

PROMOTING ENERGY EFFICIENT ROOM AIR CONDITIONERS (PEERAC)

TERMINAL EVALUATION

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Promoting Energy Efficient Room Air Conditioners (PEERAC)

Terminal Evaluation

PROJECT DATA		
Title of UNDP Supported GEF Financed Project	Promoting Energy Efficient Room Air Conditioners (PEERAC)	
UNDP and GEF Project ID Numbers	UNDP Project ID: 00072708 GEF Project ID: PIMS 4040	
Evaluation Time Frame and Date of Evaluation Report	Content	Time
	Meeting at the PMO	24 March, 2016
	Ongoing data gathering and interviews as requested by the TE team	25-31 March, 2016
	PPT Presentation of initial TE findings and recommendations	1April, 2016
	Validation of financial and other reporting information, additional analysis	2-30 April, 2016
	Submission of Draft TE	05 May, 2016
Region and Countries included in the Project	Region: Asia Pacific Country: China	
GEF Operational Program/Strategic Program	GEF Strategic Program No. 1 , Promoting Energy Efficiency in Residential and Commercial Buildings (SP-1) GEF Operational Program: 5: Removal of barriers to energy efficiency and energy conservation.	
Implementing Partner and Other Project Partners	UNDP China, MEP,NDRC,MIIT,MOFCOM, CNIS,CSCC,CHEAA,CHEARI, and 15 RAC and 10 ACC Manufacturers, retailer GOME	
Date of Inception Workshop	24 November 2010	
Date of First Disbursement	November 2010	
Original Closing Date	June2015	
Revised Closing Date	June 2016	
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This Terminal Evaluation report sets out findings, conclusions, lessons learnt and recommendations for the **Promoting Energy Efficient Room Air Conditioners (PEERAC)**. The report is developed in compliance with the terms of reference for the assignment. The conclusions and recommendations set out in the following pages are solely those of the evaluators and are not binding on the project management and sponsors.

The authors would like to thank all individuals and organizations who assisted in the Terminal Evaluation, particularly the PMO and UNDP China for providing technical and logistic support, and all the stakeholders who generously shared their time and views.

Acronyms and Abbreviations

ACC	Air Conditioner Compressor
AMIS	Air Conditioning Market Information System
AWP	Annual Work Plan
BRESL	Barrier Removal to Energy Efficiency Standards and Labeling
CEEE	Center for Environmental Energy Engineering
CFC	Chlorofluorocarbon
CHEAA	China Household Electrical Appliances Association
CHEARI	Chinese Household Electrical Appliances Research Institute
CNIS	China National Institute of Standardization
CSCC	Center for the Study of Contemporary China
UN DESA	United Nations Department of Economic and Social Affairs
DSTS	Department of Science, Technology and Standards
EE	Energy Efficiency
EER	Energy Efficiency Ratio
EOP	End of the Project
FECO	Foreign Economic Cooperation Office
GEF	Global Environment Facility
GHG	Greenhouse Gas
GOC	Government of China
M&E	Monitoring and Evaluation
MEP	Ministry of Environmental Protection
MIIT	Ministry of Industry and Information Technology
MOF	Ministry of Finance
MTR	Medium Term Review
NDRC	National Development and Reform Commission
NEX	Nationally-Executed

NHEAQSTC	National Household Electric Appliance Quality Supervision Testing Center
NPD	National Project Director
ODS	ozone-depleting substance
PAC	Project Assurance Committee
PEERAC	Promoting Energy Efficient Room Air Conditioners
PILESLAMP	Phase-out of Incandescent Lamps and Energy Saving Lamps Promotion
PMO	Project Management Office
PR	Public relations
PSC	Project Steering Committee
R&C	Residential and Commercial
R&D	Research and Development
RAC	Room Air Conditioner
SEPA	State Environmental Protection Administration
TAC	Technical Advisory Committee
TE	Terminal Evaluation
UN	United Nations
UNDP	United Nations Development Program

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Executive Summary

PROJECT SUMMARY TABLE	
Goal of the Project	Reduction of GHG emissions from room air conditioning in China's residential and commercial sectors
Objective of the Project	Significantly improved Room Air Conditioner (RAC) Energy Efficiency (EE) in China, with a 10% of upgrade for the average RAC energy efficiency gain, and the cumulative CO2 Emission Reductions from the use of EE RACs reach 35.4 M/tons by EOP.
Major Components and Outcomes of the Project	The PEERAC is composed of three major components and their major outcomes are as follows: Component 1: AC Compressor Efficiency Upgrades - Capacity building activities (in-country and international) for the design and technical personnel of local ACC manufacturers; - Technical assistance to ACC manufacturers in the design and manufacturing of EE ACCs; - Institutional capacity development activities that will promote business partnerships among the local ACC and RAC manufacturers; - Monitoring and evaluation of the ACC market; and, - ACC product testing and commercialization Component 2: RAC Efficiency Upgrades - Capacity building activities (in-country and international) for the design and technical personnel of local RAC manufacturers; - Intensive technical training on the design and manufacturing of EE RACs; - Technical assistance to RAC manufacturers in the design and manufacturing of EE RACs as well as the integrated approach to the proper handling and disposal of ODS refrigerants; - Monitoring and evaluation of the local RAC market; and, - RAC product testing and commercialization. Component 3: EE RAC Promotions

	○ Capacity building activities for the wide scale promotion of EE RACs to consumers in the C&R sector through various information, education and communication schemes; ○ Incentive programs for RAC manufacturers, RAC retailers, and RAC consumers; ○ Development of tools for use in the EE RAC promotions (e.g., procurement guidelines, web-based tools); ○ Policy and institutional capacity development (e.g., RAC standards and labels; and EE RAC policies).	
Project Budget	GEF Fund	USD 6,263,600
	Government of China Co-Financing	USD 350,000
	Private Sector Co-Financing	USD 21,000,000
	Other Sources	
	Total Committed Funds	USD 27,613,600
	Total Actual Funds Utilized	USD 376,871,217

Project Description

The project is designed to remove key barriers to the research, production, sales and use of energy efficient RACs in China by introducing globally advanced concepts and experiences and implementing a series of "Technology push" and "Market pull" activities to push forward technical progress and realize sustainable development of the RAC industry. The project's objective is the significant improvement of the energy efficiency of locally manufactured Room Air Conditioners (RACs) in China. It is expected to contribute to the reduction of GHG emissions from room air conditioning in China's residential and commercial sectors through the transformation of the Chinese RAC market towards more energy-efficient RAC products, technologies, and practices. The project is comprised of activities aimed at upgrading Air Conditioner Compressor (ACC) Efficiency, enhancing RAC Efficiency, and promoting Energy Efficient RAC. Moreover, the project also aimed to contribute to the reduction of global GHG emissions through upgrading efficiency of the locally produced ACCs and RACs exported to the global market.

Evaluation Rating Table

EVALUATION RATINGS			
1. Monitoring and Evaluation	Rating	2. IA& EA Execution	Rating
M&E design at entry	S	Quality of UNDP Implementation	S
M&E Plan Implementation	S	Quality of Execution - Executing Agency	S
Overall quality of M&E	S	Overall quality of Implementation / Execution	S
3. Assessment of Outcomes	Rating	4. Sustainability	Rating

Relevance	R	Financial resources	LS
Effectiveness	HS	Socio-political	LS
Efficiency	S	Institutional framework and governance:	LS
Overall Project Outcome Rating	S	Environmental	LS
		Overall likelihood of sustainability	LS

Summary of Conclusion, Recommendations and Lessons

The Terminal Evaluation team has determined that the PEERAC design has remained highly relevant to the development context of China and the priorities of various stakeholders, including GOC, GEF, UNDP, and the EE RAC industry.

Moreover, the project has been efficiently implemented while engaging a large number of stakeholders as partners and sub-contractors. The ownership from all stakeholders has been demonstrated in exceeding committed co-financing by 1,738.75% and has led to effective implementation, resulting in achievement of goals and component-level targets. Activities with significant impact include: Training programs designed for design and production of EE ACCs and EE RACs, development of RAC EE Standard, Manufacturer Incentive Program, and the RAC Retailer Program. A supportive environment created by the GOC also facilitated the project and resulted in unintended positive impact of a variety of activities, e.g. replication for improving the EE of other household appliances. These activities have effectively transformed the EE RAC industry in China, with EE RACs now occupying 50% market share as compared to 5% baseline levels. The project has also effectively managed its budgetary resources and activities remained responsive to evolving needs of stakeholders.

On the downside, an implementation delay of one year has resulted in the project to be delivered in 20% additional time. Moreover, activities related to the PR Campaign and Consumer education program were implemented much later planned, thereby potentially limited the efficacy of these particular initiatives.

LESSONS LEARNED

- i. The project has demonstrated that full support by Recipient country government (GOC) and cooperation between relevant public and private stakeholders lead to successful projects;
- ii. Productive engagement of the private sector at all phases can result in a multiplier effect for achieving industry and market related goals;
- iii. A 'value chain' approach to project development has a more comprehensive focus;
- iv. A simple project document with step-by-step guidance on implementation, clearly delineated roles and responsibilities, and defined financial resources is essential for guiding a smooth implementation process;

- v. M&E incorporated into various project activities facilitates cross-referencing of achievements and results. However, the presence of a project-level M&E/tracking system is essential to guide the project's reporting and activity coordination against planned outcomes and targets;
- vi. Selection of competitive organizations for sub-contracts and project delivery is crucial for overall project performance;
- vii. Policy and standards are highly cost-effective tools for market transformation in China.

RECOMMENDATIONS

i. Continuation / Up-scaling of the Project Activities

The following recommendations are provided for wider adoption of the successful initiatives implemented by the PEERAC project:

a. Establishment of Home Appliance Energy Efficiency Center of Excellence

The TE mission recommends that the GOC sets up a 'Home Appliance Energy Efficiency Center of Excellence', based after the University of Maryland's Center for Environmental Energy Engineering. Such a facility can facilitate not only EE development within China, but can also provide a hub for South-South Cooperation by providing state of the art assistance and services to other countries in the region.

b. AMIS and Manufacturer Competition

AMIS was designed as a tool to measure PEERAC's project and impact on the EE RAC industry. However, the data generated by this database has been widely appreciated and utilized by manufacturers for making strategic production and marketing decisions. The data can also be valuable to inform future policy decisions. Therefore, the TE team recommends the continuation of AMIS.

Similarly, the competition held under the Manufacture Incentive Program was well received by the stakeholders as it facilitated healthy competition within the industry for the promotion of EE RACs. Based on interviews with RAC and ACC manufacturers, the TE team recommends for the continuation of this initiative.

c. Documentation and Dissemination of Lessons Learnt

The project has made significant contributions to the development of the EE RAC industry. For future efforts and projects to build on these lessons it is important that the project's experiences, such as its approach, processes, results, and achievements are documented and widely disseminated by being made available to any potential stakeholder who may be interested in learning from PEERAC's experience. This can be achieved to a great extent through the successful delivery of the Sub-Contract having been issued to the China WTO Tribune.

ii. Recommendations for Future Project Designs

This sub-section provides recommendations for design of future projects by GEF, UNDP, and the GOC.

a. Monitoring and Reporting Systems

UNDP-GEF project designs detail elaborate monitoring and evaluation systems, including project financial reporting and audits. In fact, in the case of PEERAC, M&E was incorporated into activities and structures such as the AMIS and Testing facilities, etc. However, to keep track of projects that have multiple activities and rely on a large number of stakeholders, it is important to design an activity **tracking/monitoring system**. It is recommended that such systems are made compulsory as part of the M&E plan in future project designs, thereby allocating particular financial and human resources for the development and maintenance of such systems.

Moreover, the systematic financial reporting often only includes the GEF fund. Considering the high levels of co-financing commitments made in projects such as PEERAC, it is recommended that future project designs include a **tracking or audit trail of co-financing**. Such a measure can improve the calculation of co-financing, enhance transparency, and highlight the host country's and stakeholders' commitment to the project.

In addition, it is recommended that in the case of project involving market-led approaches, key project monitoring organizational structures, e.g. Project Steering Committees / Project Assurance Committees are comprised of stakeholders from both public and private sector.

1. INTRODUCTION

1.1. Purpose of the Evaluation

In accordance with UNDP and GEF Monitoring and Evaluation policies and procedures, all full and medium-sized UNDP supported- GEF financed projects are required to undergo a terminal evaluation upon completion of implementation.

The **objectives of this Terminal Evaluation (TE)** seek to fulfill the following overarching objectives of the monitoring and evaluation of GEF projects:

- I. Promote accountability for the achievement of GEF objectives through the assessment of results, effectiveness, processes and performance of the partners involved in GEF activities; and
- II. Promote learning, feedback and knowledge sharing on results and lessons learned among the GEF and its partners, as basis for decision-making on policies, strategies, program management, and projects and to improve knowledge and performance.

1.2. Scope and Methodology

The scope of this Terminal Evaluation (TE) covers the entire UNDP/GEF-funded project and its components as well as the co-financed components of the project.

The TE of the PEERAC Project was carried out at the component level and project level. During the evaluation an assessment was made of the progress towards achievement of the project outcomes and outputs, the relevance of the various project outputs, and effectiveness and efficiency of the different activities undertaken to achieve the outputs. Moreover, the inputs were analyzed by assessing the contributions made by the UNDP and its implementing partners, the appropriateness and effectiveness of the partnership strategy utilized, and sustainability of the project's outcomes and outputs.

The consultant team carried out various activities to undertake the evaluation, including literature review, development of an inception report and evaluation tools, and meetings with project stakeholders. Details of these are provided below:

I. Development of Evaluation Tools

A detailed review of the related documents by the consultants facilitated the understanding of the multiple dynamics of this project. A complete list of documents reviewed during the course of the assignment is provided in Annex 1. Based on this review, the programmatic and geographic scope of the evaluation activities as well as samples for interviews and visits was determined.

KII guide sheets developed by the consultants were utilized during the course of interviews with the PEERAC PMO staff, various key stakeholders, partners, and sub-contractors, etc. The draft KII guide sheets pertaining to the various project participants are attached in Annex 2.

Moreover, the proposed evaluation methodology, developed interview tools, and schedule of evaluation were shared with the UNDP and PMO in the form of an Inception Report.

II. Undertaking Country Mission and Field Visits

The International Evaluator visited China from 22 March to 02 April 2016. During this time, the two National Evaluators and the International Evaluator worked together to undertake further document review, interviews, site visits, and analysis. The detailed mission schedule is presented in Annex 3.

The mission was kicked off with an introductory workshop on 24 March, attended by the evaluation team, PMO staff, and concerned representatives of UNDP China. Subsequently, during the in-country mission, interviews were held with key project stakeholders, participants, and beneficiaries.

Initially, to get an overview of the project's implementation mechanisms and associated challenges and opportunities, detailed meetings were held with the Project Management Office (PMO) staff responsible for overseeing the various Program outputs and activities. After this, key project stakeholders including Sub-contractors, Stakeholders, and beneficiaries etc. were interviewed using the developed KII sheets. A complete list of stakeholders interviewed during the TE is presented in Annex 4.

III. Debriefing Presentation

At the end of the mission in China, to present the findings of the TE, a de-briefing presentation was conducted on April 01 2016 by the Evaluation team. The presentation was attended by the representatives of UNDP China and PEERAC PMO staff.

1.3. Structure of the Evaluation Report

Led by the international evaluator, a Terminal Evaluation report is developed according to the outline provided in Annex 5. The evidence-based report consolidates and presents an analysis of the information gathered from literature review, interviews, discussions, and site visits. According to the outline recommended by the UNDP-GEF projects Evaluations Guidelines¹, the report is divided into the following five main sections:

1. Introduction
2. Project description and development context
3. Findings
 - 3.1. Project Design / Formulation
 - 3.2. Project Implementation
 - 3.3. Project Results
4. Conclusions, Recommendations & Lessons
5. Annexes

¹ Project-Level Evaluation: Guidance for Conducting Terminal Evaluations of UNDP-Supported, GEF-Financed Projects – UNDP Evaluation Office (2012)

The report covers the criteria of relevance, effectiveness, efficiency, sustainability and impact. In addition, rating based on the obligatory rating scales is provided for (a) monitoring and evaluation (b) IA & EA execution (c) assessment of outcomes (d) sustainability. Moreover, the report includes an analysis of the Project Finance and Co-finance, Mainstreaming, and Impact. To assess project finances, the project cost and funding data is analyzed. Resultantly, planned and actual expenditures are presented and variances between the two is assessed and explained.

At the end of the report, Conclusions, Recommendations, and Lessons learnt from the project implementation experience are provided to inform future UNDP, GEF, and Government of China programming.

2. PROJECT DESCRIPTION AND DEVELOPMENT CONTEXT

This project follows the same general approach as a previous project, entitled “Barrier Removal for the Widespread Commercialization of Energy-Efficient CFC-Free Refrigerators in China,”(1999-2006), supported by GEF/UNDP and the Government of the People’s Republic of China, and executed by the former State Environmental Protection Administration (SEPA) and UN DESA.

The Final Evaluation on the ‘refrigerator project’ was concluded as “extremely effective in achieving its primary goals,²” and it was recommended that the concepts of technology push/market pull should be copied to other appliances. Since air conditioning was noted as a crucial area for reduction of both electric energy consumption and electricity demand (peak power) reduction, and for the reduction of the environmental impacts associated with supplies of both electric energy and peak power. The recommendations from the Final Evaluation Report of the refrigerator project became the basis for the development of the PEERAC project, and the ‘Technology Push/Market Pull’ concept became the overall framework for the project’s formulation and implementation.

China’s demand for RACs is primarily being met by Chinese air conditioning manufacturers. In 2012-12, there were estimated to be approximately 300 manufacturers in the country, generating \$73 billion in revenue every year, and employing approximately 350,000 people³. These manufacturers have captured an estimated 70% of worldwide production, and with an increasing competitive edge, Chinese-made air conditioners have been gaining a larger market share within the global market.

Energy use and greenhouse gas emissions associated with this rapid growth are obviously of critical concern, and Chinese air conditioners have historically had low energy efficiency levels compared with other countries. An analysis conducted by the China Household Electrical Appliances Association (CHEAA) in 2008 found that 86% of locally made room air conditioner (RAC) products fell within the Grade 5 category (i.e., the lowest energy efficiency grade, $2.6 \leq \text{EER} < 2.8$ for cooling capacity lower than 4500W). This led to a vicious cycle, whereby low-cost RAC products increasingly drove higher-priced, more efficient units from the marketplace.

The Chinese government has met these concerns through various measures, including policy improvement, standard revision, improved building codes, and fiscal incentives, etc. The PEERAC project is a complementary effort designed to contribute to the reduction of GHG emissions through the transformation of the Chinese air conditioning market, resulting in more energy-efficient room air conditioners used in residential and commercial buildings both in China and throughout the world.

2.1. Project Start and Duration

The project was approved by the GEF Secretariat in January 2010 and the Inception Workshop was held on 24 November 2010. This was followed by project start-up activities such as organization of the Project Assurance Committee (PAC), Project Management Office (PMO) and other initial work related to sub-contracting procedures

²*Final Evaluation Report*, Project Number: CPR/98/G31, November 17, 2006, p. 46.

³<http://www.ibisworld.com/industry/china/air-conditioner-manufacturing.html>; accessed 26 July 2013

and identification of proponents were accomplished in the last quarter of 2010. Thus, Year 1 is reckoned to start basically on January 1, 2011 and therefore, the year 2011 corresponds to Year 1 of the project.

PEERAC project has been implemented over a five year period. The project was initially designed to be implemented over a four year period, from July 2010 to June 2015. On 30 June, 2010, the project document was signed and PEERAC was launched. However, Project Inception Meeting was not held until 24 November, 2010 and the first disbursement of project funds was made in the same month. As the project activities did not start until January 2011, the project was initiated with a six month delay. To reflect this change, the revised project closing date was set as 31 December 2015 by PAC. Later in December 2015, the project closing date was further extended by UNDP and PEERAC is now set to close on 30 June 2016. This extension was granted without the allocation of any additional funds.

2010	2011				2012				2013				2014				2015				2016	
Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	
STAR TUP	Year 1				Year 2				Year 3				Year 4				Year 5					
PSC 1 Nov. 24					PSC 2 Mar. 20				PSC 3 Mar.28					PSC 4 Apr 29				PSC 5 May. 31	PSC 6 May. 18			PSC7 Mar.4
APR 2010	Apr2011				APR 2012				Apr 2013				APR2014								APR2015	
STAR TUP	Original Project Duration (4 yrs)																				>	

Table 1: Project Start and Its Duration

2.2.Immediate and Development Objectives of the Project

The project has aimed to achieve the objective set out in the GEF Strategic Program No. 1, which is on Promoting Energy Efficiency in Residential and Commercial Buildings (SP-1).

The PEERAC project's objective is the significant improvement of the EE of locally manufactured RACs in China. This is expected to contribute to the reduction of GHG emissions from RACs in China's Residential and Commercial (R&C) sectors through the transformation of the Chinese RAC market towards more EE RAC products, technologies, and practices. The project is comprised of activities aimed at upgrading ACC Efficiency, enhancing RAC Efficiency, and promoting Energy Efficient RAC.

2.3.Main Stakeholders

In general, the stakeholders of the Project encompass organizations and groups involved in the local air conditioner industry, raw materials supply, supply chain and market demand, and economic and social issues of the manufacture and sales of EE RACs. The mandates of these stakeholders are directly or indirectly linked to the outcomes of upgrading the RAC energy efficiency and promotion on the air condition industry and the users of RAC products in the country.

The project's main stakeholders include the Ministry of Environmental Protection (MEP), MEP's Foreign Economic Cooperation Office (FECO), the National Development and Reform Commission (NDRC), the Ministry of Industry and Information Technology (MIIT), the Ministry of Finance (MOF), the China National Institute of Standardization (CNIS), the China Household Electrical Appliances Association (CHEAA), China Household Electrical Appliances Research Institute (CHEARI), ACC manufacturers, RAC manufacturers, and other industry, trade, and building organizations. The project's main stakeholders and their respective roles are described in Annex 6.

2.4.Expected Results

It is expected that the average energy efficiency for all RACs manufactured and sold in China will increase by at least 10% by the end of the project (EOP). This is equivalent to raising the EER from 2.67 to 2.94.

The anticipated energy savings and carbon dioxide emissions reductions associated with such a result are shown in Table2. The Project Document suggests that achieving the 10% goal will result in a cumulative energy savings of 939.5 Mtce by the end of project (EOP), and 35.4 million tons of CO2 over the same period.

Table 2: Expected Results of PEERAC Project

Project Goal		Baseline of 2007
Improvement in the energy efficiency of RACs by EOP	10%	0
Average EER of RACs by end of project, W/kWh	2.94	2.67
Improvement in the energy efficiency of ACCs	none	2.67
Market share of EE RACs by end of project	15%	5%
Cumulative Energy Savings (Mtce) by EOP	939.5	0
Cumulative CO2 Emission Reductions (Mtons) EOP	35.4	0
US\$ value of EE RAC project related advertising placed by manufacturers by EOP	7,500,000	0
Share of RAC advertising by manufacturers for high efficiency products by EOP	10%	0

3. FINDINGS

Detailed findings of the PEERAC Terminal Evaluation are presented in this section. The findings include an assessment of the PEERAC Project Formulation and Design, Project Implementation Approach and modality, and Project Results.

The **goal of the PEERAC project** is the reduction in the annual growth rate of GHG emissions from the Chinese C&R sectors. The Project intends to achieve this goal through effecting a transformation of the Chinese room air conditioner (RAC) market through elimination and/or reduction of technical, market, commercial, informational and other barriers to widespread commercialization of energy-efficient RAC models.

The project is comprised of the following **three components** consisting of corresponding activities designed to achieve the project objectives.

Component 1: AC Compressor (ACC) Efficiency Upgrades – This component involves supporting AC Compressor manufacturers by providing in-country and international technical trainings on high efficiency ACC design and manufacturing, facilitating manufacturer dialogue and product planning, commercialization of Energy Efficient (ECC) ACC products, compilation of ACC market and performance information, and EE ACC product testing.

Component 2: RAC Efficiency Upgrades – This component comprises of activities to support RAC manufacturers in improving the EE of their products by providing in-country and international technical trainings on high efficiency RAC design and manufacturing, on-site Technical Assistance (TA) on EE RAC design and production, commercialization of EE RAC products, development and improvement of the RAC Efficiency standard, compilation of RAC market and performance information, and EE RAC Product testing. Under this component, the project also aimed to provide policy recommendations, and develop information, education, and communication materials on addressing ODS Refrigerant Replacement and Disposal.

Component 3: Energy Efficient RAC Promotion – This component supports the Market-Pull activities to promote the developments made in the other two components. Specifically, activities under the component included: promotion of EE RAC procurement, support to retailers in promoting EE RACs, development of enhanced EE label for RACs, a consumer education campaign, development of web-based tools on EE RACs, and promotion of EE RAC policies.

3.1. Project Formulation & Design

The PEERAC project was prepared by an expert team of officials from the Ministry of Environmental Protection (MEP) in collaboration with industry representatives and with guidance from the UNDP's Energy and Environment Unit. The project was designed based on the lessons learned from the successful implementation of the previous UNDP-GEF 'Barrier Removal for the Widespread Commercialization of Energy Efficient CFC-Free Refrigerators in China' project. Moreover, the design was informed by UNDP and GEF's experience of other Energy Efficiency projects in China and other parts of the world. This background coupled with comprehensive baseline research and key stakeholder consultations provided a solid foundation for the planned project activities.

The evaluation team concluded that the project design was detailed yet simple, comprehensive, appropriately flexible, in accordance with the implementation context, and highly responsive to the issues that the project sought to address. The project's logical framework was detailed, cohesive, and remained highly relevant and applicable during the course of the project implementation. Moreover, the logframe indicators were SMART and the activities under the three different components were coherent, replicable, sustainable, and highly cost-effective.

In addition, specific GEF support for incremental activities and co-financing from the various stakeholders, including the GOC and private sector was specified in detail. Similarly, the implementation arrangements and responsibilities of the various stakeholders were outlined clearly in the project document. The project design has also provided a good mix of policy, technology transfer, market-demand, and consumer awareness initiatives to achieve its goal and various objectives. In addition, the risks to various project components were explored in detail and mitigation strategies were provided accordingly.

The following paragraphs provide a detailed analysis of the project design:

3.1.1. Stakeholder Participation in Project Design

The evaluation team found that the project was designed using a fact-based and participative approach. Stakeholders at various levels were fully consulted at the time of project formulation, and stakeholders' financial commitments and buy-in was obtained at the design stage.

Key stakeholders such as GoC agencies and institutes, industry associations, research bodies, several leading RAC and ACC manufacturers, and other relevant development projects, etc. were consulted. The experiences and recommendations of consulted stakeholders informed targets for key project activities and stakeholder feedback was integrated into the project design and logical framework. This way, mutual trust and a sense of ownership has been inculcated in the project design from the very onset. An evidence of this are the letters of co-financing commitments received at the project design stage from various public and private stakeholders.

3.1.2. Management Arrangements (Project Design)

PEERAC was designed to be a Nationally-Executed (NEX) by the Chinese Government. Key management arrangements outlined in the design included the role of MEP as the Implementing Partner (or Executing Agency), the Foreign Economic Cooperation Office (FECO) as the Designated Implementing Partner, and a PMO responsible for day to day management of the project activities. In addition, the design called for the establishment of a Project Advisory Committee (PAC) with representation from all key stakeholders.

Moreover, the project document presented a detailed stakeholder involvement plan while specifying the role of each stakeholder. Similarly, an indicative list of partner categories has been outlined in the partnership strategy and linkages between PEERAC and other related interventions in the Chinese E.E. sector have been encouraged. This partnership strategy is three-pronged, including: (a) international coordinating and implementation function; (b) national coordination and implementation function; and, (c) Technical and commercial function.

The evaluation team concluded that the project design provided a highly cost-effective approach, while incorporating inter-agency and inter-stakeholder collaboration and oversight at various levels of management. Moreover, the roles and responsibilities of the various stakeholders involved in the project's management has been clearly defined in the project design document.

3.1.3. Replication Approach

The PEERAC project provided an innovative intervention strategy by encouraging innovations/development in the supply chain of RACs and cultivating consumer demand through marketing and awareness. Replication has been assimilated in all three components of the project document. Key activities facilitating replication include training, technology transfer, development of standards and labeling, and consumer awareness.

A number of project activities are specifically aimed at technology transfer through training, technical assistance, and linkage development. The outcomes of these activities are not only applicable to products directly related to the project (i.e. development of EE ACCs and EE RACs for the Chinese market), but can also influence a wide range of other products and technologies (e.g. Compressors used in machines other than RACs and EE RACs destined for markets outside China, etc.). Similarly, the development of a RAC EE standard, an Air Conditioning Market Information System (AMIS), and consumer awareness campaigns also have high potential for replication, as these activities play an influential role in policy development, market information, and consumer demand, respectively.

Moreover, as part of the project activities, the design planned for the development of various situation assessments and evaluation studies. These studies can be a source of reference for any subsequent projects or activities.

3.1.4. Linkages with Other Interventions in the Sector

The project design facilitated automatic project linkages with other EE projects and activities by including stakeholders that have the capacity for and crucial stake in promotion of EE RACs. A number of these stakeholders had already been effective and experienced partners of the earlier 'Refrigerator Project'. Key institutional linkages include: working with the MEP-FECO, a GOC agency as Implementing Partner (and Executing Agency); partnerships with RAC and ACC manufacturers and the Chinese Household Electrical Appliances Association (CHEAA) and Chinese Household Electrical Appliances Research Institute (CHEARI) - representative associations of the Chinese RAC industry; and collaboration with the China National Institute of Standardization (CNIS) and the UNDP-GEF funded 'Barrier Removal to Energy Efficiency Standards and Labeling (BRESL)' project, etc.

3.1.5. Assumptions and Risks

Experiences from the previously completed UNDP-GEF China Energy Efficient Refrigerator Project were integrated in the project design in order to minimize potential project implementation risks. In general, the project design is cognizant of the major potential risks associated with implementation of the three components, including lack of manufacturers' interest in participating in training or information sharing activities, lack of funding for development of new EE technologies, and delays in implementation of the new RAC EE Standard. Accordingly, practical mitigation actions were listed for each of these risks, e.g. engagement of manufacturers in planning

dialogues, close coordination with agencies responsible for standard setting and implementation, and commitment of co-financing from the manufacturers, etc.

The design also stipulated for constant monitoring and revision of these risks in accordance with the implementation realities during key stages, e.g. a revision at the inception stage as well as at the time of submission of Annual Work Plans. In anticipation of the rapidly changing needs and demands of the Chinese RAC sector, the project document also provided a highly responsive implementation approach that was based on 'assess-implement-evaluate'. Similarly, to be responsive to the evolving needs, the design authorized the Project Advisory Committee (PAC) to evaluate and approve any adjustments in the project approach during the implementation time frame.

3.1.6. UNDP Comparative Advantage

The PEERAC project is in line with the United Nations Development Assistance Framework (UNDAF) and Country Assistance Program for China. The UNDP has abundant experience of implementing GEF EE projects in China, such as BRESL, PILESLAMP, BRESL, EUEEP, and the Barrier Removal for the Widespread Commercialization of Energy Efficient CFC-Free Refrigerators in China, etc. Similarly, the UNDP regional office has provided technical support to numerous EE and Climate Change projects in various countries across the region. This cumulative experience enabled the UNDP to provide technical support to the project formulation and input into the development of the logical framework, and monitoring of the project's activities, etc.

Moreover, based on this prior experience, the UNDP provided guidance for establishment of institutional coordination mechanisms to leverage the project activities through collaboration between public and private sectors.

In conclusion, the evaluation team found the process of project formulation and the project design to be **Highly Satisfactory**.

3.2. Project Implementation

This sub-section provides an overview and assessment of the project implementation, including management arrangements, partnership arrangements, adaptive management, finance, M&E, and partner collaboration on execution.

3.2.1. UNDP and Implementing Partner Implementation/Execution (*) Coordination, and Operational issues

The various stakeholders engaged in coordinated management of PEERAC include the Project Advisory Committee (PAC), Technical Advisory Committee (TAC), MEP, and FECO (PMO). The management structure of the PEERAC project is presented in Figure1 below:

The implementation and coordination role played by the various stakeholders is detailed below:

- i. **UNDP and GEF:** UNDP China has provided GEF oversight. In this capacity, UNDP has been responsible for coordination with FECO, overall M&E, organizing project reviews, providing support in the recruitment of international consultants, approving AWP and budgets, participating in some on-site visits to beneficiaries, and providing feedback to ensure that all reporting is carried out in line with standard UNDP-GEF procedures. The UNDP China office has persistently played its oversight role and has also been a member of the PAC.

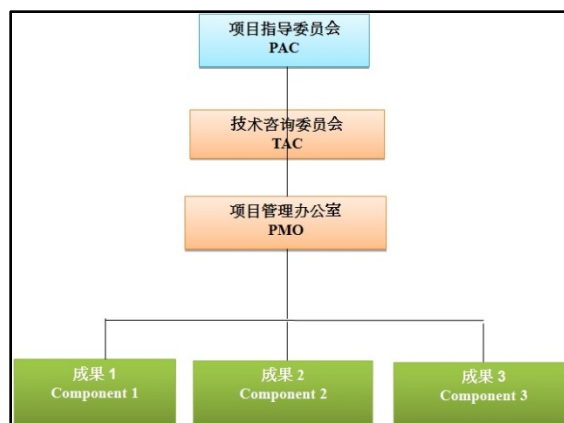


Figure 1: Project Management Structure of the PEERAC

Moreover, GEF as seen as an invaluable resource by the Chinese government for facilitation of international knowledge exchange and technical assistance.

- ii. **MEP:** The Ministry of Environmental Protection (MEP) has contributed to project management as the Implementing Partner. In this role, the MEP has provided a National Project Director (NPD) who has been in charge of overall responsibilities of achievement of the project objectives, and planning, coordination, administration and financial management of the project. The MEP, through its various departments, has longstanding linkages with the key stakeholders of PEERAC, including manufacturers and policy setting bodies, etc. Thus, designating MEP as the Implementing Partner has leveraged both the policy and production support components of the project.
- iii. **FECO and PMO:** The Foreign Economic Cooperation Office (FECO), a division of the MEP, has been the Designated Implementing Partner of the PEERAC project. In this capacity, FECO is responsible for supporting MEP and UNDP CO in managing and implementing PEERAC. Key tasks that FECO is responsible for establishment of a Project Management Office (PMO) and providing overall guidance and approval of all operational activities. FECO has been reporting project achievements and results to the MEP and UNDP CO.

Established by the FECO and headed by a National Project Manager, the PMO has been responsible for the day-to-day management of all project activities. Key tasks performed by the PMO include preparation of annual work plans, procuring inputs, preparing monitoring reports, daily coordination and general project communications. The Financial Division and Procurement Division in FECO assisted PMO in fulfilling procurement procedures and signing procurement contract, etc.

While all the project activities were carried out through subcontracting, service authorization, and services provided by experts, the PMO was responsible for the activity design, TOR preparation, procurement, process management, results evaluation and acceptance. The PMO skillfully managed and coordinated the numerous stakeholders and activities under the project, including the UNDP, PAC and TAC, project Sub-

Contractors, beneficiary companies, and other stakeholders. The project's success and relatively timely completion can be partially attributed to this coordination role.

However, it is worth noting that at different times during implementation, the PEERAC has witnessed replacements of all personnel occupying PMO posts, including the NPD, PMO Director, Project Manager, Technical Officer, and Financial and Administrative Officer. The most drastic change occurred in 2013, when both the PMO Director and Project Manager were replaced by FECO, as the previous personnel were relocated to new positions within the Ministry. This relocation was approved by the PAC. Later in 2015, upon the departure of the NPD⁴, the then PMO Director and Project Manager were promoted to fill the roles of NPD and PMO Director, respectively. In the same year, the Technical Officer also left due to the anticipated project closure, and this role was filled by the existing Financial and Administrative Officer as an additional responsibility.

Such frequent changes in project personnel are usually expected to have drastic effects on the progress of activities and stakeholder morale. However, interviews with various stakeholders and beneficiaries confirmed that the changes did not have severe implications for the project, as the activities were actually being implemented by Sub-contractors while the PMO performed a coordination function. In addition, a strong PAC is also likely responsible for minimizing the harm.

- iv. PAC:** Chaired by the FECO-appointed NPD, a Project Advisory Committee (PAC)⁵ was established at the onset of the project and comprised of 06 representatives from key stakeholders, including UNDP China, MEP, MOF, MIIT, and CNIS. Key activities performed by the PAC include: (a). Review of annual progress reports for necessary guidance; (b) Reviewing and approving any proposed changes in project activities; (c) Providing guidance on the effectiveness of PEERAC implementation, and its linkages to corporate UNDP policy decisions, and other UNDP initiatives; and, (d) Monitoring and evaluating the implementation of PEERAC towards the intended outputs. Since the start of the project, the PAC has met once a year and has convened a total of six times. A list of the PAC members and the meeting dates are presented in Annex 7.

The PAC is comprised of highly relevant stakeholders from a variety of specialized organizations in the Energy Efficiency and/or RAC industry. The members presented a combination of technical knowledge and decision making authority within their respective organizations. As the goals and objectives of the PEERAC project are aligned with their own organizational priorities, these stakeholders have a direct interest in the success of the project. Moreover, due to their exclusive involvement in energy efficiency and RAC industry, the member organizations have been well placed to guide the project planning and providing advice on prioritizing planned activities in relation to the ongoing policy and market context. In addition, the PAC has played a key oversight and monitoring function by reviewing progress of approved activities.

⁴ The NPD left this time as the project was initially scheduled to be closed in December 2015.

⁵ In UNDP-GEF assisted projects, the PAC is usually referred to as the Project Steering Committee (PSC)

The TE mission concluded that the PAC has effectively contributed to the implementation by providing guidance to project planning and monitoring. Some key examples of the support provided by the PAC members include in-depth review and advice on the PEERAC's funding allocation to AWP by the participating representative of the MOF, policy guidance by the MIIT, providing feedback for drafting of RAC EE Standard, cross-checking and validation of AMIS figure with their own organizational data sources, keeping the PMO informed on new and planned policy changes relevant to the members' organization, incorporating the EE lessons learned from PEERAC into their own organizational work, and where possible, promoting the PEERAC's objectives and activities as part of their own organizations' activities.

- v. **TAC:** A Technical Advisory Committee (TAC) was established at the onset of the project. The main responsibility of the TAC has been to provide expert advice in the implementation of technical aspects of implementation of the various project components. For instance, some of the tasks performed by TAC include due diligence in selection of Sub-Contractors, input to the formulation of RAC EE Standards, reviewing feasibility of major activities, and monitoring the Sub-Contractors' performance.

Members of the TAC have been high-level technical representatives from key stakeholders. The Committee's has met on a need-basis throughout the project's implementation. In addition to these scheduled meetings, TAC members have provided advice and inputs in the form of other planned and unplanned activities such as participation in visits, trainings, and informal interaction with other members or the PMO staff, etc. Considering the complexity and variety of PEERAC activities, membership of TAC has been open to new advisors. Annex 8 provides a list of the TAC members.

3.2.2. Adaptive Management

By incorporating the 'Assessment-Implementation-and Post Implementation Evaluation' strategy in the project design, the project was formulated on the principal of Adaptive management. Moreover, the PAC was also authorized to evaluate and approve any recommended adjustments to activities. Consequently, activities were implemented while being responsive to the continually evolving needs of the RAC EE industry in China, e.g. the increased focus of trainings and TA activities on inverter technology vs. constant speed RACs. Similarly, the activity around the manufacturer incentive program was modified by incorporating a market competition among the participating manufacturers of EE RACs. Likewise, activities related to the planned Intensive RAC Design Training Course (activity 2.3) were merged with the in-country and international EE RAC courses. Moreover, as fewer than expected firms qualified for the competition, funds of approximately USD 300,000 were saved under this activity. This fund was eventually allocated to activities to promote the project's impact.

In terms of changes to design, a major diversion from the project document has been the cancellation of the 'Rebate Activity' under Output 3 (Activities 3.3.1 to 3.3.4). In order to encourage consumer demand for EE RACs, PEERAC originally intended to develop a RAC Rebate Program. However, in view of a more comprehensive consumer rebate program offered by the GOC as part of its economic stimulus package introduced in 2009, the PAC recommended to cancel the project's rebate component on May 28, 2013. This move was also approved by the MTR mission. The funds of USD 72,500 allocated to the rebate program were redirected to Retail Incentive Program.

The TE team concludes that Adaptive Management has been thoroughly incorporated into the PEERAC’s design and implementation approach and the project continued to stay relevant in the context of the changing needs of EE RAC industry in China.

3.2.3. Partnership Arrangements

Over the course of implementation, the project has partnered with various public and private stakeholders in the Chinese EE RAC industry. These include government agencies, industry associations, manufacturing enterprises, research institutes, testing laboratories, and media outlets, etc. Major partnership activities included policy development, training and technical support, industry data collection, and awareness raising.

As stipulated in the project design document, all project activities were carried out through subcontracting. Resultantly, the PMO partnered with 10 public and private sub-contractors by issuing 13 sub-contracts with a total value of USD 2.866 million. Annex 9 presents a year-wise distribution of the Sub-Contracts since the project’s inception in November 2010. Since project establishment activities, such as recruitment of staff and obtaining commitments from manufacturers, were implemented in 2010 and 2011, the first sub-contract was not issued until 2012.

The sub-contracts were issued using an open bidding process. The bids were whetted by the PEERAC’s TAC and projects were awarded to agencies with sound technical proposals. All the sub-contracts were issued to Chinese entities, some of which were also the project’s key stakeholders, e.g. CHEARI and CHEAA. The Sub-contracts were implemented according to the TORs provided by the PMO and all sub-contracts were concluded on time. According to stakeholder views, of the sub-contractors, CHEAA, CHEARI, and GOME were the most substantial contributors to the project’s outcomes.

Analysis in Annex 9 shows that the sub-contracts with the highest budgetary proportions include Training Activities for EE RAC design and production technologies (35%) and Consumer Education Program (20%). The remaining contracts constituted 1% to 8% of the total sub-contract budget.

As shown in Table 3, the majority of sub-contracts (63%) were issued in 2012. Understandably, this proportion kept tapering off with the passing years, as a large number of activities such as RAC and ACC training and AMIS were commissioned at the start. Alternatively, activities related to awareness, research, and the manufacturers’ incentive program were commissioned in the later half of the project.

Table 3: Year-Wise Distribution of Sub-Contracts

Year	Proportion of Sub-Contracts Issues (% USD)
2012	63%
2013	1%
2014	27%
2015	9%

Moreover, PEERAC partnered with 15 EE RAC manufacturers and 05 ACC manufacturers, representing 90% and 80% of the Chinese RAC market, respectively. The RAC manufacturers were contacted through CHEAA, a highly respected industry group. As direct beneficiaries of the project, the manufacturers contributed to the project's success through their active participation and follow up on the project's activities.

Similarly, key public partner agencies included CNIS, MIIT, and MOF. These agencies provided key policy guidance to the project. In addition, CNIS was responsible for RAC EE Standard's revision and improvement, an activity that was crucial to the project's extensive impact and sustainability.

The TE Team concluded that the successful outcome of the PEERAC's major activities, including the approval of RAC EE Standard and manufacturing of various models and brands of improved EE RACs, has been a direct outcome of the dedication of the various partners involved in the project. Additionally, the evaluation team determined that the project's partnership with numerous stakeholders was a measure of efficiency as synergies and long-term partnerships were developed to achieve project goals. As shown in other relevant sections, the sub-contracting also had significant impact on cost efficiency, effectiveness, and sustainability of project activities.

3.2.4. Monitoring and Evaluation (M&E)

According to the project design, UNDP China, the PEERAC PAC, and PMO have been assigned responsibilities of M&E. In addition, the design provided a clear M&E plan and budget, including annual outcome level targets and a detailed M&E plan, a monitoring plan together with concise targets, a simple logical framework with SMART indicators, and a budget for M&E activities.

The UNDP China's designated Program Manager has effectively provided periodic oversight in implementation, including prompting timely reporting, providing guidance about reporting to ensure that the progress is implemented in line with UNDP-GEF guidelines, and providing feedback on project planning accordingly. For instance UNDP CO representatives have been in regular attendance of the PAC meetings and also undertook periodic field monitoring visits. Moreover, the UNDP CO has also arranged the project's Medium Term Review (MTR) and this Terminal Evaluation (TE).

Similarly, the PEERAC PAC and TAC have effectively undertaken their M&E responsibilities. These include review and approval of AWP and Budgets (for endorsement to UNDP-GEF for the latter's final approval), providing guidance on the effectiveness of project implementation, and overall M&E of project implementation. For instance, some PAC members triangulated project results, e.g. AMIS data, with their own organizational resources and verified the outcomes.

The PEERAC PMO has had the responsibility of project-level monitoring. The PMO has been involved in the day to day monitoring and coordinating of the project's activities and fulfilled the UNDP-GEF project M&E requirements by submitting key progress reports to UNDP China. These include the AWP, APR, and PIR. Moreover, the PMO has actively participated in key M&E activities such as PAC and TAC meetings and undertaken monitoring field visits.

Above all, the PMO and Sub-Contractors having adopted the implementation approach of 'Assess-Deliver-Evaluate' and project activities such as establishment of ACC and RAC Testing Centers and development of AMIS (under Outcomes 1 and 2) and data gathering through the retailer purchaser program (under Outcome 3.2) have been a key measure of hands-on M&E across almost all major activities of the project.

Although, the above formal and informal M&E mechanisms have been in place from the very start of the project, with the exception of AMIS, the project has lacked a formal Monitoring system and supporting tools to record progress and assess impact. The project's outputs have been timely and the absence of a monitoring system seems to have had little or no adverse effect on the project's progress. However, the presence of a formal monitoring system is critical for to track progress against targets, improve project transparency, assist in project visibility, and streamline the PMO's supervisory tasks. In the absence of such a formal system, it is easy to lose sight of the goal and tracking activities and verifying achievements becomes challenging in a project like PEERAC that involved a vastly diverse range of partners, stakeholders, sub-contractors, and activities.

A key example of such deviation has been the management's inability to detect technical flaws in the project design. The Project Document identifies RAC energy consumption with the commercial and residential energy sector as being 4,557.2 Mtce/year in 2010 (p. 18) – but this figure is considerably above the energy consumption of the whole country during that same year (i.e., 3,250 Mtce). Similarly, since carbon in fuel is oxidized, CO2 emissions reduction quantities are usually considerably higher than the corresponding fuel savings --but EOP emissions reductions in PEERAC's goal are only a small fraction of the EOP energy savings identified in the project's objective⁶. Moreover, due to the lack of an organized M&E system, the project had to rely on AMIS data for determining Project Goal and Objective level impact. Although this data should have been generated annually, in case of PEERAC, the data from AMIS did not become available until 2015⁷.

The lack of a formal M&E system can be traced back to the project design document, since in contrast to other M&E activities such as reporting and periodic evaluations, the design does not provide any management, personnel, or budgetary stipulation for setting up a systematic M&E system.

The evaluation team concluded that the PEERAC project's M&E was multi-pronged, with the major elements being PMO's supervision and coordination; the implementation approach adopted by PMO and Sub-Contractors' UNDP's oversight; review and verification of activities by the TAC; and overall surveillance of outcomes by the PAC. However, the project design and implementation have lacked a formal system to track and monitor the project's activities. Such a system would have resulted in a more efficient progress checking and reporting. Based on this conclusion, the TE team found the PEERAC's M&E to be only ***Satisfactory***.

⁶ The prodoc assumes that achieving the 10% improvement in EE of RACs will result in a cumulative energy savings of 939.5 Mtce by the end of project (EOP), and 35.4 million tons of CO2 over the same period

⁷ The data is based on analysis of information gathered since 2012

3.2.5. Project Finance

The PEERAC project was designed to be funded by various sources, including USD 6,263,600 from GEF and USD 21,350,000 from the Chinese government, manufactures and other sources. Table 4 provides a break-up of the total allocated resources at project design phase.

Table 4: PEERAC Total Allocated Resources

Grant Fund	Committed (USD)	Percent Committed
GEF	6,263,600.00	22.68%
UNDP	0	-
Sub-Total Grant	6,263,600.00	22.68%
Co-Financing	-	-
National Government	350,000.00	1.27%
Private Sector	21,000,000	76%
Others	0	
Sub-Total Co-Financing	21,350,000.00	77.32%
Total Budget	27,613,600.00	100.00%

I. Utilization of GEF Funds

This sub-section provides details about the utilization of allocated GEF funds amounting to USD 5,648,908.

Table 5 shows the summary of the approved budget, actual expenditures and delivery rate of the project on a year-to-year basis.

Table 5: PEERAC GEF-Grant Fund Annual Delivery Rate

	2010	2011	2012	2013	2014	2015
Available Budget	0	372,944	548,230	859,710	1,103,100	3,349,203
Spent (USD)	12,069	365,016	584,783	827,545	1,124,985	2,734,511
Percent Delivery	-	98%	107%	96%	102%	82%

The TE team found the project delivery rate to be satisfactory. The relatively low delivery rate in 2015 is due to the postponement of some project activities to 2016, including the project closing workshop and documentation of project achievements.

Table 6 presents the percentage expenditure on a per-component basis since the start of the project up to the end of 2015.

Table 6: Level of GEF-Grant Expenditure per Component since the Start of the Project

GEF Outcome/Atlas Activity	Total Available Budget	Total Expenditure (2010 to 2015)	Percent Spent (2010 to 2015)
Component 1: ACC Efficiency Upgrades	919,650	896,650	97.50%

Component 2: RAC Efficiency Upgrades	3,454,250	3,376,980.00	97.76%
Component 3: Energy Efficient RAC Promotion	1,273,400	813,758.52	63.90%
Project Management	616,300	561,250	91.07%
Grand Total	6,263,600	5,648,908.52	90.19%

By end of 2015, the project has utilized 90% of the GEF-fund.

The low spending (63.90%) under Component 3 is due to the fact that activities under this component, such as promotion event and documentation of the project results for Components 1 and 2 are still under implementation. The PMO plans to expend the remaining funds before project closure in June 2016.

FECO as the host for PMO, designated by MEP and MOF, undertakes the financial management of PEERAC. In this capacity, FECO is responsible for tracking GEF contribution, financial reporting according to UNDP-GEF guidelines, bidding and financial management of sub-contracts, and organizing external annual audits, etc.

It is worth noting that the project management has creatively spent funds, thereby leveraging outcomes manifold with limited funds. A key example is the Manufacturer Incentive Program, whereby the project held a competition between manufacturers and awarded the incentives accordingly. This approach and the availability of less than expected manufacturers qualifying for the award resulted in savings of USD 300,000. These funds are being used for promoting the project's achievements. Similarly, some sub-contractors have also spent the project funds very judiciously. Most sub-contracts had been either fully fulfilled or fulfilled beyond expectations, while some sub-contractors even saved project funds for utilization on other activities. For example, CHEAA saved 20% of the contract fund and returned it to the PMO.

The evaluation team concluded that financially, the PEERAC has been planned well and thoughtfully and had a satisfactory annual delivery rate. Therefore, the project's financial planning is rated as **Highly Satisfactory**.

II. Co-Financing

As seen in Table 7, according to the project design, co-financing accounted for 77.32% of total resources expected for the project in either cash or in-kind contributions from stakeholders, viz., the Government of China (1.27%) and private sector (76.05%). However, the total actual co-financing by the end of 2015 has reached more than 17-fold (1738.75%) of the commitments at project design. Resultantly, the total contribution from co-financing also jumped from 77.32% to 1,364.80% of the total expenditure.

Table 7: Committed vs. Actual Co-financing from Different Sources

Financing Source	Committed (USD)	Percent Committed	Actual Expenditure (USD)	Percent of Committed
National Government	350,000	1.27%	792,813	226.52%

Private Sector	21,000,000	76.05%	370,429,495	1,763.95%
Others				
Total Co-financing	21,350,000	77.32%	371,222,309	1,738.75%
Total Funds	27,613,600	100.00%	376,871,217	1,364.80%

Co-financing has been tracked by the respective contributing organization and reported periodically to the PMO.

a) Co-Financing by Government of China (GOC)

The realization of committed inputs from the GoC on a per-component basis is provided in Table 8.

Table 8: Realization of Committed Co-Finance from Government of China (Per Component)

Components	Planned (USD)	Actual Achievement (USD)	Percentage of Planned (%)
Component 1			
in-cash	0.00	-	-
in-kind		-	-
Component 2			
in-cash	30,000.00	30,000.00	100.00%
in-kind		-	-
Component 3			
in-cash	120,000.00	37,278.29	31.07%
in-kind		-	-
Project Management			
in-kind	200,000.00	725,535.17	362.77%
Total	350,000.00	792,813.46	226.52%

The overall co-finance provided by the GOC exceeded by 126.52% of the committed funding. Component-wise, co-financing for Component 2 is 100%, while that for component 3 is 31.07%. But the GOC co-finance provided for Project Management stands at 362.77% of the committed funds. This is due to the fact that some of the project activities were held before the GEF fund could be delivered, and the project management staff was funded through FECO resources.

b) Co-Financing by Private Sector

Private sector stakeholders such as manufacturers and industry associations, etc. had committed a total of USD 21,000,000 to implementation of PEERAC. However, as shown in Table 9, the actual contribution from private sector is USD 370,429,495, i.e. a remarkable 1,763.95% of the total committed.

Table 9: Realization of Committed Co-Finance from the Private Sector (Per Component)

Components	Commitment for Co-Financing (USD)	Actual Co-Financing (USD)	Percentage of Committed (%)
Component 1			
in-cash	3,200,000	85,760,734	2680.02%
in-kind			
Component 2			
in-cash	3,800,000	280,665,321	7385.93%
in-kind			
Component 3			
in-cash	13,000,000	3,277,905	25.21%
in-kind			
Project Management			
in-kind	1,000,000	725,535	72.55%
Total	21,000,000	370,429,495	1,763.95%

Such high levels of co-financing seem to have been calculated using liberal estimates. Moreover, the fact that private sector co-financing has not been a part of the project audits, the TE team cannot make any conclusive judgments or estimates about the actual figures. However, the co-financing reported by the private sector being manifold of the committed levels are a testament to the positive project influence and high uptake by the EE RAC industry.

Component-wise, the private co-financing contribution to Component 1 stands at 2,680.02% and to Component 2 at 7,385.93% of the commitment, respectively. The larger share of the private sector contributions have come from the manufacturers who were involved in the project. However, the contribution to Component 3 stands only at 25.21%. This is because some key activities, under this component, such as the documentation of project achievements, are still under implementation. Moreover, the PMO has not received the final report on co-financing from all the related sub-contractors and participating organizations. Therefore, the final figure on private sector co-financing will be available by June 2016.

c) Co-Financing by Other Partners

There's no Co-Financing committed from other sources according to the project agreement. But during the implementation, some organizations involved in the project actually made their additional contribution, such as CHEARI and CHEAA, carried out their sub-contracts in a highly cost-effective way and achieved more than TOR required. Similarly, GOME has performed its sub-contracted activities very well. Hence, this contribution could be considered as in-kind.

d) Summary of Co-financing

In summary, Table 10 provides the status of realization of the committed co-financing from various stakeholders for the Project. Total actual co-financing reached 1,738.75% of the total commitments made at the project design stage.

Table 10: Summary of the Realization of Committed Co-financing Inputs from all Sources

Components	Total Commitment for Co-Financing (USD)	Total Actual Co-Financing (USD)	Percentage of Actual
Component 1			
in-cash	3,200,000	85,760,734	2,680.02%
in-kind			
Component 2			
in-cash	3,830,000	280,695,321	7,328.86%
in-kind			
Component 3			
in-cash	13,120,000	3,315,183	25.27%
in-kind			
Project Management			
in-kind	1,200,000	1,451,070	120.92%
Total	21,350,000	371,222,308	1,738.75%

Overall, the GEF funds have been utilized in a discerning manner and were complemented by significant contributions from the GOC, private sector, and other stakeholders.

The TE team concluded that coordinated by the PMO, key project stakeholders including the UNDP, MEP, FECO, PAC, TAC, have played their role effectively. This is reflected in the open and smooth coordination and overall satisfaction of beneficiary manufacturers. Moreover, GEF funds have been utilized well, the actual co-financing has been significantly higher than committed, and the activities were continually adopted to the needs of the EE RAC sector. On the other hand, the project has faced some management issues, such as a one year delay in implementation, frequent change of senior management, and a systematic monitoring/activity tracking system, etc. Hence the evaluation team found the Implementing Partner management and implementation / execution coordination of the project to be *Satisfactory*.

Table 11 below provides an overview of the TE rating for various Implementation activities:

Table 11: Summary of Ratings of Accomplishment in achieving Various Components' Outcomes

Component	Rating
UNDP and Implementing Partner Implementation/Execution, Coordination, and Operational issues	S
Adaptive Management	HS
Partnership Arrangements	HS
Monitoring and Evaluation	S
Project Finance	HS
Overall Rating of the Project on Achievement of Outputs	S

3.3. Project Results

This section provides an overview of the overall project results and assessment of the relevance, effectiveness and efficiency, country ownership, mainstreaming, sustainability, and impact of the PEERAC project. Moreover, evaluation ratings for overall results, effectiveness & efficiency, and sustainability are also provided.

3.3.1. Overall Results (Attainment of Objectives)

The overall goal of the PEERAC project the reduction of GHG emissions from room air conditioning in China's residential and commercial sectors. To achieve this goal the activities were carried out related to the following three components:

- i. Component 1: AC Compressor Efficiency Upgrades
- ii. Component 2: RAC Efficiency Upgrades; and
- iii. Component 3: Energy Efficient RAC Promotion

Details of accomplishments under each component are provided below:

A. Component 1: AC Compressor Efficiency Upgrades

Under this component, it was planned that the project activities will lead to the manufacture and sale of more energy efficient AC Compressors in China.

The accomplishments for component 1 along with the evaluation rating is provided in Annex 10.

According to the logical framework, Outcome 1 was to be accomplished through the following seven outputs:

- **Output 1.1:** Completed and Evaluated In-country Technical Training on High Efficiency AC Compressor Design and Manufacturing
- **Output 1.2:** Completed and Evaluated International Technical Training on High Efficiency AC Compressor Design and Manufacturing
- **Output 1.3:** Manufacturer Dialogue and Product Planning
- **Output 1.4:** Completed Technical Assistance on EE Compressor Design and Production
- **Output 1.5:** Commercialized EE Compressor Products
- **Output 1.6:** Compilation of ACC Market and Performance Information
- **Output 1.7:** Completed EE Compressor Product Testing

The reported major activities and accomplishments against these outputs are as follows:

- i. **ACC Training:** Under PEERAC, two national and one international trainings were planned to be delivered to participating manufacturers. However, the international training was cancelled due to the implementation of a new Foreign Affairs plan under which trips longer than 5 days were not allowed and also only two

manufacturers were allowed at a time to travel for the training. The project overcame this hurdle by inviting international experts to deliver sessions as part of the domestic training on ACCs.

The two national trainings were delivered by CHEAA through a sub-contract signed with the PMO in November 2012. After undertaking an assessment of the learning needs of the participating ACC manufacturers, the training program was designed and delivered in 2013 and 2014. Based on this assessment, the training program focused on enhancing the R&D capacity towards increased EE of ACCs. Training modules focused on: EE ACC motor, Friction Loss in ACCs, Volume Efficiency, Inverter Technology, and EE Refrigerants. The training was attended by 29 selected technical staff of 10 ACC companies. Of the 10 participants, 6 ACC manufacturers were also selected for onsite TA, also designed and delivered by the CHEAA.

The ACC training and TA course were designed in collaboration with and support from various research and academic entities. For instance, the TA was delivered by 6 individuals, 3 of whom were CHEAA staff and the remaining belonged to Fairchild Control, Beijing University of Technology, and Xi'an Jiaotong University. A training follow up survey revealed that 100% of the trainees were satisfied with the trainings received, rating the training experience as Good or Excellent.

ii. Manufacturer Dialogue: Manufacturer and product planning dialogues were organized for ACC and RAC manufacturers. The purpose of these dialogues, held in 2013, was to facilitate a forward-looking planning dialogue between ACC and RAC manufacturers to discuss and plan the enhanced EE RACs through the supply of improved ACC designs. A total of 21 RAC and ACC manufacturers participated in the training.

As a result of the project's activities on EE ACCs, four EE RACs were using EE ACCs by the end of year four. This achievement is four times compared to the target of 1 EE RAC using EE ACC by that time. Similarly, against a goal of 75% TA participants, 100% TA recipient manufacturers have reported the production of EE ACCs by 2015.

iii. Commercialized EE ACCs: Of the 10 ACC manufacturer receiving project support, 6 were selected to participate in the manufacturer incentive program. These manufacturers developed new EE designs to be submitted to the project in 2014 as competitive bids for receipt of incentive funding on a competitive, least-cost, and tiered basis. Against a logframe target of 3, 4 EE ACC models received incentive funding totaling USD 400,000 for commercial production of the new EE models. Of these, two EE ACC models were designed for variable speed and the other two for constant speed EE RACs.

TE interviews with participating manufacturers and industry experts viewed the competitive incentive funding model highly effective, as this activity worked as a catalytic force for promotion of EE ACC models and led to healthy competition within the industry. The effectiveness of the activity is evident from the fact that various stakeholders recommended that, going forward, such competitions be held on an annual basis.

iv. AMIS: In 2012, the PMO sub-contracted CHEAA to design and manage an Air Conditioner Market Information System (AMIS). Although, according to the project document the system was to be established

in 2010-11, the activity was delayed due to the project start-up activities and the extensive search for a suitable Sub-Contractor.

As a first step, the designated working group within CHEAA defined basic parameters such as classification of products to be recorded and methods to address confidentiality issues. CHEAA started collecting data in July 2012 from all 10 participating ACC and 15 RAC manufacturers, thereby making AMIS information representative of the RAC sector in China as these manufacturers possess 95% of the RAC and 90% of the ACC market share in China. The data includes information such as models produced, market sales, efficiency levels, etc. A sample data gathering form is presented in Annex 11. The data is verified by CHEAA through different methods, including collection through research agencies and triangulation with its other data sources. The consolidated and analyzed information is presented annually and disseminated to all participating RAC manufacturers.

The published consolidated information was considered highly valuable by the various manufacturers as the data provides a real-time picture of the current market trends and could therefore be used to adjust product manufacturing and marketing. Moreover, AMIS also provided information on evaluation results for knowledge/skill uptake and application and retention of trained personnel.

According to a survey undertaken by the project, 100% of the participating ACC and RAC manufacturers are satisfied with AMIS, as opposed to the project target of 80%. Similarly, interviewed stakeholders reported that this information can also support and inform future policy trends, e.g. the improvement of EE ACC and EE RAC standards. Consequently, both private and public sector stakeholders are desirous of continuation of AMIS under the stewardship of a neutral body such as a GOC Agency or the CHEAA.

Due to its inherent nature of data reporting, AMIS also functioned as a project M&E tool and helped in quantifying project results and supporting other activities such as testing and standards, etc.

- v. Establishment of ACC Testing Center:** To verify the project impact on improving the EE of ACCs and RACs, the project established a Testing Center through a Sub-Contractual agreement with the CHEARI. The Testing Center also served to determine the efficacy of the manufacturers' own testing facilities. The Sub-Contract was signed in 2012 and the Testing Center was established at CHEARI's National Household Electric Appliance Quality Supervision Testing Centre (NHEAQSTC). All 10 participating ACC and 15 RAC manufacturers were obligated to provide products of their EE ACC models at the different stages of product testing. These included base-line testing, medium-term tests, and EOP tests.

The center tested 50 ACC and 100 RAC models (including variable and constant speed) at each of the above three stages. In addition, the 15 RAC and six ACC manufacturers competing for the incentive award also had to provide product samples for testing. Test results determined that there was little variation between the results of the testing center and the manufacturers' facilities, thereby confirming that the results from the later were credible and reliable. Annex 12 provides a summary of result for tested RACs.

The testing outcomes were used to monitor and evaluate project activities, quantify project results, and provide support to other project activities such as ACC and RAC design. As opposed to the satisfaction target of 80% set in the project document, 100% of the participating ACC and RAC manufacturers were satisfied with the Testing Center. Their satisfaction is also evident from the fact that by EOP, all of the participating manufacturers utilized the product testing results towards improving their EE RAC products.

B. Component 2: RAC Efficiency Upgrades

Under this component, it was planned that the project activities will lead to the manufacture and sale of more energy efficient RACs in China.

The summary of accomplishments for component 2 along with the evaluation rating is provided in Annex 13.

According to the logical framework, Outcome 2 was to be accomplished through the following nine outputs:

- **Output 2.1:** International Technical Training on High Efficiency RAC Design and Manufacturing
- **Output 2.2:** In-country technical training on high efficiency RAC design and manufacturing
- **Output 2.3:** Completed Intensive RAC Design Training
- **Output 2.4:** Completed Technical Assistance on EE RAC Design and Production
- **Output 2.5:** Commercialization of EE RAC Products
- **Output 2.6:** RAC Efficiency Standards
- **Output 2.7:** Compilation of RAC Market and Performance Information
- **Output 2.8:** Completed EE RAC Product Testing
- **Output 2.9:** Policy Recommendations and Information, Education and Communication Materials on Addressing ODS Refrigerant Replacement and Disposal

The reported major activities and accomplishments against these outputs are as follows:

- i. **Training on High Efficiency RAC Design and Manufacturing:** Capacity development of RAC manufacturers included a capacity and training needs assessment exercise, the design and delivery of two in-country workshops, a pre-departure training workshop, an international training course, and on-site TA for selected RAC manufacturers. The activity was sub-contracted to CHEARI in November 2012 and tasks were completed by December 2015.

Based on the Training Needs Assessment carried out in 2013, CHEARI designed an in-country training exercise. Two trainings, each 5 days in duration were delivered in March and August, 2013, respectively. The workshops were attended by a total of 48 R&D technicians representing 13 RAC manufacturers, and focused on product design optimization to meet new national standards. A list of key training topics is presented in Annex 14 and the list of RAC manufacturers participating in the training is provided in Annex 15. To deliver the training, CHEARI hired American, British, Japanese, and Chinese experts.

Following this, a ‘pre-training workshop’ was designed for the 24 technicians nominated for an international training. This was followed by a two month tailored course at the University of Maryland’s renown Center for Environmental Energy Engineering (CEEE). As shown in Table 12, the course was delivered in four batches between March and October 2014.

Table 12: Dates of International Technical Training on High Efficiency RAC Design and Manufacturing

Batch No.	Dates
1	March 1, 2014-April 30, 2014
2	May 1, 2014 – June 30, 2014
3	July 1, 2014-August 31, 2014
4	September 1, 2014-October 31, 2014

As opposed to the logframe goal of training 12 technicians, the international RAC training was received by 21R&D technicians from 12 RAC companies. A list of main topics covered in the international training is presented in Annex 16 and the list of RAC companies participating in the international training is provided in Annex 15.

In addition, at the end of 2014, on-site TA was provided to 12 RAC manufacturers. The post-training assessment surveys revealed that 100% of the trainees are still involved in RAC design/production as opposed to the project goal of 75%. Moreover, 100% of the trainees were satisfied with the RAC training and 96% vs. a goal of 75% manufacturers were satisfied with the TA by rating the TA as Good or Excellent. In particular, trainees were highly appreciative of the introduction to Simulation Software at the University of Maryland, and the close linkages developed between technical staff of competing manufacturers for future information exchange and R&D.

ii. Commercialization of EE RAC Products

All of the 15 RAC manufacturers receiving project support were invited to participate in the manufacturer incentive program. These manufacturers developed new EE designs to be submitted to the project in 2014 as competitive bids for receipt of incentive funding on a competitive, least-cost, and tiered basis. The incentive awards were divided into RAC Company Awards and RAC product awards. The awards, totaling USD 1.1 million, were presented to a total of 7 RAC companies for commercial production of the new EE RAC models and included both variable and constant speed EE RACs. Details of award distribution for EE RACs are provided in Table 13. The 302 EE RAC models selected for the incentive funding during the implementation of Incentive Plan on Manufacturers (from August 2013 to December 2014) have the potential of saving 1,496.54 million kWh energy.

Table 13: Distribution of RAC Manufacturer Incentive Awards

Award Type	Award Title		No.	No. of RAC Companies Awarded
RAC Companies Award	Grand Award		1	7 Companies
	Excellence Award		6	
RAC Products Award	Constant Speed	Pioneer Award	1	6 Companies
		Excellence Award	2	
	Variable Speed	Pioneer Award	1	2 Companies
		Excellence Award	2	

Similar to the EE ACC awards, TE interviews with participating manufacturers and industry experts viewed the competitive incentive funding model highly effective, as this activity worked as a catalytic force for promotion of EE RAC models and led to healthy competition within the industry. The effectiveness of the activity is evident from the fact that various stakeholders recommended that, going forward, such competitions be held on an annual basis.

iii. RAC Efficiency Standards: The PEERAC PMO sub-contracted the activity of developing a revised RAC Efficiency standard and updating the EE label for RACs in China to the China National Institute of Standardization (CNIS). This led to the development and approval of the new RAC Energy Performance Standard in 2013, titled 'GB 21455-2013'. This standard is for Variable Speed RACs and as a compulsory standard, all manufactures in China must comply with the new standard. The standard for constant speed RACs was revised by the GOC in 2010 and did not require any further changes since the market share of these RACs is continually shrinking.

Originally, the revision of the variable frequency RAC standard was scheduled to be completed at the end of 2014. However, those revisions were finished and officially published on June 9, 2013 – a full year and a half ahead of the original time schedule.

There were many formal and informal discussions organized during this revision procedure. During the development of the standard, many manufactures also attended the CNIS workshops and provided recommendations to standard developers. As a result, new ideas were included in the design of the new standard of variable frequency RAC. For example, the influence of heat generation, consumer habits, and weather zones were all included in the new standard. When providing their feedback, cost-effectiveness has been a major concern of the manufacturers, as they wished to produce EE products that were affordable for the consumers.

The revision of RAC EE Standard has had a significant influence on R&D, test results, and conclusion on RAC EE trends, as the Standard has set EE benchmarks for RACs to be produced and marketed within China.

The CNIS was also commissioned to support the establishment of EE standards for ACCs. This standard is expected to be approved in October 2016. This will be the first ever standard for RACs.

iv. RAC Market and Performance Information: For information on AMIS, please refer above to the relevant sub-section on achievements under Outcome 1.

v. Product Testing: For information on RAC Product Testing, please refer above to the relevant sub-section on achievements under Outcome 1.

vi. Development of ODS Policy and Information Materials: The project has several ODS activities (2.9.1, 2.9.2 and 3.8.4) addressing refrigerant management and disposal for old RACs, including the formulation of policy recommendations, advocacy and lobbying activities, and information and educational campaigns for ACC and RAC manufacturers, refrigerant traders and suppliers, central and local government authorities, and other interested stakeholders.

Key activities undertaken by the PEERAC project in this regard include undertaking a policy study on the most cost-effective approach for managing the old refrigerants from old RACs, a proposed national policy and set of guidelines for the management and disposal/destruction of the ODS refrigerants, and a guidebook on managing and disposal of ODS. A totally of 90 ACC/RAC manufacturers, refrigerant traders and suppliers have committed to use the guidebook in their action plans to address the ODS refrigerant issues.

C. Component 3: High Efficiency RAC Promotion

Under this component, it was planned that the project activities will promote the newly developed RACs through undertaking various market pull activities.

The summary of accomplishments for component 3 along with the evaluation rating is provided in Annex 17.

According to the logical framework, Outcome 3 was to be accomplished through the following eight outputs:

- **Output 2.1:** High Efficiency RAC Procurement Guide and Procurement Promotion
- **Output 2.2:** RAC Retailer Program
- **Output 2.3:** RAC Rebate/Recycling Program Design and Implementation
- **Output 2.4:** Enhancement of the National EE Label for RACs
- **Output 2.5:** Completed Consumer Education Campaign
- **Output 2.6:** Web-based Tools
- **Output 2.7:** Completed EE RAC Public Relations Campaign
- **Output 2.8:** RAC Energy Efficiency Policy Promotion

The reported major activities and accomplishments against these outputs are as follows:

- i. RAC Procurement Promotion
- ii. RAC Retailer and Consumer Education Campaign
- iii. Public Relations Campaign and Web-Based Tools

Details of these aspects are given below:

- i. **RAC Procurement Promotion:** In order to promote organizational demand for EE RACs, a Procurement Guide was developed with standardized information on group procurement of EE RACs. This activity was sub-contracted to the Beijing Energy-Saving and Environment Center. According to the project document, the activity was scheduled to be undertaken in 2013. However, the sub-contract was not issued until 2014. Despite the later start, all the goals for this activity were achieved, including a review of typical RAC procurement procedures, development of the Procurement Guide, its distribution to 100 organizations, commitments from five organizations to procure EE RACs, and post-activity evaluation. According to this evaluation, against the project goal of 75%, 80% of the receiving organizations found the RAC procurement guide useful.

- ii. **RAC Retailer and Consumer Education Campaign:** As a ‘Market Pull’ measure, this activity aimed to promote EE RAC sales by educating EE RAC retailers and consumers. This included carrying out a needs assessment of retailer capacity and knowledge of EE RACs, designing a training program to educate retailers on enhancing sales of EE RACs, in-store information dissemination activities addressing buyers, and a lottery program to encourage purchase of EE RACs.

The activity was implemented by engaging GOME, a major retailer of home appliances in China⁸. As part of the retailer training program, 90 retailers were trained as opposed to the project’s goal of 50; and developed information and promotional materials about EE RACs were distributed to 1,500 RAC retail outlets (50% more than the goal of 1,000 retailers).

In addition, a lottery-based consumer incentive program was implemented through GOME between May 2015 and October 2015 in more than 1,600 stores situated across 200 cities (including second and third tier cities). The program was initiated in collaboration with more than 20 major RAC companies, including the manufacturers participating in the project. Under this initiative, 340 prizes, of RMB 3,064 were awarded to lottery winners⁹. This program became vastly popular with consumers, as against a project goal of 120,000 EE RACs the retailer sold 535,371 EE RACs, thereby exceeding the sales target by 446%. This included 329,210 units of EE RACs sold directly as a result of the lottery program and the remaining as a combination of the various consumer education measures. It is estimated that these sales would result in cumulative energy saving of 540 kWh. Table 14 provides a summary of EE RACs sold by manufacturers participating in the project.

Table 14: Summary of EE RACs Sold by Manufacturers Participating in the Project

Brands	Number of Products sold	Brands	Number of Products sold	Brands	Number of Products Sold
Midea	113,404	Hisense	26,397	Kelon	1,588
Haier	100,583	Chigo	6,451	TCL	1,112
Gree	73,903	Aux	5,085	Changhong	687

The success of the retail incentive program was calculated by GOME by comparing pre and post-incentive sales volumes. Before the start of the incentive program, GOME’s EE RACs¹⁰ accounted for 20.89% of total RAC sales. However, after implementing the incentive program, these sales shot up by 7.12% to a total of 28.01%.

⁸ GOME has been ranked as the Number 1 Retailer in China from 2010 to 2013

⁹ The approximate price of a RAC

¹⁰ Inverter level 1, 2; SEER inverter level 1; APF inverter level 1, 2

A post-activity evaluation showed that the majority of participating retailers (80%) found the program useful for promoting EE RACs. The TE team interview with GOME representatives also revealed that GOME found the approach successful and plans to replicate it for promotion of other EE home appliances.

iii. Public Relations Campaign and Web-Based Tools

A public relations (PR) campaign was launched by the project through a sub-contract signed with China WTO Tribune in December 2015. The purpose of the campaign was to develop project success stories and market key information about the project in the form of 60 published articles.

The campaign was planned to coincide with the Consumer Education Campaign. However, the later was implemented during May to October 2014, whereas the activities under the PR campaign are to be implemented between January and June 2016. A review of the activities determined that the sub-contractor is satisfactorily delivering on the contract and is scheduled to finish all activities on time. These include the publication of project's success stories, e.g. Manufacturer Incentive Program, study of relevant national policies, publication of 60 articles, and a synthesized report by the EOP.

Moreover, a website was designed to enhance the project's outreach. The Sub-Contract was issued in 2012 to China Green, a local web design company, with activities including website design, Operations and Management, and training of PMO personnel in using and maintaining the website.

Although, according to the project document the website was to be operational in Year 1 i.e. 2011, the website became operational in 2013. The site has English and Chinese versions, and includes modules on: news release (project introduction, recent news, photos), consumer interaction, upload and download of document, publicity of energy efficient products, member registration and management, member training and communication, online videos, online survey, lottery drawing, visit statistics, contact us and links to other websites. Since its launch in 2013, the website has received 900, 000 visitors compared to the project goal of 350,000.

However, the sub-contractor has failed to meet other key obligations, such as reporting statistics on user satisfaction, total number of RAC purchase decisions affected by EOP, the number of established links to other websites/database, page view and download statistics and the percentage of air conditioner/compressor manufacturers under the project who have participated in cross promotion, etc. Moreover, the website suffers from occasional glitches. For instance, at the time of the TE, the latest project news being reported was from October 2014.

On the 'Technology Push' side, the project has partnered with highly relevant organizations, entities, and enterprises to enable critical policy changes and build manufacturer capacity leading to a technological transformation of the Chinese RAC industry towards production of more energy efficiency products. The TE team found the outcomes of Component 1 and Component 2 to be **Highly Satisfactory**.

The Consumer Awareness Campaign related to the 'Demand Pull' side was also implemented with high impact and significant over achievement of goals. However, as some 'Demand Pull' activities faced planning and

implementation issues, including a late start of the PR Campaign and issues with website reporting, the TE team concluded that the performance of Component 3 was only **Satisfactory**.

The summary of ratings of accomplishment in achieving various Components' outcomes is shown below in Table 15:

Table 15: Summary of Ratings of Accomplishment in achieving Various Components' Outcomes

Component	Rating
Component 1: AC Compressor Efficiency Upgrades	HS
Component 2: RAC Efficiency Upgrades	HS
Component 3: Energy Efficient RAC Promotion	S
Overall Rating of the Project on Achievement of Outputs	S

3.3.2. Relevance

Energy Efficiency has been a key priority of the GOC since the 1990's. Energy Efficient household appliances have been a main focus of the Government development and environmental protection strategy. The 12th Five Year Plan of the GOC (2011-2015) specifically focuses on energy and climate change by setting the following goals¹¹:

- A 16% reduction in energy intensity (energy consumption per unit of GDP)
- A 17% reduction in carbon intensity (carbon emissions per unit of GDP)

Moreover, the Energy and Environment unit of UNDP China in collaboration with the GEF has a tradition of assisting the GOC in its Energy Efficiency endeavors in the form of projects such as BRESL and PILESAMP projects. The project has also aimed to achieve the objective set out in the GEF Strategic Program No. 1, which is on Promoting Energy Efficiency in Residential and Commercial Buildings (SP-1); and GEF Operational Program: 5: Removal of barriers to energy efficiency and energy conservation

Consequently, the project's activities have been **relevant** to the organizational mandates of the key stakeholders such as GOC ministries (MEP, MIIT, etc.), industry associations such as CHEAA, ACC and RAC manufacturers, GEF, and the UN system in China.

3.3.3. Effectiveness and Efficiency (*)

PEERAC efficiency was evaluated as a measure of utilization of resources, including time, personnel, and funds. Key aspects investigated for efficiency include UNDP Implementing Partner Execution and Coordination, Adaptive Management, Partnership Arrangements, Monitoring and Evaluation, and Project Finance.

The Terminal Evaluation team assessed that the UNDP and MEP-FECO have closely coordinated the project's planning and implementation. Moreover, partnerships were developed with a wide array of organizations in the

¹¹<http://www.c2es.org/international/key-country-policies/china/energy-climate-goals-twelfth-five-year-plan>

public and private sectors, including government agencies ,manufacturers, retailers, industry associations, research bodies, and academia. Leveraging these partnerships, most project activities have been delivered by the sub-contractors within the agreed timeframe and have been highly responsive to the changing needs of the EE RAC sector in China. Moreover, the project's finances have been managed efficiently. In addition, the various methods of M&E inculcated in the project design, e.g. AMIS, data from Lottery Program, PAC, etc., have been duly utilized. The over-achievement of a number of important activities, such as the number of individuals trained internationally (24 vs. the project goal of 12), sales of EE RACs during the Consumer Education Campaign, etc. and the earlier than planned design of the new RAC EE Standard (standard approved by June 9, 2013 instead of by End of year 2014). However, the lack of a systemic monitoring/activity tracking tool has affected the project's ability to keep a synchronized track of activities. Moreover, the project's implementation faced a delay of one year, as the project was initially set to close in June 2015 but will now continue until June 2016.

The project has been highly effective in transforming the EE RAC industry in China towards the production and supply of more efficient ACCs and RACs. This achievement can be attributed to the selection of suitable sub-contractors, facilitating timely development and approval of the new RAC EE Standard, development of international linkages, multi-faceted training approach (needs assessment, international training, domestic training, on-site TA, and training evaluation). In particular, the following activities were highly appreciated by project beneficiaries and stakeholders:

- Timely development and approval of the new RAC EE Standard;
- Introduction to Simulation Software of the UMD CEEE;
- Linkages Developed among Competitor Staff; and Linkages facilitated between manufacturers and policy making bodies.
- Industry-wide Production and Marketing Data supplied by AMIS;
- Competitive Approach to the Manufacturer Incentive Program; and
- Methodology of the Consumer Education Campaign

Overall, the TE team concluded that the PEERAC project's Efficiency was ***Satisfactory***, while its Effectiveness was ***Highly Satisfactory***.

3.3.4. Country Ownership

All the country-level stakeholders have demonstrated strong commitment and ownership of the PEERAC project.

The GOC's ownership is demonstrated by the provision of high-level of MEP and FECO staff for project management positions, the participation of senior representatives from various ministries in PEERAC PAC and TAC, higher than committed levels of co-financing, inclusion of EE as a strategic measure in the bid to combat global warming and climate change, and most importantly, the establishment and compulsory implementation of RAC EE Standard developed by the project.

Similarly, the private sector participation has ensured the project's successful outcomes in the form of upgrading the energy efficiency levels of the ACC and RAC industries in China. Key contributions from private sector include

provision of higher than committed co-financing, providing senior and knowledgeable staff for training, participating in the product development, commercialization, and testing activities, etc.

The project's sub-contractors have also shown their keen interest in the project's success through on time or early completion of contracts, judicious spending of project funds, and cross-promotion of PEERAC's activities within their own respective organizational events. For example, China WTO Tribune, the holder of the International CSR Forum on Biodiversity and Green Development, invited PEERAC PMO staff and FECO experts to make keynote speeches on EE during the forum.

3.3.5. Mainstreaming and Sustainability (*)

Sustainability of project interventions has been inherent in the mainstreaming and replication potential incorporated into the project design. Certain project implementation practices, contributions, and outcomes have ensured sustainability in particular.

The development and compulsory application of the new RAC EE standard has implications for both the public and private stakeholders. The obligatory imposition of the standard has ensured that all RACs marketed in China meet high EE standards. The constant monitoring and periodic revision of the standard will ensure that the EE of RACs continually increases in the medium and long run by taking advantage of new technologies and practices. Furthermore, the adoption of EE by the GOC as a tool for climate change mitigation is likely to lead to adoption of best practices from the PEERAC project by new projects and programs. For instance, the NDRC is currently in contact with the PMO for potential collaboration on a new initiative.

Moreover, implementing the project through sub-contracts awarded to various public and private stakeholders, e.g. industry associations such as CHEAA and CHEARI, private sector entities such as GOME, and GOC agencies such as CNIS, has resulted in capacity building of these organizations for future support to the EE RAC industry. For instance, after a successful experience with RACs, CHEAA has started gathering EE data for other home appliances. Similarly, GOME plans to promote other EE home appliances using the approach for the Consumer Promotion Campaign.

Moreover, by successfully improving the EE capacity of ACC and RAC manufacturers with 90% and 95% of the Chinese market share, respectively, the project has transformed the EE RAC market in the country. The training, technology transfer, and inter-organizational and interpersonal linkages developed by PEERAC will lead to further development of EE RAC industry not only for China but also for other countries. For instance, a TE interview with Midea revealed that the EE RAC technology delivered through the project is being also used in RACs intended for export markets, including North America and Europe.

Similarly, through other successful initiatives such as AMIS, the Manufacturer Incentive Program and Consumer Education Campaign, the project has the potential to leave a legacy.

However, to ensure long term replicability and sustainability, it will be important to systematically document the project's approaches, methodologies, and outputs, e.g. training outlines, manuals, and methodologies, etc. and

make them freely available to all potential individual and organizational stakeholders, including manufacturers, researchers, academics, policy makers, and consumers, etc.

Considering the policy support, enthusiastic adoption by the ACC and RAC industry, and continual rise in consumer awareness, the TE team concludes that the PEERAC project is *Likely Sustainable*.

3.3.6. Impact

PEERAC has had a major impact on the industry, leading to the discontinuation of energy inefficient RACs after the implementation of the new RAC EE Standard. Moreover, the project acted as an invaluable platform for learning and exchange among different industry stakeholders, including competitors, thereby providing a level ground for learning. Similarly, the project facilitated increase in retail purchase of EE RACs and enhanced consumer awareness about the products.

Key achievements of the project include 43.82% improvement in the EE of RACs as compared to the project design goal of 10% and 49.9% market share of EE RACs as compared to the project goal of 15%. In addition, the project has also resulted in 23.6% improvement in the EE of ACCs. Accordingly, these measures have resulted in cumulative energy savings of 33.77 Mtce and a cumulative reduction of 274 Mtons of CO₂, thus far.

Table 16 below provides a detailed overview of the project’s quantitative impact.

Table 16: Detailed Overview of the Project’s Quantitative Impact

Goal		Baseline of 2007	Current	Percent Improved
Average EER of RACs by end of project, W/kWh	2.94	2.67	3.84	43.82%
Improvement in the energy efficiency of ACCs	none	2.67	3.3	23.60%
Market share of EE RACs by end of project	15%	5%	49.90%	333%
Cumulative Energy Savings (Mtce) by EOP			33.77	
Cumulative CO ₂ Emission Reductions (Mtons) EOP			274	
US\$ value of EE RAC project related advertising placed by manufacturers by EOP	7,500,000	0	18,700,000	
Share of RAC advertising by manufacturers for high efficiency products by EOP	10%	0	20%	

In addition, by presenting an implementation model and technology for EE enhancement of household appliance, the project has also had a major indirect impact on the EE sector in general. For instance, learnings from the project are already being replicated for other EE goods. Moreover, ACC and RAC manufacturers are using the learnt technology to produce products for high paying international markets.

4. CONCLUSIONS, RECOMMENDATIONS & LESSONS

4.1. Conclusion

In conclusion, the Terminal Evaluation team has determined that the PEERAC design has remained highly relevant to the development context of China and the priorities of various stakeholders, including GOC, GEF, UNDP, and the EE RAC industry.

Moreover, the project has been efficiently implemented while engaging a large number of stakeholders as partners and sub-contractors. The ownership from all stakeholders has been demonstrated in exceeding committed co-financing by 1,738.75% and has led to effective implementation, resulting in achievement of goals and component-level targets. Activities with significant impact include: Training programs designed for design and production of EE ACCs and EE RACs, development of RAC EE Standard, Manufacturer Incentive Program, and the RAC Retailer Program. A supportive environment created by the GOC also facilitated the project and resulted in unintended positive impact of a variety of activities, e.g. replication for improving the EE of other household appliances. These activities have effectively transformed the EE RAC industry in China, with EE RACs now occupying 50% market share as compared to 5% baseline levels. The project has also effectively managed its budgetary resources and activities remained responsive to evolving needs of stakeholders.

On the downside, an implementation delay of one year has resulted in the project to be delivered in 20% additional time. Moreover, activities related to the PR Campaign and Consumer education program were implemented much later planned, thereby potentially limited the efficacy of these particular initiatives.

4.2. Lessons Learned

Based on consultations with key stakeholders and the conclusions drawn by the TE team, key lessons learnt from the PEERAC project design and implementation experience are as follows:

- viii. The project has demonstrated that full support by Recipient country government (GOC) and cooperation between relevant public and private stakeholders lead to successful projects;
- ix. Productive engagement of the private sector at all phases, including project design, implementation, and evaluation can result in a multiplier effect for achieving industry and market related goals;
- x. A 'value chain' approach to project development has a more comprehensive focus;
- xi. A simple project document with step-by-step guidance on implementation, clearly delineated roles and responsibilities, and defined financial resources is essential for guiding a smooth implementation process;
- xii. M&E incorporated into various project activities facilitates cross-referencing of achievements and results. However, the presence of a project-level M&E/tracking system is essential to guide the project's reporting and activity coordination against planned outcomes and targets;
- xiii. Selection of competitive organizations for sub-contracts and project delivery is crucial for overall project performance;
- xiv. Policy and standards are highly cost-effective tools for market transformation in China.

4.3. Recommendations

Based on its conclusions and the lessons learnt, the evaluation team recommends the following actions:

I. Continuation / Up-scaling of the Project Activities

The following recommendations are provided for wider adoption of the successful initiatives implemented by the PEERAC project:

a. Establishment of Home Appliance Energy Efficiency Center of Excellence

Industry-wide trainings aimed at EE RAC/ACC product design and production offered to groups of competitors have led to the improved Energy Efficiency of RACs. However, after the project closure, the training program will discontinue and the industry will no longer have access to this collaborative approach to learning and information exchange. Also, while the manufacturers continue to utilize the learnings from the trainings, the EE technology around the world is rapidly changing, thereby making constant knowledge and technology transfer a necessity.

In view of this, the TE mission recommends that the GOC sets up a 'Home Appliance Energy Efficiency Center of Excellence', based after the University of Maryland's Center for Environmental Energy Engineering. Such a facility can facilitate not only EE development within China, but can also provide a hub for South-South Cooperation by providing state of the art assistance and services to other countries in the region.

b. AMIS and Manufacturer Competition

AMIS was designed as a tool to measure PEERAC's project and impact on the EE RAC industry. However, the data generated by this database has been widely appreciated and utilized by manufacturers for making strategic production and marketing decisions. The data can also be valuable to inform future policy decisions. Therefore, the TE team recommends the continuation of AMIS.

Since AMIS is based on critical proprietary data collected from the private sector, to ensure its continual success, it is important the database is maintained by a neutral authority. Hence, the CHEAA can continue managing AMIS by financing it through a collaborative industry fund. Alternatively, the database can be managed by a GOC agency such as the CNIS or NECC, etc.

Similarly, the competition held under the Manufacture Incentive Program was well received by the stakeholders as it facilitated healthy competition within the industry for the promotion of EE RACs. Based on interviews with RAC and ACC manufacturers, the TE team recommends for the continuation of this initiative.

c. Documentation and Dissemination of Lessons Learnt

The project has made significant contributions to the development of the EE RAC industry. For future efforts and projects to build on these lessons it is important that the project's experiences, such as its approach, processes, results, and achievements are documented and widely disseminated by being made available to any potential

stakeholder who may be interested in learning from PEERAC's experience. This can be achieved to a great extent through the successful delivery of the Sub-Contract having been issued to the China WTO Tribune.

Moreover, due to strong stakeholder ownership and quick uptake by the private sector, a number of project activities have resulted in unintended positive impact, such as application of newly adopted EE technologies and processes to RACs supplied to overseas markets. To ensure that this impact is highlighted and the processes leading to it are fed into future project designs, it is recommended that the project **documents some of the unintended positive impact**.

Moreover, it is also recommended that the project does not close down its **website**. Instead, hosting rights for 10 years should be purchased and the information mentioned above as well as any other critical contributions/practices of the projects should be posted on the website to benefit future projects/efforts. To obtain a wide audience, the website should also be linked to the online resources of other key national and international EE home appliances initiatives, e.g. the REESLN network developed under the BRESL projects, etc. Alternatively, all the materials related to the project can be uploaded to a section of an already existing organizational website, such as NDRC or CHEAA, etc.

II. Recommendations for Future Project Designs

This sub-section provides recommendations for design of future projects by GEF, UNDP, and the GOC.

a. Monitoring and Reporting Systems

UNDP-GEF project designs detail elaborate monitoring and evaluation systems, including project financial reporting and audits. In fact, in the case of PEERAC, M&E was incorporated into activities and structures such as the AMIS and Testing facilities, etc. However, to keep track of projects that have multiple activities and rely on a large number of stakeholders, it is important to design an activity **tracking/monitoring system**. It is recommended that such systems are made compulsory as part of the M&E plan in future project designs, thereby allocating particular financial and human resources for the development and maintenance of such systems.

Moreover, the systematic financial reporting often only includes the GEF fund. Considering the high levels of co-financing commitments made in projects such as PEERAC, it is recommended that future project designs include a **tracking or audit trail of co-financing**. Such a measure can improve the calculation of co-financing, enhance transparency, and highlight the host country's and stakeholders' commitment to the project.

In addition, it is recommended that in the case of project involving market-led approaches, key project monitoring organizational structures, e.g. Project Steering Committees / Project Assurance Committees are comprised of stakeholders from both public and private sector. The PEERAC's PAC comprised solely of representatives from the public sector. Although, these individuals provided policy guidance, the inclusion of private sector representatives would have leveraged the 'Market-Pull' component of the project.

b. Design of Future EE Projects

The PEERAC project pioneered the Energy Efficiency improvements in RACs and ACCs. Based on TE interviews and the experience of the evaluators, it is recommended that future projects or activities focusing on EE RACs should consider the following elements:

- i. Adoption of the value chain approach used by PEERAC;
- ii. Inclusion of RAC components other than ACCs, e.g. heat exchangers;
- iii. Focus on green manufacturing, e.g. phasing out ODS refrigerants, environmentally friendly materials, etc.; and
- iv. South-South Cooperation for promoting the use of EE RACs in countries that import RACs from China

Annexes

1. Review of Project Financial System and Analysis of Fund Utilization.
2. Combined Delivery Reports (2011, 2012, 2013, 2014, and 2015)
3. Mid Term Review (PEERAC)
4. UNDP Project Document, Government of China and United Nations Development Program
5. Presentations by Sub-Contractors (CHEAA, CHEARI, China Green, WTO Tribune, GOME, etc.)
6. Presentations by Manufacturers (Midea and GMCC)
7. Minutes of Inception Meeting
8. Institutional Stakeholders Profiles
9. TORs of Sub-Contractors
10. UNDP Guidance for Conducting Terminal Evaluation of UNDP-Supported, GEF-Financed Projects
11. Annual Project Progress Reports (APPR) 2011, 2012, 2013, 2014, and 2015
12. Annual Project Report/Project Implementation Review (APR/PIR) 2011 - 2015
13. Annual Work Plan (2011-2015)
14. Audit Reports (2011, 2012, 2013, 2014)
15. Co-financing Monitoring Data
16. GEF Grant Financial Data
17. Minutes of the Project Assurance Committee Meetings (2011-2015)
18. PEERAC Annual Targets (Based on the Project Planning Matrix)
19. PEERAC Organizational Structure
20. Project Document of PEERAC
21. TORs for Terminal Evaluation
22. Schedule and Audience Statistics of Trainings

KII/FGD with PMO Staff

Date:

Name(s) of Staff:

Position(s) in Project:

Contact Info:

Name of Interviewer:

QUESTIONS

1. Project Design

- i. When was the project developed and when did implementation start?
- ii. What was the process and timeline of project development?
- iii. Were the targets set too low in the project document? E.g. despite great demand, only two trainings were planned for ACC, only 5 dialogue workshops, etc.? If yes, did the project revise some of its targets during the course of the implementation?
- iv. What was the process of revising these targets? What problems were faced in the revision of targets?

PROJECT MANAGEMENT

PMO

- i. How many staff work at the PMO and what is the respective function of each staff member? Please provide organogram of the PMO
- ii. Has the project faced any HR challenges, e.g. insufficient or under qualified staff, high turnover, non-availability on in country technical knowhow, etc.? If yes, how have these been resolved?
- iii. Has there been a turnover/change in personnel on key project positions, e.g. PMO Director, Dy. Director, NPD, etc? If yes, when, and how has this lack of continuity affected the project?
- iv. Have there been any delays in recruitment of key staff members (e.g. CTA, M&E Officer, etc.) /contractors, etc. If yes, what were the reasons?
- v. How has this delayed hiring affected the project?

PAT and TAC

- i. What is the role of the Project Assurance Team (PAT)? What is the difference in the roles of the PAT and PAC? Who are the members of PAT? How has the PAT contributed to the project's success?
- ii. What is the role of the Technical Advisory Committee (TAC)? Who are the members of this team?
- iii. How has the TAC contributed to the project's success?
- iv. How could the roles of PAT and TAC have been improved?

Project Steering Committee (PSC)/ Project Advisory Committee (PAC)

- i. Who are members of the PSC? How often has the PSC met?
- ii. What is the %age distribution of PSC members according to sector, i.e. public, private, international, NGOs, etc.
- iii. What important decisions have been taken by the PSC?
- iv. How has the PSC steered the project in the right direction?
- v. How could the role of the PSC have been improved?

2. Key Project Stakeholders

- i. Who are the key public sector stakeholders and what is the role of each?
- ii. Who are the key private sector stakeholders and what is the role of each?
- iii. Which particular stakeholders under each project outcome have been particularly active in ensuring the project's success? How?
- iv. Did any stakeholders not meet their commitments? If yes, who are they and what was the reason?

UNDP Support in Implementation

- i. What support has been provided by the UNDP to the project? E.g. linkages with international experts, etc.
- ii. What has been the role of the UNDP in monitoring and course correction?
- iii. How could the role of the UNDP have been improved? E.g. timely budget releases, simpler reporting formats, etc.

Stakeholder Collaboration

1. What support has been provided by the GEF Focal Point?
2. How has the collaboration between the various stakeholders leveraged the project performance?
3. What key challenges have been faced by the key stakeholders in collaborating with each other? How were some of these challenges mitigated?

4. How do the various stakeholders and partners interact to ensure communication and linkages between their respective activities? E.g. quarterly meetings arranged by the PMO or any other events, etc.

3. Flexibility and Delays

- i. How did the project respond to the rapidly changing policy and market dynamics of the EE RAC industry? e.g. revising targets, changing activities, etc. (e.g. according to the meeting minutes of PAC 1, (Mr. Manuel Soriano promised to recalculate CO2 emission reduction of PEERAC, based on the scenario of energy efficient being increased from 10% to 25% due to project implementation).
- ii. During the time of implementation, have there been any changes in the project document? If yes, what were these changes? Were these changes incorporated in the project's logframe? What was the process of having these changes approved? E.g. approval from PSC, approval from GEF, etc. What challenges were faced by the project for making any changes in the project approach/logframe, etc.?
- iii. Have there been any significant delays in implementation of activities (delay of three months or more)? If yes, which activities were these and what caused the delays?
- iv. How did these delays affect the project's progress? What was the impact of activity delays on other components and activities? How were these problems mitigated?

4. Collaboration

- i. How has the project linked / collaborated with other similar GEF EE projects in China, e.g. BRESL? And How has the project linked with any ongoing GoC EE projects?
- ii. How has this collaboration leveraged the projects outcomes and impact?

5. Sub-Contractor Engagement

- i. What are the key sub-contracted activities under the project? When did each activity start and finish?

Sub-Contracted Activity	Organization	Start Date	End Date

- ii. Are there any outstanding activities in any of the sub-contracts?
- iii. What were the challenges in sub-contracting? E.g. availability of local expertise, cost, coordination, commitment and timely delivery by sub-contractors, etc.?
- iv. What was the process of sub-contractor selection? How did the project ensure transparency in selection of sub-contractors organizations?

- v. Please provide TORs of each sub-contracted activity and 1 to 2 page write-up on the accomplishments and challenges of each sub-contracted activity

6. Beneficiary Selection and Performance

- i. What was the process of manufacturer/beneficiary organization selection for each activity in the project?
- ii. How did the project ensure transparency in selection of beneficiary organizations?
- iii. What was the ownership status of the selected beneficiaries for each activity? (i.e. public, private, joint venture, multi-national, etc.). Please provide a table.
- iv. What is the %age market share of each assisted company (manufacturers/retailers)?
- v. Has the project received any complaints of bias from any companies who were not selected? How were these issues resolved?
- vi. What happens if one of the manufacturers defaults at any stage of the project implementation? How were such situations mitigated or resolved?
- vii. Which companies were involved in the ACC/RAC product testing, AMIS, etc.? Only those participating in the project or others too?

7. Technological and Marketing Support to ACC/RACs

- i. What were the key challenges faced in the 'ACC efficiency upgrades'? (i.e. training, dialogue, technical assistance, commercialization, product testing, etc.)... E.g. establishment of ACC testing facility, convincing manufacturers to share data, availability or compliance with Chinese standards, etc.
- ii. What were the key challenges faced in the 'RAC Efficiency upgrades'? (i.e. training, design, commercialization, efficiency standards, product testing, policy recommendations, and Refrigerant Replacement, etc.)...E.g. establishment of RAC testing facility, convincing manufacturers to share data, availability or compliance with Chinese standards, etc.
- iii. Can we get a graphical representation/timeline of how the ACC activities were linked into the RAC activities? E.g. were the RAC prototypes that were being improved under the project using any of the improved ACCs?
- iv. What were some of the issues faced in implementing the EE RAC Promotion component? (e.g. lack of cooperation of retailers, lack of cooperation by manufacturers, buying capacity of consumers, etc.)
- v. How were these issues resolved?

8. Trainings

- i. What selection criteria was used to identify manufacturers to be trained?(size, location, operation size, etc.)
- ii. What problems did the PMO face in the training program, e.g. selecting beneficiary companies, identifying trainers, and delivery of trainings? E.g. lack of local trainers, high demand vs. low project capacity, limited training curriculum, etc. How were these resolved?
- iii. Please provide summarized overview of trainings: How many trainings were delivered under each outcome? What topics were the trainings delivered in? Duration of trainings? How many companies/individuals benefited? % representation of the industry, etc.

Training Topic	Organization Delivering Training	Dates of Training	Names of Companies	No. of Individuals Attending

- iv. Are the training programs (and other such initiatives) being continued? If yes who is responsible for continued training?
- v. What issues have been faced in the continuation of the training programs?

9. AMIS

- i. Which manufacturers were to report to AMIS? Only those participating in the project or all manufacturers in China? If it is the later, how was the AMIS marketed/promoted?
- ii. What incentives were provided to the manufacturers for reporting to the AMIS?
- iii. How has the AMIS been helpful for the promotion of EE RACs in China? What problems were faced in the design/management/operation/implementation of AMIS? How were these resolved?
- iv. How is the data from AMIS comparable with that received from the manufacturers? Is there a direct way for reconciliation?
- v. Is AMIS connected to any other databases of products within China or another country's products?
- vi. Have the recommendations made by companies at the time of MTR been incorporated into the AMIS? If no, what have been the reasons?
- vii. How can AMIS be improved? What are the potential challenges for this?
- viii. Will the AMIS be used after project end? If so, who will managing it? What are the potential problems in its continuation? How can these be resolved?
- ix. Latest AMIS Annual Operational Report

10. Overall Challenges Faced by the Project

- i. What problems were faced by the project in 2013? (Ref. highlighted line in PAC 5 ... promoted the EE product' production and marketing in 2014, and reversed its declining in 2013, which made EE RAC outshine in household appliances)
- ii. How was the project affected by the transition from 'constant frequency' to 'variable frequency' in 2011?

11. BUDGET and Co-Financing

- i. Is the budget sufficient for the proposed activities? If no, what problems has the project faced regarding budget allocations?
- ii. What efforts have been made to resolve some of these problems?
- iii. Has the project ever faced any problems with timely availability of funds? If yes, how were these resolved?
- iv. How has the project utilized the budget for the rebate activity that was cancelled?
- v. What is the co-financing per year and who provided it? How does this compare with the plan in the prodoc?
- vi. What activities was co-financing provided for? Was this in cash or kind?
- vii. How did the co-financing affect the project's success?
- viii. Have regular project financial audits been undertaken? Were these audits satisfactory? If not, what were the reasons and how were these issues resolved?
- ix. Please share the project delivery rate table...analyze back loading elements

12. M&E and REPORTING

- i. Does the project have an M&E framework? If yes, who developed this framework and when?
- ii. Was the M&E plan approved by the PAC?
- iii. Has the PMO made any changes in the M&E framework during the implementation period? If yes, what were these changes? What were the problems in making these changes?
- iv. What are the main components of the M&E framework?
- v. What were some of the challenges faced in implementing the M&E Plan? E.g. lack of required data, difficulty in gather information, etc.
- vi. How were these challenges resolved?
- vii. How is the logframe used for purposes of Planning, M&E, and Reporting? What problems have been faced by the PMO when reporting against the logframe?
- viii. Did the project submit its reports on time?

- ix. Were any of the evaluation reports or results of surveys or impact assessments uploaded to the project website or any other public source? According to the prodoc, all evaluation reports will be uploaded to the project website for widespread dissemination.
- x. What problems were faced in reporting? How were these resolved?

13. IMPACT

1. According to the Prodoc/TORs, the power consumption in C&R sectors is 20% of the national demand, and 65% of this is HVAC (10% is for air conditioning/cooling). Since the prodoc was formulated in 2007-08, what is the current situation? This may be important in assessing the impact and potential contributions of the project.
2. Has the PMO undertaken a systematic impact assessment of the Project? If yes, what are the outcomes?
3. Which of the project activities/components have had the highest impact? Why?
4. Which of the project activities/components have had the least impact? Why?
5. What has been the project's impact on GHG emissions? What method was used to assess impact on GHG emissions?
6. How much of this is direct impact, considering the widespread interventions by the GoC for EE RAC promotions?
7. What problems were faced in assessing impact? E.g. reluctance of manufacturers to share information, too early to assess impact, overlaps with other EE RAC projects, difficulty in calculating GHG emissions, etc.

14. SUSTAINABILITY

- i. What have been the key measures of sustainability/replicability embedded in the project design and delivery?
- ii. Which outcomes/results of the project are particularly sustainable? Why?
- iii. Which outcomes/results of the project are least sustainable? Why?
- iv. What are the major risks to the sustainability of the project's activities? E.g. lack of funding, high product cost, lack of technical capacity, etc.
- v. What are the points/measures that leverage sustainability at this point? E.g. new govt. policy, increased market demand, etc?
- vi. How are the companies, other government programs, development projects replicating the activities of the project, e.g. implementation of trainings, continuation of trainings, etc.
- vii. Is there a follow up project planned, either at FECO or with any of the other sub-contractors/stakeholders, e.g. GEF/UNDP, CHEAA, etc.? If yes, how would this program be linked to PEERAC?
- viii. If no, what is the reason?

15. CONCLUSIONS and RECOMMENDATIONS

- i. In your opinion, what are some of the key achievements of the PEERAC project?
- ii. In your opinion, what are some areas in which PEERAC could have played a more active role but did not play?
- iii. What are the key lessons learned from the implementation of PEERAC?
- iv. What are your recommendations to ensure sustainability of the PEERAC's key activities?
- v. What components/activities would you recommend for a similar program in the future?

KII with INSTITUTIONAL STAKEHOLDERS: (NPD, NPC, PMO Director, CTA (GEF), PSC, UNDP, PAC)

Date:

Name of Interviewee

Organization Name

Title:

Contact Info:

Name of Interviewer:

BACKGROUND

1. What particular role does your organization play with the project?
2. In your opinion, what have been the key successes of the project?
3. In your opinion, what have been the key challenges faced by the project? E.g. delays in implementation, limited project outreach, etc.
4. How could these challenges have been mitigated?

PROJECT DESIGN & ADAPTIVE MANAGEMENT

5. In light of the rapid policy and technological changes in the EE RAC industry, have the project design and logframe remained relevant over the course of the project?
6. If no, what key factors were irrelevant and how were these addressed during the course of implementation? Especially in light of the GOC's policy changes.
7. The demand for some project activities, e.g. trainings has been very high. Does this mean that the project design document underestimated the demand in the industry and set the targets too low? If yes, what changes were made in the project to reach greater numbers of beneficiaries?

DELAYS IN IMPLEMENTATION

5. Have there been any key delays in project implementation? If yes, what caused these delays? What has been the impact of these on project implementation and progress?
6. What measures were taken by key stakeholders to avoid any further delays?
7. How come the PEERAC project finished in the exact stipulated time?

STAKEHOLDER COLLABORATION

8. Which project stakeholders/beneficiaries do you deal with directly?
9. What is the mechanism for collaboration with the project? E.g. quarterly meetings, etc.
10. In your opinion, which stakeholders have played a key role in ensuring the project's success?
11. What have been some of the opportunities/positive outcomes of the stakeholder collaboration under this project? E.g. funding leverage, policy support, higher outreach, etc.
12. What have been some of the challenges in regard to collaboration among stakeholders? E.g. difference in organizational priorities, delay in reporting, etc. Have these issues been resolved? How?

STEERING COMMITTEE

13. Has the PSC met regularly? If no, what have been the reasons?
14. What key role has the PSC played in guiding / facilitating the project implementation? Any specific examples? How effective has been the PSC been performing its duties of oversight (e.g. review of Annual Work Plans, Annual Progress Reports), and guidance (e.g. linkages to UNDP corporate policy decisions) PMO linkages with UNDP-China?
15. What challenges and opportunities has the PSC faced in overseeing the project activities? E.g. policy, stakeholder buy in, etc.?
16. How could the role of the PSC have been strengthened further?

KEY STAKEHOLDER SUPPORT

17. What support has been provided by the UNDP China?
18. What support has been provided by the GEF Focal Point?
19. How has the collaboration between the various stakeholders leverage the project performance?
20. What key challenges have been faced by the key stakeholders in collaborating with each other? How were some of these challenges mitigated?

RELEVANCE

21. What is the key role that your organization has played in the project's success? E.g. policy support, co-financing in cash/kind, mainstreaming into other programming, etc.
22. How does the project fit into the strategic priorities and current programming of your organization?
23. How can/will the project's successes/activities feed into future programming/strategy of your organization?
24. In addition to PEERAC, what other EE RAC programs has your agency been involved in? Has there been any linkage between PEERAC and these other programs?

25. How would you rate the comparative contributions and challenges of PEERAC with these other programs?

REPLICATION& UP SCALING

26. Are there any mechanisms in place for the up-scaling of the project activities? E.g. training programs, AMIS, etc?

27. What are the potential opportunities for such replication?

28. What are the potential challenges for such replication?

29. How can these challenges be mitigated?

IMPACT

30. In your opinion, how has the project impacted the performance of your organization?

31. What impact has the project had on the EE RAC industry in China?

SUSTAINABILITY

32. Will there be opportunity for the project stakeholders from the business and/or public sector to continue collaboration after project end? How?

33. What can the project do to institutionalize such collaboration platforms before it closes?

34. Which of the key project activities are sustainable in the medium and long term? Why/How?

35. Which of the project activities are not sustainable in the medium and long term? Why/How?

36. What can be done to increase the chances of sustainability of some of these activities?

LESSONS LEARNED & RECOMMENDATIONS

37. In your opinion, what are the key lessons learned from the project?

38. Based on the project implementation experience, what are your suggestions for improvement in future projects?

KII WITH SUB CONTRACTORS

- Name and Position of Person(s) Interviewed:
- Phone Number and Email Id:
- Name of Organization:
- Title of Sub-Contract:
- Date of Interview:
- Name of Interviewer:

History of Sub-Contract

1. When was the sub-contract signed between your organization and the PEERAC project?
2. Were you involved in the process of bidding and acquiring the sub-contract?
3. What was the start and end date of the contract?
4. Was the contract finished on time? If no, how much was the delay and what was the reason for the delay?

Performance of Activities

5. What activities did your organization perform under the contract? Please provide details
6. What problems did you face in delivering on the contract? E.g. lack of support from the PMO, delayed funds, lack of interest from the beneficiaries, absence of technical know-how, etc.
7. How did you overcome these issues?
8. How did the PMO support you in the resolution of such issues?
9. How could the role of the PMO be improved in future projects?

Relevance of Project

10. Since the start of PEERAC there have been a lot of large-scale changes in the policy environment, technology, and market demand, etc. In view of this, was PEERAC still relevant? If yes, how? If no, why not?
11. In your opinion, what have been some of the key contributions of the project to the EE RAC industry in China?
12. What have been some of the major challenges to the success of the PEERAC project?
13. Which project approach or activities were not highly relevant to the EE RAC context in China?

Impact

1. In your opinion, how has the project impacted the performance of your organization?
2. What impact has the project had on the EE RAC industry in China?

Sustainability

14. Which outcomes/results of the project are particularly sustainable? Why?
15. Which outcomes/results of the project are least sustainable? Why?
16. What are the major risks to the sustainability of the project's activities? E.g. lack of funding, high product cost, lack of technical capacity, etc.

Conclusions and Recommendations

17. In your opinion, what are some of the key achievements of the PEERAC project?
18. In your opinion, what are some areas in which PEERAC could have played a more active role but did not play?
19. What are the key lessons learned from the implementation of PEERAC?
20. What are your recommendations to ensure sustainability of the PEERAC's key activities?
21. What components/activities would you recommend for a similar program in the future?

KII WITH BENEFICIARIES(ACC AND RAC MANUFACTURERS AND RETAILERS)

- Name and Position of Individual Interviewed
- Name of Company: GMCC
- Company Ownership: (State Owned, Private, Joint Venture, MNC)
- Year of Establishment of Company:
- Name of Interviewer
- Phone Number and Email Id:
- Date of Interview
- Location of Interview

History and Background

1. What is your company's percent market share in China? And what is your company's percent market share internationally?
2. Since when has your company been involved with the PEERAC project? Start and end dates of involvement (Month and Year)? And was their company involved in the project design?
3. What role did you play as an individual in these activities? E.g. attended training, coordinated activities, etc.

Performance of Activities

4. What particular activities has your company been involved with PEERAC? Please provide details. E.g. If training, how many employees were trained and in what topics; if product testing, then how many models were tested and when, etc. How did they contribute to the EE standard
 - a. EE Product development
 - b. Training
 - c. Testing Center
 - d. Report Annual Sales and EE increase data to AMIS
 - e. Contribution/Input to Standard Revision
5. Has your company ever asked for assistance in these matters from another source? (e.g. donor project, government agency, etc.?). If yes, how is the support provided through PEERAC project different?
6. What problems did you face in dealing with the project? E.g. lack of support from the PMO, delayed activities, lack of ability among service providers/sub-contractors, etc.
7. How did you resolve these issues?
8. How did the PMO support you in the resolution of such issues?

9. How could the role of the PMO be improved in future projects?

Relevance of Project

10. Since the start of PEERAC there have been a lot of large-scale changes in the policy environment, technology, and market demand, etc. In view of this, was PEERAC still relevant? If yes, how? If no, why not?

11. In your opinion, what have been some of the key contributions of the project to the EE RAC industry in China?

12. What have been some of the major challenges to the success of the PEERAC project?

13. Which project approach or activities were not highly relevant to the EE RAC context in China?

Impact

14. In your opinion, how has the project impacted the performance of your organization?

15. What impact has the project had on the EE RAC industry in China?

Sustainability

16. Which outcomes/results of the project are particularly sustainable? Why?

17. Which outcomes/results of the project are least sustainable? Why?

18. What are the major risks to the sustainability of the project's activities? E.g. lack of funding, high product cost, lack of technical capacity, etc.

Conclusions and Recommendations

19. In your opinion, what are some of the key achievements of the PEERAC project?

20. In your opinion, what are some areas in which PEERAC could have played a more active role but did not play?

21. What are the key lessons learned from the implementation of PEERAC?

22. What are your recommendations to ensure sustainability of the PEERAC's key activities?

23. What components/activities would you recommend for a similar program in the future?

ANNEX 3
DETAILED MISSION SCHEDULE

DATE	TIME	MEETINGS	INTERVIEWER
03.22	1630	Arrival of International Consultant in Beijing	
03.23	1100-1500	Planning Meeting of Evaluation Experts	Umm e Zia, Yin Xiaolan, Zhao Yue
3.24	09:30-12:00	Kick off meeting with PMO and UNDP	Umm e Zia, Yin Xiaolan, Zhao Yue
	14:00-17:00	Meeting with RAC Training and Testing Centre sub-contractor	Umm e Zia, Yin Xiaolan
	14:00-17:00	Meeting with Retailer Incentive Program Sub-contractor	Zhao Yue
3.25	09:30-12:00	Meeting with PAC	Umm e Zia,ZhaoYue
	14:00-17:00	Meeting with Standard Revision Sub-contractor	Zhao Yue
	14:00-17:00	Meeting with Standard impact assessment sub-contractor	Zhao Yue
	14:00-16:00	Meeting with document collection sub-contractor	Yin Xiaolan
	14:00-16:00	Meeting with website building sub-contractor	Yin Xiaolan
3.26	9:30-17:00	TE team's internal discussion	Umm e Zia, Yin Xiaolan, Zhao Yue
3.27	9:30-17:00	TE team's internal discussion	Umm e Zia, Yin Xiaolan, Zhao Yue
3.28	09:30-12:00	Meeting with ACC Training, AMIS, Manufacture incentive program Sub-contractor	Umm e Zia, Yin Xiaolan, Zhao Yue
	14:00-17:00	Meeting with Consumer Education Program Sub-contractor	Yin Xiaolan
	14:00-15:30	Meeting with EE RAC Procurement guide sub-contractor	Zhao Yue
	15:30-17:00	Meeting with EE RAC promoting sub-contractor	Zhao Yue
3.29	AM	Flight from Beijing to Guangzhou	
		Site visit and meeting with RAC manufacture	Umm e Zia, Yin Xiaolan, Zhao Yue
3.30	9:30-12:00	Site visit and meeting with ACC manufacture	Umm e Zia, Yin Xiaolan, Zhao Yue
	PM	Flight from Guangzhou to Beijing	

3.31	whole day	Preparation for debriefing	Umm e Zia, Yin Xiaolan, Zhao Yue
4.1	AM	Preparation for debriefing	Umm e Zia, Yin Xiaolan, Zhao Yue
	14:00-16:30	Debrief meeting with UNDP china and PMO	Umm e Zia, Yin Xiaolan, Zhao Yue

ANNEX 4**LIST OF STAKEHOLDERS INTERVIEWED**

Name	Designation	Organization	Role in the Project
Liu Shijun	Project Manager	UNDP China	International agency
Wang Xin	Director	FECO	NPD
Yu Zhidi	Deputy director	FECO	PMO director
Liu Ting	President	China Household Electrical Appliances Research Institute	RAC Training and Testing Centre sub-contractor
Zhang Hongbing	Manager	GOME Electrical Appliances	Retailer Incentive Program Sub-contractor
Xiao Duyu	Director	Ministry of Industry and Information Technology	PAC
Cheng Jianhong	Researcher	China National Institute of Standardization	Standard Revision Sub-contractor
Li Junming	Professor	Tsinghua University	Standard impact assessment sub-contractor
Yin Gefei	Chief manager	China WTO Tribune drop	Document collection sub-contractor
Xu Yang	Engineer	China Green	Website building sub-contractor
Dou Yanwei	Engineer	China Household Electrical Appliances Association	ACC Training, AMIS, Manufacture incentive program Sub-contractor
Zhang Shaomin	Secretary-general	China Environmental Culture Promotion Association	Consumer Education Program Sub-contractor
Zhao Zhijun	Director	Beijing Energy-saving and Environment Centre	EE RAC Procurement guide sub-contractor
Gao Jiancheng	Editor-in-chief	Beijing Changsheng Shang Jia advertising co., LTD	EE RAC promoting sub-contractor
Li Meng	Manager	Midea	RAC manufacture
Liu Yajun	Manager	GMCC	ACC manufacture

i. Opening page

- Title of UNDP supported GEF financed project
- UNDP and GEF project ID#s.
- Evaluation time frame and date of evaluation report
- Region and countries included in the project
- GEF Operational Program/Strategic Program
- Implementing Partner and other project partners
- Evaluation team members
- Acknowledgements

ii. Executive Summary

- Project Summary Table
- Project Description (brief)
- Evaluation Rating Table
- Summary of conclusions, recommendations and lessons

iii. Acronyms and Abbreviations

1. Introduction

- Purpose of the evaluation
- Scope & Methodology
- Structure of the evaluation report

2. Project description and development context

- Project start and duration
- Problems that the project sought to address
- Immediate and development objectives of the project
- Baseline Indicators established
- Main stakeholders
- Expected Results

3. Findings

(In addition to a descriptive assessment, all criteria marked with (*) must be rated)

3.1 Project Design / Formulation

- Analysis of LFA/Results Framework (Project logic /strategy; Indicators)
- Assumptions and Risks
- Lessons from other relevant projects (e.g., same focal area) incorporated into project design
- Planned stakeholder participation
- Replication approach
- UNDP comparative advantage
- Linkages between project and other interventions within the sector
- Management arrangements

3.2 Project Implementation

- Adaptive management (changes to the project design and project outputs during implementation)
- Partnership arrangements (with relevant stakeholders involved in the country/region)
- Feedback from M&E activities used for adaptive management
- Project Finance
- Monitoring and evaluation: design at entry and implementation (*)
- UNDP and Implementing Partner implementation / execution (*) coordination, and operational issues

3.3 Project Results

- Overall results (attainment of objectives) (*)
- Relevance(*)
- Effectiveness & Efficiency (*)
- Country ownership
- Mainstreaming
- Sustainability (*)
- Impact

4. Conclusions, Recommendations & Lessons

- Corrective actions for the design, implementation, monitoring and evaluation of the project
- Actions to follow up or reinforce initial benefits from the project
- Proposals for future directions underlining main objectives
- Best and worst practices in addressing issues relating to relevance, performance and success

5. Annexes

- ToR
- Itinerary
- List of persons interviewed
- Summary of field visits
- List of documents reviewed
- Evaluation Question Matrix
- Questionnaire used and summary of results
- Evaluation Consultant Agreement Form

ANNEX 6

PROJECT'S MAIN STAKEHOLDERS AND THEIR RESPECTIVE ROLES

Stakeholder	Role in the Project
The Ministry of Environmental Protection	The National Executing Agency for the project, responsible for overall management of the project development and implementation activities and
FECO	Host of the project and overseeing of the project administration and implementation activities.
The National Development and Reform Commission	Advises on energy efficiency policy, and serves on the Project Steering Committee (PSC)
The Ministry of Industry and Information Technology	Advises on industrial and information technology and serves on the PSC
The Ministry of Finance	The National GEF Operational Focal Point and a member of the PSC;
The Ministry of Commerce	Advises on the RAC market and is a member of the PSC;
Air conditioning compressor (ACC) manufacturers	Ten companies are directly participating in PEERAC, and have signed contracts with the PMO outlining their tasks and responsibilities, as well as financial contributions to the project. Besides, the project will also provide benefits to the other ACC manufacturers not directly participating;
Room air conditioning (RAC) manufacturers	Sixteen companies are similarly directly participating in PEERAC, with contract agreements and financial contributions to the project;
The China National Institute of Standardization (CNIS)	A subcontractor advising on RAC standards and labeling, and coordinates efforts on the GEF-UNDP BRESL (Barrier Removal to the Cost Effective Development and Implementation of Energy Efficiency Standards and Labeling) Project;
The China Household Electrical Appliances Association (CHEAA)	Subcontractors for AMIS and technical training
The National Household Electric Appliance Quality Supervision Testing Center (NHEAQSTC)	Subcontracted for ACC and RAC product testing
The China Household Electric Appliance Research Institute (CHEARI)	Subcontracted for RAC technical training

Other Industry trade and research organizations involved in the air conditioning industry	Benefit from the technical improvements and increased market share associated with PEERAC activities
Building Practitioners and Consumers	Benefit from the improved technologies developed under the project, and the incentives supporting both the manufacturers and market development.

ANNEX 7**LIST OF PAC MEMBERS& MEETING DATES**

Position	Name	Organization
Leader	Li Pei	FECO, MEP
Member	Carsten Germer	UNDP
	Guo Wensong	Ministry of Finance
	Jiang Hong	Ministry of Environmental Protection
	Xiao Duyu	Ministry of Industry and Information Technology
	Yin Minghan	National Standards Commission

MEETING DATES OF PAC

- i. Jan 21, 2011
- ii. March 20, 2012
- iii. March 28, 2013
- iv. March 29, 2014
- v. March 31, 2015
- vi. May 18, 2015

Position	Name	Organization
Leader	Qi Bing	CHEARI
Member	Cheng Jianhong	National standards institute
	Li Hongqi	Beijing University of Technology
	Wang Chao	CHEARI
	Zhong Shunhe	CHEARI
	Yao Zhihong	CHEARI
	Cao Chunling	China Environmental Culture Promotion Association
	GaoJ iancheng	Changshengshangjia
	Wang Lei	CHEAA
	Wang Li	CHEAA
	Dou Yanwei	CHEAA

ANNEX 9
YEAR-WISE DISTRIBUTION OF THE SUB-CONTRACTS

Year of Award	Title of Contract	Name of Agency	Contract value (USD)	Percent of Total Sub-Contracts
2010	N/A	N/A	N/A	N/A
2011	N/A	N/A	N/A	N/A
2012	Training Activities for Energy-saving Room AC Design & Production Technologies	China Household Electric Appliances Research Institute	992,000.00	35%
	Testing Centre	National Household Appliances' Quality Supervision And Inspection Center (belong to China Household Electric Appliances Research Institute)	236,500.00	8%
	Training Activities for Energy-saving ACC Design & Production Technologies	China Household Electrical Appliances Association	198,600.00	7%
	AC energy efficiency standards revision and improvement	China National Institute of Standardization	170,000.00	6%
	Website Building	China Green	89,000.00	3%
	Information System	China Household Electrical Appliances Association	120,000.00	4%
2013	Manufacture Incentive Program	China Household Electrical Appliances Association	41,131.50	1%
2014	Retailer Incentive Program	GOME Electrical Appliances	206,140.67	7%
	Consumer Education Program	China Environmental Culture Promotion Association	567,737.00	20%
2015	EE RAC Procurement Guidelines	Beijing Energy-saving and Environment Centre	21,406.73	1%

	Publication and Propaganda of the Project Outcomes achieved	WTO Tribune	87,155.96	3%
	Energy saving effect evaluation research of energy efficiency standard	Tsinghua University	14,587.16	1%
	Propaganda Activities of EE RAC Promoting	Beijing CHANGSHENG SHANGJIA advertising co., LTD	122,324.16	4%
TOTAL			2,866,583.18	

ANNEX 10

SUMMARY OF ACCOMPLISHMENTS FOR COMPONENT 1 ALONG WITH THE EVALUATION RATING

Main Activity	Indicators	Target	Accomplishment	Results Achieved	Evaluation Rating
<u>Activity 1.1.1:Capacity Needs Assessment of Local ACC Manufacturers</u>	Number of completed Assessment Reports by mid-Year 1	1	1	A survey was conducted to determine and evaluate the basic level of capacity of the local ACC manufacturing industry to design and manufacture energy efficient ACCs.	S
<u>Activity 1.1.2: AC Compressor Technology Training Workshop Design and Implementation</u>	Number of training workshops designed, organized and conducted by end Year 3	2	2	This activity involved the design, preparation, organization of 2 in-country compressor technology training workshops that took place in 2013 and 2014.	HS
	Number of individuals trained by MTR	24	29	Trainees participated came from 10 participating manufacturers.	HS
<u>Activity 1.1.3: Evaluation of In-Country AC Compressor Technical Training</u>	Percentage of trainees that rated the training workshop training as good/excellent, %	75	100	This activity involved the assessment of the effectiveness of the in-country training courses conducted and came up with relevant recommendations for future continuing training program on EE ACC design and manufacturing (product	HS

				commercialization) after the PEERAC project.	
Activity 1.2.1: <u>International AC Compressor Technology Training Course Design and Implementation</u>	Number of international training courses designed, organized and conducted by end Year 2	1		Activities incorporated into In-Country RAC Training	
	Number of individuals trained by end Year 2	8		-	
Activity 1.2.2:<u>Evaluation of International AC Compressor Technical Training</u>	Percentage of trainees that rated the training course as good/excellent,%	75		-	
	Proportion of trainees still involved in ACC design/production at company and/or sector at EOP, %	75		-	
Activity 1.3.1: Organization and Conduct of an ACC Manufacturer Dialogue and Product Planning Workshop	Number of participating ACC & RAC manufacturers in workshop held by end Year 3	18	21	This activity took place in 2013 involved the organization of a forward-looking planning dialogue between AC compressor and RAC manufacturers in, which focused AC compressor and RAC designs on the more efficient products	HS

				which the project would enable and support.	
Activity 1.3.2: Coordination and Evaluation of Follow-up Manufacturer Dialogue	Cumulative number of follow-up dialogue meeting held by EOP	5	7	This activity tracked the progress in the partnership/cooperation between ACC and RAC manufacturers towards the manufacture of EE RACs using locally made EE ACCs. The PEERAC Team coordinated the holding of, and participate in, the follow-up meetings.	
	Average number of participating ACC meeting minutes & RAC manufacturers in each dialogue meeting	At least 2	5.86	The manufacturers' dialogue series was evaluated as to their benefits and merits to the ACC and RAC manufacturing industries.	HS
	Number of EE RACs using new EE ACCs by end Year 4	At least 1	4		HS
<u>Activity 1.4.1: Selection of Local ACC Manufacturers for TA Provision</u>	Number of ACC manufacturers selected for on-site TA activities by end year 2	6	6	A set of selection criteria was developed for use in the selection of local ACC manufacturers that will receive technical assistance.	HS
Activity 1.4.2: ACC Manufacturing TA Program	Number of design, manufacturing and technical services	30	30	This activity involved the design, preparation, organization of an ACC Technical Assistance	HS

	provided under the TA program by Year 2			Program for 6 local AC manufacturers.	
Activity 1.4.3: Evaluation of ACC Manufacturing TA Program	Percentage of manufacturers that rated the TA service they received as good/excellent by EOP, %	75	100	This activity involved the assessment of the effectiveness of the ACC manufacturing TA Program conducted and came up with relevant recommendations for continuing TA program on EE ACC design and manufacturing (product commercialization) after the PEERAC project.	HS
	Proportion of ACC manufacturers that received TA services producing EE ACC products by EOP, %	75	100	After each TA services provision, the manufacturer (inclusive of the company personnel that participated in the TA activities) evaluated the quality of the TA services provided by the Expert Team.	HS
Activity 1.5.1: Product Commercialization Contracting and Mobilization	Sales-weighted percentage of ACC manufacturers signing participation contracts by end Year 1, %	50 - 60	80	Based on the survey of local ACC manufacturers, PMO identified manufacturers that targeted for the new EE ACC product commercialization.	HS
Activity 1.5.2: <u>Product Design Implementation</u>	Average AC compressor efficiency (COP) by EOP	2.94	3.3	The product design by manufacturers took place over a 6 month period.	HS

Activity 1.5.3: Selection of Product Commercialization Models	Number of bids received for incentives on new EE ACCs developed (COP = 3.4 @ 20% EE gain)/ by end Year 3	6	6	Selecting 6 EE ACC product models designed by the local ACC manufacturers	HS
Activity 1.5.4: Product Commercialization Implementation	EE ACC market share by EOP, %	15	30	Application of the new EE ACC designs by the participating local ACC manufacturers.	HS
	Number of EE ACC models provided incentive funding (for incremental cost) by end Year 4	3	4	The local ACC manufacturers commercially produced the new high efficiency models of ACCs.	HS
Activity 1.5.5: Monitoring and Review of the Product Commercialization Program	Number of interested ACC manufacturers that are planning to produce or already producing the new EE ACC models by EOP	3	3	Assessed the effectiveness of the new EE ACC product commercialization activities of the project.	HS
Activity 1.6.1: <u>Air Conditioner Information System Design and Establishment</u>	Air Conditioning Market Information System (AMIS) established by end Year 1	Year 2010	Year 2012	(1) Determined the various information that need to be collected; (2) Identified the reliable sources of such information; (3) Established how such information shall be	S

				obtained, validated, processed, and kept; and, (4) Found out the cost-effective way of making the information available and accessible to the ACC industry.	
Activity 1.6.2: <u>ACC Information Collection and Annual Reporting</u>	Average percentage of ACC manufacturers submitting reports annually to AMIS starting Year 1, %	100	100	Collected and annually reported ACC data.	HS
	Percentage of ACC manufacturers that rated the AMIS as useful by EOP, %	80	100	The final data report included evaluation results for knowledge/skill uptake and application; and trained personnel retention.	HS
Activity 1.7.1: <u>AC Compressor Testing Center Establishment</u>	Appliance testing facility selected and established as ACC Testing Center by end Year 1	Year 2010	Year 2012	The sub-contract was signed in 2012.	HS
Activity 1.7.2: <u>ACC Product Testing</u>	Percentage of ACC manufacturers that participated in product testing by EOP, %	100	100	Testing Report.	HS
Activity 1.7.3: <u>ACC Product Testing Results Reporting</u>	Percentage of manufacturers that rated the ACC Product	80	100	Testing Report.	HS

	Testing as useful & good/excellent by EOP, %				
	Proportion of ACC manufacturers that made use of the product testing results in improving their EE ACC products by EOP, %	80	100	Testing Report.	HS



中国家用电器协会

中电协字〔2014〕16号

关于 2014 年全球环境基金节能房间空调器推进项目 信息系统运行的通知

各有关单位：

2013 年，在各项目企业的积极配合下，中国家用电器协会作为全球环境基金节能房间空调器推进项目信息中心完成了房间空调器和空调压缩机项目企业 2012 年产品能效信息的收集核对、汇总工作，分析了参加项目的企业的产品总体能效水平，更新了信息系统数据库，并完成了年度信息系统运行报告。在此基础上，中国家用电器协会将核心数据整理为 2013 年中国房间空调器能效水平调查报告和空调压缩机能效水平调查报告（见附件 1、附件 2），以协助各企业结合自身特点制定节能产品的研发目标和计划，在顺利完成项目的同时提高产品质量、研发水平和市场竞争力。

2014 年，按照项目的整体要求和计划，信息系统将开展对项目参与企业 2013 年产品能效信息的调查工作。请各企业配合填写项目产品能效信息调查表（见附件 3），及时提供完整、准确的产品能效信息，并将填报好的调查表盖章后邮寄至协会，同时将电子版发送到协会项目联系人邮箱。协会对所收集的数据将只在行业水平进行分析，

附件：全球环境基金节能房间空调器推进项目产品能效信息调查表

1. 房间空调器压缩机产品能效调查表

填报单位（盖章）：

填表人：

所属部门：

职务：

固定电话：

电子邮箱：

手机：

2015 年 1~6 月生产量（万台）：

2015 年 1~6 月出口量（万台）：

2015 年 1~6 月空调器压缩机产品类型（☐定频 ☐变频）

型号	输入功率 (W)	制冷量 (W)	COP (国标工况)	COP (测试工况)	测试工况 详细条件	噪音 dB (A)	适用制冷剂	年产量 (台)	国内销量 (台)

注：

- (1). 需列出企业全年度生产的所有型号的空调压缩机产品，如数量超过表格行数，可自行复印表格填写；
- (2). 性能指标(输入功率、制冷量、COP、噪音、适用工质)完全相同的产品应视为同一型号（系列）；
- (3). 请将定频和变频空调压缩机分不同表格进行填写，填写内容要完整准确。
- (4). COP（国标工况）：指国家标准规定的测试条件下的 COP 值，所有型号产品均须填写国标工况下的 COP；
- (5). COP（测试工况）：指企业实际测试条件下的 COP 值；
- (6). 测试工况的详细条件包括冷凝温度、蒸发温度、过冷度、吸气温度、环境温度。

2. 房间空调器产品能效调查表

填报单位（盖章）：

填表人：

所属部门：

职务：

固定电话：

电子邮箱：

手机：

2015 年 1~6 月生产量（万台）：

2015 年 1~6 月出口量（万台）：

2015 年 1~6 月房间空调器产品类型（☐定频 ☐变频）

型号	额定输入功率 (W)	额定制冷量 (W)	额定制热量 (W)	EER (W/W)	SEER (W/W)	HSPF (W/W)	APF (W/W)	能效 等级	额定噪音 dB (A) 室内/室外	制冷剂	年产量 (台)	国内销量 (台)

注：

- (1). 需列出企业全年度生产的所有型号的房间空调器产品，如数量超过表格行数，可自行复印表格填写；
- (2). 性能指标（额定输入功率、额定制冷量、额定制热量、EER、SEER、HSPF、APF、额定噪音、制冷剂）全部相同的产品应视为同一型号，并严格按照国家标准 GB/T 7725-2004 规定填写产品型号名称；
- (3). 请将定频和变频空调器分不同表格进行填写，填写内容要完整准确；
- (4). 定频房间空调器产品能效信息须填写能效比（EER）；
- (5). 单冷型变频房间空调器产品能效信息须填写制冷季节能源消耗效率（SEER），热泵型变频房间空调器产品请填写制冷季节能源消耗效率（SEER）、制热季节能源消耗效率（HSPF）和全年能源消耗效率（APF）；
- (6). 变频房间空调器产品能效等级参照国家标准 GB 21455-2013 规定进行划分；
- (7). 热泵型房间空调器产品须填写额定制热量。

Enterprise Name	Model Number of Constant Speed Air Conditioners	Model Number of Inverter Air Conditioners	Total
Galanz (Zhongshan) Household Electric Appliances Co., Ltd	2	2	4
Shanghai Mitsubishi Electric & Shangling Air Conditioner Electric Appliance Co., Ltd	—	3	3
Sichuan Changhong Air Conditioner Co., Ltd	2	2	4
China Yangzi Group Chuzhou Yangzi Air Conditioner Co., Ltd	3	—	3
Ningbo Aux Air Conditioner Co., Ltd	3	2	5
Hisensekelon Electrical Holdings Co., Ltd	2	7	9
Guangdong Chigo Air Conditioner Co., Ltd	4	3	7
Qingdao Haier Air Conditioner Co., Ltd	7	5	12
Guangdong Midea Refrigeration Equipment Co., Ltd	6	8	14
Zhuhai Gree Electric Appliance Co., Ltd	10	10	20
Shanghai Hitachi Electric Appliance Co., Ltd	—	3	3
Daikin Air Conditioner (Shanghai) Co., Ltd	—	2	2
Total	39	47	86

ANNEX 13

SUMMARY OF ACCOMPLISHMENTS FOR COMPONENT 2 ALONG WITH THE EVALUATION RATING

Main Activity	Indicators	Target	Accomplishment	Results Achieved	Evaluation Rating
Activity 2.1.1 International RAC Technology Training Design and Implementation	Number of international training courses designed, organized and conducted by end Year 2	1	4	• Implementation International RAC Technology Preliminary Training • 4 times International training courses • Summary Report of International RAC Technology Training	HS
Activity 2.1.2: Evaluation of International Room Air Conditioner Technical Training	Number of individuals trained by end Year 2	12	25	Percentage of trainees that rated the training workshop training as good/excellent by EOP is 100 %.	HS
Activity 2.2.1: Capacity Needs Assessment of Local RAC Manufacturers	Number of completed Assessment Reports by mid-Year 1	1	1	Demand Report of RAC Technical Training had been achieved in Feb, 2013	HS
Activity 2.2.2: RAC Technology Training Workshop Design and Implementation	Number of training workshops designed, organized and conducted by end Year 1	2	2	Summary Report of In-Country RAC Technical Training	HS
	Number of individuals trained by end Year 2	48	48	2 workshops, respectively 23 people and 25 people	HS

Activity 2.2.3: Evaluation of In-Country RAC Technical Training	Percentage of trainees that rated the training workshop training as good/excellent by EOP, %	75	100	100% for both workshops	HS
	Proportion of trainees still involved in RAC design/production at company and/or sector at EOP, %	75	100	Finally report	HS
Activity 2.3.1: Development of Intensive RAC Design Training Course	A comprehensive intensive RAC design and manufacturing training course by end Year 2	1	2	2 times In-Country RAC Technical Training	HS
Activity 2.3.2: Preparation of Initial RAC Prototypes/Models	Number of EE RAC prototypes or models prepared by selected RAC manufacturers by Year 3	6	3	Since the intensive training was combined in international training, the number of prototypes or models to be passed the customs was limited to 3.	HS
Activity 2.3.3: Conduct and Evaluation of the Intensive RAC Design Training Course	Number of intensive training courses conducted by end Year 4	4	4	2 in-country trainings, 1 pre-international training, 1 international training	HS
	Number of manufacturers trained by end Year 4	6	13	13 manufactures participated.	HS
	Total number of individuals trained under this Output by end year 4	24	97	The trainees of the four trainings were relatively : 23, 25, 24, and 25	HS

Activity 2.4.1: Selection of Local RAC Manufacturers for TA Provision	Number of RAC manufacturers selected for on-site TA activities by end year 1	12	12	Summary Report of RAC Manufacturing TA, which was completed in 2014	HS
Activity 2.4.2: RAC Manufacturing TA Program	Number of design, manufacturing and technical services provided under the TA program by Year 4	60	72	Each company had 6 times services	HS
Activity 2.4.3: Evaluation of RAC Manufacturing TA Program	Percentage of manufacturers that rated the TA service they received as good/excellent by EOP, %	75	96	Finally report	HS
Activity 2.5.1: Product Commercialization Contracting and Mobilization	Sales-weighted percentage of RAC manufacturers signing participation contracts by end Year 1, %	75	95	2015 Annually Report	
Activity 2.5.2: Product Design Implementation	Average RAC (EER) by EOP	2.94	3.84	2015 Annually Report	HS
Activity 2.5.3: Selection of Product Commercialization Models	Number of bids received for incentives on new EE RACs developed (EER = 2.94 @ 10% EE gain)/ by end Year 4	12	90	Finally report	HS
Activity 2.5.4: Product	EE RAC market share by EOP, %	15	49.9	2015 Annually Report	HS

Commercialization Implementation	Number of EE RAC models provided incentive funding (for incremental cost) by end Year 4	12	85	2012-2015Annually Report	HS
Activity 2.5.5: Monitoring and Review of the Product Commercialization Program	Number of interested RAC manufacturers that are planning to produce or already producing the new EE RAC models by EOP	12	13	13 manufactures participated.	HS
Activity 2.6.1: Development of RAC Energy Performance Standards	Proposed standards for new minimum EER for RACs by mid-Year 4	Year 2013	Year 2013	Summary Report of RAC energy efficiency standards revision and improvement	HS
Activity 2.6.2: Revision of Current RAC Energy Performance Standards	Number of comments and recommendations considered for the revision of EER Standards by end Year 4	At least 2	20	Finally report	HS
Activity 2.6.3: Formal & Informal Discussions on Revised Standards	Number of provisions in EER standards for recommendation for approval by GOC policymakers by end Year 4	At least 2	20		HS

Activity 2.6.4: Publication and Capacity Building on the Revised Standards Compliance	Published new standards on minimum EER of RACs	Year 2014	Year 2013	GB21455-2013	HS
Activity 2.6.5: Evaluation of the Impacts of the Revised Standards Enforcement	Market share of EE RACs by EOP	15	25		HS
Activity 2.7.1: Definition of RAC Information for Inclusion in AMIS	Information System (AMIS) established by end Year 1	Year 2010	Year 2012	Summary Report of RAC Information System Establishment and Operation	HS
Activity 2.7.2: RAC Information Collection and Annual Reporting	Percentage of RAC manufacturers submitting reports each year to AMIS starting Year 1, %	100	100		HS
Activity 2.8.1: RAC Conditioner Testing Center Establishment	Appliance testing facility selected and established as RAC Testing Center by end Year 1	Year 2010	Year 2012	The sub-contract was signed in 2012	HS
Activity 2.8.2: RAC Product Testing	Number of RAC manufacturers that participated in product testing by EOP	100	100		HS
Activity 2.8.3: RAC Product Testing Results Reporting	Percentage of manufacturers rating	80	100	No complains.	HS

	the RAC Product Testing as useful and good/excellent by EOP, %				
Activity 2.9.1: Formulation of Policy Recommendations on Proper ODS Refrigerant Management and Disposal	Completed satisfactory acceptable policy study on the most cost-effective approach for managing the old refrigerants from old RACs	Year 2011	Year 2011	Finally report	HS
	Proposed national policy and set of guidelines for the management and disposal/destruction of the ODS refrigerants	Year 2012	Year 2010	Finally report	HS
Activity 2.9.2: Development of Information, Education and Communication Materials on ODS Refrigerant Management and Disposal	Completed and published guidebook on managing and disposal of ODS containing old RACs and other refrigeration appliances/equipment	Year 2012	Year 2010	Finally report	S
	Number of ACC/RAC manufacturers, refrigerant traders and suppliers that committed to use the guidebook in their action plans to address the ODS	At least 50	90		S

	refrigerant issues by EOP				
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IN-COUNTRY WORKSHOP 1

- i. The latest energy-efficient technologies and effects at home and abroad;
- ii. Design optimization and simulation of air conditioning system;
- iii. Air conditioner inverter technology;
- iv. Driving algorithms of controller hardware circuit and DC inverter compressors;
- v. Matching and design optimization principle of key components of the household air-conditioning system;
- vi. Heating capacity of heat pumps under low temperature and ultralow temperature;
- vii. Energy saving technology of heat pump water heaters;
- viii. New refrigerants, energy-saving technology and their applications at home and abroad, and so on.

IN-COUNTRY WORKSHOP 2

- i. Develop air conditioners with high heating capacity under low ambient temperatures;
- ii. Solve the defrosting problem of outdoor machine of air conditioner under low ambient temperatures;
- iii. Application of middle and small diameter heat exchangers and new technology of copper tube and aluminum foil;
- iv. Latest research and application of new refrigerants, and problems that enterprises shall notice when using the new refrigerants

ANNEX 15

LIST OF RAC MANUFACTURERS PARTICIPATING IN THE TRAINING AND RAC COMPANIES PARTICIPATING IN THE INTERNATIONAL TRAINING

Training Topic	Organization Delivering Training	Dates of Training	Names of Companies	No. of Individuals Attending
The First EE ACC Technical Training	China Household Electrical Appliances Association	2012.5.27-5.31	All the ten ACC manufactures	29
The Second EE ACC Technical Training	China Household Electrical Appliances Association	2014.3.3-3.7	All the ten ACC manufactures	37
The First EE RAC Technical Training	China Household Electrical Appliances Research Institute	2013.3.28-4.3	Gree, Midea, Haier, Chigo, Hisense, Aux, TCL, Yangtze, Chunlan, Changhong, Mitsubishi, Shinco, Galanz	21
The Second EE RAC Technical Training	China Household Electrical Appliances Research Institute	2014.8.12-8.16	Gree, Midea, Haier, Chigo, Hisense, Aux, TCL, Yangtze, Chunlan, Changhong, Mitsubishi, Shinco, Galanz	25
EE RAC domestic training course prepared for the international intensive training	China Household Electrical Appliances Research Institute	2014.12.3-12.5	Gree, Midea, Haier, Chigo, Hisense, Aux, TCL, Yangtze, Chunlan, Changhong, Mitsubishi, Shinco, Galanz	22
The first batch of the RAC international intensive training	China Household Electrical Appliances Research Institute	2014.3.1-4.30	Midea, Hisense, Galanz	5
The second batch of the RAC international intensive training	China Household Electrical Appliances Research Institute	2014.5.1-6.30	Gree, Haier	5
The third batch of the RAC international intensive training	China Household Electrical Appliances Research Institute	2014.7.1-8.31	TCL, Aux, Mitsubishi, Chunlan	6
The fourth batch of the RAC international intensive training	China Household Electrical Appliances Research Institute	2014.9.1-10.31	Hisense, Changhong, Yangtze, Chigo	5

ANNEX 16

LIST OF MAIN TOPICS COVERED IN THE INTERNATIONAL TRAINING

- i. Previous and ongoing energy-saving air conditioner-related scientific research projects launched by CEEE;
- ii. Main technical routes of energy-saving air conditioner designing;
- iii. Design energy-efficient air conditioners by using CEEE software tools;
- iv. Analyze deviations between test results and results predicted by software model;
- v. Improve the technology of pre-selected sample air conditioners and test the improved samples based on software simulation results;
- vi. Identify reasons for deviation between simulation results and experimental results and determine the direction of further improvement;
- vii. Comprehensively assess cost performance of various programs by studying cost accounting methods of technical improvement.

ANNEX 17

SUMMARY OF ACCOMPLISHMENTS FOR COMPONENT 3 ALONG WITH THE EVALUATION RATING

Main Activity	Indicators	Target	Accomplishment	Results Achieved	Evaluation Rating
Activity 3.1.1: Review of Typical Corporate RAC Procurement Procedures	Completed survey/review report on typical corporate RAC procurement procedures/practices	Year 2013	2015	The-subcontract was signed in the end of 2014	S
Activity 3.1.2: Formulation PEERAC of RAC Procurement Guidelines	A procurement guide for RACs with standardized information for group procurement of EE RACs	Year 2014	2015	The-subcontract was signed in the end of 2014	S
	Number of organizations receiving procurement guides by EOP	100	100	Finally report	S
Activity 3.1.3: Promotion of the Application of the RAC Procurement Guidelines	Number of organizations that either have committed or have carried out actions, to procure EE RACs by EOP	At Least 5	5	Finally report	S
Activity 3.1.4: EE RAC Procurement Guidelines Effectiveness Evaluation	Number of organizations finding the RAC procurement guides useful by EOP	75	80	Finally report	S
Activity 3.2.1: Capacity Needs Assessment of Local RAC Retailers	Number of completed Assessment Reports by mid-Year 4	1	1	Retailer Program Final Report	HS
Activity 3.2.2: RAC Retailer Training Workshop Design and Implementation	Number of retailers that received training and informational materials by end Year 4	50	90	Retailer Program Final Report	HS
Activity 3.2.3: Conduct of In-Store Marketing of EERAC	Number of retailers that implemented in-store marketing using received promotional materials by EOP	1,000	1,500	Retailer Program Final Report	HS

Activity 3.2.4: Retail Incentive Program Design and Implementation	Number of EE RACs that were sold under the Retail Incentive Program by EOP	100,000	535,371	Retailer Program Final Report	HS
Activity 3.2.5: Evaluation of the RAC Retailer Program	Number of RAC manufacturers by EOP that find the RAC Retailer Program useful for promoting EE RACs, and committed to strategically employ it after PEERAC	8	9	Retailer Program Final Report	HS
	Percentage of RAC retailers by EOP that find the RAC Retailer Program useful for promoting EE RACs	70	80		HS
	Percentage of consumers that find the RAC Retailer Program useful for promoting EE RACs by EOP	70	80		HS
Activity 3.3.1: Conduct of RAC Rebate Program Workshop	Number of RAC manufacturers that committed to develop and implement a rebate/recycling program by end Year3	12	-	The rebated program was replaced by manufacture incentive program.	-
Activity 3.3.2: RAC Rebate Program Design	Number of rebate/recycling program plans submitted to PEERAC by end Year 4	12	-	The rebated program was replaced by manufacture incentive program.	-
	Number of rebate/recycling program plans approved by the PEERAC PAC by end Year 4	12	-	The rebated program was replaced by manufacture incentive program.	-

Activity 3.3.3: RAC Rebate Program Implementation	Total number of inefficient RACs retired, recycled, and replaced with new efficient ones through the approved rebate/recycling programs by end Year 5	16,000	-	The rebated program was replaced by manufacture incentive program.	-
Activity 3.3.4: RAC Rebate Program Evaluation and Incentive Award Issuance	Percentage of total number of EE RACs sold under the program accounted for by the top 3 RAC manufacturers by end Year 5	At Least 50	-	The rebated program was replaced by manufacture incentive program.	-
	Number of RAC manufacturers by EOP that find the RAC Rebate/Recycling Program useful for promoting EE RACs, and committed to strategically employ it after PEERAC	8	-	The rebated program was replaced by manufacture incentive program.	-
	Percentage of RAC retailers by EOP that find the RAC Rebate/Recycling Program useful for promoting EERACs by EOP, %	70	-	The rebated program was replaced by manufacture incentive program.	-
	Percentage of consumers that find the RAC Rebate/Recycling Program useful for promoting EE RACs by EOP, %	70	-	The rebated program was replaced by manufacture incentive program.	-
Activity 3.4.1: Review of RAC Labeling System	Completed review of existing RAC energy labeling system by end Year 4	Year 2013	2013	Final Report	S
Activity 3.4.2: Modification	Percentage of provisions in the	25	100	Final Report	S

of the RAC Energy Labeling Program	existing RAC labeling program that were modified in the new approved program by end Year 4, %				
Activity 3.4.3: Planning and Promotion of the RAC Energy Labeling Program	Number of promotional workshops conducted by Year 4	2	4	Final Report	S
Activity 3.4.4: Implementation of the RAC Energy Labeling Program	Percentage of RAC brands that qualify for the new EE RAC energy label by EOP, %	10	100	Final Report	S
Activity 3.4.5: Evaluation of the Modified RAC Energy Labeling Program	EE RAC market share by EOP, %	15	25	Final Report	S
Activity 3.5.1: Survey on Level of Consumer Awareness about EE RACs	Completed consumer awareness survey by mid-Year 3	Year 2012	Year 2015	Final Report	S
Activity 3.5.2: Development of a Consumer Education Program	Number of consumer education programs developed by end Year 3	1+	1	Final Report	S
Activity 3.5.3: Implementation of the Consumer Education Program	Number of completed consumer education events	5	5	Final Report	S
Activity 3.5.4: Implementation of Cooperative Advertising Campaign with Manufacturers	Number of advertisement templates and materials developed by end Year 3	At Least 2	4	Final Report	S
	US\$ value of EE RAC project related advertising placed by manufacturers by end Year 5	7.5 million	18.70	Final Report	S
Activity 3.5.5: Evaluation of the Consumer Education Program	Share of RAC advertising by manufacturers for high efficiency products by EOP, %	10	10		
	EE RAC market share by EOP, %	15	25	Final Report	

Activity 3.5.6: Development of a Sustainable Continuing Education Program	% Increase in number of consumers that are either planning or are ready to purchase EE RAC by EOP	10	14.6	Final Report	
Activity 3.6.1: Website Design, Implementation and Maintenance	Designed website including, website materials and operational plan by Year1	Year 2010	2013		
	No. of officially established access to other related domestic and foreign based websites/databases by EOP	At Least 5	-		
Activity 3.6.2: Development of Web based Tools	Cumulative number of users of web based tools by EOP	100,000	-		MS
Activity 3.6.3: Promotion and Launching of the Website	Officially launched and operational website by end Year 1	Year 2010	2013		MS
Activity 3.6.4: Evaluation of the Website Performance	Total number of page views and/or downloads by EOP	350,000	1000000		MS
	Total number of RAC purchase decisions affected by EOP	10,000	-		
	% of website users each year that are satisfied with information downloaded starting Year 2	50	-		
	% share of participating RAC manufacturers that link to website for cross-promotion by EOP	50	-		
	Number of new informational and promotional products available each year in website starting Year 2	12	-		
Activity 3.7.1: Preparation and Publication of Articles on EE RAC	Number of articles on EE RACs published throughout the project duration by EOP	60	60	There're 60 articles published by the end of April this year, since it should contain all the outcomes of the	S

				previous years.	
Activity 3.7.2: Presentation of PR Campaign Achievements	% of cumulative EE RAC sales that were directly influenced by the PR campaigns by EOP	25	25		
Activity 3.8.1: Conduct of EE Air Conditioning Policy Studies	Number of completed satisfactorily acceptable policy studies by EOP	At Least 2	2	Procurement guide and ODS refrigerant management related policy study document	S
Activity 3.8.2: Organization and Conduct of EE Air Conditioning Policy Workshop	Number of EE air conditioning policy materials prepared, presented and disseminated to GOC policy makers by Year 2	At Least 2	2		S
Activity 3.8.3: Conduct of International Policy Exchange	Number of policies from other countries that were considered for the improvement of existing EE policies by end Year 3	At Least 2	2		S
Activity 3.8.4: Conduct of an International ODS Workshop	Number of policies on ODS refrigerant management (including implementing rules & guidelines) from other countries considered in the formulation of ODS management policy recommendations in China by Year 3	3	3		S
Activity 3.8.5: Conduct of Targeted Policy Coordination Meetings	Cumulative number of targeted policy coordination meetings conducted by EOP	10	10		S
	Number of EE air conditioning & ODS refrigerant management policy recommendations accepted for consideration of approval by the relevant GOC authorities by EOP	At Least 2			