism, and providing initial funds to a guarantee facility, all of which will be tailored to ensure the coverage of all risks to financial institutions and banks making these loans. Successful piloting of this mechanism should instill confidence in other financial institutions in providing loans to OIZs and SMEs.	Project manager	
Entry of noncompliant motors to eco-design standards into the industrial sector	Regulatory	P = 2 I = 3 Moderate risk	This risk will be mitigated through Project activities that strengthen the government's enforcement of its standards through proactive market surveillance, improved equipment testing capacities, and the training of staff to enforce standards.	Project manager	
Climate change	Environmental	P = 1 I = 2 Low risk	Though climate risks are low in the context of the PEEMS Project, extreme climatic events may disrupt Turkey's power supply and energy security from hydro, wind and solar sources. This may cause potential disruptions to manufacturing outputs that use electric motors. Since the Project's objective is to reduce electricity demand from motors in the industrial sector, the impact of the Project's activities to increase the use of EE motors in the industrial sector is the reduction of the country's demand for electricity, reduction in the use of fossil fuels for electricity generation and a reduced risk of climate change impacts.	Project manager	

<sup>57</sup> P = probability, and I = Impact, both rated on a scale from 1 (low) to 5 (high)

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**ANNEX I: CAPACITY ASSESSMENT OF MOSIT AND HACT MICRO ASSESSMENT**

***AVAILABLE AS A SEPARATE DOCUMENT***

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**ANNEX J: CO-FINANCE LETTERS**

***AVAILABLE AS A SEPARATE DOCUMENT***

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## ANNEX K: PROFILE OF INDUSTRIAL ELECTRIC MOTORS IN TURKEY

- K.1 Electric motors exist in the residential, commercial and industrial sectors. Globally, most electric motors are used in small applications and draw less than 0.75 kW of power, but are motors that are integrated with household appliances such as refrigerator compressors, fans and computer hard drives. Their share of electric power motor consumption, however, is likely less than 10% in Turkey.
- K.2 Most of the electric motors on the Turkish market are being used in the industrial sector. Turkey's industrial sector is comprised mainly of SMEs. Out of Turkey's more than 2.6 million SMEs, an estimated 355,312 SMEs are in the industrial sector<sup>58</sup>. An estimated 91.5% of SME exports were industrial products of which 14.5% were garments, 10.3% were textiles, 12.1% were basic metals, and 15.6% were chemical and chemical products. SMEs comprise more than 97% of the enterprises within the industrial sector and produce more than 80% of the sector's outputs. This Project intends to focus on market transformation of the electric motors market within the industrial sector.
- K.3 Electric motors in the industrial sector, however, are perceived to have the highest proportion of electric motor power consumption in Turkey. The largest proportion of motor electricity consumption is found within the range of 0.75 kW to 375 kW. Within the industrial sector, these motors are used to provide mechanical movement for compressors, pumps and fans. Energy efficiency of these motors is covered under the Implementing Measure 640/2009 (as amended) under the EU framework eco-design directive 2009/125/EC.
- K.4 The size of the electric motor market in Turkey is in the range of 12 to 18 million. Estimates of new motors entering the market on an annual basis ranges from 800,000 to 1,000,000. The Directorate General for Productivity (DGP) under the Turkish Ministry of Science, Industry and Technology (MoSIT) estimates that on average 1,000,000 electric motors are produced domestically every year. Only a small portion, 10-15% meet the demand IE3 standard, whilst 500,000 units are imported, generally of lesser quality. The main manufacturers in Turkey include Gamak, Wat Motor (Arcelik), Volt Motor, Aemot, which are the partners of this Project as well as other national and worldwide leading electric motor manufacturers. There are also imported motors produced by several international electric motor manufacturers based in Europe, US, Asian countries etc. with low voltage motors. According to foreign trade statistics for 2010, Turkey's motor imports were valued at USD 588 million, and exports at USD 98.5 million.
- K.5 An "electric motor" is usually defined as a device that converts electric energy into mechanical energy. The ratio of this conversion gives us its efficiency:

$$\text{Efficiency} = \text{Output mechanical power} / \text{Input electrical power}$$

For the purposes of Regulation 640/2009 which is also transposed into Turkish regulation, "motor" means an electric single speed, three-phase 50 Hz or 50/60 Hz, squirrel cage induction motor that has:

- 2 to 6 poles;
- a rated voltage up to 1000 V;
- a rated power output between 0.75 kW and 375 kW;
- a rating based on the basis of continuous duty operation.

- K.6 A voluntary agreement supported by the European Committee of Manufacturers of Electrical Machines and Power Electronics (CEMEP) and the European Commission was established in 1999 to define a motor classification scheme with three efficiency levels, EFF3, EFF2 and EFF1 (High efficiency level). The CEMEP/EU agreement was a very important first step to promote motor efficiency classification. This led the International Electrotechnical Commission (IEC) to develop a common international standard that would replace all the different national systems. Hence, IEC 60034-30:2008 was created and defined the efficiency classes for 3-phase motors as shown on Table K.1. Figure K.1 establishes a correlation between the different efficiency classifications previously mentioned.

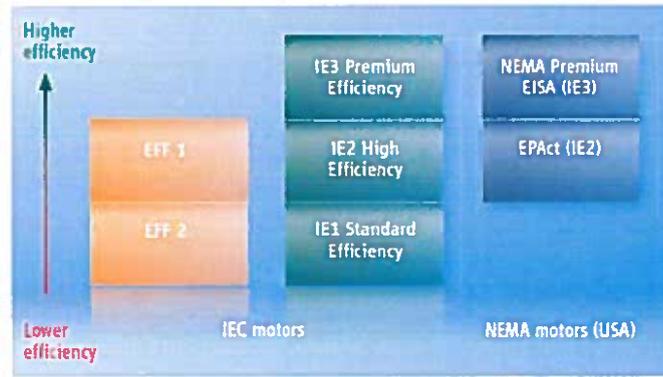
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<sup>58</sup> TUIK-Haber Bulteni / Small and Medium Size Enterprises Statistics—2014

**Table K.1: Energy Efficiency Classes under IEC 60034-30:2008**

No designation	Below standard efficiency	(equivalent to EFF3 in the obsolete classification)
IE1	Standard efficiency	0.75 kW < P < 375 kW (electric motor power range)
IE2	High efficiency	
IE3	Premium efficiency	
IE4	Super premium efficiency	(no commercially available in 2008)

**Figure K.1: Correlation between IEC 60034-30:2008 Motor Efficiency Classifications and Other Systems**



- K.7 With new regulations on electric motor efficiency entered into force after January 2015, IE3 motors and IE2 motors (with variable speed drive) are now mandatory for new motor purchases between 7.5 and 375 kW. Mandatory regulations currently do not cover motors with lower output power until 2017. As such, IE2 motors are slowly increasing their share in the market while IE3 motors still do not have a significant share. Furthermore, most SMEs at this time do not purchase IE3 motors due to their high cost and perceived disruptions to their operations. If motors breakdown in an SME, the SME will generally resort to the cheapest options of restoring operations mainly through rewinding of the motor.
- K.8 Prior to 2015, there were no firm estimates on the number of electric motors being used in the Turkish industrial sector which motor industry analysts estimated to be in the range of 12 to 18 million. Industry analysts agree that there is a wide range of motor electricity consumption found within the range of 0.75 kW to 375 kW<sup>59</sup> with each industrial SME operating between 10 and 50 electric motors to provide mechanical movement for compressors, pumps and fans for specific industrial processes. Within each SME, there are also varying sizes of motors that may range for example, from several motors at 2 to 5 kW with 1 or 2 motors in the order of 75 kW. Further adding to the complexity of SME motor usage, many of these motors are used less than 4 hours per day (less than 800 hours per year), making their replacement to a compliant energy efficient standard uneconomical.
- K.9 To this end, DGP is currently undertaking a national survey of electric motor usage that falls under Implementing Measure 640/2009<sup>60</sup>. The purpose of the survey was to compile AC and DC motor inventory information from more than 887 industrial enterprises in 62 provinces with the Provincial Directorates of MoSIT<sup>61</sup>. Data was obtained from 93,139 electric motors. Preliminary findings and analysis of this survey are as follows:

<sup>59</sup> From Mr. Harun AÇIKGÖZ, Managing Director of ProMoIE Araştırma ve Teknoloji Geliştirme A.Ş.

<sup>60</sup> This measure defines the action "to prepare an inventory of AC electric motors being used in Turkish industry with a power rate of 7.5 kW or higher" as stated in the "Development of Energy Efficiency Transformation Program - Action Plan under Turkey's 10th Development Programme" as executed by DGP under MoSIT.

<sup>61</sup> Only industrial enterprises with energy consumption greater than 50 TOE annually were included in the survey. These are generally not SMEs.

- More than half the motors in the survey were imported;
- Data from 92,891 AC motors was obtained in the survey where the average motor power was 42.5 kW and that 76% of the motors in the survey were between 7.5-37 kW;
- The average age of 79,799 AC electric motors is 12 years as depicted on Figure K.2. The service life of old motors in the this survey has been extended through rewiring (on average 2 to 3 times per motor), a practice that is very popular in Turkey based on the large number of workshops located in industrial zones dedicated to motor rewinding. Rewiring, however, causes an efficiency loss of 2% in motors below 90 kW with subsequent rewiring's causing a 3% loss in efficiency. For motors over 90 kW, 1% as the expected efficiency loss from rewiring. The number of rewirings of motors is illustrated in Figure K.3;
- The efficiency class of 53,496 motors was obtained during the survey, and found that more than 63% of the motors are IE1 (inefficient) class and 28% of these motors being in the IE2 class. This is illustrated on Figure K.4;
- 50% of the motors surveyed were equipped with variable speed drive;
- The annual average working hours of the electric motors in the survey was 5,456 hours;
- The loading rate of the surveyed motors averaged 78%;
- Industrial electric motors are generally used in ventilators, pumps and compressors as well as power transmission equipment, conveyor systems and elevators.

Figure K.2: Average age according to motor power intervals

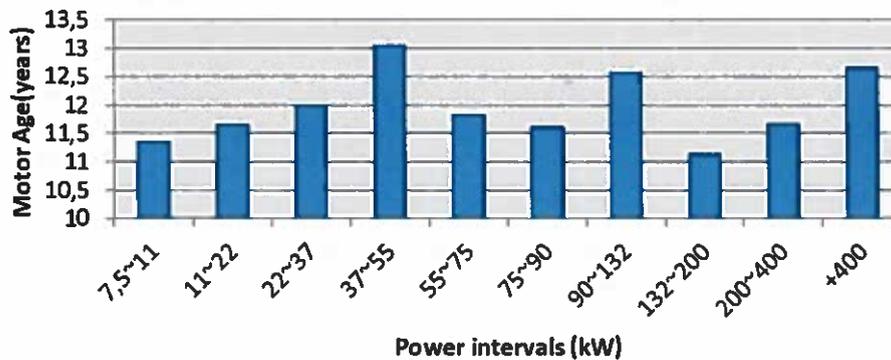


Figure K.3: Average number of motor rewiring its according to motor power intervals

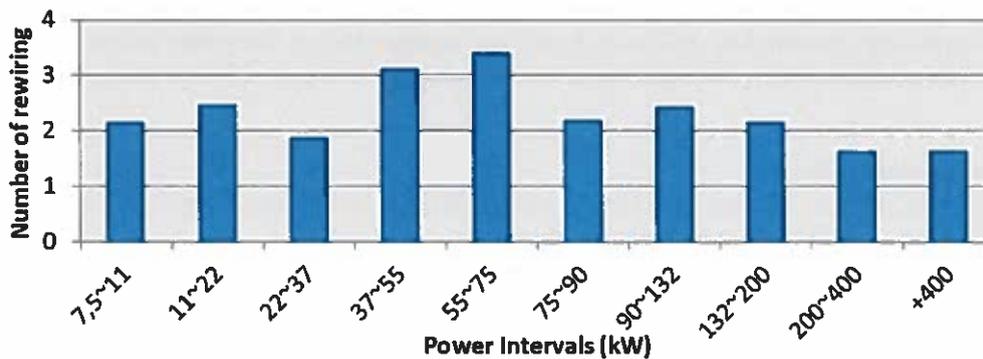
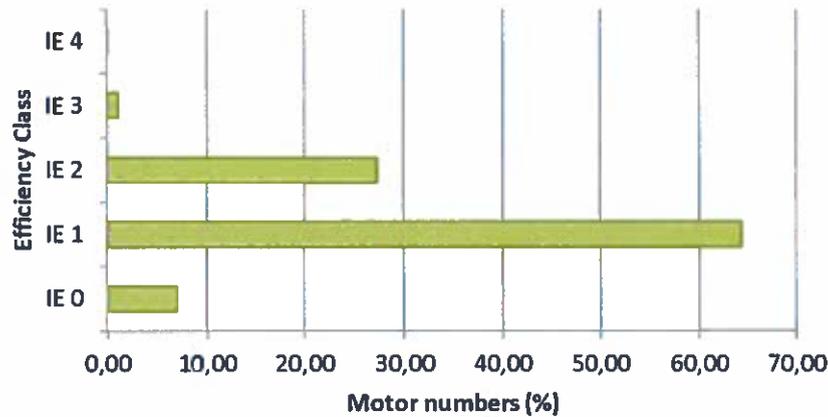


Figure K.4: Motor distribution according to efficiency class



- K.10 The Swiss government conducted the EASY programme between 2010 and 2014, consisting of a financial incentive program to encourage Swiss mid-sized industrial factories to implement energy efficiency improvements of electric motor systems<sup>62</sup>. One of the components of the program was to analyse over 4,000 motors for their age, operating hours, size and use of variable frequency drives (VFD). In addition, over 100 motor systems were thoroughly analysed providing valuable information on the current state of electric motors in Switzerland. One of the findings of the programme was confirming that by improving the energy efficiency of the frequently used motors (in the order of 20% of all installed motors), more than 80% of the potential energy savings could be realized, leading to the use of a “20-80 rule”. The programme also found that less than 20% of all motors were equipped with VFD.
- K.11 There is a high probability that this characteristic of motor usage in the industrial sector in the Swiss EASY programme resembles that of industrial SMEs in Turkey<sup>63</sup>. With the use of the 20-80 rule, the potential number of electric motors that could be *economically* changed to comply with IE2 or IE3 standards will be considerably less than the estimated 10 million electric motors operating within industrial SMEs in Turkey. In fact, it is likely that less than 5% of all electric motors in Turkey are equipped with VFD, increasing the energy efficiency potential of a motor replacement programme.
- K.12 The EASY Programme also developed a number of assessment tools designed to provide industrial SMEs with an audit program for retrofitting motor systems in Swiss industry from 2010 until 2014. The program followed the four-step audit methodology Motor-Systems-Check<sup>64</sup>, developed by the Swiss Agency for Energy Efficient Use (SAFE) within a framework of a program developed by Topmotors in 2010<sup>65</sup>. For each step of the methodology, financial incentives were paid by SAFE to participating firms.
- K.13 The 4-step methodology included:
- Step 1: An assessment of efficiency potential in the industrial SME using the SOTEA tool (“Software Tool für effiziente Antriebe” or software tool for efficient motor systems);
  - Step 2: Creating a list of motors to identify long-running motors and those motors that consume more than 70% of all motor systems in the facility. This list will consist of most of the motors that will be replaced in the program;
  - Step 3: Conduct on-site tests of motors from the list in Step 2 and prepare a standard motor testing reports (SMTR) for each motor;

<sup>62</sup> [http://www.eemods15.info/midcom/serveattachment/guid\\_1e55dd80cd6f5b45dd811e5a58751853169d036d036/energy\\_management\\_rolf\\_tieben.pdf](http://www.eemods15.info/midcom/serveattachment/guid_1e55dd80cd6f5b45dd811e5a58751853169d036d036/energy_management_rolf_tieben.pdf)

<sup>63</sup> Observations made during the PPG mission of motor usage within an SME in the Ostim OIZ in Ankara revealed a total of 22 electric motors out of which one was used for more than 10 hours per day. In addition this frequently used motor was 75 kW compared to the remainder of the motors which were in the order of 5 to 10 kW and use less than one hour per day.

<sup>64</sup> [https://www.motorsystems.org/files/otherfiles/0000/0078/werle\\_easy\\_12092011.pdf](https://www.motorsystems.org/files/otherfiles/0000/0078/werle_easy_12092011.pdf)

<sup>65</sup> [www.topmotors.ch/download](http://www.topmotors.ch/download)

- Step 4: Implement motor replacements on the basis of the recommendations in the SMTRs that is followed by verification and cost-effectiveness of the motor replacement.

- K.14 As a first step to characterizing electric motors being used by industrial SMEs in Turkey, motors were grouped into 4 categories as shown in Table K.2. Under each motor grouping, typical motor characteristics such as their applications, efficiencies, costs, load factors and average working hours are provided. Determination of the potential number of electric motors for conversion to IE2 or IE3 standards will require detailed analysis of all motors in use with SMEs in Turkey. Such an effort is being undertaken by the DGP with a national survey of electric motor usage as detailed in Para K.9. In consideration of the significant effort already being undertaken to conduct such an analysis, the proposed GEF project should augment the survey efforts of the DGP.
- K.15 Whilst many industrial SMEs operating in Turkey are aware of the cost saving benefits of energy efficiency, they have limited access to information on the benefits of replacing inefficient electric motors. Consequently, purchasing decisions often favor lower cost, less efficient electric motors, instead of more efficient ones that may cost on average 20% more and have a more favourable payback on investment between 1-3 years depending on technology and efficiency levels, as shown on the EU LCC analysis on Figure 3.

**Table K.2: Motor groupings used for this Project**

Assumed grouping of motors	2 to 5 kW:	10 to 15 kW:	40 to 75 kW:	75 to 375 kW
Technical applications of groupings of motors	Fan, small pumps, conveyers, manufacturing machines, HVAC,	Large fans, medium pumps, HVAC, small compressors, manufacturing machines, elevators	Large pumps, HVAC, compressors, manufacturing machines	Manufacturing machines, Large pumps, compressors
Typical motor efficiencies	82.7 – 86.6	90.9 – 92.1	93.8-95.0	94.7-96.0
Typical efficiencies of motors that are regularly used	79.1 - 84.2 or lower	87.2 - 88.7 or lower	91.4-92.7 or lower	92.7-94.0 or lower
Estimated motor costs				
Estimated inverter costs	€ 250-600	€ 750-1,250	€3,500-9,000	€7,500-45,000
Details of additional costs			Electrical protection equipment	Regular maintenance, electrical protection equipment
Load factor	0.9-1.05	0.9-1.05	0.9-1.10	0.9-1.10
Average working hours	Low (relatively)	Medium (relatively)	High (relatively)	High (relatively)

- K.16 An example of the actual cost savings from the replacement of an inefficient motor (IE0 or EFF3) with an IE2 motor can be found on Table K.3. The table indicates that investments involving replacement of all motors that are used over 4,000 hours annually can be paid back in less than 2 years based on typical electricity tariffs found in OIZs. As such, industrial SME managers will need to carefully assess the annual operational hours of each of their motors to ensure the viability of the investment into EE motors.

Table K.3: Investment payback for the replacement of IEO motor with IE3 motor

Power output (kW)	Eff. of IEO (EFF3) motor	Eff. of IE3 motor	kWh saved with annual operational hours			Turkish Lira Cost of Motor	Energy Savings in Turkish Lira			Investment payback period in years		
			2,000	4,000	6,000		for 2,000 hrs	for 4,000 hrs	for 6,000 hrs	for 2,000 hrs	for 4,000 hrs	for 6,000 hrs
0.75	0.646	0.825	377.8	1,626.7	2,440.1	449.0	94.5	406.7	610.0	4.8	1.1	0.7
2.2	0.751	0.867	587.9	3,066.1	4,599.1	707.2	147.0	766.5	1,149.8	4.8	0.9	0.6
7.5	0.833	0.904	1,060.7	6,670.8	10,006.2	1,549.0	265.2	1,667.7	2,501.6	5.8	0.9	0.6
15	0.868	0.921	1,491.7	10,398.3	15,597.5	2,602.0	372.9	2,599.6	3,899.4	7.0	1.0	0.7
37	0.897	0.939	2,767.5	19,516.8	29,275.2	5,545.3	691.9	4,879.2	7,318.8	8.0	1.1	0.8
75	0.914	0.95	4,664.3	32,420.7	48,631.0	10,619.6	1,166.1	8,105.2	12,157.8	9.1	1.3	0.9
90	0.918	0.952	5,252.1	37,077.6	55,616.5	12,366.8	1,313.0	9,269.4	13,904.1	9.4	1.3	0.9

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## ANNEX L: DETAILS OF APPLICABLE LEGISLATION AND ONGOING GOVERNMENT INITIATIVES TO ENCOURAGE INCREASED USE OF EE MOTORS

- L.1 The *Energy Efficiency Law* adopted in 2007 sets the rules for energy management (in industry and large buildings), project support, energy efficiency consultancy companies, and voluntary agreements. This affects industry, power plants, transmission and distribution systems, buildings, services and transport. With the enforcement of the EE Law commencing in 2009, the regulation on “Increased Energy Efficiency in the Use of Energy Resources and Energy” put in place authorizations and certifications for universities, engineering organizations and energy consultancy companies to support energy efficiency projects in industry through voluntary agreements.
- L.2 The *Energy Strategy Plan* for Turkey was adopted in 2012 and set the rules for energy management in industry amongst other sectors. Under the plan, a 20% primary energy intensity reduction target from 2011 levels was set for 2023. This was to be achieved by reducing energy intensities in each industrial sub sector by a minimum of 10% in 10 years. Although this target was envisaged for large industries, transforming the motors market to energy-efficient motors in Turkey will constitute an important part of reaching this target. Another target of the 2012 Energy-Efficiency Strategy is to have 5,000 certified energy managers and authorized 50 industrial energy-efficiency consulting companies by 2015.
- L.3 The *Energy Efficiency Strategy 2012-2023* which entered into force in 2012, outlines the actions required to be taken in the field of energy efficiency. An *Energy Efficiency Action Plan*, approved in November 2014 as part of the 10<sup>th</sup> Development Plan (2014-2018), aims at executing activities to improve energy efficiency in selected sectors and areas; expanding certain existing practices; disseminating example practices to raise public awareness and ultimately contributing to increased demand for energy efficient measures and technologies.
- L.4 One of two goals of the EE Action Plan are to: “reduce the primary energy intensity of Turkey (covering energy consumption of industrial, residential and transportation sectors in 2013), which was 0.2646 TOE per USD 1000 (climate-adjusted and in 2000 USD prices) at the end of 2011, to 0.243 TOE per USD 1000 by the end of 2018”. Out of the 6 components of the EE Action Plan, Component 3 focuses on efforts to improve the energy efficiency of industry through three policies described in the following paragraphs. The policies proposed under Component 3 are under the responsibility of the MoSIT.
- L.5 *Policy 1 is the replacement of low-efficiency AC electric motors with higher-efficiency motors.* This policy would be achieved through:
- The preparation of an inventory of 7.5 kW and higher capacity AC motors used in industry;
  - Strengthened enforcement of secondary legislation concerning shift to high-efficiency motors. This will be achieved through the preparation of legislation on minimum efficiency requirements for coupled motors, and streamlining the conduct of inspections on the production and import of electric motors;
  - The increased use of equipment increasing the efficiency of motors (such as variable speed drives, soft-starters, harmonic filters);
  - Establishment of a motor testing laboratory for the purposes of market surveillance purposes;
  - Conducting studies on taxation incentives aimed at expanding the use of high-efficiency motors.
- L.6 *Policy 2 is the improvement of mechanisms for supporting SMEs with training, study and consulting services concerning energy efficiency.* This policy would be achieved through:
- Increasing the capacities of Energy Management Units (EMUs) and to establish new EMUs in Organized Industrial Zones (OIZ). Furthermore, efforts will be made to expand the ownership of the ISO 50001 Energy Management System Standard User Guide and Conditions Standard Certificate. To achieve this standard, personnel-system certification activities and awareness raising and management system training activities will be carried out;
  - Development of support programs to assist OIZs to implement energy efficiency measures identified through energy efficiency surveys. Pursuant to Article 9 of Energy Efficiency Law, energy efficiency training, study surveys and consulting services provided to SMEs are to be supported by KOSGEB. In this regard, subsidy programs are to be developed primarily for the purchase of high-efficiency motors by industrial SMEs;
  - The utilization of cooperation networks for energy efficiency among SMEs. This would entail cooperation with agencies and organizations with international experience in energy efficiency issues to transfer knowledge, experience and technology to the Turkish industrial sector. At the national level, knowledge sharing platforms will be created through the cooperation of related agencies to raise the awareness level of SMEs.

- L.7 Policy 3 is the rollout of technologies and good practices on energy efficiency amongst SMEs. This policy would be achieved through:
- The preparation of guidance documents to disseminate energy-efficient technologies and good practices among SMEs;
  - The adoption of “Best Available Techniques Reference Documents” (BREF) in the context of energy efficiency, and the dissemination of “Best Available Techniques” (BAT) amongst SMEs;
  - Conducting awareness raising and promotional activities to increase demand for products with high energy efficiency and raise awareness amongst end users.
- L.8 Decisions of the Supreme Council for Science and Technology (BTYK) at the 26<sup>th</sup> meeting of the Supreme Council for Science and Technology (BTYK) held in 2013 included the implementation of 7 programs in the energy sector with the coordination and contribution of related institutions to support development of local technologies, increased use of renewable and local resources and increase energy efficiency. In accordance to the TÜBİTAK Energy Efficiency Technology Roadmap List of Targets, “production technologies of EE1 efficiency class, local indigenous electrical motors with at least 93% energy efficiency in 50 kW and above higher powers and drivers of all capacities will be developed”.
- L.9 MoSIT has formulated national standards on electric motors following EU Commission Regulation (EC) No 640/2009 (as amended) on electric motors. This regulation was introduced on 1 January 2015 for electric motors having a rated power between 7.5 kW and 375 kW; on 1 January 2017 motors, the regulation for electric motors will be introduced between 0.75 kW and 375 kW. These regulations set eco-design and minimum energy performance standards which require manufactured and imported three-phase asynchronous AC induction electric motors with a power rating between 0.75 kW and 375 kW to meet IE2 coupled with variable speed drive, IE3 or IE4 standard by 2017.
- L.10 MoSIT has also prepared an action plan for EE electric motors. Activities to be implemented under this plan include:
- a) timely phase out of electric motors that do not reach IE3 (targeting 50%) or IE2 with variable speed drive levels of efficiency and eventually IE4;
  - b) supporting testing laboratory activities;
  - c) raising awareness with industrialists and
  - d) creating effective market surveillance and testing and inspection of motors.
- L.11 DG for Safety and Inspection of Industrial Products (DGSİP) under MoSIT is preparing and implementing an eco-design market surveillance project for electric motors. Details of the market surveillance program will be provided by DGSİP in December 2015.
- L.12 The Directorate General for Industry (DGI) under MoSIT has also developed the Electrical and Electronics Sector Strategy and Action Plan (2012-2016) that aims to improve value added through improving design of products and components. The plan outlines the important role energy efficiency in electric motors plays in the reduction of energy consumption and outlines the need for efforts to encourage the use of EE electric motors. The Directorate General for Renewable Energy (DGRE) under the Ministry of Energy and Natural Resources (MoENR) launched the “Energy Efficient Electric Motor Initiative” in July 2008 to support increased energy efficiency of electric motors. Even with the advent of the new National Standards on electric motor requirements, this regulation is applicable only to new electric motors to be marketed (imported or locally manufactured and sold on Turkish markets) and excludes the 85% or up to 10 million inefficient electric motors of the currently operated in Turkey.
- L.13 The Government of Turkey is also transposed EU Directive 2012/19/EU into national regulations regarding the disposal of waste electrical and electronic equipment (WEEE). In particular, Para 23 of the directive specifies the obligation of a producer of electrical and electronic equipment (EEE) to shift payment for the collection of this waste from the general taxpayers to the consumers of EEE. By shifting this responsibility, EEE producers “should be responsible for financing the management of the waste from their own products. The producer should be able to choose to fulfil this obligation either individually or by joining a collective scheme. Each producer should, when placing a product on the market, provide a financial guarantee to prevent costs for the management of WEEE from orphan products from falling on society or the remaining producers. The responsibility for the financing of the management of historical waste should be shared by all existing producers when costs occur, contribute proportionately.” For electric motor manufacturers in Turkey, this directive will apply and obligate them to invest in a collective scheme for old inefficient motors. The challenge for the PEEMS project will be to have the industrial SMEs participate in a

financially attractive EE motors investment scheme that has a condition for participation obligating SMEs to give their inefficient motors to the supplier for the purposes of recycling, and preventing their re-use on the market.

#### Initiatives for SME assistance and EE electric motors

- L.14 The Turkish Small and Medium Enterprises Development Organization (KOSGEB) will be commencing a pilot project entitled "Interest Support for Investment Loan" at the Kayseri OIZ in early 2016. The purpose of this Project is to support SMEs that plan to invest in the replacement of inefficient electric motors with IE3 or IE2 motors with variable speed drivers. With the participation of a number of banks, SMEs can be granted a credit loan of up to TL 300,000 of which the loan interest would be covered by KOSGEB. To qualify for this financial support, the SME will need to prepare and energy efficiency survey report for submission to KOSGEB. The SME then applies to the banks for credit loans and to the Credit Guarantee Fund (KGF) if the banks require guarantees. After completion of this process the lending banks evaluate the project and the application. After approval the banks assist in facilitating the investment with the inefficient motors delivered to the Kayseri OIZ for the purposes of recycling old equipment at a facility authorized by the Ministry of Environment and Urbanization. The electricity consumption of the SMEs is monitored and reported by the SME to MoSIT. The pilot project is scheduled for completion at the end of 2016 with lessons learned from the pilot project to be used in designing a national motor replacement program. Further details of this program are provided on Table L.1.

Table L.1: Details of KOSGEB interest support program

SME Annual Energy Consumption Range (as TOE)	Pre-audit support up to .. (TL)	Energy Audit SMEs up to ... (TL)	Consultancy for Energy Efficiency Projects (VAP) up to ... (TL) <sup>66</sup>	Energy Efficiency Training	Implementation Support <sup>67</sup>
50-200	1,500	10,000 <sup>68</sup>	3,000	3,000	According to the detailed audit report approved KOSGEB or GDRE Up to 20,000 TL
201 and 500	2,000	15,000 <sup>69</sup>	5,000	3,000	
501 and over	2,000	20,000	5,000	3,000	

- L.15 The DGRE is implementing "Efficiency Improvement Projects in Industrial Facilities" pursuant to implementing regulations that confer tasks and responsibilities upon the DGRE. Within this initiative, DGRE provides investment support for energy efficiency projects with a maximum payback period of 5 years. The investment support covers 20% of project costs up to a maximum of TL 500,000. One of the issues with this program is that the annual energy consumption of the applying industrial enterprise should be more than 1,000 toe which generally excludes SMEs.
- L.16 There is an ongoing UNDP-UNIDO GEF project entitled "Improving Energy Efficiency in Industry" that was commenced in 2011 and is being executed by DGRE. The objective of this project is to improve energy efficiency of Turkish industry by enabling and encouraging companies in the industrial sector to implement efficient management of energy use by different energy conservation measures and energy efficient technologies. This project is not specifically focused on replacement of electric motors but on the establishment of stronger energy management units within industrial zones to conduct energy audits and promote investment in energy-efficiency in general. The project does not have any focus on creating an industry association for electric motors, on strengthening test laboratories for electric motors, or designing and strengthening a financial support mechanism (FSM) for electric motors. The activities of this project are complementary to this planned project. Completion of

<sup>66</sup> After received of VAP Application Approval Certificate from GDRE. Supporting of counseling expenses of preperation of VAP Project should be supported within 2 years. VAP Project should be implemented within 3 years after a certificate of compliance for energy audit.

<sup>67</sup> The upper limit of supports for machinery, equipment, labor and materials would be 20.000 TL according to the detailed audit report approved KOSGEB or GDRE within 3 years

<sup>68</sup> After a compliance report given by the comission formed by KOSGEB

<sup>69</sup> After received a certificate of compliance for energy audit from DGRE for 201 toe and over

the UNDP-UNIDO project is estimated to be the end of 2017. The activities of this Project will be fully complementary to this proposed GEF EE motors project using the lessons learned.

- L.17 There are ongoing private sector initiatives including the voluntary electric motor replacement initiative recently launched by Turkish household appliance company Arçelik at the Gebze OIZ. This initiative has yet to yield any results.
- L.18 The Ikitelli Organized Industrial Zone Industrial Energy Efficiency Project (SAN-VER)<sup>70</sup> is another energy efficiency initiative being conducted by the Ikitelli Organized Industrial Zone (OIZ) with the support of the Istanbul Development Agency. The overall goal of this project is the dissemination of energy saving, energy efficiency and clean energy applications to decrease Istanbul's energy intensity and GHG emissions, and develop capacity for the dissemination of clean energy and energy efficiency practices in Istanbul. Specific activities of the Project include:
- development of institutional capacity in EE issues and energy audits;
  - identify EE applications within selected buildings as demonstrations within the OIZs including the OIZ headquarter building;
  - apply energy audit software for measuring energy savings to obtain practical experience for OIZ;
  - provide industrial EE practices and energy management training to 50 OIZ enterprise personnel;
  - provide energy efficiency awareness seminars;
  - develop system optimization for OIZ buildings to decrease fuel, electricity and water costs, and to disseminate best practices; and
  - calculate OIZs carbon footprint.
- L.19 AfD and KOSGEB are jointly implementing the "Energy Efficiency in SMEs in Turkey" project. This project was launched in May 2013 and is currently being implemented commencing with a completed financing agreement between KOSGEB, AfD and FFEM. The €1.5 million project budget is being used to clarify the baseline; review and clarification of policy and legal framework; for studies for developing an energy efficiency strategy and an action plan for KOSGEB for SMEs; preparing a draft EE financing model; and training for the KOSGEB headquarter EE team and regional staff. Energy efficiency demonstrations for the SMEs consists of 50 pre-audits that have been or will be implemented in Bursa, Ankara and Antalya. The project aims to achieve an outcome where there will be 7 energy audits, 15 plans for housekeeping being implemented and 3 investments realized.
- L.20 The World Bank has also launched an "SME EE Project" under the coordination of MENR. The main development objective of the SME EE project is to improve the efficiency of energy use in SMEs by scaling-up commercial bank lending for energy efficiency investment. Financing from the World Bank will be provided through participating financial institutions who will follow a set of energy efficiency and financial viability criteria. The Project consists of 2 components:
- a) Component 1: Support investment lending and project development, appraisal and monitoring for 3 financial intermediaries; and a second policy and institutional development component for GDRE;
  - b) Component 2: Technical assistance to MENR to assist in the policy dialogue on EE, enhance the enabling environment, and foster broader EE market development in Turkey. Component work will be undertaken by 3 Task Groups: Task 1: Assessment of energy services market and identification of successful models and prevailing barriers; Task 2: Development of case studies; and Task 3: Development of guidelines, sample documents and contracts.

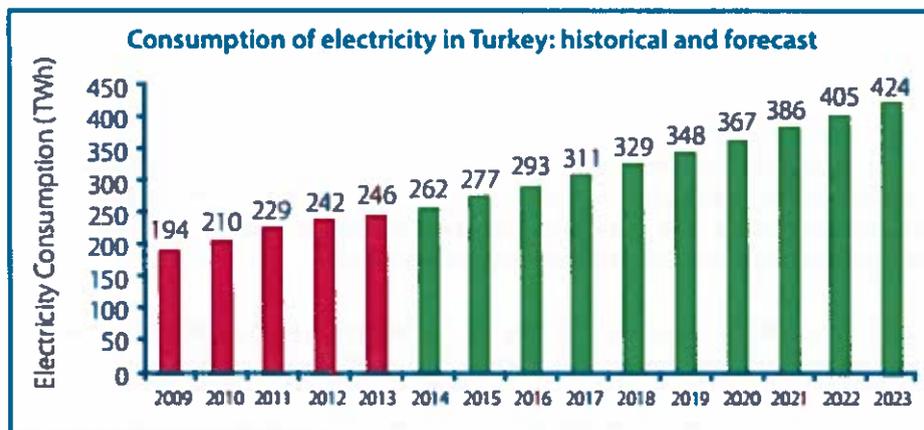
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<sup>70</sup> <http://www.sanayideverimlienerji.com/>

## ANNEX M: DETAILED MARKET BARRIER ANALYSIS

- M.1 The growth of GHG emissions in Turkey has been globally one of the highest, increasing from 188 million tonnes CO<sub>2</sub> in 1990 to 440 million tonnes CO<sub>2</sub> in 2012. According to Turkey's INDC, this can be attributed to the 230% increase of Turkey's GDP between 1992 and 2012, a 30% increase in its population since 1990, and annual increases in energy demand of 6 to 7%. The energy sector accounts for 70.2% of the country's GHG emissions followed by industrial processes with 14.3%, the waste sector at 8.2% and agriculture at 7.3%<sup>71</sup>. According to the International Energy Agency (IEA), energy use will continue to grow at an annual growth rate of around 4.5% from 2015 to 2030, approximately doubling over the next decade. The IEA expects electricity demand growth to increase at an even faster pace by 6% to 7% annually until 2023.<sup>72</sup> With limited domestic reserves of fossil fuels, Turkey is highly dependent on energy imports with more than 70% of its energy needs and 60% of its electricity based on fossil fuel consumption.
- M.2 According to the Ministry of Energy and Natural Resources (MoENR) of the Government of Turkey (GoT), demand for electricity power has been steadily increasing for the past decade; electricity demand in 2014 was 255.5 TWh, an increase of 3.7% from 2013. Moreover, the electricity growth forecast of MENR-TEIAS is an electricity consumption increase of 72% from 2013 to 2023 as shown on Figure M.1.

Figure M.3: Consumption of electricity in Turkey: recent data and forecast<sup>73</sup>



- M.3 While Turkey was a party to the Kyoto Protocol, it did not have targets due to the fact that it is not in Annex B, and that its national conditions include rapid industrialization and urbanization and a low per capita GHG emission rate. In the successor agreement to the Kyoto Protocol, adopted in Paris in 2015, Turkey's INDC states that the country will adopt GHG emission reduction targets along with all other nations that will include a 21% reduction in GHG emissions from the business-as-usual (BAU) level by 2030 that will enable the country to adopt low carbon development initiatives to limit the increasing global temperatures below 2°C. One of these low carbon development initiatives will be the implementation of the Strategy on Energy Efficiency (SEE), or more specifically, the National Strategy and Action Plan on Energy Efficiency (NSAPEE) that targets the industrial sector. Another important plan to be implemented under the INDC is to increase energy efficiency in industrial installations and provide financial support to energy efficiency projects<sup>74</sup>.
- M.4 By increasing energy efficiency in Turkey's industrial sector, the GoT will also work towards achieving its goal of further decreasing the country's energy imports and current account deficit. Efforts to increase energy efficiency in Turkey have intensified over the past 15 years. This has led to a total energy intensity decrease of 0.5% per annum between 2000 and

<sup>71</sup> [http://www4.unfccc.int/submissions/INDC/Published%20Documents/Turkey/1/The\\_INDC\\_of\\_TURKEY\\_v.15.19.30.pdf](http://www4.unfccc.int/submissions/INDC/Published%20Documents/Turkey/1/The_INDC_of_TURKEY_v.15.19.30.pdf)

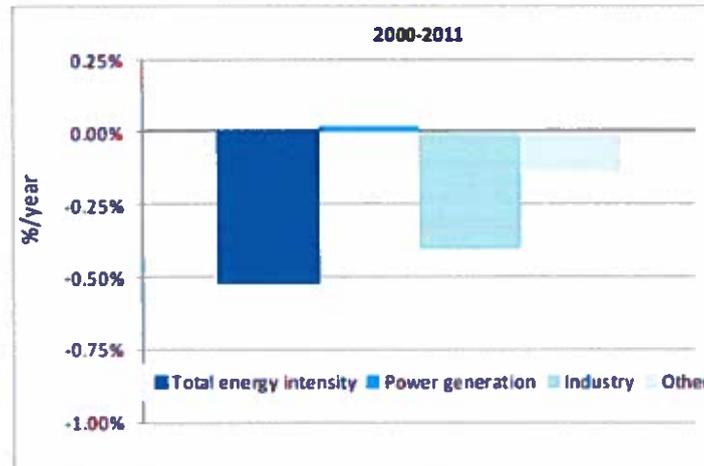
<sup>72</sup> Turkish Electricity Transmission Company (TEIAS), 2013: Turkish Electricity Production Planning Study (2005-2020). Available at: [www.teias.gov.tr/Eng/apkuretimplani/veriler.htm#\\_Toc86219420](http://www.teias.gov.tr/Eng/apkuretimplani/veriler.htm#_Toc86219420)

<sup>73</sup> Source: TEIAS

<sup>74</sup> Ibid 70

2011, much slower than the EU average of 1.6%. As shown on Figure M.2, industry contributed to a significant part of this reduction, whereas the power sector is moving in the opposite direction. In this regard, the Government support for measures for energy efficiency and power generation using renewable energy (RE) sources will aid the competitive edge of the Turkish industrial sector.

**Figure M.4: Energy intensity trends**



Source: Enerdata

- M.5** While there have been gains in decreasing the energy intensity of the industrial sector, the sector has been the highest energy consuming sector in Turkey for many years. This has been the case notwithstanding reductions in industrial outputs from the economic crisis. Since 1990, industrial primary energy consumption has increased an average of 4% per annum, a growth rate higher than the country's overall energy consumption.
- M.6** In Turkey, 47% of net electricity consumption is represented by industry<sup>75</sup>. It is estimated that 70% of energy consumption in industry is by electric motor-driven systems (EMDS), 90% of which use 3-phase squirrel cage asynchronous motors as defined in the EU Eco-design Implementing Measure 640/2009 on electric motors as amended by Implementing Measure 4/2014<sup>76</sup>. Through this adoption of this Implementing Measure (or IM), industrial processes in Turkey and EU are assumed to be more or less comparable and the consumption profile is assumed to be nearly the same.
- M.7** Electric motors in Turkey, in general, are not energy efficient. Moreover, it is estimated that electric motors in Turkey vary considerably in efficiencies; for example, there can be as little as 3-5% difference in the efficiency of an IE1 and IE3 15 kW motor assuming the IE1 motor has not been rewound<sup>77</sup>. Based on DGP's 2015 motor inventory analysis<sup>78</sup>, industrial IE1 motors are generally rewound 2 to 3 times (likely from old or burnt out wires) at local shops with a loss of 2 to 3% per re-winding, raising the difference of efficiencies between the IE1 and IE3 motors to 5 to 15%. In this case, these motors may consume an amount of energy equal to its purchase cost in about 5 to 6 months (assuming an 8-hour daily operation of the motor)<sup>79</sup>. A typical electric motor causes an energy cost of more than 25 times its purchase cost during an average service life of 10 years. This means that energy-efficiency is an extremely important consideration in the decision on which motor to purchase as illustrated in Table K.3 in Annex K that provides a detailed profile of industrial motors in Turkey.
- M.8** The GoT recognizes the opportunity to transform the market for electric motors towards energy efficient electric motors (EE motors) and electric motor driver systems (EMDS), and has made energy efficiency a priority of industry, development

<sup>75</sup> TEDC (TEDAS), Electricity Distribution and Consumption Statistics of Turkey, 2015

<sup>76</sup> These are defined in Communiqué on Eco-Design Requirements for Electric Motors (OG No. 28197 of 7 February 2012)

<sup>77</sup> IEC 60034-30 Efficiency Table

<sup>78</sup> DGP Electric Motor Inventory – Preliminary Analysis Report from December 2015

<sup>79</sup> For motors that are used less than 2,000 hours annually, price of the motor would be equivalent to the electricity consumed over a much longer period (3 years or more), making the installation of an EE motor less feasible.

and climate change policy. The new Strategy on Energy Efficiency (SEE), in this context, sets an overall target of reducing Turkey's energy intensity (energy consumption per unit of GDP) by 20% by Year 2023 from the levels of 2011. Promoting EE in Turkey's industrial and service sectors is among the top-priority actions outlined in the SEE. Details of applicable legislation and ongoing government initiatives to encourage EE motor adoption are provided in Annex I.

- M.9 Notwithstanding the success of the GoT in developing and implementing rigorous legislative and institutional frameworks for promoting EE in recent years, and despite ongoing government initiatives to encourage the increased use of EE motors, EE motor market share is currently very low due to a range of market barriers. A detailed market barrier analysis is provided in Annex J. Figure M.3 provides further justification of the Government's EE Strategy depicting an EU simple life cycle cost analysis (LCC) of a motor with 2, 4 and 6 thousand operating hours per year. The LCC justifies a higher initial purchase cost of an EE motor that will bring higher savings with shorter payback periods. This justification has led the EU (and Turkey) to adopt a separate IM for electric motors. One of the most important principles of eco-design is to make significant improvements in the environmental performance of the product (ErP) without entailing excessive costs.

Figure M.3: A 15-year LCC analysis of an 11 kW IE2 motor<sup>80</sup>



- M.10 The developmental challenge for Turkey on this proposed GEF project, is to achieve substantial energy savings in an industrial sector that is comprised mainly of SMEs<sup>81</sup>. With most of the electric motors on the Turkish market are being used in the industrial sector, more than 95% of Turkey's industrial sector is comprised mainly of SMEs. Out of Turkey's more than 2.6 million SMEs, there are an estimated 355,312 SMEs in the industrial sector<sup>82</sup>. SMEs comprise more than 99.5% of the enterprises within the industrial sector and produce more than 46% of the sector's outputs. The challenge lies in convincing SMEs to utilize more efficient motors in their industrial processes to save energy as opposed to their current alternative of resorting to the cheapest options of restoring operations of a motor, mainly through the rewinding of the motor.

- M.11 The distribution of efficiency classes of 53,496 motors surveyed in DGP's 2015 motor inventory survey found that more than 63% were IE1 (inefficient) class with only 28% being in the IE2 class. Current motor sales trends indicate that IE2 motors are slowly increasing their market share while IE3 motors still do not have a significant share. Furthermore, most SMEs at this time do not purchase IE3 motors due to their high cost and perceived risks of operational disruptions when a motor is replaced. If motors breakdown in an SME, the SME will generally resort to the cheapest options of restoring operations mainly through rewinding of the motor. With new regulations on electric motor efficiency entered into force

<sup>80</sup> Guideline accompanying Commission Regulation (EU) No 640/2009 of 22 July 2009 Implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to eco-design requirements for electric motors and Commission Regulation (EU) No 4/2014 of 6 January 2014 amending Regulation (EC) No 640/2009 implementing Directive 2005/32/E 2014.

<sup>81</sup> The KOSGEB definition of an SME is "an enterprise with up to 249 employees and an annual turnover of up to 40 million Turkish Lira."

<sup>82</sup> TUIK-Haber Bulteni / Small and Medium Size Enterprises Statistics (2014)

after January 2015, IE3 motors and IE2 motors (with variable speed drive) are now mandatory for new motor purchases between 7.5 and 375 kW. Mandatory regulations currently do not cover motors with lower output power until 2017. However, a number of measures are still required to increase the pace of EE adoption and lower the barriers that reduce the likelihood of the Turkish industrial sector from meeting its 2023 EE Strategy target (as outlined in Para 7). These measures will serve as the basis for this proposed GEF Project, which focuses on market transformation of the electric motors within the industrial sector through accelerated replacement of inefficient electric motors.

- M.12 Industry analysts have provided strong indications that SMEs in Turkey are having serious difficulties in obtaining access to finance, and lack the ability to attain and utilize the necessary knowledge to make their operations and ultimately the entire Turkish economy, more competitive internationally. It is estimated that SMEs account for 99.8% of all enterprises, 76% of employment, 55% of wages and salaries, and 53% of investments in tangible goods<sup>83</sup>. Nevertheless, they receive less than 23% of total bank loans according to the Turkish Statistical Institute (TUIK). The Turkish government has committed itself to a large array of programs aimed at helping industrial SMEs become more competitive and capable of applying modern technologies to improve production processes and become more successful exporters. This includes KOSGEB support to SMEs in the first 10 months of 2015 was TL 247.5 million<sup>84</sup>. One of the major priority policy areas of the Government is still access to finance for SMEs.
- M.13 The aforementioned and current KOSGEB initiative to replace inefficient electric motors within the Kayseri OIZ is a bold attempt to encourage SMEs to become more energy efficient. Moreover, this effort attempts to address a number of barriers to the wider adoption of EE electric motors within industrial SMEs in Turkey.
- M.14 Primary barriers to the wider adoption of EE electric motors in the industrial sector in Turkey include:
- The lack of importance of energy efficiency to most SMEs. The main concerns of the SMEs are related to optimizing production and minimizing risks of interruption;
  - The low level of awareness amongst SME personnel on the benefits of energy efficiency. As a result, decisions by these personnel on motor investments almost always involves lowest cost options, not life cycle costs;
  - The general lack of liquidity of SMEs to pay up front costs for energy efficient motor investments. Most SMEs do not have available cash for such investments;
  - SME aversion on the use of external engineers such as ESCOs and equipment suppliers to improve their energy efficiency. Many of these engineers are generally linked to preferred equipment suppliers. As such, general SME perceptions are that these engineers may not offer the best solutions for their operations. In addition, they feel that there are higher risks of operational disruptions if the equipment replacement does not function as designed. Overcoming this barrier will require the development of a trusting relationship between a trusted and independent equipment supplier and the end-user SME;
  - Inefficient coordination in the implementation of the EE Law that slows the pace of legislative changes. Since the majority of institutional effort to implement the EE Law falls under the responsibilities of MoSIT (who in this instance have oversight of industrial issues and implementing EE), improving the coordination between MoSIT and other line agencies such as MENR is required; this would ensure efficient development and implementation of EE policies, regulations and government supported programs

These are described in more detail in Table M.1.

**Table M.2: Barriers to market transformation of EE motors and proposed actions required for removal**

Barrier category	<i>Description of barrier and actions required for removal</i>
Information and awareness barriers	<p><i>Lack of baseline information and awareness of technology, applications and energy efficiency potential of EE electric motors.</i></p> <p>Despite the availability of EE motors in the Turkish market, the level of awareness amongst policymakers, motor manufacturers in Turkey, and industrial end-users (mainly SMEs) is limited on potential energy savings and economic benefits. The</p>

<sup>83</sup> Small and Medium Enterprise Statistics 2014 TUIK

<sup>84</sup> 2015 KOSGEB bulletin that estimates SME energy consumption of 603 PJ is 46% of the total industry sector's energy consumption, and the SME energy efficiency potential of 42 PJ per year or 7% of the total SME energy consumption

Barrier category	<i>Description of barrier and actions required for removal</i>
	<p>limitations of this awareness within an industrial enterprise is also related to knowledge on the life-cycle benefits of energy efficiency within an industrial enterprise. Without a survey of motors used within industrial SMEs in Turkey, it is difficult for policymakers to set standards, realistic targets, and action plans to transform the motors market towards EE motors.</p> <p>For most electric motor manufacturers in Turkey, there is limited knowledge on the different technologies and methods of design and manufacture of IE2, IE3 and IE4 motors due to the various components which can be used to remanufacture motors that do not meet EE standards. An enhanced motor test lab will help manufacturers to adopt the efficient technologies to their products.</p> <p><i>Lack of importance lack of importance of energy efficiency to most SMEs.</i>  For industrial SMEs, CEOs who make investment decisions have limited awareness of the differences and benefits of IE2, IE3 and IE4 motors. Moreover, SMEs do not regard energy efficiency as important when their main concerns are related to optimizing production and minimizing risks of interruptions. As such, if an SME experiences reduced production from a malfunctioning motor, the CEOs make the decisions opting for lowest cost solutions <i>without consideration of life cycle costs</i>. This typically involves the replacement of this malfunctioning motor with a spare electric motor that is stored onsite. While the spare electric motor may not have the required capacity, the broken electric motor is then repaired in a clandestine repair shop, where it is rewired and loses 2-3% efficiency with each rewiring. Changing this modus operandi will require a change in behaviour via full-scale awareness raising.</p> <p>Many industrial SMEs are located within OIZs<sup>85</sup> who employ energy managers within energy management units (EMUs) who provide advice to member SMEs on energy related matters. Knowledge of these energy management units (EMU) on issues related to energy efficiency is generally weak.</p> <p>SMEs generally do not know how many and what type of electric motors are needed to replace their inefficient electric motors. Moreover, there is a lot of variance in the usage of motors within SMEs and SMEs are not aware of how inefficient these motors are operating within their enterprises. While some of them may be used over 10 hours daily, many of them may only be used less than 1 hours per day, probably making their replacement to IE2 and IE3 uneconomical. Motors are often paired with equipment to perform mechanical work otherwise referred to as an electric motor drive system (EMDS). As such, a motor replacement may also be coupled with the analysis of the EMDS that may result in a recommendation to replace the most common equipment found in SMEs that includes pumps, compressors and fans.</p>
Technical barriers	<p><i>Limited technical capacities on energy auditing and assessments</i>  Many industrial SMEs are located within OIZs<sup>86</sup> who employ energy managers within energy management units (EMUs) who should provide advice to member SMEs on energy efficiency in accordance EE law. Knowledge of these EMUs on issues related to energy efficiency is generally weak.</p> <p>Due to their small scale, SMEs typically do not have dedicated energy managers that understand and convince management to engage with external parties to replace</p>

<sup>85</sup> It is estimated that around 70% of all industrial SMEs are within OIZs

<sup>86</sup> It is estimated that around 70% of all industrial SMEs are within OIZs

Barrier category	<i>Description of barrier and actions required for removal</i>
	<p>electric motors. Given the risk aversion of SMEs due to their lack of liquidity, a solution to this barrier is to provide a linkage to an entity with unbiased EE motor expertise. Moreover, this entity will need to perform to a level where the execution of an EE motor transaction must have assurances of minimal disruption on the SME industrial operation. This may include closer collaboration with Organized Industrial Zones (OIZs) who are tasked to provide services and infrastructure that best serve the SME. This would include energy supply where an energy management unit (EMU) within the OIZ do exist to advise the SME on reducing its energy consumption within an OIZ.</p> <p>For SMEs, EE consultants and EMUs, there is not any standard tool to make quick and effective assessments for motors. The Project will need to develop necessary tools and arrange for training to disseminate these tools.</p> <p><i>Limited monitoring, verification and enforcement (MVE) capacity for EE motors market transformation and compliance to MEPS for EE motors.</i></p> <p>While the capacity for market surveillance of motors is improving within the Directorate General for Safety and Inspection of Industrial Products within MoSIT, there is limited capacity in Turkey for the compliance testing of motors in the range of 90 kW to 375 kW. Given the significance of energy consumption within this range of motors in the industrial sector of Turkey, compliance testing equipment for these motors is needed. In addition, there is no national database for motors in Turkey that can serve as an effective tool for monitoring EE motors market transformation.</p>
Institutional barriers	<p><i>Inefficient coordination in the implementation of the EE Law that slows the pace of legislative changes.</i></p> <p>Since the majority of institutional effort to implement EE measures on energy consuming equipment in accordance with the EE Law falls under the responsibilities of MoSIT (who in this instance have oversight of industrial issues and implementing EE), improving the coordination between MoSIT and other line agencies such as MENR is required; this would ensure efficient development and implementation of EE policies, regulations and government supported programs. This would include development of minimum energy performance standards (MEPS), protocols for testing regimes for new motors, and EE motor manufacturing specifications that includes identification of specific component parts of a motor.</p> <p>Motor manufacturers in Turkey have no association to increase effectiveness of EE initiatives and to ensure coordination with Government departments. The Turkish Electric Motor Manufacturers Association (TEMMA) is under development. This Project needs to support the development of TEMMA and improve its capacity to more effectively promote the sale and use of EE motors in the industrial sector. This would include TEMMA's involvement in a national motors database which should be to feed the database with information for the effective monitoring EE motors market transformation.</p>
Legal, regulatory and policy barriers	<p><i>Gaps in the MV&amp;E strategy and market surveillance plans programmes of the MoSIT which needs improvements regarding market surveillance of industrial products (including electric motors and electric motor driven ErPs)</i></p> <p>Although MoSIT has already established a strong MV&amp;E strategy and market surveillance programme (including benefiting from previous GEF-supported projects such as the EE Appliances Project), their strategy, plans and programmes still need improvements to remove gaps regarding industrial products (ErPs) which are put into service (i.e. not placed on the market but directly installed in the production facilities such as electric motors). MoSIT also needs assistance for timely transposition and</p>

Barrier category	<i>Description of barrier and actions required for removal</i>
	adoption of upcoming revisions and amendments of the existing eco-design measure 640/2009 on electric motors.
Financial barrier	<p><i>Industrial SMEs experience a general lack of liquidity to pay the upfront costs for an EE motor investment.</i></p> <p>This is a primary cause of difficulties in financing SMEs. With their small scale operations and limited own funds, limited collateral and capacity to borrow money, these SMEs have limited access to de-risked credit support that does exist in Turkey. If a SME has money available to invest, either own means or bank credit, the SME typically will invest in increasing production rather than improving efficiency. As such, most industrial SMEs generally are unwilling to pay the replacement of this equipment with upfront costs for an energy efficient motor or measures. With SME unwillingness to make investments in EE measures, any feasible financial mechanism involving an SME investment in an EE motor cannot include a down payment.</p> <p><i>Despite the availability of EE credit lines to industrial SMEs, there is poor uptake of these credit lines by these SMEs given that these investments are voluntary, and that too much time and effort is required to apply for these credit lines.</i></p> <p>Many SMEs can access these financial products on a voluntary basis provided they are able to meet collateral and liquidity requirements of the lenders. With limited knowledge of the SMEs on the benefits of EE motors, these financial products are available from a number of sources including KOSGEB, state development banks as well as private commercial banks all of whom have a number of credit lines, which can be used for the finance of EE motor investments. Industrial SMEs, however, do not have any motivation to initiate these investments given the voluntary time and effort required to apply for these credit lines. To date, this has not resulted in significant uptake of these financial products to the extent that the SME industrial motors market has transformed. Additional difficulties for industrial SMEs include qualifying for loan guarantees that can potentially reduce collateral requirements for these loans; while loan guarantees from the KGF cover 80% of the loan amount, the loan guarantee can take as much as 2 months to get approved. An industrial SME can ill afford to wait for the approval. In addition, the administrative paperwork required to access these loan guarantees has been deemed onerous by many of the applicants, thereby reducing the number of loans for EE motor replacements. Under the Turkish Banking Law, borrowers are required to post collateral, even if they have guarantees.</p>
Market barrier	<p><i>Lack of available external experts who can provide an unbiased and cost effective motor replacement plan to industrial SMEs.</i></p> <p>SME distrust in the use of external engineers, ESCOs and equipment suppliers to improve their energy efficiency stems from the fact these experts and engineers are generally linked to preferred equipment suppliers. Due to their small scale, SMEs typically do not have dedicated energy managers that understand and convince management to engage with external parties to replace electric motors. Given the risk aversion of SMEs due to their lack of liquidity, general SME perceptions are that these engineers and experts may not offer unbiased EE solutions for their industrial enterprise. A solution to this barrier is to provide a linkage to an entity with unbiased EE motor expertise. Moreover, this entity will need to perform to a level where the execution of an EE motor transaction must have assurances of minimal disruption on the SME industrial operation. This may include closer collaboration with Organized Industrial Zones (OIZs) who are tasked to provide services and infrastructure that best serve the SME. This would include energy supply where an energy management unit</p>

Barrier category	Description of barrier and actions required for removal
	<p>(EMU) within the OIZ do exist to advise the SME on reducing its energy consumption within an OIZ.</p> <p>As a reflection of the lack of <u>independent</u> professional entities that conduct pre-energy audits and design investments plans to replace electric motors, there are only 12 official ESCOs are authorized for the industrial sector in Turkey<sup>87</sup>. While there are specialized companies that undertake this work, they are generally tied to specific product lines (usually imported motors).</p> <p>Since motor efficiency regulations have become valid after April 2012, "IE0-IE1" motors inefficient motor sales continue to be the most common motors for SMEs and would likely dominate motor retail inventories until the stocks of IE1 motors are depleted. Furthermore, there is a market for second hand inefficient motors. An effective market development strategy is required that ensures there is incentive for recycling of inefficient motors instead of their operation in another industrial SME.</p>

M.15 The barrier of the lack of importance of energy efficiency to SMEs requires full-scale awareness raising. When electric motors breakdown, they are typically replaced with spare electric motors, which are stored onsite. While spare electric motors may not have the required capacity, the broken electric motor is then repaired in a clandestine repair shop, where it is rewired, and losing 2-5% efficiency with each rewiring<sup>88</sup>. Changing this modus operandi will require a change in behaviour via full-scale awareness raising.

M.16 With regards to the barrier of the low level of awareness amongst SME personnel on energy efficiency:

- Only 12 official ESCOs are authorized for the industrial sector in Turkey<sup>89</sup>. While there are specialized companies that undertake this work, they are generally tied to a specific product line (usually imported motors). There is a clear need to increase the number of independent professionals that conduct pre-energy audits and design investments plans to replace electric motors in industry;
- Industrial SMEs within OIZs<sup>90</sup> employ energy managers who provide advice to member SMEs on energy related matters, which include energy efficiency. Capacity of energy management units within OIZs is generally quite weak. Capacity building of these units is currently supported under UNDP-GEF project on Improving Energy Efficiency in Industry;
- Motors are often paired with equipment to perform mechanical work otherwise referred to as an electric motor drive system (EMDS). As such, a motor replacement may also be coupled with the analysis of the EMDS that may result in a recommendation to replace the most common equipment found in SMEs that includes pumps, compressors and fans;
- An unknown number of electric motors are being used well past their designed service life, which is generally for <11 kW motors up to 10 years and >11 kW up to 20 years. SMEs are not aware of how inefficient these motors are operating within their enterprises;
- SMEs do not really know how many and what type of electric motors are needed to replace inefficient electric motors in their facility. Moreover, there is a lot of variance in the usage of motors within SMEs. While some of them may be used over 10 hours daily, many of them may only be used less than 1 hours per day, probably making their replacement to IE2 and IE3 uneconomical.

M.17 A key barrier of the lack of liquidity of industrial SMEs manifests their unwillingness to pay upfront costs for energy efficient measures. From this, there are a number of key issues that need incorporation into design of this project:

<sup>87</sup> ESCOs in Turkey currently do not give financial support to SMEs

<sup>88</sup> As estimated in DGP's 2015 Motor Inventory Survey

<sup>89</sup> ESCOs in Turkey currently do not give financial support to SMEs

<sup>90</sup> It is estimated that around 70% of all industrial SMEs are within OIZs

- A feasible financial mechanism is required that does not include down payment towards the purchase of an energy efficient motor. Especially in the case of SMEs, there are additional investments are primarily focused on increased production. Improving quality is of secondary importance. There is little to no interest in energy efficiency measures, particularly measures that are supportive to the production equipment, such as electric motors. For any program to be successful, it cannot include SMEs making upfront investments;
- Since financing of SMEs is typically difficult due to their small scale and limited credit room, de-risking or credit support to SMEs is therefore needed for a successful financing model.

M.18 Another key barrier related to the SME aversion on the use of external engineers and vendors need to be addressed in the Project design:

- Efforts to sell EE motors to SMEs are done by a number of motor manufacturer vendors. The trust level between these vendors and SMEs is poor given that vendors are only trying to sell their products as opposed to assisting them to become energy efficient. This also include a number of ESCOs owned by manufacturers who do not provide independent advice with regards to equipment purchases;
- Industrial SMEs located within an OIZ will have a more trusting relationship with the EMU than with motor vendors;
- Execution of EE motor transactions must have minimal disruption on SME operations. As such, SME management will be able to work with an EMU to avoid the risk of operational disruptions. Furthermore, due to the small scale, SMEs typically do not have dedicated energy managers that understand and can convince management to engage with external parties to replace electric motors. In this context, the advice of an ESCO through an EMU would be valuable.

#### Baseline capacities of ESCOs, OIZs and banks in Turkey

M.19 Transformation the Turkish motors market through the use of a financial mechanism may involve more actors such as the OIZ management, their energy management units (EMUs), ESCOs and financial institutions. The capacities of these players are reviewed in the following paragraphs.

M.20 Organized industrial zones or OIZs are entities that manage and maintain infrastructure where SMEs can operate. OIZ managers provide the administration for such services including the maintenance of factory buildings, utilities and roads. Provision of electricity to the SMEs at a lower rate is included in the utilities. In many cases, the OIZ generates their own electricity supply for the OIZ tenants. In addition to receiving revenues from SME tenants to administer and maintain the OIZs, OIZs also generate revenue from electricity sales as well as some government support.

M.21 With regards to involving OIZs in a market transformation programme for EE motors, there are a number of OIZ characteristics that need to be addressed in the design of a financial mechanism:

- OIZs perception of EE is that it may reduce their income from sale of energy to its tenants;
- Limited OIZs willingness to utilize credit room to facilitate EE measures;
- Limited OIZs interest in empowering their EMUs; and
- Their limited awareness of EE benefits for its members.

M.22 There are energy management units or EMUs within OIZs that provide assistance to SME tenants on all energy related issues. More importantly, their relationship with SME tenants is one built on trust where the EMU provides independent advice. EMUs, however, have a number of limitations including:

- Limited empowerment and support from OIZs management;
- Minor role played in supporting the development of EE within the OIZs;
- Insufficient equipment to assist SMEs in monitoring energy consumption; and
- Limited knowledge on a wide range of technical energy issues;

Capacity of EMUs are being built through the GEF IEEI Project with DGRE. One of the key actions of this Project is to provide energy equipment to assist SMEs in monitoring their energy consumption.

M.23 ESCOs can provide the requisite technical assistance to an SME in partnership with an OIZ. However, according to the ESCO association of Turkey, there are a few ESCOs operating in Turkey, many with side businesses other than providing ESCO services. The state of ESCOs in Turkey can be described as follows:

- Viable ESCO transactions involve clients with energy loads that are steady, allowing the ESCO to confidently determine a baseline to base remuneration from an energy performance contract (EPC);
- There are few if any ESCOs with industrial clients given the difficulties of determining industrial SME energy baselines (due to variations in industrial output). In this regard, the ESCO has insufficient data and control to guarantee performance of an industrial SME;
- Many ESCOs in Turkey do not have sufficient experience to act as a full ESCO that would include finance measures an executing energy performance contracts;
- As a result, many ESCOs in Turkey have limited creditworthiness to obtain financing;
- Viable ESCOs in Turkey that have industrial clients are often linked with multinational companies. With their perceived bias towards certain electric motor models, these ESCOs are perceived to lack independent technical opinions reducing the confidence of the SME of an ESCO's technical advice.

M.24 These characteristics of ESCOs in Turkey are somewhat consistent with the EU's ESCO Market Report for 2013<sup>91</sup>. Some of the ESCO characteristics of this report that applied to Turkish ESCOs includes:

- low level of awareness amongst SME clients of ESCO services;
- lack of supporting legislative framework for ESCO services including a tendering process and the lack of exposure in Turkey to an energy performance contract;
- ESCO difficulties in accessing financing;
- perceptions of high business and technical risks in the ESCO model that are related to:
  - perceived risk that energy efficiency interventions might compromise core business related production processes;
  - competition of energy efficiency investments with other investments related to the core business;
  - aversion to outsourcing energy management of an enterprise; and
  - required long commitments of ESCO contracts that lead to a lack of flexibility;
- lack of trust in the ESCO model due to the lack of standardization that is related to:
  - lack of homogeneity in ESCO offers;
  - lack of competition due to the nascent nature of the ESCO industry;
  - lack of experience of ESCOs, their clients and participating financial institutions;
  - lack of reference ESCO projects from which new clients can draw confidence;
  - lack of clarity in EPC contract definitions leading to failed EPC contracts;
  - insufficient standardized measurement and verification protocols; and
  - complex and non-standardized EPC contracts

M.25 The participation of financial institutions will be necessary to provide the financing for the procurement of EE motors. There are a number of development banks in Turkey that are available to support SMEs. Their participation, however, will be contingent on:

- the participation of creditworthy SME borrowers;
- how the program can make costly transactions of small sizes less expensive;
- design of the program that includes measures to de-risk transactions; and
- sufficiency of funds to finance EE measures.

M.26 Despite these limitations and deficiencies, a financial mechanism that provides EE motors to SMEs without upfront payment of this equipment is possible. The key issue is to utilize the capacities of the aforementioned players, and introduce new players who can provide de-risking measures to the financial mechanism. Where capacities are weak, capacity building by the Project can contribute towards a sustainable and functional financial support mechanism for EE motors in Turkey.

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<sup>91</sup> European commission JRC science and policy Report EUR 26691 EN, "ESCO Market Report 2013"

**ANNEX N: CRITERIA FOR OIZ SELECTION FOR DEMONSTRATING ONE-STOP SHOP FINANCIAL MECHANISM**

<b>Criteria</b>	<b>Condition</b>	<b>Evaluation</b>
<b>Technical</b>	Total "Electrical Energy" consumption of the OIZ should enough to show EE saving effect of the project	Electricity consumption > 100,000 MWh
	Variety of active industrial sectors in the OIZ such as machinery, textiles, food processing, metal and non-metal sectors.	There should be at least 3 different industrial sector to motivate similar companies with implementation results
	All SMEs in the OIZ can be monitored by electricity consumption at least in daily intervals and have some past records of energy consumption of the enterprises	Existence of Scada control in OIZ more than 2 years of records of the SMEs
	Measuring equipment and personnel with experience in using this equipment (especially OIZs benefiting from the IEEI project)	Owning equipment for energy auditing especially to measure electricity consumption and other electrical processes
	Previous experience on energy efficiency on other activities and projects	OIZ working on at least 2 recent EE projects, especially on electric motors
<b>Geographic</b>	Distribution of selected OIZs is representative of the distribution of industries	3 different OIZs from different geographic regions of Turkey
	In same region, there should be more than one OIZ to share the experiences	In the same region, at least 3 OIZs to be included in a demonstration zone
	Number of SMEs in the OIZ should be sufficient to find voluntary enterprises to participate in the project	Focus on OIZs with more than 750 SME tenants
<b>Motivation</b>	Motivation of the OIZ management and EMU team to invest in reducing its tenant's energy costs	The OIZ should be ready to sign protocol to involve PEEMS project personnel as coordinator, technical supporter and participant in financing process. In addition, the OIZ and SME tenant should be willing to share the findings of the pilot project with other SMEs including energy savings and payback periods.
	Number of engineers in EMU who are motivated to participate in training and field studies	More than 2 engineers, one of them electrical engineer, preferably holding energy manager certificate
<b>Financing experiences and capacity</b>	OIZ should have accessed financial credit previously for different purposes	Ongoing relations between OIZs and a bank
	Strong accounting system to follow up the financing procedures	Experienced accountants to follow up financing transactions
<b>Gender</b>	OIZs and SMEs will be selected for the implementation of demonstration projects, which will have criteria designed to encourage the participation of women	At least one of the member of EMU team will consist of one woman to participate in training offered by the Project
<b>Environmental</b>	OIZ to be selected according to the criteria of successful implementation of environmental projects	ISO 14000 certification, waste treatment facilities, etc.

(\* ) The above listed criteria will be detailed during the implementation phase considering actual and current conditions and circumstances prevailing in Turkey.

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## ANNEX O: THEORY OF CHANGE DIAGRAM

- O.1 A Theory of Change (TOC) diagram is provided in Figure O.1 to illustrate the drivers, Project interventions and assumptions that will address the developmental challenges outlined in Section 1, and barriers to EE motors market transformation in the Turkish industrial sector. The TOC diagram provided in Figure O.2 also illustrates the contribution of the Project outputs that will lead to desired Project and long-term outcomes and eventual long-term impacts comprising of reduced GHG emissions from reduced electricity use in the SME industrial subsector. Key barriers to the EE motor market transformation as outlined on Table 1 includes a lack of baseline information and awareness of technology, applications and EE potential of EE electric motors; inefficient coordination in the implementation of the EE Law that slows the pace of legislative changes; limited monitoring, verification and enforcement or MV&E capacity for EE motors market transformation and compliance with MEPS for EE motors; lack of enforcement capacity to improve implementation of the MVE strategy; unwillingness of industrial SMEs to pay upfront costs or make for EE motor investments; and a lack of available external experts who can provide an unbiased and cost effective motor replacement plan to industrial SMEs.
- O.2 The key strategies to achieving the proposed Project objective of *"promoting significant additional investment in industrial energy efficiency in Turkey by transforming the market of EE motors used in SMEs"* will be strengthening the enforcement framework that includes an improved MV&E strategy, market surveillance, trained field inspectors; improved capacity of relevant stakeholders to promote the benefits of EE motors; improved capacity for monitoring, verification and enforcement for better compliance of electric motors supply chain through upgrading test laboratories at the Turkish Standards Institute as well as improved MV&E strategy and training of field inspectors of MoSIT; launching of an operational and sustainable "one-stop-shop" for financial support; and increasing the availability of EE motor information to raise stakeholder awareness on the benefits of EE motors and to sustain motor market transformation.

### O.1 Drivers of change

- O.3 There are a number of baseline conditions that serve as drivers for this Project. These drivers serve as a basis on which the Project will provide incremental assistance to augment the capacities or efforts of ongoing initiatives to achieve significant impacts from transforming the motors market in the SME industrial sector.
- O.4 A primary driver of change for this Project is the GoT's commitment to improve the competitiveness of Turkish industries through alignment with EU standards. This is reflected in GoT's adoption of the Energy Efficiency Law in 2007, its enforcement in 2009 with the regulation of "Increased Energy Efficiency in the Use of Energy Resources and Energy", and the adoption of Turkey's Energy Efficiency Strategy 2012 – 2023 that was entered into force in 2012. The Strategy was followed in November 2014 with an "Energy Efficiency Improvement Program" action plan that was developed as a part of the 10<sup>th</sup> Development Plan (2014 – 2018). One of the goals of the EE improvement program was to reduce primary energy intensity of Turkey that included the industrial sector. Details of the Strategy and other relevant EE legislation are provided in Annex I.
- O.5 Another driver of change is the presence of a small group of local electric motor manufacturers in Turkey who have knowledge of and are manufacturing EE motors that are in compliance with EU eco-design motor standards. The issue for these manufacturers, however, are the poor sales of IE2 (with variable speed drives) and IE3 motors in Turkey. With GoT's stated desire to reduce the energy intensity of the country's industrial sector, these manufacturers have knowledge of EU eco-design standards for motors to advance the Government's EE agenda to meet national targets, and which EE standards can be applied in Turkey.
- O.6 Finally, there are local energy experts with knowledge on planning and implementing motor replacement programmes. These experts are aware that the investment into energy efficient motors can be typically paid back in less than 2 years<sup>92</sup>. The relationship of these experts with industrial SMEs, however, needs to be improved. Industrial SME perceptions of these experts is that they are linked with local motor manufacturers or multi-national companies, and as a result, are unable to

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<sup>92</sup> See Tables P.1 and P.2.

provide unbiased opinions on equipment to be purchased in a motor replacement program. This GEF project can play a significant role to change this perception and to improve the relationship between SMEs and “impartial” energy experts.

- O.7 By the end-of-Project (EOP), there will still be key external drivers that will exert a positive influence on the Project outcomes and the Project goal of reduced GHG emissions from the industrial sector of Turkey. This would include the improved energy efficiencies of the global industrial sector (including the global electric motor industry that would force the Turkish industrial sector to further address energy efficiency as a means of maintaining its competitiveness in global markets. In addition, it is expected that the Government will continue to encourage the use of EE motors that will support Turkey’s INDC plan and policy to reduce industrial emission intensities and support energy efficiency. Project outputs will serve as internal drivers towards market transformation including adoption of upcoming EU eco-design measures for motors, increased availability of information on best international practices for energy efficiency, and increased awareness amongst end users and policy makers on the benefits of EE motors.

## O.2 Assumptions

- O.8 For the proposed Project interventions to succeed, a number of assumptions have been made including:
- Continued economic growth in Turkey that will fuel the desire of industries to review and change their energy consumptive patterns;
  - Achieving consensus between competing electric motor manufacturers to establish a national electric motor manufacturers association. The formation of such an association would allow local motor manufacturers to more effectively promote the sale and use of EE motors in the industrial sector;
  - Clarity provided by EU on directives concerning IE2 motors and VSD. Details of the required clarity on EU directives are contained in Output 1.2;
  - Industrial SMEs accept technical assistance from the Project and its designated partners that includes the OIZs and their Energy Management Units;
  - EMUs have absorptive capacity for training on the management of motor replacement programmes with SMEs;
  - Industrial SMEs become genuinely interested in EE motors as a result of public awareness campaigns supported by the Project.
- O.9 To achieve the long-term outcomes and Project sustainability, a number of assumptions have also been made including:
- sustained government support of their INDC commitments to reduce industrial energy intensity;
  - OIZs and industrial SMEs have absorptive capacities to comprehend and undertake EE motor investments;
  - the continued involvement of financial institutions with sufficient funds to provide financing and risk guarantees for motor replacement programmes involving SMEs;
  - the effectiveness of OIZs to involve all SMEs in motor replacement programmes;
  - motor manufacturers are stimulated by enabling regulatory framework to increase their volume of manufacturing of EE motors; and
  - banks and EECs will use experience, tools and lessons learned from the pilot demonstration on a “one-stop-shop” for financial support mechanisms and apply them to other OIZs and industrial SME clients.

## O.3 Project stakeholders

- O.10 A strength of the Project strategy will be the involvement of stakeholders that are key to affect market transformation of the motors market in the industrial sector of Turkey. Most of the stakeholders listed in Table O.1 are active in the baseline activities of the Project that are provided in this Annex under the section entitled “Project Approach”. Table O.1 provides an elaboration of the role of the stakeholders of this Project including their role on Project outputs. All these stakeholders will be fully informed of the project activities to ensure their active involvement in the Project implementation and respective project activities will be coordinated and/or implemented with these stakeholders.

**Table O.1: Possible Contributions of Project stakeholders**

Stakeholder	Contributions	Relevant Project outputs
Directorate General of Productivity (DGP) under the Ministry of Science,	DGP is a key stakeholder of the PEEMS Project and will be serving as the national implementing agency. In addition, DGP will guide development of the framework for EMAPs and testing protocols for	DGP will be involved in all components of the Project. Some of their most relevant Project outputs are:

Stakeholder	Contributions	Relevant Project outputs
Industry and Technology (MoSIT)	EE motors entering the market, and develop, post and maintain the national motors database.	<ul style="list-style-type: none"> <li>• Output 1.1: Baseline survey on industrial SME motor usage;</li> <li>• Output 1.3: Strengthened institutional coordination mechanism;</li> <li>• Output 5.1: National EE electric motor database;</li> <li>• Output 5.2: Nationwide PR campaign for EE motors targeting the general public; and</li> <li>• Output 5.3: EE motors website.</li> </ul>
Directorate General of Industry (DGI) under MoSIT	DGI is currently and will be formulating and strengthening EE motor policies and standards in harmony with EU eco-design directives.	<ul style="list-style-type: none"> <li>• DG will be involved in concurrent transposition of EU eco-design measures for electric motors. Their most relevant Project output is Output 1.2: Supportive policies for EE electric motors and harmonized with international best practices.</li> </ul>
Directorate General of Safety and Inspection of Industrial Products (DGSIIP) under MoSIT	DGSIIP supports the proactive market surveillance program (PMSP) for EE electric motors that enter the Turkish market. DGSIIP currently implements a comprehensive PMSP for other electronic appliances and white appliances in Turkey under the "Development of Energy Efficiency in Industry Action Plan" and in close collaboration with the Turkish Standards Institute (TSI).	<ul style="list-style-type: none"> <li>• Output 3.1: Completed assessment of M the EE needs;</li> <li>• Output 3.3: Developed plans for enforcement and market surveillance.</li> </ul>
Directorate General of Renewable Energy (DGRE) under the Ministry of Energy and Natural Resources (MoENR)	DGRE supports the legislative, regulatory and policy framework related to energy efficient motors in Turkey. This includes preparation of EE legislation, authorisation of EVD on EE and control of sanctions in the EE legislation. This would also include final approvals of the setting of MEPS for electric motors that are in line with EU directives.	Output 1.2: Supportive policies for EE motors and harmonized with international best practices.
Ministry of Environment and Urbanization (MoEU)	MoEU currently serve as the authorizing body for the approval of motor recycling facilities. They currently play an important role in recycling on the Kayseri OIZ "low efficient AC electric motor replacement program" pilot project. The project can provide incremental assistance to MoEU efforts to bring motor recycling efforts in Turkey in line with international best practices.	Output 1.2: Supportive policies for EE electric motors and harmonized with international best practices
Turkish Standards Institute (TSI) under MoSIT	TSI currently operates several test laboratories for the testing of electronic equipment as part of a proactive market surveillance plan to ensure compliance of new and existing electronic products to adopted MEPS. Current TSI motor testing laboratories have the capacity to test motors between 0.75 and 90 kW for 2, 4, and 6 pole induction motors.	Output 3.2: Upgraded electric motor testing facility.
KOSGEB under MoSIT	Serves as an SME support organization in Turkey and as such executes SME policy in Turkey such as the provision of financial support for the assessments of the electric motor replacement potential, and payment for the hire of the energy consultant and/or fixed fee per assessment to the	<ul style="list-style-type: none"> <li>• Output 4.3: Pilot EE motor replacements using "one-stop-shop" financing arrangements;</li> <li>• Output 4.4: Scaled up one-stop-shop financing arrangements for replacing inefficient electric motors.</li> </ul>

Stakeholder	Contributions	Relevant Project outputs
	EMU. KOSGEB currently supports an interest rate subsidy program within the Kayseri OIZ for the purposes of increasing the purchase and use of EE motors within industrial SMEs.	
Financial institutions	Local financial institutions (development banks and commercial banks) will market and engage with the Project and avail funds for financing electric motor replacements.	<ul style="list-style-type: none"> <li>• Output 4.3: Pilot EE motor replacements using “one-stop-shop” financing arrangements;</li> <li>• Output 4.4: Scaled up one-stop-shop financing arrangements for replacing inefficient electric motors.</li> </ul>
KGF – Credit Guarantee Fund	KGF has been set up to improve SMEs’ access to finance by providing guarantees for SME default. KGF is a non-profit organization and work in partnership with TOBB, KOSGEB, TESK, TOSYÖV, MEKSA and numerous Turkish banks. The guarantees are provided to address the insufficient availability of collateral, which is typically required by banks to provide finance.	<ul style="list-style-type: none"> <li>• Output 4.3: Pilot EE motor replacements using “one-stop-shop” financing arrangements;</li> <li>• Output 4.4: Scaled up one-stop-shop financing arrangements for replacing inefficient electric motors.</li> </ul> <p>KGF to provide a guarantee under a Portfolio Guarantee system that covers default of SMEs in paying for the use of the electric motor replacements. Based on this guarantee the banks extend loans to:</p> <ul style="list-style-type: none"> <li>• OIZs for financing of SME motor replacement investment programme (in case of OIZ finance);</li> <li>• SMEs for financing their own motor replacement investment programme (in case of SME finance);</li> <li>• Motor Manufacturers for financing of the supply of motors to the motor replacement investment programme (in case of Vendor finance).</li> </ul>
Electric motor manufacturers	There are 6 prominent electric motor manufacturers based in Turkey who are in the process of forming the Turkish Electric Motor Manufacturers Association (TEMMA). The members of the TEMMA will be contributing their knowledge of EU eco-design standards for motors, and the manufacturing of various models of EE motors. Through TEMMA, they will provide to DGP their applied knowledge of motor eco-design standards that can be manufactured in Turkey, and promoting increased use of EE motors in the industrial sector.	<ul style="list-style-type: none"> <li>• Output 1.3: Strengthened institutional coordination mechanism;</li> <li>• Output 2.1: Technical assistance delivered for building the capacity of newly established industrial association “Turkish electric motors manufacturers association (TEMMA)).</li> </ul>
Chambers of Industry (CIs)	ICI’s mandate is to promote the well-being of its members that includes raising awareness of the benefits of energy efficiency to its members.	<ul style="list-style-type: none"> <li>• Output 2.2: Training workshops on designing and implementing EE motor replacement programmes;</li> <li>• Output 5.2: Nationwide PR campaign for EE motors targeting the general public</li> </ul>
Organized industrial zones (OIZs)	OIZs are the entities that provide the infrastructure and services for industrial SMEs to operate. Moreover, their services to industrial SMEs includes minimizing their operational costs which includes SME minimization of energy costs. Energy management units (EMUs) exist within the OIZs, and	<ul style="list-style-type: none"> <li>• Output 4.1: Completed efficient motor assessed potential (EMAP);</li> <li>• Output 4.2: Standard motor testing reports and MEEIPs;</li> <li>• Output 4.3: Pilot EE motor replacements using “one-stop-shop” financing arrangements;</li> </ul>

Stakeholder	Contributions	Relevant Project outputs
	are well-positioned to promote EE motors and implement motor replacement programmes.	<ul style="list-style-type: none"> <li>Output 4.4: Scaled up one-stop-shop financing arrangements for replacing inefficient electric motors.</li> </ul>
Energy management units (EMUs)	Under the Energy Efficiency Law (No. 5627) all organized industrial zones that include enterprises with less than 1,000 TOE of energy consumption must establish an energy management unit.	<ul style="list-style-type: none"> <li>Output 4.1: Completed efficient motor assessed potential (EMAP);</li> <li>Output 4.2: Standard motor testing reports and MEEIPs;</li> <li>Output 4.3: Pilot EE motor replacements using "one-stop-shop" financing arrangements;</li> <li>Output 4.4: Scaled up one-stop-shop financing arrangements for replacing inefficient electric motors.</li> </ul>
Energy efficiency consultants (EECs)	There are approximately 12 EECs (also referred to as EVDs in Turkish) as of February 2016, as authorized by MoENR who have ongoing businesses lines with comprehensive energy audits in industry. Some of these EECs are part of the multinational companies that has fostered an environment of distrust between industrial SMEs and EECs due to a lack of independence on their expertise and recommendations of equipment.	<ul style="list-style-type: none"> <li>Output 4.1: Completed efficient motor assessed potential (EMAP);</li> <li>Output 4.2: Standard motor testing reports and MEEIPs;</li> <li>Output 4.3: Pilot EE motor replacements using "one-stop-shop" financing arrangements;</li> <li>Output 4.4: Scaled up one-stop-shop financing arrangements for replacing inefficient electric motors.</li> </ul>
Industrial SMEs or end-users of EE motors	Industrial SMEs within selected OIZs will receive technical and financial support for the replacement of inefficient electric motors. They will also participate in demonstration projects that are designed to raise awareness of the different applications and benefits of EE motors within different industrial subsectors.	<ul style="list-style-type: none"> <li>Output 4.1: Completed efficient motor assessed potential (EMAP);</li> <li>Output 4.2: Standard motor testing reports and MEEIPs;</li> <li>Output 4.3: Pilot EE motor replacements using "one-stop-shop" financing arrangements;</li> <li>Output 4.4: Scaled up one-stop-shop financing arrangements for replacing inefficient electric motors.</li> </ul>

#### O.4 Project approach

O.11 Each one of the Project components comprises a critical strategic step towards creating an enabling environment for market transformation for EE motors for the Turkish industrial sector. The steps include:

- a. strengthening the legislative and regulatory framework for EE motors to provide confidence to both manufacturers and end-users of the importance of EE motors to reduce energy intensity in the industrial sector;
- b. improving the knowledge-base and capacities of the electric motor manufacturers, energy efficiency consultants, SME industrial end-users, EMUs in OIZs and the general public on the benefits of EE motors;
- c. improving the capacities of the Turkish Standards Institute to provide an independent testing facility that can monitor and verify, and MoSIT to enforce newly adopted electric motor MEPS and facilitate market transformation of the motors market in Turkey;
- d. the setup of a one stop shop within an OIZ to increase the utility of available financial products that will accelerate adoption of EE motors within industrial SMEs; and
- e. increasing the availability of information on EE motors that will raise the awareness of all relevant stakeholders on the benefits of EE motors and sustain market transformation.

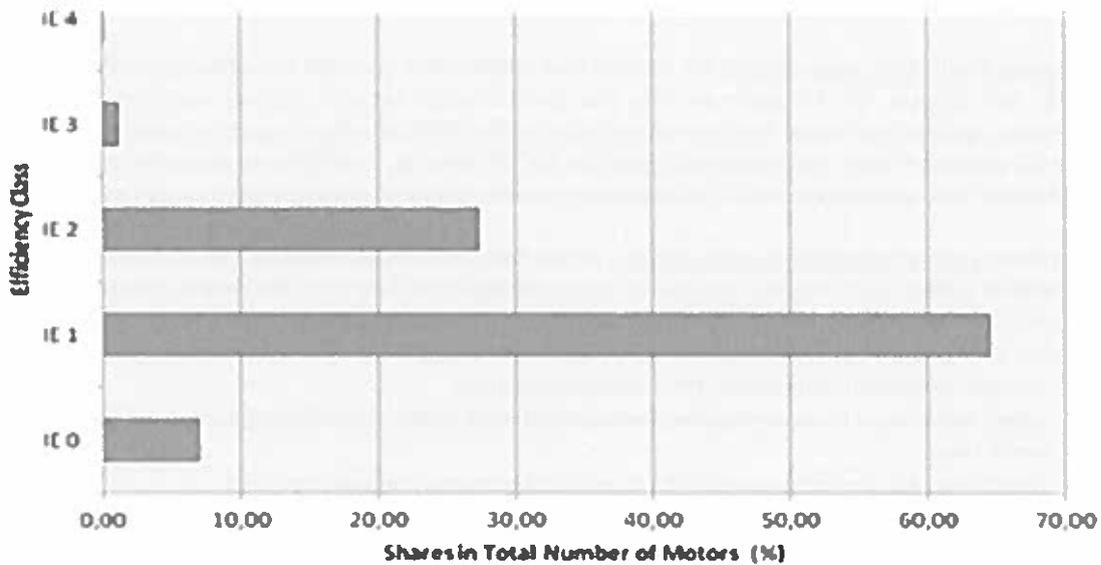
*a. Strengthening legislative and regulatory framework for EE motors*

O.12 The Turkish Government recognizes the opportunity for energy savings from energy efficient electric motors and electric motor driver systems (EMDS), and has made energy efficiency a priority of industry, development and climate change policy. Over the past 10 years, the GoT has been successful in developing and implementing rigorous legislative and policy

frameworks for promoting EE. While this demonstrates strong drivenness to reduce energy intensity of the industrial sector, there is a paucity of specific information related to energy usage by motors in the industrial sector. This includes the lack of specific knowledge on the size of the electric motor stock or electric motors are already in use in Turkey estimated to be in the range of 12 to 18 million motors.

- O.13 DGP in 2015 recently commenced a national survey of electric motor usage that falls under Implementing Measure 10<sup>th</sup> Development Plan. The survey covered 93,139 AC electric motors with a power rate 7.5 kW or above in 887 industrial enterprises (annual energy consumption greater than 50 toe) and includes information on the distribution of motor power ratings, service hours, number of re-windings, brand name, age, and estimates of efficiency. An estimated 75% of the motors surveyed were relatively low power (7.5-37 kW). Since more than 98% of all enterprises in the industrial sector are SMEs, the assumption is made that the survey findings apply to SMEs. The survey findings are summarized in Para K.9 in Annex K. With national estimates on the number of electric motors in Turkey ranging from 12 to 18 million, there is a need to increase the sample size of DGPs survey to increase the confidence level of a national motors survey. As such, the Project will provide resources to augment and increase the number of motors that are in the survey that will provide valuable information that can serve as a basis for setting targets policies and standards related to EE motor market transformation.
- O.14 Despite the adoption of a range of energy efficiency strategies and action plans since 2007<sup>93</sup>, DGP's survey indicates that there are still too many IE1 and IE0 motors still in use. Due to the lack of enforcement capacity, motor manufacturers and suppliers have said that IE1 motor sales have continued until IE1 motor stocks were recently depleted<sup>94</sup>. DGP's 2015 survey information indicates 72% of motor market share to IE0 and IE1 motors, (otherwise referred to as inefficient motors), 27% to IE2 motors and less than 1% to IE3 motors; this is illustrated on Figure O.1.

**Figure O.1: Distribution of Motor Efficiency Classes from 2015 DGP Survey**



- O.15 In response, MoSIT has formulated national standards on electric motors following EU Commission Regulation (EC) No 640/2009, a regulation issued in 2010 followed by a Communiqué on electric motors 7 February 2012 ((OG No. 28197) issued by General Directorate of Industry on the "Eco-design Requirements of Electric Motors". This regulation was introduced on 1 January 2015 for electric motors having a rated power between 7.5 kW and 375 kW; on 1 January 2017

<sup>93</sup> These are provided in detail in Annex L.

<sup>94</sup> For enforcement purposes, the date of manufacture is considered. Then, if the motor's date is before the date of mandatory enforcement, the motor can be placed on the market or put into service.

for electric motors between 0.75 kW and 375 kW. This Communiqué sets eco-design criteria which require manufactured and imported three-phase asynchronous AC induction electric motors (with a power rating between 0.75 kW and 375 kW) to meet IE2 standards coupled with variable speed drive, and the IE3 standard by 2017. To assist the Government in accelerating market transformation of the motors market in Turkey, the Project will provide resources to assist DGP in:

- Transposition of any upcoming revised EU eco-design regulation for electric motors into Turkish Law;
- Tracking any update in eco-design implementing measure also getting involved in eco-design ADCO discussions;
- Improvement of MV&E strategy of the MoSIT particularly to manage non-compliant motor imports (to avoid free riders);
- Preparing proposals for the shifting of institutional responsibilities for changing industrial EE legislation on equipment to MoSIT.

*b. Improved knowledge-base and capacities of relevant stakeholders to promote EE motor usage*

- O.16 Transformation of the Turkish motors market will involve a wider range of stakeholders including organized industrial zones, their energy management units, EECs and financial institutions. Baseline analyses of the stakeholders indicates that improvements need to be made in their knowledge on best international practices for designing and implementing an EE motor replacement program.
- O.17 Most industrial SMEs operating in Turkey are not well aware of the cost saving benefits of energy efficiency. This situation is exacerbated by their limited access to information on the benefits of replacing inefficient electric motors. Consequently, purchasing decisions to replace a dysfunctional motor often favours lower cost, less efficient electric motors, instead of more efficient ones that may cost on average 20% more and have a more favourable payback on investment between 1-3 years depending on working hours, technology and efficiency levels, as shown on the EU LCC analysis on Figure K.1. Awareness raising activities highlighting energy saving and cost reducing benefits of motor replacement and also benefits of using SEEFM developed under the Project as well as technical training on various aspects of industrial EE on this proposed GEF Project combined with the IEEI Project will result in a greater number of industrial SMEs becoming interested in EE, particularly in the replacement of inefficient motors.
- O.18 Organized industrial zones or OIZs are entities that manage and maintain infrastructure within a designated area where SMEs can operate. OIZ managers provide the administration for such services including the maintenance of factory buildings, utilities and roads. Provision of electricity to the SMEs at a lower rate is included in the utilities. In many cases, the OIZ generates their own electricity supply for the OIZ tenants. In addition to receiving revenues from SME tenants to administer and maintain the OIZs, OIZs also generate revenue from electricity sales as well as some government support.
- O.19 There are energy management units or EMUs within OIZs (which accommodate minimum 50 active tenants) that provide assistance to SME tenants which are annual energy consumption less than 1000 toe on all energy related mostly EE issues. More importantly, their relationship with SME tenants is one built on trust where the EMU provides independent advice. EMUs, however, have a number of limitations including:
- Limited motivation and support from OIZs management;
  - Minor role played in supporting the development of EE within the OIZs despite the fact this task is assigned to them by EE Law;
  - Insufficient equipment to assist SMEs in monitoring energy consumption; and
  - Limited knowledge on a wider range of technical energy issues.
- O.20 ESCOs<sup>95</sup> have a business model that can provide the requisite technical assistance to an SME in partnership with an OIZ. However, according to the ESCO association of Turkey, there are a few ESCOs operating in Turkey, many with side businesses other than providing ESCO services. The state of ESCOs in Turkey can be described as follows:
- Viable ESCO transactions involve clients with energy loads that are steady, allowing the ESCO to confidently determine a baseline to base remuneration from an energy performance contract (EPC). For example, an ESCO contract could consist of the installation of energy-efficient lighting in a shopping complex where the hours of usage of the lighting can be confidently determined;

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<sup>95</sup>In this report, an ESCO is defined as an energy service company that provides technical solutions as well as financing support. This is in contrast to the fact that companies providing energy services in Turkey that do not provide financing assistance are also referred to as ESCOs.

- There are few if any ESCOs (also referred to as EVDs in Turkish) with industrial clients given the difficulties and variances in determining industrial SME energy demand baselines. Much of this is due to variations in industrial production output, frequency and intensity in the use of the equipment, and the type of products being manufactured, making the baseline for each factory unique, complex and difficult to measure. In this regard, the ESCO has insufficient data and control to guarantee performance under EPC contracts;
- Many ESCOs in Turkey do not have sufficient experience to act as a full ESCO that would include finance measures and executing energy performance contracts;
- Nearly all ESCOs in Turkey do not have collateral and thus have limited borrowing capacity;
- Viable ESCOs in Turkey are often linked with multinational companies. However, these ESCOs have a perceived bias towards certain electric motor models, and lack independent technical opinions reducing the confidence of the SME on the technical advice of these ESCOs.

O.21 These characteristics of ESCOs in Turkey are somewhat consistent with the EU's ESCO Market Report for 2013<sup>96</sup>. Some of the ESCO characteristics of this report that applied to Turkish ESCOs includes:

- low level of awareness amongst SME clients of ESCO services;
- lack of supporting legislative framework for ESCO services including a tendering process and the lack of exposure in Turkey to an energy performance contract;
- ESCO difficulties in accessing financing;
- perceptions of high business and technical risks in the ESCO model that are related to:
  - perceived risk that energy efficiency interventions might compromise core business related production processes;
  - competition of energy efficiency investments with other investments related to the core business;
  - aversion to outsourcing energy management of an enterprise; and
  - required long commitments of ESCO contracts that lead to a lack of flexibility;
- lack of trust in the ESCO model due to the lack of standardization that is related to:
  - lack of homogeneity in ESCO offers;
  - lack of competition due to the nascent nature of the ESCO industry;
  - lack of experience of ESCOs, their clients and participating financial institutions;
  - lack of reference ESCO projects from which new clients can draw confidence;
  - lack of clarity in EPC contract definitions leading to failed EPC contracts;
  - insufficient standardized measurement and verification protocols; and
  - complex and non-standardized EPC contracts.

O.22 In summary, the application of the ESCO business model to replace electric motors in Turkish industrial SMEs would not be practical since the business model would introduce several risks which may prove to be too cumbersome to overcome. However, they do have personnel with valuable technical experience (herein referred to as energy efficiency consultants or EECs) to assist EMUs and SMEs in scoping and implementing EE motor investments.

O.23 To improve the knowledge base of the aforementioned stakeholders, Project resources will be used for training and workshops and awareness raising campaigns. By designing specific training sessions, workshops and awareness raising sessions tailored to each type of audience (including SMEs and financial institutions to better disseminate SEEFM), the overall knowledge base of these important stakeholders will be raised to the extent that EE motors would be in greater use by the EOP. This would include improving the knowledge of end-users or industrial SMEs in the lifecycle benefits of EE motors in an attempt to change their behaviour from buying the lowest cost equipment without consideration of the energy consumed over the service life of the equipment. Similarly for OIZs and their EMUs, they will require additional technical knowledge and management skills to design, implement and sustain a motor replacement program during the course of the Project as well as beyond. International technical EE expertise will be utilized by the Project to provide this technical assistance; their recruitment onto the Project will be done as energy efficiency consultants or EECs for the purposes of building the capacity and technically assisting EMU's in designing, implementing and managing a motor replacement program with OIZs.

<sup>96</sup> European commission JRC science and policy Report EUR 26691 EN, "ESCO Market Report 2013"

0.24 The other important stakeholder group are the motor manufacturers in Turkey. This includes Gamak, Wat Motor (Arcelik), Volt Motor and Aemot, which are the partners of this Project. There are also imported motors produced by several international manufacturers based in Europe, US and Asian countries with low voltage motors. According to foreign trade statistics for 2010, Turkey's motor imports were valued at USD 588 million, and exports at USD 98.5 million. There have been efforts spearheaded by Arcelik to form a Turkish Electric Motors Manufacturing Association (TEMMA). More details of TEMMA are provided on Table 2. To accelerate the functionality of TEMMA and its contribution to the promotion of EE motors to industrial SMEs, Project resources will be used to assist TEMMA in preparing its charter, business plans, outreach activities, and providing EE motor market reports to government on the progress of market transformation.

*c. Improved capacities for market surveillance of electric motors*

0.25 To ensure market transformation towards the use of more efficient Energy related Products (ErPs), the Government of Turkey has supported the development of electrical and electronic equipment testing labs under the Turkish Standards Institute (TSI). In addition to having a number of testing labs for white appliances and other household equipment, TSI also established an electric motor testing laboratory in August 2015 that has been accredited by TURKAK to TS EN /IEC 60034-1 and TS EN/IEC 60034-2-1. The laboratory has a capacity to test up to 220 motors annually up to 90 kW. TSI had plans to increase the capacity of the lab for testing of motors up to 375 kW but has been unable to implement the plan due to the USD 1.35 million cost of the laboratory. Project resources will be used to assist TSI in the development of a laboratory for testing motors in the 90 to 375 kW range.

0.26 On the basis of the improved capacity of TSI to provide credible motor testing services for compliance, improvements will be required in developing and implementing a proactive market surveillance program (PMSP) for motors to be put into service in industrial SMEs in Turkey. This will also include improvement of the existing MV&E strategy of DG of Safety and Inspection of Industrial Products (DSIIP) within MoSIT. There is an existing PMSP for white appliances and other electrical equipment in Turkey under the direction of the DSIIP. Market inspectors implementing PMSP use checklists for products seeking compliance prior to sending the equipment for testing at TSI<sup>97</sup>. Project resources will be required to strengthen and extend existing PMSPs being implemented by DSIIP to include electric motors.

*d. "One stop shop" to provide more tailored finance structure utilizing available financing mechanisms*

0.27 SMEs in Turkey have traditionally had difficulties in obtaining access to finance primarily due to their lack of capacity to articulate their specific needs for financing to banks, their creditworthiness and inability to provide sufficient collateral. With SMEs representing a significant proportion of the country's economic production, the Government has established a number of support programs through MoSIT (KOSGEB, Techno-entrepreneurs, SAN-TEZ), and TÜBİTAK (TEYDEB). These programs provided a number of financial products targeting SMEs to access bank loans at concessional interest rates from banks contracted with KOSGEB, and the involvement of the Credit Guarantee Fund (KGF) that is supported by the Turkish Treasury (KGF provides guarantees up to 80% of the loan amount). While more than 24,600 SMEs utilize the program between 1994 and 2015 to access more than USD 4.72 billion in bank loans with guarantees for USD 3.42 billion<sup>98</sup>, the scheme has been underutilized by the SMEs for the purposes of financing various investments.

0.28 Turkish banks have historically been reluctant to offer EE financing product lines since they associated such funding with higher transaction cost and higher risk. Moreover, banks typically had limited internal capacity to properly assess, develop, and market financing instruments for EE. However, since 2009, GoT together with a number of development banks and organisations collaborated to mobilise significant amount of private sector funds for the purposes of reducing GHG emissions while driving sustainable economic growth in Turkey. As part of this effort, the European Bank for Reconstruction and Development (EBRD) extended dedicated credit lines to a number of local banks dedicated for on-lending to SMEs for the implementation of energy efficiency and renewable energy investments (the Turkey Private Sector Sustainable Energy Finance Facility or TurSEFF). The local banks use the credit line to provide commercial loans, at their own risk, to borrowers with eligible investment opportunities, which include load-matching variable speed motor controls. Currently USD 390 million has been disbursed and a further USD 265 million is available for financing under TurSEFF. One of the eligible types

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<sup>97</sup> These checklists include a review of a technical documentation of the product, markings and other visual aspects of the product as required by applicable technical regulations.

<sup>98</sup> KGF Activity Report 2015- <http://www.kgf.com.tr/wp-content/uploads/2016/03/2015-faaliyet-raporu.pdf>

of financing under TurSEFF is vendor finance. This type of financing allows a manufacturer or vendor of equipment to borrow money from one of the banks to provide finance for the sale of their equipment. The end-user would pay for the equipment with a monthly fee until the equipment is fully paid off.

- O.29 Concurrently, the International Finance Corporation (IFC) offers an EE leasing, rather than lending, approach. Under this model, the IFC provides “blended” concessional loans (USD 115 million) to Turkish leasing companies for the express purpose to finance energy efficient equipment. The leasing company markets EE financing to its clients.
- O.30 Many of the financial products available to SMEs are accessed on a voluntary basis provided they are able to meet collateral and liquidity requirements of the lenders. From the SME perspective, financial products for energy efficiency investments are available from a number of sources including KOSGEB, state development banks as well as private commercial banks all of whom have a number of credit lines, which can be used for the finance of EE motor investments. *However, industrial SMEs who already have limited knowledge of the benefits of EE motors, are not highly motivated to initiate these investments given that they need to make the voluntary effort to access one of these credit lines.* Additional difficulties for industrial SMEs includes qualifying for loan guarantees that can potentially reduce collateral requirements for these loans; loan guarantees from the KGF cover 80%. Furthermore, the administrative paperwork required to access these loan guarantees has been deemed onerous by many of the applicants (in particular as it applies to the KOSGEB Kayseri motor change project), thereby reducing the number of loans for EE motor replacements. Under the Turkish Banking Law, borrowers are required to post collateral, even if they have guarantees. To date, there has not been significant uptake of these financial products for financing EE motor investments to the extent that the market is transformed.
- O.31 To increase the uptake of loans for EE motor replacements, the Project will provide resources to develop a “pilot one stop shop” for industrial SMEs to identify the potential for EE motor replacements, design a replacement plan for EE motors and improve SME access to available financial products as well as new ones to be introduced by the Project. The basis for improvement of SME uptake to available financial support mechanisms will be the involvement of the EMU within the OIZ; the capacity of the EMU will be strengthened by the Project to provide guidance to industrial SMEs on best approaches to implementing an EE motor replacement program. The building of such a relationship takes advantage of the fact that EMUs are trusted by industrial SMEs to provide unbiased advice on such issues.
- O.32 One such approach can be modeled after the Swiss Government’s EASY programme between 2010 and 2014, consisting of a 4-step methodology and financial incentive program to encourage Swiss mid-sized industrial factories to implement energy efficiency improvements of electric motor systems<sup>99</sup>. One of the components of the program was to analyze over 4,000 motors for their age, operating hours, size and use of variable frequency drives (VFD). In addition, over 100 motor systems were thoroughly analyzed providing valuable information on the current state of electric motors in Switzerland<sup>100</sup>. The 4-step methodology could be adopted by the PEEMS Project to catalyze the transformation of the motors market in the industrial sector of Turkey. This would include an assessment of the efficiency potential of an industrial SME, creating a list of long-running motors that consume more than 70% of all motors running in the industrial SME, conducting on-site tests of motors from this list, and implementation of the motor replacements. Details of the EASY programme can be found in Annex K, Paras K.10 to K.13.
- O.33 One adaptation of the EASY programme on the PEEMS Project will be to enable the EMU to prepare a “Motor EE Investment Plan” (MEEIP) (from the on-site testing of motors) that can serve as the basis on which financing or leasing can be arranged. The MEEIP can then be shared with relevant parties, such as banks for financing or with leasing company in case of leasing. The generation of an MEEIP from several SMEs will have numerous advantages including the enabling of an SME to visualize its investment as well as options for financing such an investment; and creation of an enabling environment for promoting

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<sup>99</sup>[http://www.eemods15.info/midcom-serveattachmentguid-1e55dd80cd6f5b45dd811e5a58751853169d036d036/energy\\_management\\_rolf\\_tieben.pdf](http://www.eemods15.info/midcom-serveattachmentguid-1e55dd80cd6f5b45dd811e5a58751853169d036d036/energy_management_rolf_tieben.pdf)

<sup>100</sup> One of the findings of the programme was confirming that by improving the energy efficiency of the frequently used motors (in the order of 20% of all installed motors), more than 80% of the potential energy savings could be realized, leading to the use of a “20-80 rule”. The programme also found that less than 20% of all motors were equipped with VFD.

EE motors such as a strengthened policy, legal and regulatory framework that governs motors, and strengthened capacity to test motors<sup>101</sup>.

- O.34 Through Project efforts to strengthen the EMU, the Project aims to enable the EMU to facilitate or arrange financing through 4 possible and already existing financing structures: (i) direct finance to the SME from a bank with an monthly annuity payment; (ii) vendor finance, whereby one or more motor manufacturer would arrange finance from a bank and make the equipment available to a portfolio of SMEs in return for a monthly payment; (iii) portfolio finance by OIZ, whereby the OIZ would arrange finance from a bank and make the equipment available to the SMEs for a monthly payment; and (iv) lease by a lease company directly to the SMEs for a monthly lease fee. This would include specifically local dedicated energy efficiency credit lines (as described earlier), which are offered through several Turkish banks, and possible interest rate support being provided by KOSGEB via same or similar Turkish banks.
- O.35 A key incremental contribution of the PEEMS Project, however, envisions further de-risking of SME financing. The risk of SMEs defaulting on their monthly payment is too restrictive for banks, OIZ, motor manufacturers or leasing companies. To make these finance structures less risky, a guarantee will need to be provided, which will pay out when an SME defaults on a payment. This guarantee could be provided by the Credit Guarantee Fund (KGF). This fund is already providing guarantees to support SME finance. However, for a demonstration under the PEEMS Project, a KGF guarantee can be provided that is tailored to the required needs of all stakeholders involved, such as a partial guarantee for a full demonstration (instead of specific guarantees that would be unique for each case). The additional cost associated with the adjusting of the guarantee, would be covered by the Project budget<sup>102</sup>. In all cases, the SMEs would pay a fixed monthly fee for the use of the electric motors and the installation of the equipment. This fixed fee would be based on estimated electricity cost savings, whereby the fee should be lower than the estimated cost savings with a longer tenure than the payback period. This would allow the SME to benefit from the motor replacements. To further enhance the attractiveness of the scheme as a demonstration, the OIZ will take central role in awareness creation among SMEs in the zone. A campaign will be organised with support from the Project.
- O.36 Details of the baseline financing scenarios for EE motors and the proposed "one-stop-shop" is provided in Annex M.
- e. Availability of EE motor information that raises stakeholder awareness of the benefits of EE motors and sustains market transformation
- O.37 To monitor market transformation of EE motors, DGP is proposing to host a national motors database which can be maintained for entries of inefficient motors that have been replaced with those mandated by the latest EE Law regulations. The current national motors database is being now developed on the basis of 100,000 motors being surveyed in the OIZs covering 62 provinces in Turkey that is currently being conducted by DGP. The Project will assist DGP in the formulation and development of a larger motors database that would include motor replacement entries from other OIZs targeted by the Project. This effort would provide a higher confidence level to the information being generated by this new motors database.
- O.38 Through the development of the Project's one stop shop and an expected acceleration of market transformation towards EE motors, positive information will be generated on the benefits of EE motors for industrial SMEs. To ensure sustain market transformation of the motors market, this information will need to be disseminated to a wide range of stakeholders that includes:
- the end-users or industrial SMEs who can benefit from the replacement of inefficient motors with IE2 or IE3 motors;

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<sup>101</sup> A market surveillance programme is conducted for products to be placed on the market or put into service. This specific program will consist of 2 product testing programmes:

- i) In-situ testing of motors for replacement purposes; and
- ii) A pilot testing programme for new motors under a market surveillance programme to strengthen the market surveillance strategy and enforcement capacity of MoSIT (and building testing capacity at TSI)

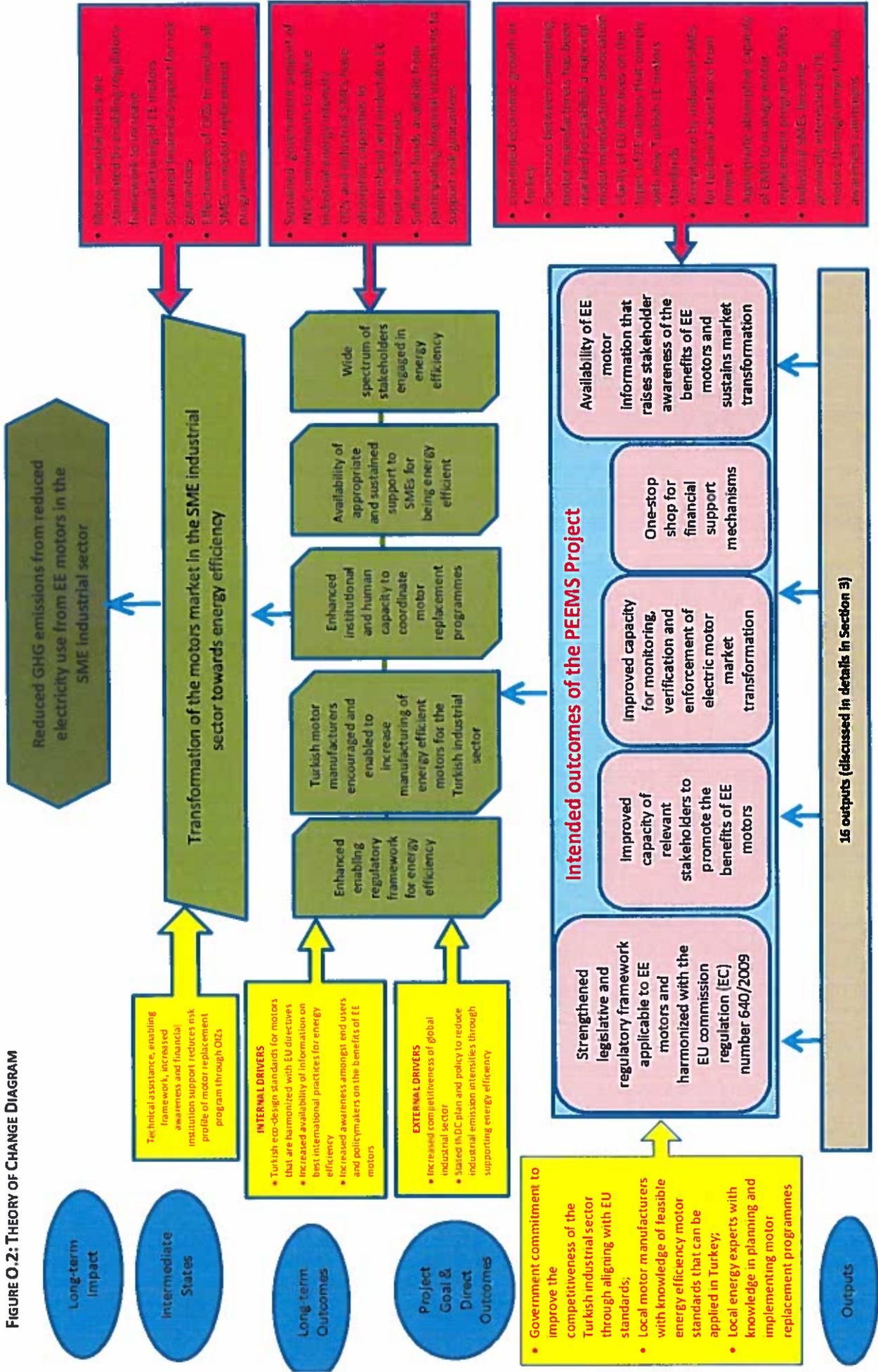
<sup>102</sup> Proper assessment of the feasibility of the proposed models will require pricing and modelling of replacement of the electric motors. This will require undertaking analyses of information and data collected from electric motor manufacturers on motors, their efficiencies, costs and savings. Data will be averaged out, aggregated and used as best guess data for the modelling cost and savings, and eventually modelling of the finance structured and presented in a MEEIP baseline report.

- EMU personnel or OIZs management who can effectively disseminate this information to their SME clients;
- EECs who can ensure that the EE information disseminated is technically credible;
- financial institutes who will have an interest in promoting their own lines of credit and guarantee funds; and
- DGP and other policymakers who will on behalf of the GoT want to sustain market transformation and increase the likelihood that the 2023 targets of the EE Law will be achieved.

O.39 As such, Project resources will need to be utilized to develop promotional material to increase the rate of replacement of inefficient motors within industrial SMEs. This would include the need to develop TV spots, radio commentaries, pamphlets and brochures, and technical guidebooks on the life cycle of EE motor replacements and on available financial products that will assist industrial SMEs on implementing motor replacements.

O.40 Lastly, Project resources will be utilized to develop a website dedicated to the promotion of EE motors in the industrial sector. The webpage design will target industrial SMEs as well as other stakeholders involved with EE motor replacement programmes such as EECs and EMUs to provide them with sufficient information flows that will sustain market transformation.

FIGURE O.2: THEORY OF CHANGE DIAGRAM



**Legend:**  
Assumptions:  
Drivers:

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## ANNEX P: SUSTAINABLE ENERGY EFFICIENCY FINANCING MECHANISM (SEEFM)

### P.1 Stakeholders involved in the SEEFM

- P.1. Transformation of the Turkish motors market will involve a wide range of stakeholders, which includes the SMEs, electric motor manufacturers, organized industrial zones (OIZs), their energy management units (EMUs), energy efficiency consultants (EECs) such as EVDs and financial institutions (public and private sector). Consultations with these stakeholders have identified design requirements, which if met, will secure solid participation in the project.

#### SMEs

- P.2. The ultimate beneficiaries of this project are the Small and Medium sized Enterprises (SMEs). In line with the official Turkish definition, an SME is an enterprise with up to 249 employees and an annual turnover of up to 40 million Turkish Lira. The industrial sector in Turkey comprises mainly of SMEs. With most of the electric motors on the Turkish market being used in the industrial sector, more than 95% of Turkey's industrial sector is mainly comprised of SMEs. Out of Turkey's more than 2.6 million SMEs, there are an estimated 355,312 SMEs in the industrial sector. The SMEs in the industrial sector produce more than 46% of the sector's outputs. The challenge lies in convincing SMEs to utilize more efficient motors in their industrial processes to save energy as opposed to their current alternative of resorting to the cheapest options of restoring operations of a motor, mainly through the rewinding of the motor.
- P.3. There are many barriers that are limiting SMEs to engage with electric motor replacement. Despite the availability of energy efficient motors in Turkey for the past decade, the level of awareness amongst SMEs is limited. The limitations of this awareness are mainly related to knowledge on the benefits of energy efficiency within an industrial enterprise. Managers of SMEs who make investment decisions have limited awareness of the differences and benefits of IE2, IE3 and IE4 motors. Moreover, SMEs do not regard energy efficiency as important when their main concerns are related to optimizing production and minimizing risks of interruptions. As such, if an SME experiences reduced production from a malfunctioning motor, the manager makes the decisions opting for lowest cost solutions without consideration of life cycle costs. This typically involves the replacement of this malfunctioning motor with a spare electric motor that is stored onsite. While a spare electric motor may not have the required capacity, the broken electric motor is then repaired in a clandestine repair shop, where it is rewired and losing 2-3% efficiency with each rewiring. Changing this modus operandi will require a change in behaviour via full-scale awareness raising. Many industrial SMEs are located within OIZs who employ energy managers within energy management units (EMUs) who provide advice to member SMEs, with less than 1,000 toe<sup>103</sup> annual energy consumption, on energy related matters.
- P.4. In general, industrial SMEs experience a lack of liquidity to pay the upfront costs for an energy efficient motor investment. This is a primary cause of difficulties in financing SMEs. With their small scale operations and limited own funds, limited capacity to borrow money, these SMEs have limited awareness of de-risked credit support that does exist in Turkey<sup>104</sup>. If a SME has money available to invest either own means or bank credit, the SME typically will invest in increasing production rather than improving efficiency. As such, most industrial SMEs generally are unwilling to pay the replacement of this equipment with upfront costs for an energy efficient motor or measures. Furthermore, replacing electric motors result in downtimes, duration of which varies depending on the complexity of the electric motor driven systems. These downtimes can lead to significant interruptions in production. With SME unwillingness to make investments in energy efficiency measures, any feasible financial mechanism involving an SME investment in an energy efficient motor cannot include a down payment.
- P.5. SME distrust in the use of external engineers, ESCOs and equipment suppliers to improve their energy efficiency stems from the fact these experts and engineers are generally linked to preferred equipment suppliers. Due to their small scale<sup>105</sup>, SMEs typically do not have dedicated energy managers that understand and are able to convince management

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<sup>103</sup> toe is tonne of oil equivalent

<sup>104</sup> KOSGEB and KGF provide financial support specifically to SMEs.

<sup>105</sup> If the annual energy consumption of a company is more than 1,000 toe, the company is required to appoint an energy manager. However, in the case of smaller companies, these energy managers are not fully dedicated and often perform the role of energy manager on top of their other role in the company.

to engage with external parties to replace electric motors. Given the risk aversion of SMEs due to their lack of liquidity, general SME perceptions are that these engineers and experts may not offer unbiased energy efficiency solutions for their industrial enterprise.

#### Motor Manufacturers

- P.6. There are several international and domestic producers of electric motors active in Turkey. The main domestic electric motor manufacturers are Gamak, Wat Motor (Arcelik), Volt Motor and Aemot. There are also imported motors produced by Siemens, ABB, AEG, SEW Leroy Somer, ATB Group, and the VEM Group with low voltage motors. According to foreign trade statistics for 2011, Turkey's motor imports were valued at USD 793 million, and exports at USD 134 million<sup>106</sup>. There have been efforts spearheaded by Arcelik to form a Turkish Electric Motors Manufacturing Association (TEMMA). The members of the TEMMA will be contributing their knowledge of EU eco-design standards for motors, and the manufacturing of various models of energy efficient motors. Through TEMMA, they will provide to DGP their applied knowledge of motor eco-design standards that can be manufactured in Turkey.
- P.7. These manufacturers have indicated their interest in supporting an increased share of energy efficient motors through motor replacements. From this perspective, some of these manufacturers have engaged with banks on vendor finance for other products and could be convinced to enter into a similar agreement if the terms are right. Further discussion with these manufacturers to explore possible arrangements is advised.

#### Organized Industrial Zones

- P.8. Organized Industrial Zones are designed to allow companies to operate within an investor-friendly environment with ready-to-use infrastructure and social facilities. The existing infrastructure provided in the zones typically includes roads, water, natural gas, electricity, communications, waste treatment, and other services. Provision of electricity to the SMEs at a lower rate is included in the utilities. In many cases, the OIZ generates their own electricity supply for the OIZ tenants. In addition to receiving revenues from OIZ tenants to administer and maintain the zone, OIZs generate revenue from electricity sales as well as some government support. OIZs are also allowed to finance investments to increase effectiveness of their electricity service.
- P.9. Under the Energy Efficiency Law (No. 5627), all organized industrial zones with more than 50 enterprises will need to establish an energy management unit (EMU) to support companies that consume less than 1,000 toe of energy consumption with increasing energy efficiency. Several OIZs have limited awareness of or incentive to explain energy efficiency benefits for its members. Some, particularly those that own their own electricity generation installations, have the perception that energy efficiency may reduce their income from sale of energy to its tenants. As a result, most of the EMUs are not empowered and do not have the capacity to support SMEs to unlock their energy efficiency potential. More progressive OIZs, however, have the perception that their role is to offer energy at lowest cost. These OIZs typically already assist their SMEs with lowering their energy use. There are EMUs within OIZs that do provide quality assistance to SME tenants on all energy related issues. More importantly, their relationship with SME tenants is one built on trust where the EMU provides independent advice. The capacity of the selected EMUs is being built through the GEF IEEI Project with DGRE. One of the key actions of this Project is to provide energy consumption measuring instruments to assist SMEs in monitoring their energy consumption.
- P.10. To involve OIZs in a market transformation programme for energy efficient motors, their reluctance will need to be addressed particularly if the zones are to have a central role in the finance of the electric motor replacements. OIZs do have credit lines in place with banks to finance a wide range of projects related to maintaining and building new infrastructure as a service to their SME tenants such as roads, waste collection, and energy supply. For these credit lines, they are providing collateral. Borrowing additional funds for the replacement of electrical equipment, capitalizing its EMU to purchase equipment, and implementing a motor replacement program with SMEs for a monthly fee, would probably have limited impact on their current credit arrangements. However, during initial consultation, even the more progressive zones have indicated a reluctance to utilize borrowing capacity to fund energy efficiency measures at SMEs.

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<sup>106</sup> From Ministry of Economy <https://www.ekonomi.gov.tr/portal/content/conn/UCM/uuid/dDocName:EK-051195;jsessionid=o6kkc58sWboZAbc4oH59QGa9wWvSE-uxFoOxI7dzY6LvshjgN9rI1249264818>

Further exploration of OIZ's willingness to finance energy efficiency is advisable, especially if tailored guarantees can be applied to cover SME default risk.

#### Financial Institutions

- P.11. A financial institution or bank is an institution that provides financial services for its clients or members. There are about 50 banks active in Turkey. Many Turkish financial institutions offer financial products dedicated to energy efficiency investments. Chapter 4 provides further details on these financial products.

#### Energy Service Companies

- P.12. ESCOs are companies that provide both technical and financial services to implement energy efficiency projects on energy performance-based contracts (EPCs). As the ESCO guarantees performance, their remuneration is directly linked to the amount of energy saved by the project. The ESCO assumes the technical and performance risks associated with the project. If the energy savings are not achieved, the ESCO does not get paid. This is what differentiates ESCOs from other energy-efficiency consultants that sell energy efficiency equipment. The typical services that an ESCO offers are:
- Identification, development and design of the energy-efficiency project;
  - Financing or acquiring the financing of the energy-efficiency project;
  - Installation of energy-efficiency technology/equipment; and
  - Measuring, monitoring and verification of the project's energy savings.
- P.13. Globally, many ESCOs are implementing a variety of energy-efficiency measures, including high-efficiency lighting, heating and air conditioning, efficient motors, industrial process improvement, cogeneration, variable speed drives, waste heat recovery and centralized energy management systems. ESCOs can be vendor-based or consultancy-based. Consultancy or technically based ESCOs, are often consulting firms that have a general expertise in engineering or energy efficiency. Vendor or technology-based ESCOs are often energy technology suppliers, sometimes with a connection to a particular energy-efficiency equipment manufacturer.
- P.14. In many developing countries, ESCOs undertake more traditional fixed-fee energy efficiency contracts. These contracts do not include guarantees or performance-based remuneration element. They do not take performance risks, arrange financing or undertake monitoring. These companies are technically not ESCOs, although they are still referred to as ESCOs leading to much confusion. This is also often the case with Turkish ESCOs or EVDs. In most cases, Turkish ESCOs or EVDs do not have performance risk nor arrange finance.
- P.15. Under the PEEMS demonstration project, Turkish ESCOs or EVDs could provide the technical assistance to an SME to identify the motor replacement investment opportunity and finance the purchase against a performance-based contract (i.e. act as a full ESCO including the provision of finance). However, according to the ESCO Association of Turkey, there are a few ESCOs operating in Turkey, many with side businesses other than providing ESCO services. The state of ESCOs in Turkey can be described as follows:
- Viable ESCO transactions involve clients with energy loads that are steady, allowing the ESCO to confidently determine a baseline to base remuneration from an energy performance contract (EPC). For example, an ESCO contract could consist of the installation of energy-efficient lighting in a shopping complex where the hours of usage of the lighting can be confidently determined;
  - There are few if any ESCOs with industrial clients given the difficulties and variances in determining industrial SME energy demand baselines. Much of this is due to variations in industrial production output, frequency and intensity in the use of the equipment, and the type of products being manufactured, making the baseline for each factory unique, complex and difficult to measure. In this regard, the ESCO has insufficient data and control to guarantee performance under EPC contacts;
  - Many ESCOs in Turkey do not have sufficient experience to act as a full ESCO that would include finance measures an executing energy performance contracts;
  - Nearly all ESCOs in Turkey do not have collateral and thus have limited borrowing capacity;
  - Viable ESCOs in Turkey are often linked with multinational companies. However, these ESCOs have a perceived bias towards certain electric motor models, and lack independent technical opinions reducing the confidence of the SME on the technical advice of these ESCOs.

- P.16. These characteristics of ESCOs in Turkey are somewhat consistent with the EU's ESCO Market Report for 2013. Some of the ESCO characteristics of this report apply to Turkish ESCOs including:
- low level of awareness amongst SME clients of ESCO services;
  - lack of supporting legislative framework for ESCO services including a tendering process and the lack of exposure in Turkey to an energy performance contract;
  - ESCO difficulties in accessing financing (mainly due to limited availability of collateral);
  - perceptions of high business and technical risks in the ESCO model that are related to:
    - perceived risk that energy efficiency interventions might compromise core business related production processes;
    - competition of energy efficiency investments with other investments related to the core business;
    - aversion to outsourcing energy management of an enterprise; and
    - required long commitments of ESCO contracts that lead to a lack of flexibility;
  - Lack of trust in the ESCO model due to the lack of standardization that is related to:
    - lack of homogeneity in ESCO offers;
    - lack of competition due to the nascent nature of the ESCO industry;
    - lack of experience of ESCOs, their clients and participating financial institutions;
    - lack of reference ESCO projects from which new clients can draw confidence;
    - lack of clarity in EPC contract definitions leading to failed EPC contracts;
    - insufficient standardized measurement and verification protocols; and
    - complex and non-standardized EPC contracts
- P.17. In summary, the application of the ESCO business model to replace electric motors in Turkish industrial SMEs would not be practical since the business model would introduce several risks, which may prove to be too cumbersome to overcome.

## P.2 Financial Structures

- P.18. SMEs in Turkey have traditionally had difficulties in obtaining access to finance primarily due to their lack of creditworthiness and inability to provide sufficient collateral. With SMEs representing a significant proportion of the country's economic production, the GoT has established a number of support programs through MoSIT (KOSGEB, Techno-entrepreneurs, SAN-TEZ), and TÜBİTAK (TEYDEB).
- P.19. Turkish banks have historically been reluctant to offer energy efficiency financing product lines since they associated such funding with higher transaction cost and higher risk. Moreover, banks typically had limited internal capacity to properly assess, develop, and market financing instruments for energy efficiency. However, ever since 2009, GoT together with a number of development banks and organisations collaborated to mobilise significant amount of private sector funds for the purposes of reducing GHG emissions while driving sustainable economic growth in Turkey. Some examples are KOSGEB financial support, dedicated energy efficiency credit lines and leasing of energy efficient equipment. In addition and although not specifically directed to energy efficiency investments, SMEs can apply for guarantees to support their loan application.

### KOSGEB Financing Support

- P.20. KOSGEB has programs that provide a number of financial products targeting SMEs to access bank loans at concessional interest rates from banks contracted with KOSGEB. While more than 16,000 SMEs utilize the program between 2010 and 2014 to access more than USD 2.7 billion in bank loans, the scheme has been underutilized by the industrial sector for the purposes of financing energy efficiency investments.
- P.21. One relevant KOSGEB program is the pilot project entitled "Interest Support for Investment Loan" that was commenced in late 2015 to support SMEs in their plans to invest and replace inefficient electric motors with IE3 or IE2 motors with variable speed drives. In addition to KOSGEB and MoSIT (DGP), the Credit Guarantee Fund (KGF) as well as 9 commercial banks are designated to provide services to SMEs for this interest rate support. The credit loan to be granted under this pilot project is a maximum of TL 300,000 per enterprise. This pilot project is scheduled for completion in late 2016 at

which time the performance of the project would be evaluated for its uptake by SMEs and possible further implementation.

#### Dedicated Energy Efficiency Credit Lines

- P.22. Credit lines are set up at local banks from extended credit lines from multilateral or bilateral development banks, specifically for on-lending to industrial borrowers for the implementation of energy efficiency and renewable energy investments. Typically, these credit lines are supported by a comprehensive technical assistance package that underpins demand for the facility, helps potential borrowers prepare loan applications and familiarises local bank loan officers with sustainable energy investment opportunities. This assistance is provided free-of-charge by a project implementation team consisting of international and local experts supported by grant funding provided by donors.
- P.23. For example, the European Bank for Reconstruction and Development (EBRD) provides funds under the Turkey Private Sector Sustainable Energy Finance Facility or TurSEFF. The local banks use the credit line to provide commercial loans, at their own risk, to borrowers with eligible investment opportunities, which include load-matching variable speed motor controls. Currently USD 390 million has been disbursed and a further USD 265 million is available for financing. One of the eligible types of financing under TurSEFF is vendor finance; this financing modality allows a manufacturer or vendor of equipment to borrow money from one of the banks to provide finance for the sale of their equipment. The end-user would pay for the equipment with a monthly annuity payment to cover interest and repayment of the principal until the equipment is fully paid off. While 10% of TurSEFF's portfolio has been financed using vendor finance, the facility does not focus on electric motors; rather, it provides finance for their "list of eligible materials and equipment" (LEME) that can be only accessed from a "list of eligible suppliers and installers" (LESI) . Since SME access to these credit lines is voluntary and approved by commercial banks on a case-by-case basis, SMEs have not accessed these credit lines for motor replacements.

#### Leasing

- P.24. Finance lease is an alternative solution to borrowing. Also known as Capital Lease or Full Payout Lease, it is an agreement between two parties (Lessor and Lessee) whereby lessor (lease company) purchases the asset and transfers largely all the rights, risks and rewards to the lessee (user or SME) against a periodical fixed rental. It is more an arrangement of funds rather than a lease. In situations other than leasing, a firm needs to finance its assets either through borrowing or from his own capital. However, if a business has limited capital that is insufficient to buy an asset, it will have to go either for borrowing or any other option like leasing. The basic difference between borrowing and leasing is of ownership. In borrowing, the ownership is transferred initially and in the latter, ownership is typically transferred at the end of the term of lease.
- P.25. Under lease, the lessee would select the equipment that is needed, negotiate with the manufacturer about pricing, features and functionality of equipment. Once this has been agreed, the lease company purchases the equipment and leases the equipment to the lessee. The Lessor would have (legal) ownership, while the lessee gets the rights and benefit of use. Leasing is classified as off-balance sheet debt and does not appear on company's balance sheet and lowers initial cost and lower capex requirements (no or lower collateral requirements). Finally, leasing expense or lease payments are considered as operating expenses, and hence, like interest, are typically tax deductible and VAT payments on lease are only 1%, while VAT on a normal purchase is 18% (i.e. 17% advantage).
- P.26. The International Finance Corporation (IFC) offers an energy efficiency leasing facility in Turkey, rather than lending approach. Under this model, the IFC provides "blended" concessional loans (USD 115 million) to Turkish leasing companies for the express purpose to finance energy efficient equipment. Leasing companies such as IS Leasing, Yapi Kredi Leasing, and Finans Leasing, markets energy efficiency financing to its clients.

#### Guarantees

- P.27. Credit guarantee facilities provide guarantees on loans to borrowers by covering a share of the default risk of the loan. In case of default by the borrower, the lender recovers the value of the guarantee. Guarantees are usually provided against a fee, covered either by the borrower, the lender or both. In case of a default, the lender usually is obliged to

proceed with the collection of the loan and share the proceeds with the guarantor. Credit guarantees allow the partial transfer of credit risk stemming from a loan or a portfolio of loans.

- P.28. This project focuses on credit guarantee facilities providing guarantees on loans to SMEs. Financial institutions are usually reluctant to extend uncollateralised credit to SMEs, even at high interest rates, in part because of the high costs of obtaining adequate information on the true credit quality of typical small upstart companies. In addition, many of these firms do not have the necessary amount and type of assets that could serve as collateral for the loan. As a result, many SMEs with economically viable projects cannot obtain the necessary financing from the regular system of financial intermediation. This phenomenon is often referred to as the SME financing gap.
- P.29. In Turkey, the KGF with support from the Turkish Treasury provides guarantees to SMEs. This guarantee is provided to certain Turkish financial institutions and covers borrowers default. For manufacturing SMEs, the guarantee limit is TRL 2.5 million and 80% of the credit risk.

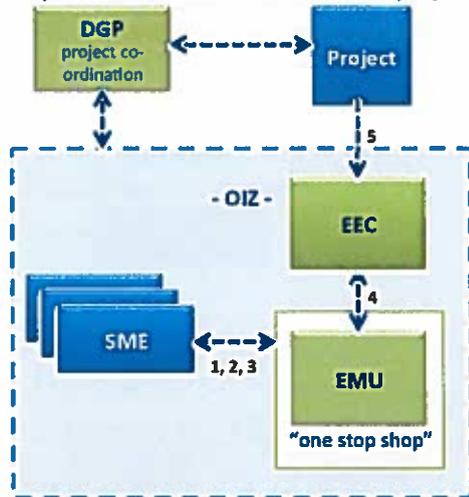
### P.3 Proposed Financial Structure

- P.30. Many of financial products available to SMEs are accessed on a voluntary basis provided they are able to meet collateral and liquidity requirements of the lenders. With limited knowledge of the SMEs on the benefits of energy efficient motors, these financial products are available from a number of sources including KOSGEB, state development banks as well as private commercial banks all of whom have a number of credit lines, which can be used for the finance of energy efficient motor investments. Industrial SMEs, however, are not highly motivated to initiate these investments given the voluntary time and effort required to apply for these credit lines. To date, this has not resulted in significant uptake of these financial products to the extent that the SME industrial motors market has transformed. Additional difficulties for industrial SMEs include qualifying for loan guarantees that can potentially reduce collateral requirements for these loans; loan guarantees from the KGF cover 80%. In addition, the administrative paperwork required to access these loan guarantees has been deemed onerous by many of the applicants, thereby reducing the number of loans for motor replacements. Under the Turkish Banking Law, borrowers are required to post collateral, even if they have guarantees.

### Implementation

- P.31. To increase the uptake of finance of electric motor replacements, the Project will assist DGP to develop and manage a “one-stop-shop” for industrial SMEs with a central role for the EMU in the OIZs. Once established, the EMU will be able to charge service fees to continue to offer these services. This “one-stop-shop” will allow the EMU to identify the potential for electric motor replacements, design a replacement plan for electric motors and assist and facilitate access to available financial products. The foundation to increase demand for financial support mechanisms will be the involvement of the EMU within the OIZ who will be enabled by the Project to provide guidance to industrial SMEs on best approaches to implementing an electric motor replacement program. The building of such a relationship takes advantage of the fact that EMUs are trusted by industrial SMEs to provide unbiased advice on such issues. Once the Project and DGP have successfully demonstrated the feasibility of this one-stop shop mechanism during Years 1 and 2 to all stakeholders including KOSGEB, they will enter into discussions with KOSGEB with the intention of having them increase their support for the mechanism by Years 3 to 5 of the Project. It is expected that KOSGEB will assume the management and promotion of EE motors through the use of the PEEMS-developed one-stop shop financial support mechanism.
- P.32. Implementing this structure will require the Project to enable the EMU to prepare an “efficient motor assessed potential” or EMAP that will provide an assessment of the potential motors to be replaced within an industrial SME (Relationship 1 in Flow Chart 1). An estimated 100 SMEs are anticipated to be surveyed on an EMAP per OIZ in an anticipated 3 OIZs. The cost of an EMAP survey is estimated to be USD 500 per SME and should be made payable to the EMU for each survey performed. The total cost for an EMAP per OIZ is estimated at USD 50,000. The project will contribute USD 20,000 to the payment of these costs, with the remainder paid for with contributions from KOSGEB via the SMEs or directly to the project, the motor manufacturers and the OIZ by making EMU staff available.

**Flow Chart 1:  
Implementation of demonstration project**



P.33. With an EMAP in place, the SME can target certain motors for a standard motor testing report (SMTR) to measure motor use that will provide recommended improvements not just to the electric motor itself, but to the entire electric motor drive system. From this information, a "Motor Energy Efficient Investment Plan" (MEEIP) can be prepared for an SME to include: (i) a technical component, which will include the proposed electric motors (brand, capacity and efficiency) with predefined associated equipment such as VSD, efficient belt, to fully benefit from potential cost savings; and (ii) a financial component, which will include the cost savings, payback period, monthly fee calculation with a simple sensitivity analysis (Relationship 2 in Flow Chart 1).

P.34. Selection of electric motors to include in the MEEIP will be made on a number of selection criteria, which include: (i) only equipment that is included in the List of Eligible Materials and Equipment (LEME), which is to be provided to the EMU at the start of the project and can be updated from time to time; (ii) investment plan should predominately include motor replacement, but also could include a limited amount of associated equipment to maximise the potential cost savings; (iii) the total investment amount of the

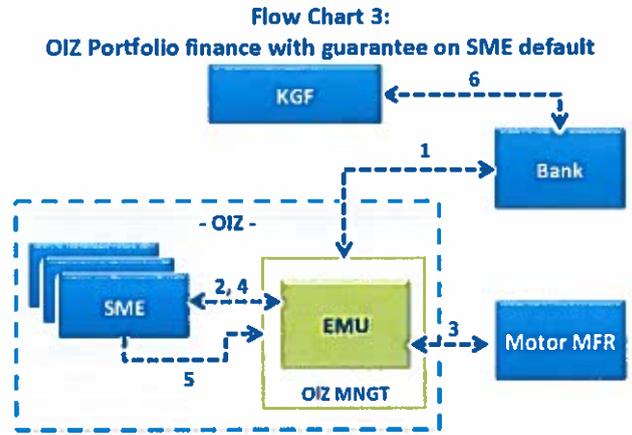
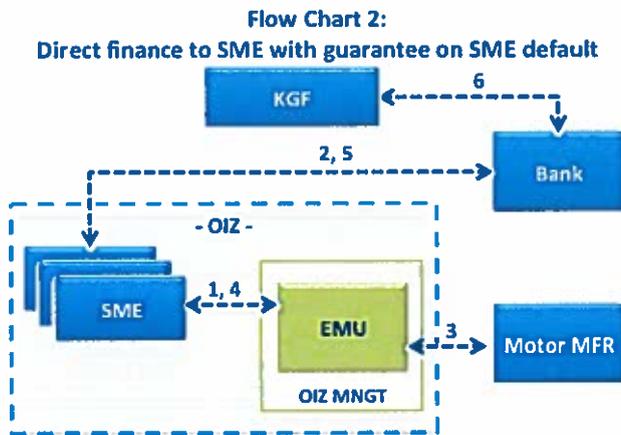
investment plan should not be less than USD 10,000 and not exceed USD 30,000, whereby the EMU should strive to an average investment amount per SME of USD 20,000; (iv) the payback period of the investment plan, which ideally should not be more than 2 years. The cost to prepare a MEEIP is estimated to be USD 1,500. The project is expected to contribute USD 70,000 per zone to these costs, which comes to USD 210,000 for three zones. The remainder will be funded with contributions from other stakeholders. (KOSGEB could support the funding of this activity). The total cost for the preparation of the MIEEPs per zone is therefore estimated at USD 150,000.

- P.35. The MEEIP can serve as the basis on which financing (or leasing as the case may be) will be arranged and therefore will be shared with relevant parties, such as banks for financing or with leasing company in case of leasing. After finance and purchase (see Section 4.3 below), the EMU will replace these motors while having limited impact to the SME's operations (Relationship 3 in Flow Chart 1). Each zone should identify and seek to implement motor energy efficiency investment with 100 SMEs. The total amount of investment that is to be leveraged in a zone is therefore estimated to be USD 2 million.
- P.36. The EMU will receive support from an EEC defined as Relationship 4 in Flow Chart 1. The exact support needed from the EEC will be tailored to the EMU's needs required for the demonstration project. The technical capacity of the relevant EMU is to be determined and compared to the anticipated technical capacity through a Project supported gap analysis. This support should at least include training on use of Motor Energy Efficient Assessment Tool, application of Motor Testing Measurements Procedure and Reporting and the preparation of MEEIP that will streamline scope and quality of the deliverables. Anticipated duration of such training programme is 5 days. The cost of the service provided by the EEC will be paid for by the project (see relationship 5 in Flow Chart 1). However, OIZ, KOSGEB and the Electric Motor Manufacturers (the Motor MFR) could contribute (either in cash or in kind) to these costs. The total cost for the EEC is estimated to be USD 45,500 for the training in 3 zones and a further 30,000 to prepare the tools and handbook and guides.

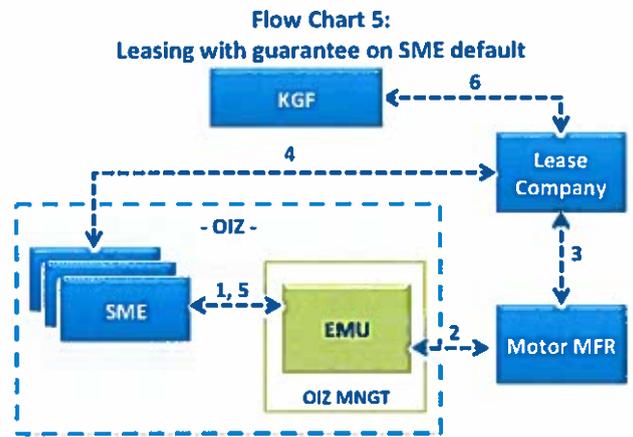
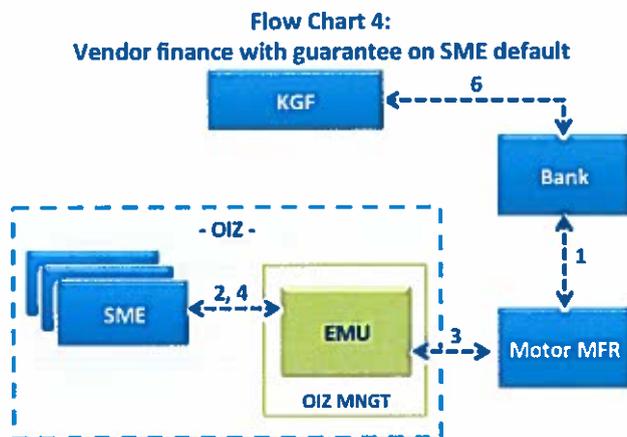
#### Finance

- P.37. The generation of an MEEIP from several SMEs has numerous advantages including the enabling of an SME to visualize its investment as well as options for financing such an investment; and creation of an enabling environment for promoting energy efficient motors such as a strengthened policy, legal and regulatory framework that governs motors.
- P.38. Through Project efforts to strengthen the EMU, the Project aims to enable the EMU to facilitate or arrange financing through 4 possible and already existing financing structures: (i) direct finance to the SME; (ii) portfolio finance by OIZ; (iii) vendor finance by manufacturer; and (iv) lease.

P.39. Under direct finance to the SME (see Flowchart 2), the EMU will identify, propose, negotiate and arrange the electric motor for the replacement (see Relationship 1 on Flowchart 2). The SME with support from the EMU will arrange financing (see Relationship 2). The EMU will arrange to source the equipment and its installation (Relationship 3 and 4). The SME will pay a monthly annuity to the bank for debt service (Relationship 5).



P.40. With portfolio finance by the OIZ (see Flowchart 3), the zone would arrange financing with a bank (see Relationship 1). The EMU would identify and propose the scope of the investment to the SME (Relationship 2). It will then negotiate the details of the purchase with the motor manufacturer (see Relationship 3). Once the purchase is concluded and delivered, the EMU will arrange installation (Relationship 4). The SME will pay a monthly rent under a rental agreement to the OIZ for the use of the equipment.



P.41. In case of vendor finance as depicted in Flowchart 4, the motor manufacturer will be the borrower to make the motors available to the SMEs (see Relationship 1). However, the EMU would still have a central role in identifying, proposing the scope of the investment to the SME (Relationship 2) and negotiating with the manufacturer or outlet (Relationship 3) and arrange installation (Relationship 4).

- P.42. Finally, in the case of leasing as depicted in Flowchart 5, the EMU would identify and propose the scope of the investment to the SME (Relationship 1) and negotiate with the manufacturer (Relationship 2). The manufacturer would sell the equipment to the leasing company (Relationship 3), who in their turn would lease the equipment to the SME for a monthly lease fee (Relationship 4). The EMU would receive and install the equipment (Relationship 5).
- P.43. A key incremental value of the PEEMS Project, however, envisions further de-risking of these financing schemes for SMEs. The risk of SMEs defaulting on their monthly payment is too restrictive for banks, OIZ, motor manufacturers or leasing companies. To make these finance structures less risky, a guarantee will need to be provided, which will pay out when a SME defaults on a payment. The Credit Guarantee Fund (KGF), illustrated as Relationship 6 on Flowcharts 2 to 5, could provide the guarantee. This fund is already providing guarantees to support SME finance. However, for a demonstration under the PEEMS Project, a guarantee that is tailored to the required needs of all stakeholders involved, such as a partial guarantee for a full demonstration (instead of specific case-by-case guarantees that would be unique for each SME). The project will contribute additional cost associated with the adjusting of the guarantee.
- P.44. In all cases, the SMEs would pay a fixed monthly fee (annuity) for the use of the electric motors and the installation of the equipment. This fixed fee would be based on estimated electricity cost savings, whereby the fee should be lower than the estimated cost savings with a longer tenure than the payback period. This would allow the SME to benefit from the motor replacements as detailed in the next section on a financial model on the replacement of electric motors under the project. To further enhance the attractiveness of the scheme as a demonstration, the OIZ will take central role in awareness creation among SMEs in the zone. A campaign will be organised with support from the Project.

Financial model: electric motor replacement

- P.45. For the financial modelling of the electric motor replacement several assumptions have been made. Most of these assumptions are based on the electric motor survey conducted by the Turkish Ministry of Science, Industry and Technology. The following assumptions have been made:
- **Investment and savings**
    - The average cost of an electric motor has been estimated at TRL 3,600, including 10% to cover the cost of installation;
    - The average electric motor investment per SME is USD 20,000 and therefore allows the replacement of 16 electric motors;
    - Each electric motor will be able to generate an average electricity cost saving of TRL 2,913 per year;
    - To increase the commitment of the SME a 10% sharing in the cost saving is applied, which leaves an average monthly cost saving of TRL 3,570 (i.e 90% of the total saving) to cover cost of the motor replacement.

Table P.1 presents the summary the assumptions made on the electric motor replacement investment and savings in cost of energy.

- **Interest rates and finance**
  - The loan will be provided in Turkish Lira (TRL) as summarized on Table P.2;
  - The interest rate of a bank loan is depending on the creditworthiness of the borrower. This will vary significantly. However, if an OIZ would apply for a loan, they typically would pay an annual interest rate of 13-15%. For a vendor this would be between 10 and 14% and for an SME anywhere between 15 and 20%. The averages of these rates have been used in the financial model, i.e. 14%, 12% and 17.5% for respectively OIZs, vendors and SMEs;
  - A credit guarantee provided by the KGF would cost an annual 2% of the (remaining) principal and an initial fee to cover the cost of 0.5% of the principal;
  - The guarantee would cover default of the SME for 80%; the benefit that the OIZ and vendor might create with their lower cost of capital (i.e. lower interest rates) would normally not be passed on to the SME. Both the OIZ and vendor would still charge at similar level as the interest rate that the SME would be able to obtain directly from a bank. The real benefit for financing via the OIZ or vendor is therefore not in the lower cost, but more in the improved abilities of the OIZ to arrange loans to borrow money, ability to aggregate and facilitate the transaction, thereby reducing the burden to the SME;

- In the case of (financial) lease, the interest rate that forms the base of the lease fee would be similar to the interest rate that a bank would apply on a loan to a SME, i.e. on average 17.5%;
- The real advantage of leasing is the difference in VAT. On a normal purchase, 18% VAT is applicable. In the case of leasing, only 1%. Therefore the value of the lease ticket (principal) is 17% lower than with a loan.

**Table P.1: Electric motor replacement investment and saving assumptions**

Assumptions	Amount	Notes
Cost average motor	TRL 3600	TRL/motor (including VAT and 10% installation cost)
Annual energy cost saving per electric motor	TRL 2,913	
Loan p/SME	TRL 60,000	Assumed equal to USD 20,000
Motors per SME	16.34	Average number of motors to be replaced
Sharing of proceeds with SMEs	10%	To increase commitment of the SME
Available for payback	TRL 3,569.85	This is the maximum available for annuity payment

**Table P.2: Summary electric motor interest rates and finance**

	Finance to OIZ		Finance to vendor		Finance to SME		Lease to SME	
	w/out KGF	w/ KGF	w/out KGF	w/ KGF	w/out KGF	w/ KGF	w/out KGF	w/ KGF
Average interest rate	14.0%	12.4%	12.0%	12.0%	17.5%	13.1%	17.5%	13.1%
Total of principal (USD)	60,000	60,000	60,000	60,000	60,000	60,000	51,356	51,356
Monthly annuity payment (USD)	3,595	3,595	3,595	3,595	3,595	3,595	3,595	3,595
Total of interest payments (USD)	7,026	6,116	5,893	5,893	9,122	6,510	6,560	4,721
Total cost of capital including principal (USD)	65,893	66,116	65,893	66,893	69,122	66,510	57,916	56,077
Tenor of the loan (months)	18.41	18.16	18.1	18.1	18.98	18.27	15.91	15.40
Potential benefit margin arranger p/SME (i.e. OIZ or vendor) (USD)	2,096	394	3,229	617	-	-	-	-
Potential benefit/margin arranger p/OIZ (i.e. OIZ or vendor) (USD)	209,600	39,400	322,900	61,700	-	-	-	-

Table P.3: Pros and Cons of Various Financing Channels

Finance to OIZ	Finance to vendor	Finance to SME	Lease to SME
<b>Capacity to borrow money</b>			
<ul style="list-style-type: none"> <li>- OIZs have lines of credit in place with banks for on-going investments and upgrades in zone.</li> <li>- OIZs typically have provided collateral for these lines, which could be extended to cover loan for electric motor replacements.</li> <li>- Not all OIZ are able or willing to arrange money;</li> <li>- OIZs claim regulatory restrictions to financially support SMEs with EE</li> </ul>	<ul style="list-style-type: none"> <li>- OIZs have lines of credit in place with banks for on-going investments and upgrades in the zone</li> <li>- Vendors typically have provided collateral for these lines, which could be extended to cover the loan for the electric motor replacements.</li> <li>- Not all vendors are willing to arrange financing</li> </ul>	<ul style="list-style-type: none"> <li>- Collateral is required and often not available</li> <li>- Limited understanding of finance requirements</li> <li>- Perceived as cumbersome process</li> <li>- Small loan amounts, therefore high transaction cost</li> </ul>	<ul style="list-style-type: none"> <li>- Typically no collateral is required</li> <li>- Review creditworthiness on SME is typically needed</li> <li>- Small lease tickets, therefore high transaction cost</li> </ul>
<b>Effectiveness working with SMEs</b>			
Finance to OIZ	Finance to vendor	Finance to SME	Lease to SME
<ul style="list-style-type: none"> <li>- SMEs are members of OIZ and OIZ is bound by statutory obligation to facilitate members to operate their business</li> <li>- OIZ already provides services to SMEs, including energy supply and often generation</li> <li>- Relationship of trust and generally good understanding</li> </ul>	<ul style="list-style-type: none"> <li>- Supply of equipment often via suppliers and not directly from factory, therefore SMEs at arm's length</li> <li>- SME default risk High fee collection risk as vendors have limited exposure to SMEs to control payment.</li> <li>- Vendors are perceived as biased to their own products (forced sourcing)</li> </ul>	<ul style="list-style-type: none"> <li>- Banks are already working with SMEs</li> <li>- Banks are typically respected by SMEs</li> </ul>	<ul style="list-style-type: none"> <li>- Although not to common for small sized enterprises, leasing is applied in SMEs, especially for capacity extension.</li> <li>- Ticket of USD 20 is relatively small</li> </ul>
<b>Effectiveness to implement replacements</b>			
Finance to OIZ	Finance to vendor	Finance to SME	Lease to SME
<ul style="list-style-type: none"> <li>- OIZs have EMU operational</li> <li>- Finance via OIZ, will empower EMU role in assisting with EE</li> <li>- Sometimes limited capacity</li> </ul>	<ul style="list-style-type: none"> <li>- Clear understanding what is required to implement motor replacements</li> <li>- Forced sourcing</li> </ul>	<ul style="list-style-type: none"> <li>- Will require EMU to assist with the implementation of the replacements</li> </ul>	<ul style="list-style-type: none"> <li>- Will require EMU to assist with the implementation of the replacements</li> </ul>
<b>Ability to aggregate</b>			

Finance to OIZ	Finance to vendor	Finance to SME	Lease to SME
<ul style="list-style-type: none"> <li>- Finance to OIZ will need to be based on aggregation to create interest of zone management, benefit from economies of scale and most importantly to spread risk over portfolio</li> </ul>	<ul style="list-style-type: none"> <li>- Vendor finance will need to be based on aggregation to create interest of vendor, benefit from economies of scale and most importantly to spread risk over portfolio</li> </ul>	<ul style="list-style-type: none"> <li>- n/a (could be structured that EMU facilitates aggregation of equipment purchases)</li> </ul>	<ul style="list-style-type: none"> <li>- n/a (could be structured that EMU facilitates aggregation of equipment purchases)</li> </ul>
<b>Ability to collect annuity payment</b>			
<ul style="list-style-type: none"> <li>- Already collect utility and other OIZ services bill from SMEs</li> <li>- Can force payment by suspending other services, such as electricity supply</li> </ul>	<ul style="list-style-type: none"> <li>- Often no existing relationship</li> <li>- Supply of equipment often via local dealers</li> <li>- Difficult to collect fees in case of default</li> </ul>	<ul style="list-style-type: none"> <li>- Banks typically have ability to cease funds or arrange automatic fee collection</li> </ul>	<ul style="list-style-type: none"> <li>- Experienced in fee collection</li> <li>- Lease company often linked to bank</li> </ul>

**Table P.4: Sample Monthly Payments by OIZs and Motor Vendors (in USD)**

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total	
<b>Lain to OIZ w/ 80% KCF</b>																						
Month	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
remaining principal	60,000.00	56,918.75	53,976.28	50,842.27	47,726.39	44,578.31	41,397.70	38,184.23	34,937.55	31,653.23	28,335.20	24,999.83	21,641.86	18,193.93	14,700.68	11,251.75	7,796.37	4,165.37	1,455.76	0	0	6,115.52
interest payments	0	670.00	588.78	557.24	525.37	493.17	460.64	427.78	394.57	372.13	349.88	327.88	306.28	285.28	264.80	244.80	225.32	206.38	187.94	170.44	153.00	394.49
principal payments	0	3,021.25	3,052.87	3,084.01	3,115.88	3,148.00	3,180.61	3,213.67	3,246.68	3,280.23	3,314.22	3,348.37	3,382.57	3,416.81	3,451.25	3,485.88	3,520.58	3,555.34	3,590.16	3,625.04	3,659.97	60,000.00
total payment	0	3,691.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	60,000.00
check	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.16
<b>Lain to OIZ w/out KCF</b>																						
Month	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
remaining principal	60,000.00	57,051.875	54,083.19	51,072.91	48,071.51	44,966.58	41,829.70	38,676.47	35,486.44	32,259.20	28,994.31	25,691.33	22,349.91	18,969.31	15,549.36	12,089.52	8,593.22	5,068.28	1,465.97	0	0	2,096.31
interest payments	0	700.00	645.59	630.97	615.85	600.32	584.48	568.31	551.91	535.36	518.68	501.88	484.99	468.01	450.94	433.78	416.53	399.18	381.74	364.21	346.65	5,872.62
principal payments	0	2,941.25	2,975.56	3,010.28	3,045.40	3,080.93	3,116.87	3,153.24	3,190.07	3,227.24	3,264.69	3,302.38	3,340.33	3,378.53	3,416.98	3,455.68	3,494.54	3,533.56	3,572.74	3,612.06	3,651.52	60,000.00
total payment	0	3,641.25	3,621.11	3,641.25	3,661.25	3,681.25	3,701.25	3,721.25	3,741.25	3,761.25	3,781.25	3,801.25	3,821.25	3,841.25	3,861.25	3,881.25	3,901.25	3,921.25	3,941.25	3,961.25	3,981.25	65,872.62
check	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.41
<b>Lain to Vendor w/ 80% KCF</b>																						
Month	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
remaining principal	60,000.00	56,958.75	53,887.09	50,784.71	47,651.31	44,486.57	41,299.18	38,084.84	34,851.20	31,597.97	28,322.36	24,933.26	21,429.22	17,819.87	14,115.32	10,315.45	6,420.81	2,342.81	0	0	0	5,872.62
interest payments	0	600.00	569.59	538.87	507.85	476.51	444.87	412.90	380.67	348.01	314.88	281.27	247.22	212.79	178.04	142.99	107.64	72.09	36.44	0	0	617.39
principal payments	0	3,041.25	3,071.66	3,102.38	3,133.40	3,164.74	3,196.38	3,228.35	3,260.63	3,293.24	3,326.17	3,359.33	3,392.73	3,426.36	3,460.23	3,494.34	3,528.68	3,563.25	3,598.04	3,633.06	3,668.31	60,000.00
total payment	0	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	65,872.62
check	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.10
<b>Lain to Vendor w/out 80% KCF</b>																						
Month	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
remaining principal	60,000.00	57,013.25	53,994.00	50,943.09	47,852.97	44,729.17	41,566.33	38,367.90	35,130.50	31,859.76	28,559.23	25,233.16	21,887.22	18,526.11	15,155.50	11,780.06	8,404.65	5,024.81	1,645.97	0	0	5,872.62
interest payments	0	655.00	627.40	599.44	571.20	542.78	514.18	485.40	456.45	427.33	398.04	368.57	338.92	309.09	279.09	248.92	218.58	188.06	157.36	126.47	95.34	3,279.22
principal payments	0	2,986.25	3,018.85	3,051.81	3,085.12	3,118.80	3,152.85	3,187.27	3,222.04	3,257.23	3,292.74	3,328.57	3,364.73	3,401.21	3,438.01	3,475.13	3,512.56	3,550.31	3,588.38	3,626.76	3,665.45	60,000.00
total payment	0	3,641.25	3,646.25	3,651.25	3,656.25	3,661.25	3,666.25	3,671.25	3,676.25	3,681.25	3,686.25	3,691.25	3,696.25	3,701.25	3,706.25	3,711.25	3,716.25	3,721.25	3,726.25	3,731.25	3,736.25	65,872.62
check	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.10
<b>Lain to SME w/ 80% KCF</b>																						
Month	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
remaining principal	60,000.00	57,233.75	54,473.16	51,579.64	48,550.59	45,394.57	42,118.19	38,726.19	35,223.20	31,615.76	27,909.43	24,111.81	20,231.51	16,277.13	12,257.27	8,181.46	4,050.46	0	0	0	0	6,510.00
interest payments	0	875.00	834.66	793.73	752.60	710.87	669.04	627.50	585.65	543.78	501.98	460.53	419.53	379.07	338.20	296.92	256.23	215.14	173.74	132.04	90.94	3,279.22
principal payments	0	2,766.25	2,806.59	2,847.52	2,889.05	2,931.38	2,974.38	3,017.93	3,062.04	3,106.71	3,151.94	3,197.73	3,244.07	3,290.95	3,338.37	3,386.34	3,434.85	3,483.90	3,533.49	3,583.62	3,634.29	60,000.00
total payment	0	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	66,510.00
check	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.27
<b>Lain to SME w/out 80% KCF</b>																						
Month	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
remaining principal	60,000.00	57,233.75	54,473.16	51,579.64	48,550.59	45,394.57	42,118.19	38,726.19	35,223.20	31,615.76	27,909.43	24,111.81	20,231.51	16,277.13	12,257.27	8,181.46	4,050.46	0	0	0	0	9,121.83
interest payments	0	875.00	834.66	793.73	752.60	710.87	669.04	627.50	585.65	543.78	501.98	460.53	419.53	379.07	338.20	296.92	256.23	215.14	173.74	132.04	90.94	3,279.22
principal payments	0	2,766.25	2,806.59	2,847.52	2,889.05	2,931.38	2,974.38	3,017.93	3,062.04	3,106.71	3,151.94	3,197.73	3,244.07	3,290.95	3,338.37	3,386.34	3,434.85	3,483.90	3,533.49	3,583.62	3,634.29	60,000.00
total payment	0	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	69,121.83
check	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.98
<b>Lain to SME w/ 0% KCF</b>																						
Month	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
remaining principal	60,000.00	51,255.93	48,275.37	45,161.07	42,012.83	38,890.72	35,612.87	32,300.39	28,948.24	25,561.53	22,155.60	18,736.19	15,308.19	11,876.19	8,435.26	4,989.52	1,544.21	0	0	0	0	4,721.48
interest payments	0	560.64	527.01	493.01	458.64	423.90	388.77	353.27	317.09	280.36	243.13	205.41	167.20	128.50	89.30	49.10	0	0	0	0	0	51,255.93
principal payments	0	3,000.61	3,114.24	3,148.24	3,182.61	3,217.35	3,252.48	3,287.90	3,323.61	3,359.61	3,395.99	3,432.74	3,469.85	3,507.31	3,545.12	3,583.28	3,621.79	3,660.64	3,699.84	3,739.28	3,778.97	60,000.00
total payment	0	3,561.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	3,641.25	64,727.41
check	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.40
<b>Lain to SME w/out 0% KCF</b>																						
Month	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
remaining principal	60,000.00	48,463.62	45,529.13	42,551.85	39,531.15	36,466.59	33,266.95	30,021.15	26,730.87	23,405.72	19,945.30	16,358.30	12,644.30	8,812.10	4,871.40	0	0	0	0	0	0	6,560.13
interest payments	0	748.94	706.76	663.97	620.55	576.50	531.80	487.44	443.33	399.46	355.84	312.46	269.33	226.46	183.84	141.46	99.24	57.18	15.18	0	0	51,255.93
principal payments	0	2,892.31	2,934.49	2,977.28	3,020.70	3,064.75	3,109.45	3,154.79	3,200.78													

**STANDARD LETTER OF AGREEMENT BETWEEN UNDP AND THE MINISTRY OF SCIENCE  
INDUSTRY AND TECHNOLOGY OF THE REPUBLIC OF TURKEY FOR PROVISION OF  
SUPPORT SERVICES**

Dear Mr. Yılmaz,

1. Reference is made to consultations between officials of the Ministry of Science, Industry and Technology (hereinafter referred to as “Ministry”) and officials of UNDP Turkey hereinafter referred to as UNDP with respect to the provision of support services by the UNDP Turkey country office for nationally managed project “Promoting Energy Efficient Motors in SMEs Project” (89899 Award ID, 95939 Project ID) (Hereinafter referred to as Project). UNDP and the Ministry hereby agree that the UNDP country office may provide such support services at the request of the Ministry through its institution designated in the relevant project document, as described below.
2. The UNDP country office may provide support services for assistance with reporting requirements and direct payment. In providing such support services, the UNDP country office shall ensure that the capacity of the Ministry -designated institution is strengthened to enable it to carry out such activities directly. The costs incurred by the UNDP country office in providing such support services shall be recovered from the administrative budget of the office.
3. The UNDP country office may provide, at the request of the designated institution, the following support services for the activities of the project:
  - a) Identification and recruitment of project and programme personnel;
  - b) Identification and facilitation of training activities;
  - c) Procurement of goods and services.
4. The procurement of goods and services and the recruitment of project and programme personnel by the UNDP country office shall be in accordance with the UNDP regulations, rules, policies and procedures. Support services described in paragraph 3 above shall be detailed in an annex to the project document, in the form provided in the Attachment hereto. If the requirements for support services by the country office change during the life of a project, the annex to the project document is revised with the mutual agreement of the UNDP resident representative and the designated institution.
5. The relevant provisions of the “Revised Standard Agreement” between UNDP and the Government of Turkey signed on 21 October 1965, including the provisions on obligations, facilities, privileges and immunities, shall apply to the provision of such support services. The Government shall retain overall responsibility for the nationally managed project through the Ministry as its designated institution. The responsibility of the UNDP country office for the provision of the support services described herein shall be limited to the provision of such support services detailed in the annex to project document.
6. Any claim or dispute arising under or in connection with the provision of support services by the UNDP country office in accordance with this letter shall be handled pursuant to the relevant provisions of the “Revised Standard Agreement”.
7. The manner and method of cost-recovery by the UNDP country office in providing the support services described in paragraph 3 above shall be specified in the annex to project document.

8. The UNDP country office shall submit progress reports on the support services provided and shall report on the costs reimbursed in providing such services, as may be required.
9. Any modification of the present arrangements shall be effected by mutual written agreement of the parties hereto.
10. If you are in agreement with the provisions set forth above, please sign and return to this office two signed copies of this letter. Upon your signature, this letter shall constitute an agreement between the Ministry and UNDP on the terms and conditions for the provision of support services by the UNDP country office for nationally managed projects.

Yours sincerely,

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Signed on behalf of UNDP  
Claudio Tomasi  
UNDP Country Director

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For the Ministry of Science, Industry and  
Technology of the Republic of Turkey  
Anıl Yılmaz  
General Director of Productivity of the  
Ministry of Science, Industry and  
Technology

## Attachment

### **DESCRIPTION OF UNDP COUNTRY OFFICE SUPPORT SERVICES**

1. Reference is made to consultations between the Ministry of Science, Industry and Technology, the institution designated by the Government of Turkey and officials of UNDP with respect to the provision of support services by the UNDP country office for the nationally managed GEF funded project "Promoting Energy Efficient Motors in SMEs Project"

2. In accordance with the provisions of the letter of agreement signed on 12 June 2015 and the project document, the UNDP country office shall provide support services for the project "Promoting Energy Efficient Motors in SMEs Project" as described below.

3. Support services to be provided:

<b>Support Services</b>	<b>Total Cost to UNDP</b>	<b>Method of Reimbursement of UNDP</b>
1. Procurement Support	\$50,000.00	DPC & Billing
2. HR and Administrative Support	\$50,000.00	DPC & Billing
<b>Total:</b>	<b>\$100,000.00</b>	

4. Description of functions and responsibilities:

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UNDP country office support services to national execution:

1. Recruitment of Project personnel:

- Assist in conducting search for suitable candidates (advertisement, website, roster)
- Assist in preparing TORs
- Involve in interviewing candidates
- Assist in issuing contracts
- Authorizing salary/consultancy fee/missions
- Assess performance

2. Sub – contracting/Procurement

- Assist in identifying suitable subcontractors (advertisement, website, posters)
- Assist in preparing TORs
- Assist in evaluating TORs
- Assist in evaluation bids
- Assist in issuing contracts (when necessary)
- Assess sub – contractors work
- Ensure inputs as per contracts TOR's
- Ensure payments are made accordingly
- Ensure milestones are met

- Critical review of sub – contractors performance
- 3. Financial Management and Accountability
  - Training of staff of implementing agency on financial disbursement and reporting
- 4. Training/Workshops
  - Making appropriate arrangements for the logistical and technical support of the training and workshop activities
- 5. Equipment
  - Review specifications
  - Identify suppliers of goods and services
  - Approve specifications
  - Assist in evaluating contracts
  - Assist in awarding contracts (when necessary)
  - Undertake Customs clearance
  - Authorize payments.





Annex Q: Direct Project Costs (DPC)

**STANDARD LETTER OF AGREEMENT BETWEEN UNDP AND THE MINISTRY OF SCIENCE INDUSTRY AND TECHNOLOGY OF THE REPUBLIC OF TURKEY FOR PROVISION OF SUPPORT SERVICES**

Dear Mr. Yilmaz,

1. Reference is made to consultations between officials of the Ministry of Science, Industry and Technology (hereinafter referred to as "Ministry") and officials of UNDP Turkey hereinafter referred to as UNDP with respect to the provision of support services by the UNDP Turkey country office for nationally managed project "Promoting Energy Efficient Motors in SMEs Project" (Hereinafter referred to as Project). UNDP and the Ministry hereby agree that the UNDP country office may provide such support services at the request of the Ministry through its institution designated in the relevant project document, as described below.

2. The UNDP country office may provide support services for assistance with reporting requirements and direct payment. In providing such support services, the UNDP country office shall ensure that the capacity of the Ministry-designated institution is strengthened to enable it to carry out such activities directly. The costs incurred by the UNDP country office in providing such support services shall be recovered from the administrative budget of the office.

3. The UNDP country office may provide, at the request of the designated institution, the following support services for the activities of the project.

- a) Identification and recruitment of project and programme personnel,
- b) Identification and facilitation of training activities,
- c) Procurement of goods and services.

4. The procurement of goods and services and the recruitment of project and programme personnel by the UNDP country office shall be in accordance with the UNDP regulations, rules, policies and procedures. Support services described in paragraph 3 above shall be detailed in an annex to the project document, in the form provided in the Attachment hereto. If the requirements for support services by the country office change during the life of a project, the annex to the project document is revised with the mutual agreement of the UNDP resident representative and the designated institution.

5. The relevant provisions of the "Revised Standard Agreement" between UNDP and the Government of Turkey signed on 21 October 1965, including the provisions on obligations, facilities, privileges and immunities, shall apply to the provision of such support services. The Government shall retain overall responsibility for the nationally managed project through the Ministry as its designated institution. The responsibility of the UNDP country office for the





provision of the support services described herein shall be limited to the provision of such support services detailed in the annex to project document.

6. Any claim or dispute arising under or in connection with the provision of support services by the UNDP country office in accordance with this letter shall be handled pursuant to the relevant provisions of the "Revised Standard Agreement".
7. The manner and method of cost-recovery by the UNDP country office in providing the support services described in paragraph 3 above shall be specified in the annex to project document.
8. The UNDP country office shall submit progress reports on the support services provided and shall report on the costs reimbursed in providing such services, as may be required.
9. Any modification of the present arrangements shall be effected by mutual written agreement of the parties hereto.
10. If you are in agreement with the provisions set forth above, please sign and return to this office two signed copies of this letter. Upon your signature, this letter shall constitute an agreement between the Ministry and UNDP on the terms and conditions for the provision of support services by the UNDP country office for nationally managed projects.

Yours sincerely,

A handwritten signature in black ink, appearing to be 'C. Tomasi', written over a horizontal line.

Signed on behalf of UNDP  
Claudio Tomasi  
Country Director

A handwritten signature in black ink, appearing to be 'Anil Yilmaz', written over a horizontal line.

For the Ministry of Science, Industry  
and Technology of the Republic of  
Turkey  
Anil Yilmaz  
General Directorate of Productivity  
General Director



## Attachment

### DESCRIPTION OF UNDP COUNTRY OFFICE SUPPORT SERVICES

1. Reference is made to consultations between the Ministry of Science, Industry and Technology, the institution designated by the Government of Turkey and officials of UNDP with respect to the provision of support services by the UNDP country office for the nationally managed GEF funded project "Promoting Energy Efficient Motors in SMEs Project"

2. In accordance with the provisions of the letter of agreement signed on 12 June 2015 and the project document, the UNDP country office shall provide support services for the project "Promoting Energy Efficient Motors in SMEs Project" as described below.

3. Support services to be provided:

Support Services	Total Cost to UNDP	Method of Reimbursement of UNDP
1. Procurement Support	\$50,000.00	DPC & Billing
2. HR and Administrative Support	\$50,000.00	DPC & Billing
Total:	\$100,000.00	

4. Description of functions and responsibilities:

UNDP country office support services to national execution:

1. Recruitment of Project personnel:

- Assist in conducting search for suitable candidates (advertisement, website, roster)
- Assist in preparing TORs
- Involve in interviewing candidates
- Assist in issuing contracts
- Authorizing salary/consultancy fee/missions
- Assess performance

2. Sub-contracting/Procurement

- Assist in identifying suitable subcontractors (advertisement, website, posters)
- Assist in preparing TORs
- Assist in evaluating TORs
- Assist in evaluation bids
- Assist in issuing contracts (when necessary)
- Assess sub-contractors work
- Ensure inputs as per contracts TOR's
- Ensure payments are made accordingly
- Ensure milestones are met
- Critical review of sub-contractors performance

3. Financial Management and Accountability

- Training of staff of implementing agency on financial disbursement and reporting

4. Training/Workshops



- Making appropriate arrangements for the logistical and technical support of the training and workshop activities

#### 2. Equipment

- Review specifications
- Identify suppliers of goods and services
- Approve specifications
- Assist in evaluating contracts
- Assist in awarding contracts (when necessary)
- Undertake Customs clearance
- Authorize payments





26 April 2016

**Subject:** Co-financing letter for the “Promoting Energy-Efficient Motors in Small and Medium Sized Enterprises” project

Dear Ms. Dinu,

I would like to express UNDP Turkey’s support for the full-size project proposal on “Promoting Energy-Efficient Motors in Small and Medium Sized Enterprises”. This project aims to promote significant additional investment in industrial energy efficiency in Turkey by transforming the market for energy efficient motors used in small and medium sized enterprises.

As the Implementing Agency for this project, we would like to confirm our commitment to co-finance this project in the amount of \$300,000 (\$80,000 in-cash and \$220,000 in-kind) over the lifetime of project implementation.

Your Sincerely,

A handwritten signature in blue ink, appearing to read 'Kamal Malhotra', is written over a vertical line that extends down to the name below.

Kamal MALHOTRA  
UN Resident Coordinator  
UNDP Resident Representative

Ms. Adriana DINU  
UNDP-GEF Executive Coordinator and Director a.i.  
Global Environmental Facility Unit (UNDP-GEF)  
Energy & Environment Group, BDP  
304 East 45<sup>th</sup> Street  
9<sup>th</sup> Floor New York, NY 10017, USA

