**Project Identification Form (PIF)**

**Project Type:** **Full-Size Project**

**Type of Trust Fund:** **GEF Trust Fund**

For more information about GEF, visit [TheGEF.org](http://www.thegef.org/gef/home)

**PART I: Project Information**

|  |  |  |  |
| --- | --- | --- | --- |
| Project Title: | Promoting Energy Efficient Electric Motors in Chinese Industries | | |
| Country(ies): | People’s Republic of China | GEF Project ID:[[1]](#footnote-1) | 5360 |
| GEF Agency(ies): | UNDP | GEF Agency Project ID: | 5121 |
| Other Executing Partner(s): | In China: Ministry of Industry and Information Technology (MIIT) | Submission Date: | 9 April 2013 |
| GEF Focal Area (s): | Climate Change | Project Duration(Months) | 48 |
| Name of parent program (if applicable):   * For SFM/REDD+ * For SGP | N.A. | Agency Fee ($): | 332,500 |

1. **Indicative** [**Focal AREA STRATEGYFramework**](http://www.thegef.org/gef/sites/thegef.org/files/documents/document/GEF5-Template%20Reference%20Guide%209-14-10rev11-18-2010.doc)**[[2]](#footnote-2):**

|  |  |  |  |
| --- | --- | --- | --- |
| Focal Area Objectives | Trust Fund | IndicativeGrant Amount($) | Indicative Co-financing($) |
| CCM-2 | GEFTF | 3,500,000 | 17,700,000 |
| Total Project Cost |  | 3,500,000 | 17,700,000 | |

1. **Indicative Project Framework**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Project Objective: Increased manufacturing and widespread application of energy efficient electric motors[[3]](#footnote-3) in China | | | | | | |
| Project Component | Grant Type[[4]](#footnote-4) | Expected Outcomes | Expected Outputs | Trust Fund | IndicativeGrant Amount ($) | Indicative Co-financing($) |
| 1. Policy and Regulatory Frameworks on the Production and Application of Energy Efficient Electric Motors (EE motors) | TA | Enhanced and clearly defined policy enforcement mechanisms on the production EE motorsand their applications in the Chinese industrial sector | 1.1. Completed survey of the local electric motor market in China  1.2. Completed review of existing policies and regulations applicable to EE motors applications in buildings and industries in China  1.3. Recommended policies and implementing rules and regulations on EE motors production and their application in the Chinese industries1.4. Recommended policies and implementing rules and regulations on the development and support of the local EMR industry.  1.5. Recommended policies and implementing rules and regulations for the phasing out (including appropriate support measures) of existing low efficiency electric motors.  1.6. Enforced implementing rules and mechanisms for the approved policies & regulations on EE Motors production and application | GEFTF | 800,000 | 1,900,000 |
| 2. Energy Efficient Electric Motor Production andApplications | TA | Increased local production of EE motors for applications in Chinese industries | 2.1.1.Developed capacity development program for local EE motor (HEM and REM) manufacturers;  2.1.2. Completed training courses for local electric motor manufacturers on the design and manufacturing of EE motors (HEMs and REMs)  2.1.3. Disseminated information on improved EE motor product design and production | GEFTF | 900,000 | 957,000 |
| Inv |  | 2.2.1. Established and operational EE motor research center and EE motor industry association  2.2.2. Completed demonstration of improved EE motor product design and manufacturing  2.2.3. Commercialization of REM products  2.2.4. Established and enforced EE motors product testing and certification system; | GEFTF | 1,003,330 | 11,000,000 |
| 3. Financial Support & Accessibility Improvement | TA | Increased application of domestically produced EE Motors(HEMs and REMs)in Chinese industries | 3.1. Completed techno-economic feasibility assessment and action plan for financing improved EE motor initiatives of local electric motor manufacturers and suppliers  3.2. Developed and implemented new business models for local financial institutions to supportEEmotor manufacturing  3.3. Operational EE motor rebate program\* for electric motor users | GEFTF | 350,000 | 1,500,000 |
| 4. Energy Efficient Electric Motor Promotion |  | Increased market share of energy efficient electric motors | 4.1. Established and operational electric motor market monitoring system  4.2. Regularly disseminated publication of local EE motors market and product performance Information  4.3. Established guidelines for EE motor (HEM &REM) procurement  4.4. Operational EE motor (HEM and REM) manufacturer incentive program  4.5. Completed industrial consumer education campaigns on EE motor (HEM and REM) applications  4.6. Sustainable follow-up plan for the replication of the project interventions in other cities in collaboration with electric motor manufacturers in other Chinese cities. | GEFTF | 280,000 | 1,500,000 |
| Subtotal | | | |  | 3,333,330 | 16,857,000 |
| Project Management Cost (PMC)[[5]](#footnote-5) | | | | GEFTF | 166,670 | 843,000 |
| Total Project Cost | | | |  | 3,500,000 | 17,700,000 |

**\***This program is meant for the replacement of old, low efficiency electric motors (10 kW and above). The program aims to encourage consumers to replace their standard electric motors with EE motors (HEM and REM). The idea under the program is to carry this out through some sort of a rebate scheme that involves exchanging standard electric motors withEEmotors. The customers will receive lower price for newEE motor units if they send their old standard electric motors to: (a) EE motor dealers for exchanging with new EE motors; or (b) to REM manufacturers for remanufacturing. The possibility of having this kind of intervention in the envisioned project will be verified and confirmed during the logical framework analysis (LFA) exercise during the project preparation stage.

1. **Indicative** [**Co-financing**](http://gefweb.org/Documents/Council_Documents/GEF_C21/C.20.6.Rev.1.pdf) **for the project by source and by name if available, ($)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sources of Co-financing** | **Name of Co-financier** | **Type of Co-financing** | **Amount ($)** | **Main Project Contribution** |
| National Government | Ministry of Industry and Information Technology of the People's Republic of China | Cash | 1,900,000 | * EE motor rebate scheme * REMs standards * REMs certification system * Support for Project Management Office (PMO) expenses |
| National Government | Ministry of Industry and Information Technology of the People's Republic of China | In-kind | 1,000,000 | * Support for project M&E * Project coordination |
| Local Government | Shandong Provincial Government | Cash | 1,900,000 | * REMs manufacturing demonstration * Support for PMO expenses |
| Local Government | Shandong Provincial Government | In-kind | 1,300,000 | * Support for project M&E * Project coordination |
| Local Government | Hunan Provincial Government | Cash | 1,000,000 | * REMs manufacturing demonstration * Support for PMO expenses |
| Private Sector | Xiangtan Electric Manufacturing Co. Ltd. | Cash | 900,000 | * Project demonstration |
| Local Government | Hunan Provincial Government | In-kind | 1,200,000 | * Support for project M&E * Project coordination |
| Local Government | Shanghai Municipal Government | Cash | 2,300,000 | * REMs product R&D * EE motor rebate scheme * REMs research center * REMs testing facility * Support for PMO expenses |
| Local Government | Shanghai Municipal Government | In-kind | 1,000,000 | * Support for project M&E * Project coordination |
| Local Government | Anhui Provincial Government | Cash | 2,400,000 | * REMs product R&D * REMs manufacturing demonstration * REMs testing facility * Support for PMO expenses |
| Private Sector | Anhui Wannan Electric Machine Co. Ltd. | Cash | 1,000,000 | * Project demonstration |
| Local Government | Anhui Provincial Government | In-kind | 1,000,000 | * Support for project M&E * Project coordination |
| Private Sector | Xi'an SIMO Motor, Inc. | Cash | 500,000 | * Project demonstration |
| GEF Agency | UNDP | Cash | 300,000 | * Project management |
| **Total Co-financing** | | | 17,700,000 |  |

1. **Indicative trust fund Resources($) Requested by Agency, Focal Area and Country**a**: N.A.**

aPMC amount from Table B should be included proportionately to the focal area amount in this table.

1. **Project preparation grant (PPG)**

Please check on the appropriate box for PPG as needed for the project according to the GEF Project Grant:

Amount Agency Fee

Requested ($) for PPG ($)[[6]](#footnote-6)

* No PPG required. \_\_\_-- 0--\_\_\_\_ --0--\_\_\_
* (up to) $50k for projects up to& including $1 million \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_
* (up to)$100k for projects up to& including $3 million \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_
* (up to)$150k for projects up to & including $6 million 150,000 14,250
* (up to)$200k for projects up to& including $10 million \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_
* (up to)$300k for projects above $10 million \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_

1. **PPG Amount requested by agency(ies), focal area(s) and country(ies) for MFA and/or MTF Project only: N. A.**

**part ii: project JustiFication**

**Project Overview**

**A.1. Project Description**:

Global Environmental Problems, Root Causes and Barriers

Globally, electric motor systems have been identified as the major electricity consumer in the industrial sector of countries, and have been recognized as having one of the largest energy and energy cost savings potentials. These electric motors are by and large responsible for about 60% of industrial electricity consumption. It is estimated that in 2011, electric motor systems accounted for an estimated 64% of China’s total annual electricity consumption, or about 3 trillion kWh with the installed capacity of 1.7 billion kW. On average, locally produced electric motors in China typically have efficiencies that are lower by approximately 3 to 5 percentage points than those in the developed countries such as the USA and Canada. It has been estimated that there will be 26 billion kWh annual electricity saving amount for 1% efficiency improvement. In this regard, the country has ample reasons and opportunities to improve the efficiency of locally made and used electric motor[[7]](#footnote-7).

The national standard GB18613-2012 was implemented in September 2012, and the outdated electric motor product inventory was phased out in October 2012. The Government of China intends to remove the Y and Y2 series electric motors from the market[[8]](#footnote-8). The local electric motor manufacturers and retailers are required not to produce and sell these outdated electric motor products. However, existing owners of such kind of products can continue to use them. Because there is currently no mandatory requirement for electric motor users to use the GB18613-2006 premium/high rated electric motors, the continuous use of the standard low-efficient electric motors is a barrier in achieving the set targets for the electric motor industry as stipulated in the Industrial Energy-Saving 12th Five-Year Plan of the MIIT. In the foreseeable future, the old electric motors presumably will remain operational for a long time span[[9]](#footnote-9).

Currently there are over 2,300 electric motor manufacturers in China. Among these, only about 50 are capable of producing HEMs. In that regard, locally manufactured HEMs account for only about 10% of the total electric motor production output of the country. It should be noted that about 70% of these HEMs are for export. In March 2010, China implemented a financial subsidy scheme for electric motor users providing subsidies for the purchase of HEMs from 1.9 USD/kW to 9.7 USD/kW. However, such scheme turned out to be not effective because electric motor users and original equipment manufacturers (OEMs) still prefer the least costly standard electric motors, which can be rewound if they get burned out. Clearly the motor efficiency is not a major concern among the users.

Recently, some Chinese industries become interested in the use of remanufactured (recycled) electric motors (REMs). However, the current situation for the EMR enterprises is not optimistic due to low production capacity and absence of a mature product value chain, as well as other barriers that are very similar to those that currently hinder the increased local production of HEMs and their widespread application in Chinese industries.

The following table shows the comparison of the unit price, efficiency, electricity consumption and annual operating & maintenance cost of the major types of locally manufactured electric motors that are used in Chinese industries. The data are for the commonly sold size of electric motor in China which is 2.2 kW.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Electric Motor Type** | **GB18613-2006 Classification** | **Price (USD)a** | **Efficiency, %** | **Annual Electricity Consumption (kWh)b** | **Annual O&M Cost (USD)c** |
| SEM | Grade 3 | 80.65 | 87.0 | 21680 | 2,797 |
| HEM | Grade 2 | 117.74 | 90.1d | 20720 | 2.674 |
| REM | Grade 2 | 104.52 | 90.1d | 20720 | 2,674 |

a. Current local retail price. HEM price is typically 1.4 – 1.5 of SEM price; REM price is typically 1.2 to 1.35 of SEM price.

b. Assume 8000 annual operating hours.

c. Based on industrial tariff price for electricity (0.13USD/kWh). Generally, the maintenance cost is very low for most electric motors, and usually only when the motor is damaged. In some places the repair cost is 8.06 USD/ kW

d. An electric motor is re-manufactured to make its performance better (in terms of operating performance and energy utilization). A SEM can be re-manufactured to become a higher capacity and more energy efficient electric motor (i.e., a REM). In China, REMs are produced to make them at par with HEMs meeting the Grade 2 standard (GB18613-2006). The proposed project will involve capacity building for local electric motor manufacturers to produce REMs that meet Grade 2 standard, which calls for a motor efficiency the same as that for HEMs.

The main barriers to the promotion and extensive application of HEMs and REMs in Chinese industries are the following:

* Low level of awareness about, and lack of accessible information on technologies and techniques in the design and production of EE motors (HEMs and REMs) - Few Chinese HEM and REM manufacturers are aware of, or adequately know, the latest technologies and techniques for the design and production of EE motors, and improving the efficiency of old and potentially recyclable electric motors. This is further aggravated by the difficulties in accessing the rather limited information about such technologies/techniques particularly on REMs. In the case of REMs, such EE motors are not easily identifiable and recognizable to most electric motor users as these are difficult to distinguish them from the standard electric motors. Consequently the users lack confidence and interest in buying such products. There is also a dearth of information about REMs, their quality and performance.
* Inadequate policies and regulatory frameworks–There are limited government policies and regulations concerning the utilization of EE motors and in the enforcement of applicable energy performance standards for electric motors sold locally and used in electric motor systems in industries. Presently, the existing standards and regulations have no restrictions on electric motor users, thus existing standard low-efficiency electric motors will continue to be used. There are also no regulations and mandatory standards applicable to the emerging EMR industry.
* Lack of capacity to locally produce EE motors –There are very few EE motor (HEM and REM) manufacturers in China. The existing ones often have limited technical capacity in designing and producing products that are at par with international standards (e.g., IEC, NEMA) in terms of quality and energy utilization performance.
* Shortage of financing for EE motors production and application –Since it is not mandatory for industries to utilize EE motors the share of EE motors in the local electric motor market is relatively low compared to that of the widely available less efficient standard electric motors. Conversion of existing electric motor production lines to produce EE motors will require high investments that may not be forthcoming if the demand for EE motors is low. Those that are currently engaged in the EMR business will require additional capital to pay for improving the quality and energy performance of their products; for availing of higher quality raw materials that will be used in REMs; and for promotion and market development of their REM products.

Baseline Scenario and Associated Baseline Projects:

EE motors (mainly HEMs) account for 3% of the total electric motor production output in China. The Chinese government had in the past implemented several energy efficiency improvement programs focused on electric motor system, such as on the optimization of motor systems and the application of variable speed control in motor systems in the industry sector. However, there are very limited GOC-led interventions for improving the energy efficiency for locally made electric motors. Apart from the previous projects funded by organizations such as the Energy Foundation and UNIDO, most of the activities in this area are from the private sector, e.g., the International Copper Association. R&D in the area of EE motors is currently limited to individual efforts of electric motor manufacturers and the application of advanced technologies are constrained by lack of investment due to inadequate support and enforced policies that could spur interest and confidence of investors and in particular the industrial users of electric motors. While there is an ongoing old-for-new and rebate programs for electric motors, this is only for the electric motor users. Very few local electric motor manufacturers have shown interest in venturing to the production of EE motors (particularly HEMs). Converting existing standard electric motor production line for EE motor production is currently not economically feasible for the over 2000 electric motor manufacturers in China.

In June 2009, the MIIT launched the Electromechanical Products Remanufacturing Pilot Project for implementation nationwide. This project focuses on the remanufacturing of old electromechanical products and improving their efficiency. To date, the MIIT has supported 3 electric motor companies in Anhui (*Anhui Wannan Electric Machine Co. Ltd);* Hunan *(Xiangtan Electric Manufacturing Co. Ltd); and,* Xian *(Xi'an SIMO Motor, Inc.*), and a research institution in electric motor remanufacturing (EMR). Recently, Shanghai government implemented the “*Detailed plan of promoting the implementation of high-efficiency electric motor remanufacturing in Shanghai*” in September 2012. This scheme involves the provision of subsidy of 45 CNY (7.26 USD) per kW for the purchase and use of REMs. Additionally, this scheme also includes the incentive mechanism for old electric motor replacement at 20 CNY (3.23 USD) per kW. The objective of Shanghai’s plan is the diffusion of 2 million kW HEMs (including high-efficiency REMs) by 2012 and 8 million kW HEMs (including 2.4 million high-efficiency REMs) by 2015. This program targets achieving HEM application of about 20% of the total installed capacity of electric motors by the end of 12th Five-Year Plan[[10]](#footnote-10). Because of this, there is large market potential for old electric motor replacement.

Currently, the main activity in the EMR field is research and development of EMR techniques. At present, the EMR production capacity and annual sales of REMs are still negligible compared to that of the standard electric motor manufacturing industry[[11]](#footnote-11). However, the REMs provide a number of important benefits: greater availability of products, potential lower prices to customers, and conservation of material resources. Generally, the remanufacturing of an electric motor costs more than repairing one (e.g., some parts in a 2.2 kW REM are from 3 kW SEMs), but the resulting product is similar to HEM. These benefits motivate local entrepreneurs to engage in EMR. Considering this trend, by 2020, HEMs and REMs are expected to account for about 30% of the total installed electric motor capacity in China.

Proposed Alternative Scenario, Components and Expected Outcomes of the Proposed Project:

The objective of the proposed project is to enhance the manufacturing and widespread application of energy efficient electric motors in China. To achieve this, the identified barriers to the effective promotion and extensive application of HEMs and REMs in Chinese industries have to be removed. Thus a barrier removal approach will be applied[[12]](#footnote-12).

Advanced EE motors production techniques can now increase the energy efficiency of electric motors by 2% or more thereby meeting the Grade 2 requirement under the China Standards (GB18613-2006) for electric motors. The typical efficiency of SEMs is 87%, while that of EE motors (HEM/REM) is 90.1%. Hence, if the manufacturing process is performed properly employing advanced technologies and techniques and in qualified and competent EE motor production facilities, relatively low cost and high quality EE motors (HEMs and REMs) can become available in the local electric motor market. The utilization of EE motors is expected to bring about large gains in electricity savings in the operation of electric motor systems in industries. This translates to benefits to the global environment, as well as to China's economy and local environment given the significant economic cost and local pollution associated with power generation and consumption. For illustrative purposes, the table below shows the annual energy savings and GHG emission reduction in replacing an existing 7.5 kW SEM with a new EE motor (HEM/REM) of the same size or buying a new 7.5 kW EE Motor (HEM/REM) instead of a 7.5 kW SEM. The unit price of HEMs range from 1.4 to1.5 of the SEM unit price, while that of REMs is typically 80% to 90% of HEMs.



From the above table, it makes sense to invest in an EE motor (HEM/REM) when there is the opportunity to replace an existing SEM or buying a new electric motor. Based on the resulting energy savings and associated GHG emission reduction from using an EE motor, this can translate to significant quantities nationwide if the local electric motor market is transformed towards wider production and sale of EE motors[[13]](#footnote-13). The potential electricity savings and consequent GHG emission reductions from the use of locally made EE motors will be estimated in more detail during the project design and preparation stage.

The proposed project intends to facilitate the realization of such potential by removing the identified barriers that up until now has prevented China from realizing substantial GHG emission reductions that would contribute to the achievement of the countries climate change mitigation targets. The project will address current teething problems in the nascent EMR industry in China which focuses on the recycling/repowering of old or broken/burnout electric motors and improving their energy efficiency[[14]](#footnote-14); as well as retrofitting the existing less energy efficient standard electric motors to turn them into high efficiency REMs. The proposed project will focus on removing a number of key barriers in the local electric motor industry. A combination of “technology push” and “market pull” activities will be employed to enhance the energy efficiency levels of HEMs and REMs that are locally produced in China by facilitating/enabling the effective promotion and application of advanced EE motor production and application technologies and techniques.

**Component 1: Policy and Regulatory Frameworks on the Production and Application of EE motors**  – This component will address the barrier related to the inadequate policies and regulatory frameworks that support the promotion and application of EE motors (HEMs and REMs)in China e.g., in industries. A situation wherein there will be enhanced and clearly defined, and enforced policies and regulations on the more stringent application of EE motors in the Chinese industries is the expected outcome from the envisioned activities under this component. This component will involve working with the MIIT on the enhancement of the current policies on EE motors, and will include: (a) an assessment of the local electric motor market in China to establish the potentials and demand for energy efficient electric motors (HEMs and REMs); (b) a detailed review of existing policies and regulations applicable to electric motor applications in buildings and industries in China; (c) formulation and recommendation for approval and adoption of policies and regulations supportive of: (1) EE motors production and application in Chinese industries; (2) the development and support of the nascent EMR industry; and, (3) the phase out (including appropriate support measures) of existing low efficiency electric motors; (d) formulation and recommendation for approval of implementing rules and mechanisms for the approved policies & regulations.

**Component 2: EE Motors Production and Applications** – This component is meant to address the barrier regarding the lack of local expertise in cost-effective design and production of REMs. It is expected that with the interventions that will be carried out under this component, more locally made EE motors (HEMs & REMs) will be available in the local market, and consequently increased applications of EE motors in Chinese industries The activities that will be carried out under this component will be in cooperation with the local electric motor manufacturers that are interested in venturing into the production and sales of EE motors, as well as the existing EE motor producers. The activities that will be carried out under this component will also be coordinated with ongoing projects/programs on energy efficiency standards for electric motors. In particular, the technical capacity development for local electric motor manufacturers and the pilot REM producers that are currently being supported by the MIIT program on EMR will be coordinated to make use of the potential synergies. One of the major capacity development activities will be on the demonstration of the application of improved EE motor product design and manufacturing. This will involve the provision of technical assistance to selected electric motor manufacturers and pilot REM producers on the design and manufacturing of REMs, the prototype production of selected EE motor designs, including EE motor product testing. Other activities that will be carried out whose results will contribute to the realization of the anticipated outcome are the following: (a) Development of a capacity development program for local EE motor (HEM and REM)[[15]](#footnote-15); (b) Conduct of training courses for local electric motor manufacturers on the design and manufacturing of EE motors; (c) Establishment and operationalization of an EE motor research center, as well as an EE motor industry association; (d) Commercialization of EE motor products; (e) Formulation of EE Motor Efficiency Standards and Certification System; and, (f) Compilation and dissemination of information on improved EE motor product design and production. The results of the capacity development activities and demonstrations of the application of energy efficient EE motor designs and production will be published and disseminated to other local electric motor manufacturers.

**Component 3: Financial Support & Accessibility Improvement** - This component is primarily aimed at addressing the shortage of financing for EE motor (HEM and REM) production and application. The expected outcome from achievement of the deliverables under this component is the improved availability and accessibility of financial support for EE motor production and applications. The envisioned activities include: (a) Conduct of the techno-economic feasibility analyses and the preparation of the action plan for financing EE motor initiatives of local electric motor manufacturers and suppliers; (b) Development and implementation of suitable business models for local financial institutions to support EE motors manufacturing, as well as efforts to use EE motors in industries; and, (3) Design, funding and implementation of a EE motor rebate program for electric motor users, similar to that implemented in previous EE appliance/equipment projects in China on CFC-free refrigerators, and in the ongoing project on EE room air conditioners (UNDP-GEF PEERAC).

**Component 4: EE Motors Promotion** – This component will consist of "market pull" activities, which are aimed at removing barrier concerning the low level of awareness about, and lack of accessible information on, technologies and techniques in the design and production of REMs. The successful completion of the envisioned activities under this component will contribute achieving an increased share for EE motors in the local electric motor market. Among the activities under this component is the establishment and operationalization of an electric motor market monitoring system. A market tracking system will be developed and implemented to monitor the prices, sales volume, and availability of the different types and brands of electric motors (SEMs, HEMs and REMs) sold in the market, and their corresponding market shares. It is the intention to make such tracking system formally adopted and implemented by a designated government agency. The information that will be derived from the market monitoring activities, as well as the technical and energy performance specifications of the various tested electric motor products in the market will also be disseminated as part of an EE motors procurement guide for the purpose of enabling consumers to choose the appropriate EE motor products. These monitoring and information dissemination activities will also be coordinated with relevant ongoing projects in China that also monitor local and regional markets for energy efficient appliances and equipment such as electric motors. The project website that will be created will also be used for disseminating EE motor technology information aside from providing fast and easy access to information about the project activities.

Clearly, the facilitation of the exchange/sharing of information through yearly meetings of concerned organizations and individuals in the electric motor industry on EE motor technologies, business opportunities, success stories, and best practices in the industry, is the main strategy to remove the awareness and information-related barriers. In addition, the establishment and operationalization of an EE motor manufacturer incentive program; and the conduct of industrial consumer education campaigns on EE motor (HEM and REM) applications are among the interventions that will be carried out under the proposed project to enhance the energy performance quality of Chinese made EE motors and the development of the nascent local EMR industry. Lastly, a sustainable follow-up action plan will be developed that will scale-up and replicate the project interventions in other Chinese cities, particularly where there is a large industrial sector. Since the target electricity savings and GHG emission reductions will come from electric motor users that would be influenced by the results of the project, and by the support frameworks that the project will establish, it is imperative to include the private sector (e.g., electric motor manufacturers and electric motor users) in the design and implementation of such plan.

Through this combination of measures, the MIIT expects that by the end-of-project, at least 40% of the local electric motor manufacturers in China will produce HEMs and REMs that are compliant with at least the mid-level Grade 2 requirement under the China Standards (GB18613-2006) for electric motors, or better still be at par with foreign-made HEMs & REMs. It is estimated that the HEM production output will reach 89 million kW annually by 2015. By end-of-project, HEMs will have a larger market share in the electric motor market in China, and the application rate of Grade 1&2 (GB 18613-2006) electric motors would reach 80%, and the energy efficiency of such type of EE motor will improve further by 2% to 3%. The proposed project intends to facilitate/influence, and contribute to the achievement of these targets of the MIIT by removing the barriers that are presently hindering their realization. At the same time, the forecast REM production output is about 12 million kW. Moreover, more than 60 million kW of low-efficiency electric motor will be phased-out annually by the end of this project. For the emerging EMR industry, the phased-out SEMs will become the raw material of REMs. It will be difficult for the local EMR industry to grow in the absence of this project, which will help facilitate the SEM phase-out.

A cumulative total of about 160 million kW of the low-efficiency electric motors will be phased-out within the project period. Ten years after the end of project, with an average 3% improvement in energy efficiency of locally made EE motors, the estimated cumulative energy saving would be no less than131 billion kWh, which translates to a reduction in GHG emissions of at least 105 million tons CO2.

Incremental Cost Reasoning and Expected Contributions from the Baseline, the GEFTF, LDCF/SCCF and Co-financing

Because more existing electric motors will be phased-out due to this project, the HEMs will face less barriers compare to the baseline scenario, consequently the HEM industry will growing faster; while for the REMs, due to lack of techniques and financial support, the EMR industry will not be commercialized. As a result, the existing electric motors are less likely to be replaced or retrofitted in the absence of this project. Without the proposed alternative project that GEF will support, the energy utilization performance of electric motors produced and utilized in China will be at a relatively low level compared to other electric motors that are compliant with internationally recognized performance standards. That fact translates to a relatively higher energy consumption of electric motors and the systems, processes and operations in the Chinese industry sector that use them. This means also that the operation of these locally made electric motors will further add to the current rapidly growing consumption of electricity in the country. Considering the current trend and practices of using electric motors, the potential for utilizing locally made energy efficient units (HEMs and REMs) will not be realized if the proposed project will not materialize. The potential energy saving and energy cost savings that can be derived from the use EE motors in the country (particularly in the industries) will not be realized without the removal of certain barriers that hinder the promotion, production and utilization of EE motors (HEMs and REMs) in the country.

While the country has already initiated policies and actions to promote EE motors production and utilization in the country, and there are other ongoing broad energy efficiency programs that have components on energy efficient electric motors and motor systems, these rather limited and general actions are not sufficient to remove the identified barriers, create and sustain enabling environments, and facilitate or at least influence the increased investments in EE motor production and their widespread application in industries[[16]](#footnote-16). Without GEF support for funding the incremental cost for removing the barriers that this proposed project will address, the expected potential additional global environmental benefits (in terms of avoided CO2 emissions linked from the electricity that will be saved) would not be realized. Without this proposed project, China would have limited success in promoting the widespread utilization of EE motors, especially for the REMs; in increasing use of the HEMs; and, in the phasing-out of existing energy inefficient electric motors. Such efforts will be at a relative low level, and in so doing, the potential contribution to the country’s GHG emissions reduction targets as well as the country’s aim to conserve energy and protect both the global and local environment will not be fully realized. With the GEF support for the incremental cost needed to create the much needed market pull and technology push to remove the barriers that will in turn facilitate the increased share of HEMs and REMs in the local electric motor market. In so doing, the project will help realize for China the expected global environmental benefits of reduced GHG emissions from the energy savings that will be derived from the widespread use EE motors.

Global Environmental Benefits

The proposed project will facilitate the realization of the expected outcomes through barrier removal and other capacity development and technical assistance activities. The proposed project targets the realization of at least 40% of energy efficient (Grades 1 and 2) HEMs and REMs by end of project, facilitated through the barrier removal activities and other capacity building and technical assistance activities that will be implemented. With the target realized, about 105 million tons CO2 are expected to be potentially avoided. For this project, the direct CO2 emission reduction is about105 million tons CO2, and this translates to a unit abatement cost (UAC) of about US$ 0.035/ton CO2 (i.e., GEF$ per ton CO2). Note that this only account for direct CO2 emission reductions that will be derived from the sales and applications of EE motors through the manufacturer incentive programs that will be carried out under the proposed project. This measure of the project’s cost effectiveness (i.e., UAC) will be tracked using a monitoring and evaluation system that the proposed project will be developed during the project. This UAC figure will be regularly re-evaluated and updated during the project implementation particularly in quantifying the potential energy savings from projected replications (i.e., sales of REMs outside of the manufacturer incentive and consumer rebate programs), and in coming up with the CO2 emission reduction estimates.

Innovativeness, Sustainability and Potential for Scaling-up

A clearly innovative aspect of this proposed project is the inclusion of interventions that will focus on the EMR industry in China. Apart from the barriers faced by the local electric motor industry in promoting and expanding its EE motor business, the nascent EMR industry in China also has it current teething problems that need to be addressed in an integrated manner to help pave the way for a rather very promising development. The potential for a wider application of EE motors is quite high, especially for REMs. Hence, a project such as what is being proposed can be considered innovative since there have been no initiatives yet on the promotion of EMR and the utilization of REMs, especially in the industry sector in China. The activities that will be carried out under this proposed project are barrier removal in nature. To ensure avoidance of the recurrence of the barriers and the continuance of the enabling environments that will be created and/or facilitated by the project, appropriate sustainable follow-up actions will be planned as part of the project activities. Such action plan will be implemented after the project as per the institutional arrangements that will be developed for such purpose. In addition, the removal of barriers and the effective and seamless implementation of the procedures and regulatory/policy and institutional frameworks that will be established will surely influence the scaling-up of the project, e.g., to cover other local electric motor manufacturers, or to facilitate the trading of locally made EE motors (HEMs and REMs) to other countries.

**A.2. Stakeholders**:

The stakeholders of this project include the relevant entities in the national and local governmentsthat are Science & Technology, and Industry & Information Technology; as well as those in the private sector (electrical appliance/equipment/machinery manufacturers, electric motor manufacturers, REM producers, electric motor parts suppliers, etc.), energy service companies (ESCOs); and regional organizations such as the International Copper Association (ICA).

|  |  |
| --- | --- |
| **Stakeholder** | **Roles and Responsibilities in Project Preparation** |
| Ministry of Industry and Information Technology | Responsible for communication and coordination with MOF and UNDP, liaison with local governments, project development management, and project development financial management. |
| Ministry of Science and Technology | Provision of assistance in the identification and design of demonstrations for the promotion of the production and application of EE motors (HEMs and REMs) |
| Standardization Administration of China | Provision of assistance in the design of activities on the development of energy efficiency standardsfor EE motors |
| Dept. of Energy Conservation in Local Governments(MIIT EMR pilot sites) | Design of the technical assistance, capacity development and demonstration activities of the project |
| Pilot Enterprises on the production of (REMs) | Design of the incremental technical assistance and capacity development activities of the project |
| Electric motor industry association | Provision of information regarding research work on EE motor manufacturing , particularly on HEMs and REMs |
| Other private sector entities (e.g., electric motor parts suppliers) | Provision of information regarding the research work on alternative materials used in the parts and components of EE motors (HEMs and REMs) |
| International Copper Association | Provision of information on the various projects on EE motors that have been carried out in China by the private sector, and other institutions (including ICA), as well as potential interventions in removing barriers to the development of the local EMR industry. |
| Energy Service Companies (ESCOs) | Provision of information in the design of the activities on the development of standards for REMs, as well as in the design of technical training programs on the application and design of motor systems using HEMs and REMs. |

It should be noted that in the design and preparation of this project, adequate consideration shall be accorded to women and indigenous people if there are opportunities to involve them.

**A.3 Risk**:

|  |
| --- |
|  |

During the project implementation, the risks that might prevent the project objectives from being achieved are listed as follows:

|  |  |  |
| --- | --- | --- |
| **Risk** | **Level of Risk** | **Mitigating Actions** |
| 1. Individual vested interests and objectives of local electric motor manufacturers as well as other stakeholders in the local and central governments may prevent the effective organization and coordination of their participation and support of the project | Low | MIIT, as project executing agency will closely coordinate the project implementation with the project partners utilizing its rich experience implementing energy management projects with government offices such as NDRC, MOF, MOST and MEP. In addition, the MIIT, apart from establishing an effective project team that will comprise of competent local and international experts in the field of electric motor systems and technology, will also make use of its current good working relationship with the Chinese electric motor industry. |
| 2. The level of co-financing amount may not support the project implementation promptly and sufficiently. | Low | The project team shall secure central government funding prior to project launching. During project implementation, the project team will closely monitor and ensure co-financing is available by project partners and co-financers promptly and at least as per their respective committed amounts. |
| 3. The end-users may not like to buy or use EE motors, particularly REMs. | Medium | The project will include information dissemination and promotion to ensure end-users better understanding about the use and benefits of using EE motors, particularly REMs. The project shall also include product certificationsthat are expected to encourage and influence end-users to purchase REMs. |
| 4. HEM manufacturers may not support EMR because REMs can compete with HEMs. | Medium | The project will work together with HEM manufacturers to come up with arrangements that would ensure that REMs are complementing rather than competing with HEMs in the supporting the government’s objective of promoting energy efficiency in Chinese industries. |
| 5. Recommended policies may not be approved by the relevant authorities, or may be approved but not effectively enforced. | Low | The project will include the piloting of the application of the support policies for EE motors to gauge the effectiveness of said policies. That will help guide the relevant government authorities in the finalization, approval and effective enforcement of such policies. |

**A.4. Coordination**:

|  |
| --- |
|  |

The design of the proposed project will fully coordinate with the other projects implemented in China that are related to energy efficient appliances/equipment (particularly electric motors).

1. China Energy Efficiency Promotion in Industry Project (CEEPI) – This is a MIIT/WB/GEF project that focuses on promoting energy management systems and capacity building in industry. The project development team will liaise and consult with the implementers of the CEEPI Project (particularly those working on the policy research component) in designing and implementing the policy barrier removal activities under Component 1 of this proposed GEF project.
2. Motor Challenge Program (MCP) – This ongoing project is financed by the EU Switch Asian and focuses on promoting energy management schemes capacity building, such as energy standards development, energy management etc. The project development team will interact and consult with the implementers of the MCP (particularly those working on the energy efficiency capacity development activities) in designing and implementing the technical and information barrier removal activities under Component 4 of this proposed GEF project.
3. Barrier Removal to the Cost-effective Development and Implementation of Energy Efficiency Standards and Labeling (BRESL) Project – This is an ongoing UNDP-GEF project aimed at rapidly accelerating the adoption and implementation of energy standards and labels (ES&L) in Asia, and in so doing bring about energy savings from the use of selected energy efficient appliances/equipment (refrigerator, air conditioner, electric motor, electric fan, rice cooker, CFL and FL ballasts). Although China is part of BRESL, it is just involved in the development of ES&L for the following products – air conditioners, ballasts, electric fans, and rice cookers. Nonetheless, China assists the other BRESL countries in their ES&L work on refrigerators and electric motors, since their MEPS for these products are more or less already established. The project development team will interact and consult with the implementers of the BRESL (particularly those working on electric motors standards and labeling) in designing and implementing the technical and information barrier removal activities under Component 4 of this proposed GEF project.

The project development team will also coordinate with the relevant departments of MIIT on their ongoing/planned activities and projects that are relevant to the proposed GEF project in order to explore and possibly make use of potential synergies, and ensure complementarity and building on best practices and lessons learned. The establishment of links with the relevant agencies and ongoing projects/programs is expected to help in identifying the relevant activities that will build on their respective achievements. The project will be developed in close cooperation with its stakeholders as well as with the UNDP-Asia Pacific Regional Centre in Bangkok. The UNDP country office in China will be fully involved in the project development through its participation in the various stakeholder and co-financing consultation meetings and technical workshops during project development, and in the multipartite review meetings. Consultations will also be done with UNDP-GEF, New York during the project development phase.

|  |
| --- |
| **B.1.National strategies and plans or reports and assessments under relevant conventions, if applicable**: |

The project is consistent with China’s national energy strategy and planning. China’s 12th Five-Year Plan (2011 to 2015) clearly states the strategies and guidelines for developing a resource-conserving and environment-friendly society. The objective of Energy-Saving and Emission-Reduction aims to further reducing energy use intensity aiming for the reduction of the energy consumption per 10,000 GDP (CNY)from 1.032 tce in 2011 to 0.869 tce in 2015. That will translate to an energy saving of 670 million tce to be achieved during 12th Five-Year Plan period. Specifically for the electric motors industry, the Industrial Energy-Saving 12th Five-Year Plan published by the Ministry of Industry and Information Technology (MIIT) indicates that by 2015 the application of Grade 2 efficiency electric motors shall reach 80%, with a consequent powersavingfrom electric motor system increase of about 2% to 3%. In this regard, the proposed project is fully consistent with China’s national strategies and will contribute to the achievement of the national energy saving targets.

The proposed project is in line with China’s several plans on the development of climate technologies. While the country China has yet to meet the technological standards of OECD countries, the Chinese government continuously stresses the role of advanced technologies for both climate change mitigation and adaptation to meet its sustainable development goals in a timely manner and at a minimum cost that does not threaten economic development and poverty alleviation. Both the transfer of best available global technologies to China and the enhancement of the local science, technology, innovation capacity and diffusion are necessary to make the most relevant and advanced technologies widely available for deployment. The ongoing WB-GEF project on technology needs assessment supports China’s efforts to assess climate mitigation and adaptation technology needs and adopt corresponding global best practices. Said project will, among others, identify barriers to technology transfer, and also design one or more technology transfer mechanisms that would accelerate the ultimate deployment of prioritized technologies in both climate mitigation and adaptation.

The project is also in line with the plans and recommendations set out in the country’s national communications to the UNFCCC. The most recent national communications (i.e., 2nd National Communications), includes the application of energy efficient electric motors among the key energy conservation projects during the 12th Five Year Plan period (projects to promote energy efficiency products for the benefit of people) . High efficiency electric motor products are also among those included to be demonstrated for industrializing energy saving technologies. As part of its continuing partnership with NDRC, the UNDP is currently assisting China in the development of its proposal for GEF funding of the preparation of its 3rd National Communications. It is expected that more intensive efforts towards the application of EE motors (HEMs and REMs) and the development of other types of EE motors, as well as other energy consuming appliances and equipment, will be among the climate change mitigation technologies that will be prioritized.

**B.2. GEF focal area and/or fund(s) strategies, eligibility criteria and priorities**:

The proposed project fits strategic objective #2 (Promotion of market transformation for energy efficiency in industry and the building sectors) under the climate change mitigation focal area of the GEF and will contribute to the reduction of greenhouse gas emissions through the transformation of the electric motor market in China towards more energy-efficient electric motors used in the major end-use sectors of the country, particularly the industrial sector. The project focuses on the removal of barriers to the development of the electric motor remanufacturing industry in China, and on interventions that serve as “market pull” to achieve widespread adoption of energy efficient remanufactured electric motors in Chinese industries.

**B.3.GEF Agency’s comparative advantage for implementing this project**:

This project contributes to the achievement of the outcome - energy efficiency in industry and the building sectors as stated in the UNDP-China Country Program Document 2011 – 2015. It also contributes to the achievement of the primary outcome - Environmental protection, climate change, and natural resource management on Environment and Sustainable Development, as mentioned in the UNDAF 2011-2015. Moreover, this program is directly in line with the UNDP EITT’s signature program on low emission urban and transport infrastructure, specifically focusing on GHG emission reduction from electric motor systems in Chinese industries. With its country presence, UNDP-China is well-positioned to implement this proposed project as it has, and currently have, a proven track record of successful implementation of energy efficiency projects in the country, as well as in other developing countries in Asia. The optimization and improvement of the energy performance of energy consuming equipment and electric motor-driven systems are included in most of these energy efficiency projects carried out in industries and buildings.

UNDP also has sufficient staff complement that can effectively supervise the design and implementation of this project. The fact that it is one of the leading UN agency in China supporting the GOC in addressing climate change issues in the country; its staff members’ substantial experience in the successful implementation of GEF-funded projects in the country; and its overall substantial experience and expertise in working in partnership at the decentralized level with local communities, private sector, policy makers and civil society, justify its capacity and qualification to implement this proposed project. Moreover, for this project, UNDP-China will be backstopped by technical expertise available in the UNDP Asia-Pacific Resource Centre (APRC) in Bangkok, Thailand.

|  |
| --- |
|  |

**part iii: approval/endorsement by gef operational focal point(s) and GEF agency(ies)**

1. **Record of Endorsement of GEF Operational Focal Point (S) on Behalf of the Government(S):**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Position** | **Ministry** | **Date** |
| Jiandi Ye | GEF Operational Focal Point | International Dept., Ministry of Finance | 12/17/2012 |

1. **GEF Agency(ies) Certification**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **This request has been prepared in accordance with GEF/LDCF/SCCF/NPIF policies and procedures and meets the GEF/LDCF/SCCF/NPIF criteria for project identification and preparation.** | | | | | |
| **Agency Coordinator, Agency name** | **Signature** | **Date** | **Project Contact Person** | **Telephone** | **Email Address** |
| Adriana Dinu  Officer-in-Charge UNDP-GEF | Adriana_signature.png | April 9, 2013 | Manuel L. Soriano  Sr. Tech. Advisor  Energy & Climate Change  EITT | +66-2-3049100 Ext 2720 | manuel.soriano@undp.org |

1. Project ID number will be assigned by GEFSEC. [↑](#footnote-ref-1)
2. Refer to the reference attached on the [Focal Area Results Framework](http://www.thegef.org/gef/sites/thegef.org/files/documents/document/GEF5-Template%20Reference%20Guide%209-14-10rev11-18-2010.doc) when completing Table A. [↑](#footnote-ref-2)
3. Energy efficient electric motors (EE Motors) include both high efficiency motors (HEMs) and remanufactured electric motors (REMs). Electric motor remanufacturing (EMR) involves the retrofitting of low-efficiency electric motors through redesign, parts replacement and application of advanced electric motor techniques to produce high-efficiency remanufactured electric motors (REMs). The difference between EMR and electric motor rewinding is that the former results in a product (i.e., REM) that has higher efficiency than the original electric motor, while the latter results in the restoration of the operational functions of the original electric motor but at the expense of, at best, a unit percentage reduction in efficiency. Electric motor rewinding is the traditional way of extending the life of electric motors and is done to burned-out electric motors. [↑](#footnote-ref-3)
4. TA includes capacity building, and research and development [↑](#footnote-ref-4)
5. To be calculated as percent of subtotal. [↑](#footnote-ref-5)
6. PPG fee percentage follows the percentage of the GEF Project Grant amount requested. [↑](#footnote-ref-6)
7. In China, the most popular electric motors manufactured and used are those of the Y and Y2 series. These are standard electric motors that are produced since the 1980s (Y series). The Y2 series electric motors have been in production since the 1990s. These standard electric motors account for almost 90% of the local electric motor market. The rest is accounted for what are considered locally as high efficiency motors (HEMs). These are locally manufactured HEMs, which include those of the YX, GX and HJN series. Furthermore, only 30% of the HEMs manufactured are for the domestic market. In recent years, China has begun implementing labelling and minimum energy performance standard (MEPS) schemes for electric motors. The electric motor efficiency classification in China is comparable to that of the International Electro-technical Commission (IEC) standards (see table below). The Y and Y2 series electric motors are categorized as Grade 3 in the 2006 standard (GB18613-2006) and below Grade 3 in the 2012 standard (GB18613-2012).

   |  |  |  |  |  |
   | --- | --- | --- | --- | --- |
   | **Country/Region** | **Super Premium** | **Premium** | **High** | **Low** |
   | Europe | IE4 (draft) | IE3 2015 (2017) | IE2 | IE3 |
   | U.S./Canada |  | NEMA Premium 2010 | EPAct 1997 |  |
   | China Standard (2006) GB18613-2006 |  | Grade 1 | Grade 2 (2011) | Grade 3\* |
   | China Standard (2012)\*\* GB18613-2012 | Grade 1 | Grade 2 | Grade 3 |  |

   \*The Y and Y2 series electric motors are categorized to Grade 3 in the 2006 standard (GB18613-2006), occupy almost 90% of market share in China.

   \*\*GB18613-2012 was recently published in China, The policies and plans made before 2012 were based on GB18613-2006. The effective date of this new standard is unknown.

   *Source: CGGC, based on (Leroy Somer, 2009), except GB18613-2012.* [↑](#footnote-ref-7)
8. According to the MIIT Announcement (No.14 2012), the energy conservation supervision department in the local governments (e.g., provincial and/or city energy conservation supervision center) will be in-charge of regulating the electric motor manufacturers ensuring that the non-production and non-sales of the Y and Y2 Series motors are complied with. The sales of such motor products after October 2012 will be subject to fines. The ban does not apply to the sales of such motor products that are manufactured before October 2012. [↑](#footnote-ref-8)
9. This is due to the reasons listed below: (1) Typical lifetime of standard low-efficiency electric motors is generally over 20 years, and the users of these electric motors believe that the repair (i.e., rewinding) of burnout motors makes economic sense; (2) Industrial companies stock backup electric motors of the same type and size to prepare for breakdowns; and, (3) In case of an electric motor breakdown (burnout), users typically will have it rewound to avoid higher investments in a new one. [↑](#footnote-ref-9)
10. In May 2012, China decided to continue the implementation of the financial subsidy scheme for HEMs with the support funding of 1.6 billion CNY (258 million USD). [↑](#footnote-ref-10)
11. As an illustration of this, the investment of the demonstration EMR project in Xian was 5.2 million CNY (0.84 million USD), with a production capacity of 1,068 units of REMs in the 1st quarter of 2012 and sales revenue of 11 million CNY (1.8 million USD). Compared to the large traditional electric motor manufacturers in China that usually have an annual production output value of above 200 million CNY (32.3 million USD), the EMR industry has currently have a little market share. [↑](#footnote-ref-11)
12. For this project, the barrier removal approach is considered more appropriate, holistic and cost effective, because: (1) Electric motors are commonly used in almost all economic sectors (particularly the industry sector) of the country; (2) The country has a big electric motor industry that caters to both the domestic and export markets; (3) Energy efficient (according to the China Standards - GB18613-2012) electric motors are manufactured in the country, albeit at a lower production rate compared to that of standard electric motors; and, (4) Locally made EE motors have relatively low efficiencies compared to foreign brands. Only limited success can be expected if the option of just relying on individual consumers switching to energy efficient motors is considered. The impacts would also be limited to those that are directly involved in individual and uncoordinated EE motor (HEM and REM) application initiatives, compared to the proposed approach, which includes a program for disseminating the results and lessons identified. [↑](#footnote-ref-12)
13. The estimated energy savings from the use of HEM and REM is actually still conservative since the possibility of having a much lower energy efficiency for existing SEMs (some of which are already near the end of their economic lifetimes) due to factors such as under-loading (oversized or not matched with load), intermittent operations, and having undergone several rewinding), were not taken into account. A much higher differential between the efficiency of HEM/REMs vs. SEMs would result in higher energy savings. [↑](#footnote-ref-13)
14. In case of an electric motor breakdown/burnout, the common practice in China is to repair the broken electric motor (rewinding) thus avoiding higher investments in a new one. Some electric motors are rewound for multiple times before they are finally scrapped. From an efficiency point of view, rewinding can be bad for two reasons: (1) The older less efficient electric motor will continue to be used for a much longer time; and, (2) Rewinding often comes with a loss of efficiency of 1 to 3%. [↑](#footnote-ref-14)
15. The capacity development activities may include, but not limited to, as follows: (1) Technical assistance in the evaluation of EE motor designs from abroad to verify feasibility of adopting new design features in locally made electric motors; (2) Investigation and evaluation of the feasibility of applicable improvements in the EE motor design and in the local electric motor production process; (3) Modeling and performance evaluation of EE motors and electric motor system; (4) Integration of EE motors in electric motor systems, and the optimization of such systems; and, (5) Preventive/Predictive maintenance of EE motors and electric motor systems. [↑](#footnote-ref-15)
16. These include baseline activities on EE motors promotion that the GOC and some local governments are supporting that will be subsumed into the proposed project, such as: MIIT (China Motor Energy Efficiency Improving Program); Shandong Provincial Government (EMR pilot program); Hunan Provincial Government (EMR pilot program); Shanghai Municipal Government (EE motor promotion and R&D); and, Anhui Provincial Government (EMR pilot program). Please refer to Part I, Sec. C for other activities of project partners that are subsumed into the proposed GEF project. [↑](#footnote-ref-16)