



Project Implementation Report

(1 July 2022 – 30 June 2023)

Project Title:	<i>Promoting Energy Efficiency in Industrial Heat Systems and High Energy-consuming (HEC) Equipment</i>
GEF ID:	4866
UNIDO ID:	100283
GEF Replenishment Cycle:	GEF-5
Country(ies):	<i>P.R.China</i>
Region:	<i>EAP - East Asia and Pacific</i>
GEF Focal Area:	<i>Climate Change Mitigation (CCM)</i>
Integrated Approach Pilot (IAP) Programs¹:	<i>N/A</i>
Stand-alone / Child Project:	<i>Stand-alone</i>
Implementing Department/Division:	<i>ENE / ETI</i>
Co-Implementing Agency:	<i>N/A</i>
Executing Agency(ies):	<i>Special Equipment Safety Supervision Bureau (SESA) of the State Administration for Market Regulation (SAMR)</i>
Project Type:	<i>Full-Sized Project (FSP)</i>
Project Duration:	<i>48 months</i>
Extension(s):	<i>24 months</i>
GEF Project Financing:	<i>5,375,000 USD</i>
Agency Fee:	<i>537,500 USD</i>
Co-financing Amount:	<i>40,500,000 USD</i>
Date of CEO Endorsement/Approval:	10/14/2014
UNIDO Approval Date:	3/12/2014
Actual Implementation Start:	4/30/2018

¹ Only for **GEF-6 projects**, if applicable

Cumulative disbursement as of 30 June 2023:	5,128,728.42 US
Mid-term Review (MTR) Date:	8/7/2021
Original Project Completion Date:	1/31/2023
Project Completion Date as reported in FY22:	1/31/2024
Current SAP Completion Date:	1/31/2024
Expected Project Completion Date:	7/31/2025
Expected Terminal Evaluation (TE) Date:	7/31/2025
Expected Financial Closure Date:	7/31/2026
UNIDO Project Manager ² :	Sanjaya SHRESTHA

I. Brief description of project and status overview

Project Objective		
<p>The Project is to promote energy efficiency in “high energy consuming” special equipment through the development of technical regulations; the establishment of national laboratories; the training of national experts; and the demonstration of new technologies at enterprise level.</p>		
Project Core Indicators		Expected at Endorsement/Approval stage
A	Incremental direct CO ₂ eq emission reductions (tons of CO ₂ eq)	Cumulative Direct emission reductions of 2,423 ktCO ₂ Cumulative post project direct emission reduction of 912,889 ktCO ₂
B	Incremental indirect CO ₂ eq emission reductions (tons of CO ₂ eq)	Indirect emission reduction of up to 2,339,723 ktCO ₂ (as a result of the wide implementation of the equipment standards)
C	Specific energy consumption of selected enterprises	Implementation of systems optimization and operational improvements in 50 enterprises (including equipment replacement in 5 of them) lead to annual fuel savings of 139 PJ and power savings of 1100 GWh
1	National technical regulations on energy efficiency for HEC special equipment are adopted	KPI have been identified for both equipment performance as well as systems efficiency; and the regulations have been revised to reflect these methods KPI have been identified for both equipment performance as well as systems efficiency; and the regulations

² Person responsible for report content

		have been revised to reflect these methods	
2	A reporting system from in service boilers is available	A reporting system is created and database is populated	
3	A dissemination campaign is conducted	Awareness has been raised amongst selected stakeholders	
4	The analytical capacities of the HEC Special Equipment Energy Efficiency Testing Centre are upgraded	100 CSEI staff and regional inspectors are trained in the analysis of data collected from the enterprises (gender disaggregated)	
5	6 national testing laboratories have the competencies to verify and test against the new technical regulations	The 6 laboratories are equipped, staffed and trained for testing the relevant parameters for Steam and Heat Recovery systems to implement the methods established in outcome 1	
6	Number of stakeholders with increased awareness of steam and heat recovery systems measures	1000 representatives of selected stakeholder groups have improved awareness 200 enterprises technical staff receive user training (gender disaggregated)	
7	Trained local practitioners in System Optimization active in industry	50 practitioners are trained (gender disaggregated)	
8	Training material available for SSO and HRSO	Training material are available in Chinese and localized web based platform has assisted them in the training	
9	Appropriate and active financial mechanisms to support industrial EE projects	100 enterprises to be trained	
10	In-depth system assessments of SSO and HRSO conducted	75 enterprises	
11	Systems optimization measures are implemented	50 of the companies adopt measures	
12	Replaced equipment	5 companies	

Baseline

Industrial boilers in China are the most significant equipment employed in terms of energy conversion, with the majority being coal-fired. In 2010, the total coal production in China reached 3.24 billion tonnes, with boilers representing 70% (about 2.24 billion tons) of the consumption. The average operational efficiency of industrial boilers in China is only 65%, which is 15-20% lower than that of boilers in more technologically developed countries. Several previous projects have addressed the performance issues related to industrial boilers in recent years, perhaps most importantly the GEF-WB China Efficient-Industrial Boilers Project (GEF ID 97). Nevertheless, considerable potential for energy-saving remains to be realized.

For heat exchangers research by the Chinese Special Equipment Institute (CSEI) shows that the expenditure on heat exchangers comprises 30% of the total capital expenditure on new equipment in the chemical industry, and around 40% in oil refineries. Improved heat recovery efficiency and the optimization of heat exchanger networks (HENs) would significantly contribute towards higher overall plant energy efficiency. These technologies have benefited from a growing realization of the effects of climate change. The consequent tightening of environmental regulations has prompted greater demand for energy saving equipment, in particular heat exchangers, as economically optimized heat recovery typically offers a 15-

40% improvement in energy efficiency. An additional benefit to industrial enterprises is that manufacturing costs are significantly reduced, at better rates of return than other alternatives. Equipment manufacturers have responded to the resulting market demand with many new types of specialized heat exchanger designs for niche applications.

Please refer to the explanatory note at the end of the document and select corresponding ratings for the current reporting period, i.e. FY23. Please also provide a short justification for the selected ratings for FY23.

In view of the GEF Secretariat's intent to start following the ability of projects to adopt the concept of adaptive management³, Agencies are expected to closely monitor changes that occur from year to year and demonstrate that they are not simply implementing plans but modifying them in response to developments and circumstances or understanding. In order to facilitate with this assessment, please introduce the ratings as reported in the previous reporting cycle, i.e. FY22, in the last column.

Overall Ratings ⁴	FY23	FY22
Global Environmental Objectives (GEOs) / Development Objectives (DOs) Rating	<i>Satisfactory (S)</i>	<i>Satisfactory (S)</i>
Implementation Progress (IP) Rating	<i>Moderately Satisfactory (MS)</i>	<i>Moderately Satisfactory (MS)</i>
Overall Risk Rating	<i>Moderate Risk (M)</i>	<i>Moderate Risk (M)</i>

II. Targeted results and progress to-date

Please describe the progress made in achieving the outputs against key performance indicator's targets in the project's **M&E Plan/Log-Frame at the time of CEO Endorsement/Approval**. Please expand the table as needed.

Project Strategy	KPIs/Indicators	Baseline	Target level	Progress in FY23
Component 1 – Policy and market promotion				
Outcome 1: Enhanced regulatory framework that will enable HEC user to adopt energy efficiency measures and government institutions to monitor compliance, including a knowledge management tool				
Output 1.1: National technical regulations on energy efficiency for HEC special	1)National technical regulations on energy efficiency for HEC special	Existing regulations do not include Key Performance Indicators (KPIs), and do not consider a systemic	KPI have been identified for both equipment performance as well as	·seminar on national standard "Evaluation of Uncertainty in Boiler Thermal Performance Test Methods"

³ Adaptive management in the context of an intentional approach to decision-making and adjustments in response to new available information, evidence gathered from monitoring, evaluation or research, and experience acquired from implementation, to ensure that the goals of the activity are being reached efficiently

⁴ Please refer to the explanatory note at the end of the document and assure that the indicated ratings correspond to the narrative of the report

equipment (boilers and heat exchangers) are revised and improved through the implementation of innovative systemic approaches	equipment are adopted	approach to steam or heat recovery systems as methods to improve performance	systems efficiency; and the regulations have been revised to reflect these methods	<ul style="list-style-type: none"> · Shell and tube heat exchanger energy efficiency index study · Steam system energy efficiency curve · Study of fuel characteristics of biomass boilers · Study on energy efficiency index of coupled fuel boiler
Output 1.2: A reporting system is designed and implemented to allow inspection agencies to collect data from in-service boilers systematically	2) A reporting system from in service boilers is available	Inspection data is not centralized, only collected at inspection agency level, and not systematically	A reporting system is created and database is populated	<ul style="list-style-type: none"> · Statistical Analysis of Boiler Data and Energy Efficiency Indicators in Use Nationwide · Boiler energy-saving and environmental protection technology application guide boiler industry energy-saving and low-carbon development path and financial policy research · Research on statistical accounting methods for carbon emissions from boilers and heat exchangers
Output 1.3: A national awareness raising and dissemination campaign is developed and implemented	3) A dissemination campaign is conducted	Inspection agencies and enterprises have limited knowledge of measures to improve equipment performance and energy efficiency	Awareness has been raised amongst selected stakeholders	

Component 2 – Capacity Building activities (Government)

Outcome 1: The AQSIQ (SAMR) has the capacities required to enforce the technical regulations, and testing capabilities are enhanced to facilitate the implementation of a systems optimization approach and the use of energy efficient equipment

Output 2.1: The capacities of the HEC Special Equipment Energy Efficiency Testing Centre are upgraded	The analytical capacities of the HEC Special Equipment Energy Efficiency Testing Centre are upgraded	Inspection agencies and CSEI staff have limited analytical capacities to collect and analyze data on steam and heat recovery systems	100 CSEI staff and regional inspectors are trained in the analysis of data collected from the enterprises (gender disaggregated)	<ul style="list-style-type: none"> · Testing organization capacity comparison
Output 2.2: National testing laboratories are established and have the competencies to verify and test against the new technical regulations	6 national testing laboratories have the competencies to verify and test against the new technical regulations	The 6 national testing laboratories are to be established in 2015. Currently testing is conducted mostly on performance and safety parameters and there is need for testing/verification capacities to be established for the new technical regulations.	The 6 laboratories are equipped, staffed and trained for testing the relevant parameters for Steam and Heat Recovery systems to implement the methods established in outcome 1	<ul style="list-style-type: none"> · Procurement of Laser-induced fluorescence system

Component 3 – Capacity Building activities (enterprises)

Outcome 3: A cadre of highly specialized system optimization experts from public and private sectors are available as a long-term technical resource to industry and the country. Enterprises awareness on measures and new technologies and EE financing mechanisms is increased.

Output 3.1: Awareness on the concept of energy efficiency focused on optimization of steam systems and heat recovery systems is raised amongst 1000 representatives of selected stakeholder groups (inspection agencies, equipment manufacturers, enterprises, consultants)	Number of stakeholders with increased awareness of steam and heat recovery systems measures	Only a few large industries have energy management personnel; some industries have replaced or refurbished inefficient equipment yet there is limited awareness on energy efficiency and/or systems optimization measures	1000 representatives of selected stakeholder groups have improved awareness 200 enterprises technical staff receive user training (gender disaggregated)	<ul style="list-style-type: none"> · 1000 enterprise management training (ongoing) · 5700 Operator training (currently under bidding procedure)
Output 3.2: 50 candidates are trained to become national energy practitioners on steam and heat recovery systems optimization	Trained local practitioners in System Optimization active in industry	ESCOs are operating in the market, yet their focus is on replacing or refurbishing inefficient equipment	50 practitioners are trained (gender disaggregated)	<ul style="list-style-type: none"> · 60 International Energy Expert training (ongoing)

Output 3.3: 75 in-depth system assessments are completed in manufacturing facilities to identify energy conservations	Training material available for SSO and HRSO	SSO training package only available in English HRSO training package not developed	Training material are available in Chinese and localized web based platform has assisted them in the training	·90 HEC equipment energy conservation and environment friendly testing (currently under bidding procedure)
Output 3.4: 100 enterprises improve their capacities for the financial evaluation of industrial energy efficiency projects	Appropriate and active financial mechanisms to support industrial EE projects	Enterprises are lack of financial evaluation methods for this project	100 enterprises to be trained	·100 boiler manufacturing enterprises training (ongoing)
Component 4 – Demonstration of energy efficient equipment implementation and operation				
Outcome 1: New efficient technologies are demonstrated at national level to serve as case studies for future investments				
Output 4.1: Systems optimization: 50 of the companies trained adopt measures to reduce their energy consumption	Systems optimization measures are implemented	Limited number of companies have implemented systems optimization measures	50 of the companies adopt measures	·Statistical Analysis of Boiler Data and Energy Efficiency Indicators in Use Nationwide
Output 4.2: New technologies: at least 5 of the companies trained adopt measures and replace equipment with more efficient technologies	Replaced equipment	Industries need to improve efficiency through new system optimization measures	5 companies	·Industrial heat systems and high energy-consuming (HEC) equipment project guideline system construction
Component 5 –Monitoring and Evaluation				
Outcome 1: A robust mechanism for the monitoring and evaluation is put in place to ensure the attainment of project outcomes				
Output 5.1: Project management methods	The project monitoring plan is designed and executed	The Project needs management methods to standardize the project management and fund use.	Complete the drafting and implementation of management measures	
Output 5.2: Mid-term and final project evaluations are conducted	Mid-term and final project evaluations	The Project needs to commission experts who have participated in GEF project in China to draft the mid-term assessment and evaluation method of the project.	Completing the mid-term evaluation work and carry out the evaluation.	
Project Strategy	KPIs/Indicators	Baseline	Target level	Progress to-date

III. Project Risk Management

1. Please indicate the overall project-level risks and the related risk management measures: (i) as identified in the CEO Endorsement document, and (ii) progress to-date. Please expand the table as needed.

	(i) Risks at CEO stage	(i) Risk level FY 22	(i) Risk level FY 23	(i) Mitigation measures	(ii) Progress to-date	New defined risk ⁵
1	Lack of effective coordination between various	Low Risk	Low Risk	Proper coordination will be sought through the Project Steering Committee. Ad-hoc	After the second grant was disbursed, two project steering committees were convened. At	<input type="checkbox"/>

⁵ New risk added in reporting period. Check only if applicable.

	partners involved and with other EE programs			working groups per sector or theme can be set up as needed, bringing in other partners and beneficiaries.	the meeting, the work plan for the next grant was determined and several universities, testing units, and consulting work were invited as partners to join the project work	
2	Effectiveness of policy to promote the desired results	Low Risk	Low Risk	The regulations will be developed or revised during the project period are all in line with the issued laws and latest State Council Policy documents.	Regulations and standards are being revised in an orderly manner and according to plan	<input type="checkbox"/>
3	Limited number of candidates interested in training	Low Risk	Low Risk	Since the awareness raising with the project implementation, technical agencies and enterprises will involve into and take part in the detail training. However, engagement still needs to be addressed to maintain interest.	At present, bidding has been initiated and it is planned to entrust at least 8 provincial-level testing units as project partners to carry out provincial-level training work	<input type="checkbox"/>
4	No immediate demand of services for trained experts	Medium risk	Low Risk	The integrated approach adopted by the project is expected to mitigate this risk by combining expert training with factory training designed to create interest in the services that the new national experts will provide.	In the training of international energy efficiency experts, we plan to provide teacher training for some of the outstanding students, and cultivate this group of trainees to become new teachers and invest them in relevant teaching work	<input type="checkbox"/>
5	Limited interests for experts from government or enterprise side	Low Risk	Low Risk	Following the project document content, expert training will be combine with equipment using enterprises assessment, and their interest will be enhanced after the good effect and newest regulation will also make relevant requirement.	With the large-scale implementation of project work (including training, testing, pilot demonstration) in each province, the project will have a wide impact on all parts of the country in succession	<input type="checkbox"/>
6	Demonstration projects are delayed, limiting the opportunity to disseminate success stories and develop case studies	Low Risk	Low Risk	The enterprises selected as demonstration sites for the expert-level training will be carefully screened for management support and implementation of the resulting recommendations. These factories are anticipated to provide the initial case studies and thus serve as examples for other factories.	At present, we have carried out the application work for the pilot demonstration of high energy consuming equipment. The demonstration case of high energy consuming equipment that has been submitted for application has been submitted to the relevant experts of the stakeholder for screening and evaluation	<input type="checkbox"/>
7	Incentives and financial support systems are insufficient, especially for technology transfer	Low Risk	Low Risk	Financial institutions will be encouraged to learn more about potential conservations resulting from industrial energy efficiency; and companies will be made aware of financing opportunities.		<input type="checkbox"/>
8	Vulnerability to climate events	Low Risk	Low Risk	The type of interventions to be undertaken in this project (standards and demonstration and diffusion measures) has negligible vulnerability to climatic events.		<input type="checkbox"/>

2. If the project received a sub-optimal risk rating (H, S) in the previous reporting period, please state the actions taken since then to mitigate the relevant risks and improve the related risk rating. Please also elaborate on reasons that may have impeded any of the sub-optimal risk ratings from improving in the current reporting cycle; please indicate actions planned for the next reporting cycle to remediate this.

N/A

3. Please indicate any implication of the **COVID-19** pandemic on the progress of the project.

From the end of 2022, the epidemic prevention policy to deal with the new coronavirus begins to gradually slow down. From 2023 onwards, any international travel, inter-provincial travel, large-scale conferences and other activities are unrestricted.

In response to the new policy, we have resumed the activities of various projects that were severely restricted before 2023, and actively invited the project manager of the UNIDO, to conduct in-field visits in China.

At present, all project-related training, pilot demonstration and cross-country communications have been carried out smoothly.

4. Please clarify if the project is facing delays and is expected to request an **extension**.

To promote the project, the State Administration for Market Regulation and the UNIDO project manager jointly organized a PSC meeting on March 16, 2023. Based on the current work situation, the meeting discussed the extension of the project implementation cycle. Considering the subsequent impact of the pilot demonstration project work, the end time of the project is planned to be extended from January 31, 2024 to July 31, 2025. The actual extension date will be adjusted according to the progress of the project. When submitting the application for project extension, the project steering committee shall submit the extension plan to the Ministry of Finance for approval, and then submit the relevant documents to the United Nations Industrial Development Organization.

5. Please provide the **main findings and recommendations of completed MTR**, and elaborate on any actions taken towards the recommendations included in the report.

Findings on standardized review issues and questions

A. Project design assessment

1. Project Design

Original design is still highly relevant to the country context and has the potential to create awareness and capacity for implementing EE of HEC equipment. From today's perspective the project seems to be even more relevant (see also 'country context').

The project outputs and activities are in line with Chinese government and SAMR priorities as well as with UNIDO's focus on SDG 9 and GEF strategies on GHG reduction. All interviewed stakeholders have stressed the need for this kind of project. Project results can be used to support China's enhanced goals on GHG reduction and countries using Chinese technology and products.

The project has also shown flexibility and several components and activities have been adapted to actual needs (e.g. Covid restriction, selection of trainers).

2. Project Results Framework

Project components and activities are well-targeted, clear and consistent, but not all components are fully visible. The Project Results Framework, which includes objectively verifiable indicators, is well designed. Feasible indicators are provided for outputs; most of the targets provided are consistent with the activities described. The resulting chain from outputs, outcomes to impact is logical and SMART (Specific, Measurable, Attainable, Relevant and Time-bound).

For a few activities, proper indicators are missing, and means for verifications are not clear. For example, for output "1.3 Dissemination campaign" a SMART target is not given. For output 2.2

“6 national testing laboratories established” it is not clearly defined how monitoring can be done, as the project is only supporting specific test equipment for one of these labs. Other labs are directly funded by Chinese government.

Last but not least, the impact of revised standards to the “Chinese landscape of EE HEC equipment” cannot be completely evaluated. If the project is successful, many investments will happen without the knowledge of the project team.

Recommendations

□ PMO has to prepare project Status (activity based)[During MTR RT has supported PMO to prepare project result framework and current status], financial reports and an updated workplan.

□ With these documents a 2 days’ workshop for UNIDO and PMO team with professional (external) moderation should be organized to:

- solve project management issues, esp. financial reporting and pending payments

- jointly ‘re-think’ project design (intervention logic and detailed activities) and amend PRF (if needed) and activities

- agree on a work plan with realistic time frame to achieve all objectives as planned (in project documents) or to achieve jointly revised objectives and indicators

- use outputs from the workshop to come up with a decision on project extension and inform stakeholders accordingly.

□ PMO should develop and implement effective project management and monitoring system, including the evaluation of co-finance, possibly with external support.

□ PMO should immediately engage an expert to design the framework to calculate and monitor CO2 and GHG emission reductions. UNIDO has vast experience in doing this work and can support to find the right person or to develop the framework themselves.

□ PMO should update the reporting system for in-service boiler to enable stakeholders to utilize information covered in database (Output 1.2). The data can be utilised to select specific industries for tailor-made trainings and/or awareness campaigning, and to support the marketing of EE HEC equipment. If quality data is provided and database is designed accordingly, it will enable and support the calculation of GHG reduction (indirect savings).

□ PMO supported by UNIDO should immediately solve payment issues for procurement process for Oil and Gaseous Fuel Burners) Testing Laboratory, as further delays might lead to extra costs. UNIDO HQ could consider engaging UNIDO Beijing team to offer training and support to PMO staff on financial reporting and monitoring, this might help to foster a solution.

□ PMO should review PRF and ‘Detailed Project Activities’ from Endorsement Document to ensure consistence of the targets and indicators. For example, targets for activity 3.1.3 (train 10.000 boiler operators and 3.1.4 training for 300 equipment manufacturers and vendors) are not reflected in PRF.

□ PMO should refocus on steam system optimization. At the moment the project has a strong focus on EE technologies, while system optimization is ignored.

□ PMO should review targets for Output 3.1 and expand training for enterprises.

□ PMO should select ‘50 practitioners’ (Output 3.2) accordingly and train them at the earliest as their support is needed to work on output 3.3 and 4.1 and part of their practical trainings. If overseas travel is not possible, in-country and online trainings should be considered.

□ PMO should clarify the need for training on “Improve capacities for the financial evaluation of industrial energy efficiency projects in 100 enterprises” and incorporate financial element (Output 3.4) in trainings targeting enterprises.

□ PMO should review the target for Output 3.3 (75 in depth assessment) and accelerate the testing. They should also clarify the intervention logic between Output 3.3 and Output 4, i. e. how the test is linked to demonstration.

□ PMO should clarify intervention logic and review the targets for Output 4 and accelerate the implementation of activities, with special focus on monitoring results including CO2 emission reduction.

□ PMO should put a stronger focus on project marketing, e. g. designing project logo and website. This will be needed to support the dissemination campaign. If a project extension is given an internal communication and knowledge management strategy should also be developed and introduced.

□ PMO should record, summarise and disseminate knowledge products, e. g. training materials, case studies and best practices. A web-based platform can support these activities.

□ PMO should focus on Gender mainstreaming as per project documents and engage a gender expert to include gender analysis in M&E work plan (see endorsement document page 23).

□ Robust communication channels should be established between UNIDO and PMO team. Both parties have to agree on communication protocols and frequency of online meetings.

- UNIDO should support the PMO to identify more opportunities to interact with international expertise through seminars and workshops. Several stakeholders mentioned the value of discussion with experts from abroad.
- PMO should make use of UNIDO's trainings and experts on SSO (see detailed activities 3.2.1.- 3.2.5). UNIDO should provide necessary support.
- UNIDO GEF coordinator may play a more active role to clarify project issues, e.g. regarding the monitoring of in-kind contributions, materialization of co-finance and needed amendments for project execution.
- UNIDO should elaborate on accounting rules with SAMR and clarify the co-financing rules with GEF focal point. SAMR should start monitoring in-kind contributions and co-financing with support from UNIDO.
- To enable measuring savings from the demonstration project, collect a baseline before the start of implementation. After enterprises implement the energy-efficient measures for 6-12 months, final saving results can be collected and measured and the overall direct CO2 savings can be evaluated.
- Given that China is a major exporter of industrial boilers and HEC equipment, it will add value to the project if the PMO could consider how to ensure that boilers for exports also fulfil the new standards and to explore what kind of support and training producers and exporters will need.

IV. Environmental and Social Safeguards (ESS)

1. As part of the requirements for **projects from GEF-6 onwards**, and based on the screening as per the UNIDO Environmental and Social Safeguards Policies and Procedures (ESSPP), which category is the project?

- Category A project
- Category B project
- Category C project

(By selecting Category C, I confirm that the E&S risks of the project have not escalated to Category A or B).

Notes on new risks:

- *If new risks have been identified during implementation due to changes in, i.e. project design or context, these should also be listed in (ii) below.*
- *If these new/additional risks are related to Operational Safeguards # 2, 3, 5, 6, or 8, please consult with UNIDO GEF Coordination to discuss next steps.*
- *Please refer to the UNIDO Environmental and Social Safeguards Policies and Procedures (ESSPP) on how to report on E&S issues.*

Please expand the table as needed.

	E&S risk	Mitigation measures undertaken during the reporting period	Monitoring methods and procedures used in the reporting period
(i) Risks identified in ESMP at time of CEO Endorsement			
(ii) New risks identified during project implementation (if not applicable, please insert 'NA' in each box)			

V. Stakeholder Engagement

1. Using the previous reporting period as a basis, please provide information on **progress, challenges and outcomes** regarding engagement of stakeholders in the project (based on the Stakeholder Engagement Plan or equivalent document submitted at CEO Endorsement/Approval).

Project Steering Committee (PSC)'s members include MOF, SAMR, UNIDO, CSEI and CPASE.

Besides hosting the PMO, CSEI has assumed multi-functional role in the delivery of technical activities, including standard development, lab building, training and testing. It also provides technical advice to SAMR. CSEI, with a strong network of testing and enforcement agencies, has organised several training for these audiences and some project meetings.

With the large-scale promotion of the project, we have also invited many previously collaborated and newly added stakeholders as our partners.

The China Promotion Association for Special Equipment Safety and Energy-Saving(CPASE) and the China Boiler and Boiler and Water Treatment Association are national, industrial, and non-profit social organizations voluntarily formed by units and individuals in the field of special equipment, playing a key role in the field of special equipment in China. At present, the project office utilizes these associations' platform to release various publicly available information, solicitation notices, and other information related to the national industry. Given their extensive training experience in the field of special equipment industry, we have also entrusted them with organizing some standard research activities and training activities.

In order to promote the development and revision of project output 1-regulations and standards and project output 4-pilot demonstration activities, we actively seek cooperation with various universities and consulting companies, entrust them to carry out various planned regulations and standard development and revision work, and select the first batch of excellent high energy consuming equipment science and technology pilot units. At present, we have commissioned 4 universities to collaborate on the demonstration of regulations and standards, and have screened the 23 submitted materials for the pilot demonstration of high energy consuming equipment with China Energy Conservation Consulting Co., Ltd.

At the same time, in view of the huge volume of training and Testing task planned to be carried out this year, we also plan to invite at least 8 provincial special equipment inspection units to participate in the training of boiler operators and the energy saving and environmental protection Test effort of high energy consuming equipment. At present, the relevant work is in the bidding stage, and relevant institutions in various provinces are also actively responding.

2. Please provide any feedback submitted by national counterparts, GEF OFP, co-financiers, and other partners/stakeholders of the project (e.g. private sector, CSOs, NGOs, etc.).

N/A

3. Please provide any **relevant stakeholder consultation** documents.

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In Nov 18,2022, since the second grant of the project are in position, the PSC held a PSC meeting. At the meeting, committee members discussed personnel changes for the project, confirmed the management of funds, and more importantly, reviewed and confirmed the execution plan for the second grant.

In order to systematically grasp the direction of the project, another project steering committee meeting was

held on March 16, after the in-field visit of UNIDO's project manager Sanjaya SHRESTHA. At the meeting, Sanjaya shared his thoughts on the visit to China and exchanged views with Cui Gang, Director of the Project Steering Committee, on the future direction of the project work.

4866_01_Nov 18, 2022, PSC meeting

4866_02_Mar 16, 2023, Minutes of PSC Meeting

VI. Gender Mainstreaming

1. Using the previous reporting period as a basis, please report on the **progress achieved on implementing gender-responsive measures and using gender-sensitive indicators**, as documented at CEO Endorsement/Approval (in the project results framework, gender action plan or equivalent),.

In China, there is a significant disparity in the proportion of men and women engaged in the field of special equipment engineering, but the project office still strives to contribute to the industry on the issue of gender equality as much as possible.

1. To promote activities related to project output 2- laboratory improvement, we invited Dr Liu Xuemin to join the project office as an expert in Laboratory equipment procurement and construction. In the past year, Dr Liu Xuemin has actively promoted the procurement and delivery of PLIF facilities.

2. As a closely cooperating unit with the project office this year, the Boiler and Water Treatment Association's Secretary General Wang Jiaoling organized training for enterprise management and technical personnel, as well as for boiler manufacturing enterprises. With project funds, a total of 1000 management personnel from national agencies, universities, and enterprises in the special equipment industry were organized and completed.

3. In the existing training for enterprise management and technical personnel and boiler manufacturing enterprises, as well as the upcoming international level energy efficiency expert training, the project office and relevant experts will not set any gender threshold for any participants. In the upcoming international-level energy efficiency expert training, we received a total of 10 submissions from female applicants out of a total of over 60 application documents. We will continue to closely monitor the subsequent selection of this important training to ensure that it does not harm anyone's gender rights.

VII. Knowledge Management

1. Using the previous reporting period as a basis, please elaborate on any **knowledge management activities / products**, as documented at CEO Endorsement / Approval.

As required by the project agreement, the project office conducts financial audit activities annually. The audit report for the previous year is expected to be submitted in July this year. In accordance with the requirements of UNIDO and the Ministry of Finance for the management of project funds, the project conducts open bidding process for project activities with the expense that exceeding \$30,000

4866_03_audit_report

4866_04_audit report for July 2021-June 2022

2. Please list any **relevant knowledge management mechanisms / tools** that the project has generated.

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In July of this year, the project office conducted bidding for the project guide system research activity and plans to officially open the bid on July 25th. The purpose of this activity is to study and determine an international and standardized system for providing clear information specifications for project guidelines, energy efficiency testing, energy efficiency product demonstrations, and other reports.

- *Minutes of the PSC meeting*

VIII. Implementation progress

1. Using the previous reporting period as a basis, please provide information on **progress, challenges and outcomes achieved/observed** with regards to project implementation.

In June 2022, the PMO submitted work plan for the second allocation of funds for the project, and with the PMO's active facilitation with Sanjaya and colleagues in UNIDO, the work plan was endorsed by UNIDO. At the end of October 2022, the PMO received the second grant from the GEF totaling \$2.859 million.

We have made steady progress in the four major output components and project management of the project.

In the Component 1-regulations and standards, we have entrusted research institutions such as Harbin Institute of Technology, Xi'an Jiaotong University, Shandong University, Shenyang University of Chemical Technology, etc. to carry out a total of 8 studies on regulations and standards. The regulations and standards include:

- ◆ Seminar on national standard "Evaluation of Uncertainty in Boiler Thermal Performance Test Methods
- ◆ Shell and tube heat exchanger energy efficiency index study
- ◆ Steam system energy efficiency curve
- ◆ Study of fuel characteristics of biomass boilers
- ◆ Study on energy efficiency index of coupled fuel boiler
- ◆ Statistical Analysis of Boiler Data and Energy Efficiency Indicators in Use Nationwide
- ◆ Boiler energy-saving and environmental protection technology application guide boiler industry energy-saving and low-carbon development path and financial policy research
- ◆ Research on statistical accounting methods for carbon emissions from boilers and heat exchangers

In the Component 2- laboratory capacity improvement, we have completed the procurement of laser induced fluorescence equipment (PLIF). At present, in view of the problems related to the import and export documents, some European manufacturers are actively producing the parts required for PLIF and will ship after the final assembly and Test effort. The instrument is planned to be shipped to China from August to September and installed in place. At the same time, after the Laboratory equipment is in place, we will entrust CPASE to organize and carry out the capacity comparison activities of testing institutions based on the completed laboratory.

In the Component 3- personnel training, the project office has entrusted institutions such as the CPASE and the Boiler and Water Treatment Association to carry out and plan to carry out multiple training tasks. The personnel training plan for this year is steadily advancing. The training work currently underway is as follows:

- 60 International Energy Expert training - The application for trainees has been completed, and experts are being organized to select teaching teachers and trainees.
- 1000 enterprise management training, 100 boiler manufacturing enterprises training - Organized by the Boiler and Water Treatment Association
- 5700 Operator training - It is planned to be carried out by various provincial inspection institutions for

synchronous with the annual training work. At present, the project office is conducting bidding and tendering work, selecting qualified executing agencies from at least 8 provinces.

In the Component 4 - pilot demonstration work, we commissioned China Energy Conservation Consulting Company to conduct research on the evaluation methods of energy-saving technology products for boilers and heat exchangers, as well as the selection and promotion of demonstration projects in 2023. At the same time, we plan to conduct bidding work in conjunction with the training of 5700 boiler operators, and select qualified executing agencies from at least 8 provinces to conduct a total of 90 energy-saving and environmental protection testing and evaluation work for high energy consuming equipment.

2. Please briefly elaborate on any **minor amendments**⁶ to the approved project that may have been introduced during the implementation period or indicate as not applicable (NA).

Please tick each category for which a change has occurred and provide a description of the change in the related textbox. You may attach supporting documentation, as appropriate.

<input type="checkbox"/>	Results Framework	
<input type="checkbox"/>	Components and Cost	
<input type="checkbox"/>	Institutional and Implementation Arrangements	
<input type="checkbox"/>	Financial Management	
<input type="checkbox"/>	Implementation Schedule	
<input type="checkbox"/>	Executing Entity	
<input type="checkbox"/>	Executing Entity Category	
<input type="checkbox"/>	Minor Project Objective Change	
<input type="checkbox"/>	Safeguards	
<input type="checkbox"/>	Risk Analysis	
<input type="checkbox"/>	Increase of GEF Project Financing Up to 5%	
<input type="checkbox"/>	Co-Financing	
<input type="checkbox"/>	Location of Project Activities	
<input type="checkbox"/>	Others	

3. Please provide progress related to the **financial implementation** of the project.

Component 1

seminar on national standard "Evaluation of Uncertainty in Boiler Thermal Performance Test Methods" RMB 200,000

⁶ As described in Annex 9 of the *GEF Project and Program Cycle Policy Guidelines*, **minor amendments** are changes to the project design or implementation that do not have significant impact on the project objectives or scope, or an increase of the GEF project financing up to 5%.

Shell and tube heat exchanger energy efficiency index study RMB 500, 000

Steam system energy efficiency curve RMB 500,000

Study of fuel characteristics of biomass boilers RMB 850,000

Study on energy efficiency index of coupled fuel boiler RMB 495,000

Component 2

Procurement of Laser-induced fluorescence system RMB 2,978,000

Testing organization capacity comparison (Carried out with 60 International Energy Expert training in component 3)

Component 3

60 International Energy Expert training RMB 2,200,000

1000 enterprise management training and 100 boiler manufacturing enterprises training RMB 560,000

5700 boiler operator training RMB 4,880,000 (currently under bidding procedure)

Component 4

90 HEC equipment energy conservation and environment friendly testing (currently under bidding procedure) (Carried out with 5700 boiler operator training in component 3)

Statistical Analysis of Boiler Data and Energy Efficiency Indicators in Use Nationwide RMB 800,000

Industrial heat systems and high energy-consuming (HEC) equipment

project guideline system construction RMB 650,000 (currently under bidding procedure)

Project management

Travel expenses RMB 100,000

Project Specialist Salary RMB 200,000

As of July 2023, the second grant of the project has been executed and is expected to be executed with a total of approximately 2.1 million US dollars.

The detailed expenditure amount will be reflected in the audit report of the project's annual Financial audit activities carried out from July to August

IX. Work Plan and Budget

1. Please provide **an updated project work plan and budget** for the remaining duration of the project, as per last approved project extension. Please expand/modify the table as needed.

Please fill in the below table or make a reference to a file, in case it is submitted as an annex to the report.

Outputs by Project Component	2022				2023				2024				GEF Grant Budget Available (US\$)
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Component 1 –Policy and market promotion													
Outcome: Enhanced regulatory framework that will enable HEC user to adopt energy efficiency measures and government institutions to monitor compliance, including a knowledge management tool													

Output 1.1: National technical regulations on energy efficiency for HEC special equipment (boilers and heat exchangers) are revised and improved through the implementation of innovative systemic approaches			√	√	√	√	√	√	√	√			350,000
Output 1.2: A reporting system is designed and implemented to allow inspection agencies to collect data from service boilers systematically			√	√	√	√	√	√	√	√			130,000
Output 1.3 A national awareness raising and dissemination campaign is developed and implemented			√	√	√	√	√	√	√	√			20,000
Component 2 –Capacity Building activities (Government)													
Outcome: The AQSIQ (SAMR) has the capacities required to enforce the technical regulations, and testing capabilities are enhanced to facilitate the implementation of a systems optimization approach and the use of energy efficient equipment													
Output 2.1: The capacities of the HEC Special Equipment Energy Efficiency Testing Centre are upgraded								√	√				50,000
Output 2.2: National testing laboratories are established and have the competencies to verify and test against the new technical regulations		√											550,000
Component 3 –Capacity Building activities (enterprises)													
Outcome: A cadre of highly specialized system optimization experts from public and private sectors are available as a long term technical resource to industry and the country. Enterprises awareness on measures and new technologies and EE financing mechanisms is increased.													
Output 3.1: Awareness on the concept of energy efficiency focused on optimization of steam systems and heat recovery systems is raised amongst 1000 representatives of selected stakeholder groups (inspection agencies, equipment manufacturers, enterprises, consultants)				√	√	√	√	√					1,125,000
Output 3.2: 50 candidates are trained to become national energy practitioners on steam and heat recovery systems optimization				√	√	√	√						280,000
Output 3.3: 75 in-depth system assessments are completed in manufacturing facilities to identify energy conservations				√	√	√	√	√					150,000
Output 3.4: Awareness and promotion workshop for 1000 managers and technical personnel of enterprises (0.5 days). Training of 100 national trainers who will train operators in the user training steam systems optimization (SSO) and heat recovery system optimization (HRSO). Training for 10,000 boiler operators (user). Dedicated training to 300 equipment manufacturers and vendors (0.5 days).				√	√	√	√	√					15,000
Component 4 –Demonstration of energy efficient equipment implementation and operation													

Outcome: New efficient technologies are demonstrated at national level to serve as case studies for future investments												
Output4.1 : New technologies: at least 5 of the companies trained adopt measures and replace equipment with more efficient technologies					√	√	√	√				420,000
Output4.2 : Industries implement the systems optimization measures identified during the in depth systems assessments					√	√	√	√	√	√		1,150,000
Component 5 –Monitoring and Evaluation												
Outcome: A robust mechanism for the monitoring and evaluation is put in place to ensure the attainment of project outcomes												
Output 5.1: Project monitoring plan is designed												64,000
Output 5.2: Mid-term and final project evaluations are conducted			√	√								
Output 5.3: As part of the terminal evaluation follow-up actions recommendation are determined for long term project sustainability									√	√	√	

X. Synergies

1. Synergies achieved:

N/A

3. Stories to be shared (Optional)

N/A

XI. GEO LOCATION INFORMATION

The Location Name, Latitude and Longitude are required fields insofar as an Agency chooses to enter a project location under the set format. The Geo Name ID is required in instances where the location is not exact, such as in the case of a city, as opposed to the exact site of a physical infrastructure. The Location & Activity Description fields are optional. Project longitude and latitude must follow the Decimal Degrees WGS84 format and Agencies are encouraged to use at least four decimal points for greater accuracy. Users may add as many locations as appropriate.

Web mapping applications such as [OpenStreetMap](#) or [GeoNames](#) use this format. Consider using a conversion tool as needed, such as: <https://coordinates-converter.com>

Please see the Geocoding User Guide by clicking [here](#)

Location Name	Latitude	Longitude	Geo Name ID	Location and Activity Description
State Administration of Marketing Regulation	39.971338N	116.37238E	1816670	
China Special Equipment Institute	39.966159N	116.408923E	1816670	
CPASE	39.967426N	116.408762E	1816670	

Please provide any further geo-referenced information and map where the project interventions is taking place as appropriate.

EXPLANATORY NOTE

1. **Timing & duration:** Each report covers a twelve-month period, i.e. 1 July 2022 – 30 June 2023.
2. **Responsibility:** The responsibility for preparing the report lies with the project manager in consultation with the Division Chief and Director.
3. **Evaluation:** For the report to be used effectively as a tool for annual self-evaluation, project counterparts need to be fully involved. The (main) counterpart can provide any additional information considered essential, including a simple rating of project progress.
4. **Results-based management:** The annual project/programme progress reports are required by the RBM programme component focal points to obtain information on outcomes observed.

Global Environmental Objectives (GEOs) / Development Objectives (DOs) ratings	
Highly Satisfactory (HS)	Project is expected to achieve or exceed <u>all</u> its major global environmental objectives, and yield substantial global environmental benefits, without major shortcomings. The project can be presented as “good practice”.
Satisfactory (S)	Project is expected to <u>achieve most</u> of its <u>major</u> global environmental objectives, and yields satisfactory global environmental benefits, with only minor shortcomings.
Moderately Satisfactory (MS)	Project is expected to <u>achieve most</u> of its major <u>relevant</u> objectives but with either significant shortcomings or modes overall relevance. Project is expected not to achieve some of its major global environmental objectives or yield some of the expected global environmental benefits.
Moderately Unsatisfactory (MU)	Project is expected to achieve <u>some</u> of its major global environmental objectives with major shortcomings or is expected to <u>achieve only some</u> of its major global environmental objectives.
Unsatisfactory (U)	Project is expected <u>not</u> to achieve <u>most</u> of its major global environmental objectives or to yield any satisfactory global environmental benefits.
Highly Unsatisfactory (HU)	The project has failed to achieve, and is not expected to achieve, <u>any</u> of its major global environmental objectives with no worthwhile benefits.

Implementation Progress (IP)	
Highly Satisfactory (HS)	Implementation of <u>all</u> components is in substantial compliance with the original/formally revised implementation plan for the project. The project can be presented as “good practice”.
Satisfactory (S)	Implementation of <u>most</u> components is in substantial compliance with the original/formally revised plan except for only few that are subject to remedial action.
Moderately Satisfactory (MS)	Implementation of <u>some</u> components is in substantial compliance with the original/formally revised plan with some components requiring remedial action.
Moderately Unsatisfactory (MU)	Implementation of <u>some</u> components is <u>not</u> in substantial compliance with the original/formally revised plan with most components requiring remedial action.
Unsatisfactory (U)	Implementation of <u>most</u> components in <u>not</u> in substantial compliance with the original/formally revised plan.
Highly Unsatisfactory (HU)	Implementation of <u>none</u> of the components is in substantial compliance with the original/formally revised plan.

Risk ratings	
Risk ratings will assess the overall risk of factors internal or external to the project which may affect implementation or prospects for achieving project objectives. Risk of projects should be rated on the following scale:	
High Risk (H)	There is a probability of greater than 75% that assumptions may fail to hold or materialize, and/or the project may face high risks.
Substantial Risk (S)	There is a probability of between 51% and 75% that assumptions may fail to hold or materialize, and/or the project may face substantial risks.
Moderate Risk (M)	There is a probability of between 26% and 50% that assumptions may fail to hold or materialize, and/or the project may face only moderate risk.

Low Risk (L)

There is a probability of up to **25%** that assumptions may fail to hold or materialize, and/or the project may face only low risks.