GLOBAL ENVIRONMENT FACILITY
INVESTING IN OUR PLANET

Naoko Ishii
CEO and Chairperson

March 18, 2015

Dear Council Member:

The UNDP as the Implementing Agency for the project entitled*: **Indonesia: Promoting Energy Efficiency for Non-HCFC Refrigeration and Air Conditioning (PENHRA) (RESUBMISSION)***, has submitted the attached proposed project document for CEO endorsement prior to final Agency approval of the project document in accordance with the UNDP procedures.

The Secretariat has reviewed the project document. It is consistent with the project concept approved by the Council in June 2013 and the proposed project remains consistent with the Instrument and GEF policies and procedures. The attached explanation prepared by the UNDP satisfactorily details how Council's comments and those of the STAP have been addressed.

We have today posted the proposed project document on the GEF website at www.TheGEF.org for your information. We would welcome any comments you may wish to provide by April 14, 2015 before I endorse the project. You may send your comments to gcoordination@TheGEF.org .

If you do not have access to the Web, you may request the local field office of UNDP or the World Bank to download the document for you. Alternatively, you may request a copy of the document from the Secretariat. If you make such a request, please confirm for us your current mailing address.

Sincerely,

Naoko Ishii

Attachment: GEFSEC Project Review Document
Copy to: Country Operational Focal Point, GEF Agencies, STAP, Trustee

1818 H Street, NW • Washington, DC 20433 • USA
Tel: +1 (202) 473 3202 - Fax: +1 (202) 522 3240
E-mail: gefceo@thegef.org
www.thegef.org

REQUEST FOR CEO ENDORSEMENT

PROJECT TYPE: Full-sized Project
TYPE OF TRUST FUND:GEF Trust Fund

For more information about GEF, visit TheGEF.org

PART I: PROJECT INFORMATION

Project Title: Promoting Energy Efficiency for Non-HCFC Refrigeration and Air Conditioning (PENHRA)			
Country(ies):	Indonesia	GEF Project ID:[1]	4899
GEF Agency(ies):	UNDP	GEF Agency Project ID:	4945
Other Executing Partner(s):	Ministry of Energy and Mineral Resources (MEMR)	Submission Date:	20 February 2015
GEF Focal Area (s):	Climate Change	Project Duration(Months)	36
Name of Parent Program (if applicable): ➢ For SFM/REDD+ ☐ ➢ For SGP ☐ ➢ For PPP ☐		Project Agency Fee ($):	476,978

A. FOCAL AREA STRATEGY FRAMEWORK[2]

Focal Area Objectives	Expected FA Outcomes	Expected FA Outputs	Trust Fund	Grant Amount ($)	Co-financing ($)
CCM-2	Outcome 2.1: Appropriate policy, legal and regulatory frameworks adopted and enforced	Output 2.1: Energy efficiency policy and regulation in place	GEF TF	2,375,800	4,012,466
CCM-2	Outcome 2.2: Sustainable financing and delivery mechanisms established and operational	Output 2.2: Investment mobilized Output 2.3: Energy savings achieved	GEF TF	2,645,022	15,102,583
		Total project costs		5,020,822	19,115,049

B. PROJECT FRAMEWORK

Project Objective: Significantly improved energy efficiency of refrigeration and air conditioning (RAC) equipment and appliances manufactured and used in Indonesia						
Project Component	**Grant Type**	**Expected Outcomes**	**Expected Outputs**	**Trust Fund**	**Grant Amount ($)**	**Confirmed Co-financing ($)**
1: Policy, Regulation and Standards Developmen	TA	1: Appropriate enforcement of policies, laws, and regulatory support	1.1: Established and effectively enforced mandatory national minimum energy performance standards (MEPS) for RACs 1.2: Adopted policy and regulations	GEF TF	503,500	842,040

[1]Project ID number will be assigned by GEFSEC.
[2] Refer to the Focal Area Results Framework and LDCF/SCCF Framework when completing Table A.

t for the RAC Industry		mechanism that ensure manufacturing and sale of certified quality energy efficient (EE) RACs increased in Indonesia	on the local manufacturing and import of EE RACs 1.3: Established and operational accreditation, inspection and certification system for all locally manufactured and imported RACs sold in Indonesia 1.4: Established and operational consumer assistance and information dissemination service center on EE RACs 1.5: Established RAC industry-wide coordination and cooperation system and implemented EE RAC technology development and application program 1.6: Completed performance evaluation of the EER/COP enhancement program in the RAC industry[3]			
2. Capacity Building and Awareness Enhancement on the Production and Utilization of EE RACs	TA	2.1: Increased awareness of the retailers and consumers on the benefits of energy efficient RACs in Indonesia 2.2: Enhanced technical capacities of appliance testing institutions to test the energy efficiency performance of RACs	2.1.1: Completed EE RAC retailer training and awareness program 2.1.2: Completed consumer education campaign on the use and benefits of EE RACs 2.1.3: Completed public relation campaigns for EE RAC industry players 2.1.4: Completed awareness and capacity building on the use of non-HCFC RACs 2.2.1: Formulated and applied testing procedure for RACs EE prototypes and commercial availability. 2.2.2: Completed training and accreditation of testing institutions in implementing the adopted procedures and regulations for EE performance testing, verification and certification of RACs. 2.2.3: Completed monitoring and evaluation for improvement of testing and certification institutions and validated recommendations for continuing EE enhancements.	GEF TI	1,753,300	2,786,421
3: Promoting Investments for EE Enhancemen	Inv.	3.1: Enhanced capacities of RAC manufacturers to	3.1.1: Designed and implemented financial assistance program 3.1.2: Modified and optimized production lines for EE RAC	GEF TI	2,077,000	13,895,938

[3] The difference between the constant frequency (CF) and variable frequency (VF or inverter type) RACs was not yet considered as there is no data available. But the increasing trend of VF RACs will be considered during project implementation.

ts in the RAC Industry		produce EE RACs 3.2: Increased production and sale of EE RACs in Indonesia	manufacturing installed and operational 3.2.1: Manufacturing companies implementing technology modifications for the production of EE RACs			
4: Technical Assistance for RAC Industry in EE Enhancements	TA	4: Enhanced knowledge and capacity on EE RAC technologies in the RAC industry	4.1: Documented and publicly available information on technically and economically feasible EE technologies with low GWP that can be applied by local RAC manufacturers 4.2: Completed capacity development programs for local RAC manufacturers 4.3: Regularly updated information on EE RAC market	GEF TF	449,022	822,640
			Subtotal		**4,782,822**	**18,347,039**
			Project management Cost (PMC)[4]	GEF TF	238,000	768,010
			Total project costs		5,020,822	19,115,049

C. SOURCES OF CONFIRMED CO-FINANCING FOR THE PROJECT BY SOURCE AND BY NAME ($)

Sources of Co-financing	Name of Co-financier (source)	Type of Co-financing	Co-financing Amount ($)
National Government	Ministry of Energy and Mineral Resources	In-kind	2,777,450
National Government	Ministry of Energy and Mineral Resources	Cash	335,355
National Government	Ministry of Environment	Cash	7,236,307
Private Sector	Panasonic	Cash	3,172,709
Private Sector	Fata Sarana	In-kind	62,594
Private Sector	Fata Sarana	Cash	436,267
Private Sector	Alpine Cool	In-kind	158,094
Private Sector	Alpine Cool	Cash	1,263,224
Private Sector	Tata Udara	In-kind	62,594
Private Sector	Tata Udara	Cash	577,940
Private Sector	Mandiri Teknik	In-kind	62,594
Private Sector	Mandiri Teknik	Cash	405,978
Private Sector	Sumo Elco Mandiri	In-kind	167,594
Private Sector	Sumo Elco Mandiri	Cash	1,558,932
Private Sector	Rotaryana Prima	In-kind	53,094
Private Sector	Rotaryana Prima	Cash	709,323
GEF Agency	UNDP	Cash	75,000
Total Co-financing			19,115,049

D. TRUST FUND RESOURCES REQUESTED BY AGENCY, FOCAL AREA AND COUNTRY[1]: N.A.

[1] In case of a single focal area, single country, single GEF Agency project, and single trust fund project, no need to provide information for this table.

[4]MC should be charged proportionately to focal areas based on focal area project grant amount in Table D below.

E. CONSULTANTS WORKING FOR TECHNICAL ASSISTANCE COMPONENTS:

Component	Grant Amount ($)	Co-financing ($)	Project Total ($)
International Consultants	83,200	0	83,200
National/Local Consultants	300,000	2,290,000	2,590,000

F. DOES THE PROJECT INCLUDE A "NON-GRANT" INSTRUMENT? No

PART II: PROJECT JUSTIFICATION

A. DESCRIBE ANY CHANGES IN ALIGNMENT WITH THE PROJECT DESIGN OF THE ORIGINAL PIF[5]

The project conceptual design remains the same, except some minor modifications and clarifications and the inclusion of a fifth component, i.e. Component 5: Capacity Building of Testing Institutions for EE Enhancements in RACs.

Expected Outputs		Rationale for Changes in PIF Outputs/Activities in the ProDoc
GEF-Approved PIF	**Project Document**	
Component 1. Policy & Institutional Frameworks for the Refrigeration and AC (RAC) Industry	Component 1. Policy, regulation & standards development for the Refrigeration and AC (RAC) Industry	Rephrased to emphasize establishment and enforcement of MEPS
Outcome 1. Enforced policies, laws and regulatory support mechanism to ensure manufacturing and sale of certified quality energy efficient (EE) RACs in Indonesia	Outcome 1: Appropriate enforcement of policies, laws, and regulatory support mechanism that ensure manufacturing and sale of certified quality energy efficient (EE) RACs in Indonesia	Rephrased to emphasize the appropriateness of enforcement measures to ensure availability of EE RACs in the market.
Outputs:	*Outputs:*	
1.1: Developed policies and regulations on the local manufacturing and import of EE RACs	1.1: Established and effectively enforced mandatory national minimum energy performance standards (MEPS) for RACs	Rephrased to define meaning of MEPS.
1.2: Established and effectively enforced mandatory national standards (MEPS) for RACs	1.2: Adopted policy and regulations on the local manufacturing and import of EE RACs	Rephrased to indicate adoption as the result of policy development.
1.3: Inspection and certification system established and operational for all imported and locally manufactured RACs sold in Indonesia	1.3: Established and operational accreditation, inspection and certification system for all locally manufactured and imported RACs sold in Indonesia	Rephrased to include accreditation in policy formulation.
1.4: Established RAC industry-wide coordination and cooperation system for EE RAC technology	1.4 Established and operational Consumer assistance and information dissemination service center on EE RACs	Rephrased to define scope of the EE RAC program
1.5: Consumer assistance and information dissemination service center established and operational	1.5 Established RAC industry-wide coordination and cooperation system and implemented EE RAC technology development and application program	Rephrased to define scope of the EE RAC program
	1.6: Completed performance evaluation of the EER/COP enhancement program in the RAC	Added to keep track of the EE enhancement program

[5] For questions A.1 –A.7 in Part II, if there are no changes since PIF and if not specifically requested in the review sheet at PIF stage, then no need to respond, please enter "NA" after the respective question.

Expected Outputs		Rationale for Changes in PIF Outputs/Activities in the ProDoc
GEF-Approved PIF	Project Document	
	industry[6]	results
Component 2. Public awareness of benefits of energy efficient RACs	Component 2. Capacity building and Awareness Enhancement on the production and utilization of EE RACs	Capacity building and awareness enhancement have been included under Component 2 as an integrated approach to providing information that enhances awareness with the necessary training towards deriving the full benefits of EE RACs
Outcome 2. Increased awareness in users of energy efficiency benefits for RACs in Indonesia *Outputs:* 2.1: Completed EE RACs retailer assistance program 2.2: Completed consumer education campaign on the use and benefits of EE RACs 2.3: Completed public relation campaigns for EE RAC manufacturers, and distributors	Outcome 2.1: Increased awareness of the retailers and consumers on the benefits of energy efficient RACs in Indonesia Outcome 2.2: Enhanced technical capacities of appliance testing institutions to test the EE performance of RACs *Outputs:* 2.1.1: Completed EE RAC retailer training and awareness program 2.2: Completed consumer education campaign on the use and benefits of EE RACs 2.1.3: Completed public relation campaigns for EE RAC industry players 2.1.4: Completed awareness and capacity building on the use of non-HCFC RACs Outputs: 2.2.1: Formulated and applied testing procedure for RACs EE prototypes and commercial availability. 2.2.2: Completed training and accreditation of testing institutions in implementing the adopted procedures and regulations for EE performance testing, verification and certification of RACs. 2.2.3: Completed monitoring and evaluation for improvement of testing and certification institutions and validated recommendations for continuing EE enhancements.	The outcome statement under component 2 is rephrased and added to emphasize the need awareness of the retailers and consumers on the benefit of EE RACs as well as to build capacity of the testing institutions to support implementation of EE RACs regulations. Added to emphasize the combination of EE and shift to low GWP non-HCFC refrigerants Added outputs to include the necessary capacity enhancement and availability of testing institutions to support EE technology development and performance evaluation in RACs to respond to the growing market demand of EE RACs.
Component 3: Promoting investments for EE enhancements in the RAC Industry	Component 3. Promoting investments for EE enhancements in the RAC Industry	No change
Outcome 3a. Enhanced capacities of RAC manufacturers to produce EE	Outcome 3.1: Enhanced capacities of RAC manufacturers to produce EE RACs	Additional output to emphasize demonstration of

[6] The difference between the constant frequency (CF) and variable frequency (VF or inverter type) RACs was not yet considered as there is no data available. But the increasing trend of VF RACs will be considered during project implementation.

Expected Outputs		Rationale for Changes in PIF Outputs/Activities in the ProDoc
GEF-Approved PIF	**Project Document**	
RACs Output3a.1: Designed and implemented financial assistance program Outcome 3b. Increased production and sale of EE RACs in Indonesia Output 3b.1: Modified and optimized production lines for EE RAC manufacturing installed and operational	*Outputs:* 3.1: Designed and implemented financial assistance program 3.1.2: Modified and optimized production lines for EE RAC manufacturing installed and operational. Outcome 3.2: Increased production and sale of EE RACs in Indonesia *Outputs:* 3.2.1: Manufacturing companies implementing technology modifications for the production of EE RACs	the actual operation and evaluation of the EE enhancement technology modifications.
Component 4.Technical assistance and training for RAC industry	Component 4. Technical Assistance for RAC Industry in EE Enhancements	As mentioned above, training was transferred to Component 2 so that Component 4 will focus on technical assistance for RAC industry
Outcome 4. Enhanced knowledge and capacity on EE RAC technologies in the RAC industry *Outputs*: 4.1: Documented and made available information on technically and economically feasible EE technologies that can be applied by local RAC manufacturers 4.2: Completed capacity development programs for local RAC manufacturers. 4.3: Regularly updated information on EE RAC market	Outcome 4: Enhanced knowledge and capacity on EE RAC technologies in the RAC industry *Outputs:* 4.1: Documented and publicly available information on technically and economically feasible EE technologies with low GWP that can be applied by local RAC manufacturers 4.2: Completed capacity development programs for local RAC manufacturers 4.3: Regularly updated information on EE RAC market	Rephrased to clarify introduction of low GWP refrigerants.

A.1 National strategies and plans or reports and assessments under relevant conventions, if applicable, i.e. NAPAS, NAPs, NBSAPs, national communications, TNAs, NCSA, NIPs, PRSPs, NPFE, Biennial Update Reports, etc.

The basic concept and approach of this proposed GEF-supported alternative to the baseline scenario as described above in order to significantly reduce further the GHG emissions is to facilitate the realization of opportunities for improving the energy efficiency performance of locally made RACs while transitioning to the use of non-HCFC refrigerants. This project is a unique demonstration of combining and sequencing different sources of funding that target specific common goals. During the changeover phase, RAC enterprises that will be benefiting from the baseline MLF-funded project will need to make significant additional investments to enhance product design to produce improved energy efficiency equipment. The required additional costs must be borne by the enterprise and may need additional financial assistance from bank or financial institutions, since these additional costs for energy-efficiency enhancements are not eligible for funding through MLF. MLF will cover only incremental costs involved in the technology conversion, change of equipment and appliance production line from HCFC to non-HCFC technology that would be carried out in selected RAC manufacturing enterprises in Indonesia. The additional interventions needed for the production lines to produce energy efficient RAC appliances require additional investments. The HPMP project is considered as a one-time window of opportunity for

local RAC manufacturers to carry out energy efficiency technology conversions in conjunction with the phasing out of HCFCs. MLF will not fund any sort of such energy efficiency interventions and related investments. The opportunity for such energy efficiency interventions will be facilitated through the proposed PENHRA project, which will mainly remove the current barriers to achieving the widespread production and application of energy efficient RAC appliances/equipment in Indonesia. Such barrier removal activities represent the bulk of the incremental activities of the proposed project that are eligible for GEF funding. Thus, the basic requirements to meet the HCFC phase-out are met through the technical and financial assistance from MLF, while, the GEF funding requested will focus on the energy efficiency improvements in the production, sale and use of EE RACs after transitioning to non-HCFC technologies. RAC equipment manufacturers will be selected to lead the transition. The selection of RAC manufacturers will be based on the following criteria: (a) commitment of RAC manufacturers to participate in HPMP program, (b) RAC manufacturers that has a larger market share in Indonesia, and (c) the RAC manufacturers expressed interest to participate as beneficiaries of PENHRA project.

Under the HPMP, by 2015, RAC industry segments in Indonesia will phase-out HCFCs, and convert to non-HCFC technologies. During this changeover process, as mentioned earlier, the base cost required to meet mandatory production line changes will have to be borne by the enterprises. In some circumstances, during this changeover phase, enterprises may invest additional investments to expand the production capacity or enhance product design to produce improved energy efficiency equipment or may need to relocate to a different location considering safety aspects etc. Under all these circumstances, the required cost must be borne by the enterprise and may need additional financial assistance from bank or financial institutions. One proven way of encouraging the banks/financial institutions to become interested in supporting such projects is to introduce to them the financial benefits that the customer and the bank/FIs can realize from such projects. Also, by providing training to their personnel on how to evaluate the viability of such initiatives, they become more confident in venturing into the provision of financing. For that, the proposed project includes activities that will involve participation in training/workshops of selected staffs of banks and financial institutions for the financial evaluation of EE RAC business proposals. Further modifications in the existing production lines, therefore, will be done to accommodate the enhanced energy efficiency features of specific RAC components that will make use of the new non-HCFC refrigerants. Collectively, this combination and sequencing of funding sources will enable the RAC industry in Indonesia to simultaneously adapt low carbon technologies that enhance system energy efficiency performance and lead to maximize environmental benefits of the changeover. While transitioning from HCFCs to non-ozone depleting substances (ODS) alternatives under the HPMP, technical interventions to introduce safe low-GWP alternatives (reduced impact of refrigerants to climate change) and to improve energy efficiency (reduced GHG emissions through reduced energy consumption) can be most suitably and cost-effectively accomplished if implemented simultaneously with HPMP implementation timeframe.

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

The overall goal of PENHRA is reduction of greenhouse gas (GHG) emissions during the use phase of refrigeration and air conditioning (RAC) equipment in Indonesia. This PENHRA goal is aligned with GEF-5 Climate Change Mitigation Focal Area Objective 2 (CCM-2) which is to: Promote Market Transformation for Energy Efficiency in Industry and the Building Sector. The project objective of improved energy efficiency of Refrigeration and Air conditioning (RAC) equipment and appliances manufactured and used in Indonesia will be achieved with the fulfillment of the following focal area outcomes: Outcome 2.1- Appropriate policy, legal and regulatory frameworks adopted and enforced for both manufacturing of Refrigeration and Air Conditioning (RAC) equipment and appliances (Output 2.1: Energy efficiency policy and regulation in place); Outcome 2.2 - Sustainable financing and delivery mechanisms established and operational for OEM (manufacturers) to adapt to the change in policy and regulatory frameworks (Output 2.2: Investment mobilized; Output 2.3: Energy savings achieved). The

goal of the project is reduction of greenhouse gas (GHG) emissions during the use phase of air conditioners (ACs) and refrigeration equipment in Indonesia.

A.3 The GEF Agency's comparative advantage:

According to the Comparative Advantages of GEF Agencies (GEF Council Paper C.31.5.rev.1), it is acknowledged that UNDP has a comparative advantage in implementing energy projects, particularly in providing integrated policy development, human resources development, institutional strengthening and non-governmental and community participation, which are key features of the barrier removal activities of this proposed project. The Government of Indonesia has designated UNDP as the lead implementing agency for overall HPMP in Indonesia and also as the implementing agency for the Refrigeration, Air Conditioning and Firefighting sectors.

This project is supported by UNDP because it contributes to the achievement of Outcome: Enhanced capacity of Government of Indonesia (GoI) to manage natural resources and energy as stated in the UNDP-Indonesia Country Program Document 2011 – 2015. It also contributes to the achievement of the Country Programme Output: Developed policy framework to promote energy efficiency and renewable energy strengthened and renewable energy and energy efficiency roadmap. It also contributes to the achievement of the Primary Outcome 5: Strengthened climate change mitigation and adaptation and environmental sustainability measures in targeted vulnerable provinces, sectors and communities on Climate Change and Environment, as mentioned in the UNPDF 2011-2015.

UNDP-Indonesia, with its presence in the country is well-positioned to implement this proposed project. It has a proven track record of successful implementation of energy efficiency and renewable energy projects in the country. It has sufficient staff to supervise the implementation of this project. It is the leading UN-agency in Indonesia supporting the GoI in addressing climate change issues in the country with a staff complement possessing substantial experience in the successful implementation of GEF-funded projects in the country. The current staffing of the Energy and Environment Unit of the UNDP Indonesia Country Office (CO) can adequately support the implementation of projects related to the different GEF focal areas, including biodiversity, climate change, land degradation and chemical management. A dedicated program officer of the unit will solely be responsible for project implementation oversight, quality assurance and reporting requirements. Apart from this, the implementation of the HPMP is specifically being supervised also by another program officer of the unit. Its overall substantial experience and expertise, working in partnership at the decentralized level with local communities, private sector, policy makers and civil society, justify its capacity and qualification to implement this proposed project. Furthermore, UNDP-Indonesia CO will be backstopped by technical expertise available in the UNDP Bangkok Regional Hub (BRH) based in Bangkok, Thailand.

A.4. The baseline project and the problem that it seeks to address:

The proposed project baseline consists of the activities, projects and programs on energy efficiency improvements and changeover to non-HCFC refrigerants in the RAC industry that are ongoing and planned in Indonesia. In order to provide incentive for RAC industries in the country to manufacture or to assemble energy-efficient products, the MEMR with Ministry of Finance has implemented import tax reduction for companies that import high-efficiency equipment to the country.

The DG-NREEC has been developing ministerial regulations on national energy standard and labeling for six home appliances, including ACs which is currently, this is being done through an ongoing UNDP-GEF regional project, the BRESL Project. Indonesia is one of the 6 participating countries. Although it cannot be considered as a baseline activity for the proposed project as far as co-financing is considered, the results, experiences and lessons learnt from BRESL can certainly be used as basis for potential

incremental activities that may be necessary in PENHRA such as issuance of ES&L regulation for AC, capacity building for ES&L stakeholders in coordination and development of energy standard, technical assistance provided to support AC manufacturers to meet the requirements under ES&L, financing facility to support the manufacturers to implement the ES&L activities and awareness program that will be implemented for consumers, retailers and manufacturers. With regards to RACs, the types of appliance/equipment covered under the BRESL project in Indonesia are refrigerators (around 187 liters) and room air conditioners (12,000 BTU/h capacity; about 1.8 to 3.5 kW power capacity). The government has already established a database of energy efficient products and has implemented a consumer education scheme. The MEMR has also allocated budget for a program that involves the implementation of energy efficiency activities such as energy audits, fiscal policies, and regulations focusing ES&L. Specific activities of this program will be subsumed into PENHRA as baseline activities. Such baseline activities will support the achievement of the expected outputs under Component 1, 2 and 4 of PENHRA.

Moreover, to support the implementation of ES&L for ACs, the Japan Government/Japan Partnership Fund has allocated budget to conduct demand-side management study on RACs and to support improvement of a RAC testing facility in Indonesia. Also, the Australian government/AUSAID has been facilitating MEMR to participate in various international knowledge exchange events that aim to strengthen understanding in ES&L policy & institutional development as well as to provide further needed support in the implementation of an ES&L program in Indonesia. The activities from the programs of the Australian and Japanese governments will be considered as baseline activities under PENHRA to support the delivery of expected outputs in Components 1 and 4, respectively. Furthermore, the private sector comprising of beneficiary enterprises of the HPMP and this proposed project will co-finance specific activities of PENHRA to support the achievement of outputs under Components 1, 2 and 4. Among these are the multi-stakeholder discussions on policy and institutional framework, investment needs in companies to improve energy efficiency in RAC system and contribute to market development activities, such as consumer awareness campaign.

Through the coordination work of the MoE and in close collaboration with the MoI, Indonesia is currently implementing its HCFC Phase-out Management Program (HPMP). The HPMP focuses on extraordinary efforts to curb the momentum of inevitable growth in HCFC consumption in the RAC sector. HPMP activities aim to phase out HCFC use in the manufacturing of refrigeration and air conditioning products and equipment by 2015. Such activities include investment/financial assistance in RAC sectors, policy and regulation, supervision, coordination & monitoring and awareness and capacity building for targeted sectors. About 90% of the HCFC used in Indonesia is in air conditioning and the rest in refrigeration. The use of HCFC for refrigeration is quite low. The manufacturing activities in Indonesia's RAC industry are concentrated in a relatively small number of well-organized enterprises (less than 50). The use of HCFC is 85% of the total refrigerant consumption, while 15% is HFC such R-410A, R-507, R-134a, R-404A. HCFC phase-out will be addressed in the HPMP through technology conversions in about 48 enterprises that belong to various RAC sub-sectors in Indonesia, and this will include technology conversion, modification of production lines from HCFC to non-HCFC technology that would be carried out at these enterprises. A total funding of US$ 8,953,902 has been approved by Multilateral Fund for covering eligible incremental capital and operating costs for phase-out of HCFCs. This is expected to directly support the Component 3 of PENHRA, particularly the Output 3.1.2, i.e., Modified and optimized production lines for EE RAC manufacturing installed and operational. In line with this, financing institutions have also allocated loan programs for clean energy projects in Indonesia, which can support achievement of Component 3 of PENHRA.

A. 5. Incremental /Additional cost reasoning: describe the incremental (GEF Trust Fund/NPIF) or additional (LDCF/SCCF) activities requested for GEF/LDCF/SCCF/NPIF financing and the associated global environmental benefits (GEF Trust Fund) or associated adaptation benefits (LDCF/SCCF) to be delivered by the project:

The PENHRA project aims to improve the energy efficiency of new RAC equipment in Indonesia from 2015 onwards. This will be achieved by addressing the existing barriers that hinder the widespread application of EE technologies and techniques in the manufacturing of energy efficient refrigeration and air conditioning (RAC) equipment and appliances in the country. By removing such barriers, it is expected that there will be a wider availability of EE RAC equipment and appliances in the country that can be used by consumers, as well as adequate local technical capacity in the country to manufacture such equipment.

The proposed project focuses on EE enhancements in RAC manufacturing and import in coordination with Indonesia's HPMP project. The phase-out of HCFCs will be combined with introduction of alternative technologies that will involve, technology conversion including modification of production lines and processes, increased versatility of the system design to accept a wider range of prospective low-GWP refrigerants including hydrocarbon refrigerants, technical assistance, trials and testing, training and certification. The implementation of energy efficiency measures in the design and manufacturing of new RAC equipment and appliances during this changeover phase would enable the country's RAC industry realize greater global environmental benefits due to the early adoption of energy efficiency technologies and techniques in the design and manufacturing of energy efficient RAC equipment and appliances while carrying out HCFC phase-out for compliance with the Montreal Protocol. To achieve this, an activity involving the conduct of a study of other potential alternatives to R-32 that are cost-effective, energy efficient and has low GWP is also included in the PENHRA project. While this topic was discussed by the manufacturers and government agencies during the PPG process to come up with the initial list of potential low GWP refrigerant alternatives, the need for further detailed study in the first months of the project implementation was deemed necessary to ascertain the technical basis of the program. The difference between the constant frequency (CF) and variable frequency (VF or inverter type) RACs was not yet considered as there is no data available. Also there is no segregated data on the number of CF and VF RACs sold in market. Since the RAC technology is moving towards the proliferation of VF or inverter type of RACs which is also in line with EE technology improvements, this segmented classification and program management to consider the expanded market of VF types should be considered during the project implementation.

The PENHRA project will include incremental activities such as the facilitation of the mandatory implementation of Minimum Energy Performance Standards (MEPS) in RACs. The on-going activities under BRESL project will complement the improved test procedures developed and adopted. Further, the incremental activities that will be carried out under Component 1 of proposed project will deliver approved and enforced policies and regulations for the local manufacturing, servicing and sale of energy efficient RACs. The proposed project is expected to come up with a number of national standards for RAC equipment performance, which are approved and adopted by the industry. This would enable RAC equipment sold in Indonesia to be compliant with these national standards. The project will support the government to roll out incentive and disincentive programs wherein a number of incentives are availed by RAC manufacturers. Those who are not complying with the national standards are going to be fined under the program. In order to implement such an incentive and disincentive program, there should be government-accredited inspection and certification agencies. The project will develop accreditation standards which will help the government to select and accredit potential certification and inspection agencies. During the course of project implementation, performance of inspection & certification agencies will be evaluated. This project will draw lessons from on-going BRESL project in the design and implementation of planned consumer education schemes for energy efficiency products. There will

be consumer awareness programs developed based on the earlier lessons and experiences. Consumer assistance will be provided through an information dissemination service center that will be established under the PENHRA project and made operational to influence the consumers to purchase energy efficient RAC appliances/equipment. Consumer awareness programs will be launched through this service center. During the course of project implementation, the performance of the service center will be evaluated.

In total, the incremental funds requested amounts to USD 5,020,822 from the GEF. The co-financing inputs manifest the strong interest and commitment by the Government of Indonesia through the MEMR and the MOE and the RAC Industry Players towards achieving energy efficiency in the local production and imported RACs. The GEF's incremental funding support mentioned above is 20.8% of the US$ 24,135,871 total cost of the Alternative Scenario. To match this, the RAC industry is co-financing the project in the amount of US$ 8,690,937 (36.0%) while that of the GoI is US$ 10,349,112 (42.9%), all in terms of in-cash and in-kind input contributions. These inputs reflect each of the contributor's commitment to the achievement of PENHRA goal and objectives and are manifested in the Commitment Letters included in this PENHRA Project Document.

As the implementing agency for this proposed project, UNDP will allocate at total of US$ 75,000 including budgets for the project preparation phase (US$ 50,000) and for full size project implementation and monitoring and evaluation expenses totaling (US$ 90,000). These inputs reflect each of the contributor's commitment to the achievement of PENHRA goal and objectives and are manifested in the Commitment Letters included in this PENHRA Project Document.

Thus, it can be assured that under the PENHRA project there will be complementary efforts with the activities of other ongoing similar projects as well as among the components proposed in the PENHRA project. The budgeting details have delineated that the GEF support will be mainly for the EE improvement in RACs.

A.6 Risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and measures that address these risks:

Table 1: Project Risks and Mitigation Measures

Date Identified	Risk Type	Risk Description	Risk Management
June 2014	*Political*	*Insufficient, discontinuous and/or uncommitted support from government and coordination among line Ministries and the RAC manufacturers* • Shifting of government energy program priorities leading to reduced technical and budgetary support to ES&L program; poor coordination among line ministries and RAC industry may lead to slow policy execution and poor implementation of the program. Risk Rating: Low	• Government commitment to the project will be clearly established and confirmed. • Regular coordination meetings among relevant line ministries and RAC industry. • Government issuing policies and acting lead role on EE RAC program
June 2014	*Institutional*	*Lack of support, participation and commitment from local RAC manufacturers*	• Industry associations, professional organizations, and private individuals will be

Date Identified	Risk Type	Risk Description	Risk Management
		• Private sector not participating adequately in the project, due to lack of interest, disruption to operation and business priorities. Financing of investments for manufacturers to modify their production facilities may not be available. Risk Rating: Moderate	consulted and involved in the annual project work planning. • Working relationships with industry and commercial sector associations will be further enhanced to ensure cooperation. • Commitment and active participation of RAC manufacturers, distributors, and service providers. • Awareness and interest by the public in using energy efficient RACs will be facilitated • Close collaboration with HPMP
June 2014	*Technology*	*EE Technology Risk* • Failure of EE products (equipment and appliances) to perform as claimed by manufacturers resulting to customer dissatisfaction. • Proliferation of illegally traded and unreliable RACs. Risk Rating: Low	• Serious implementation of EE standards, labelling and warranty • Consumer education activities focus on use and application of EE RAC as well as consumer protection programs of the government. • Testing and certification institutions to be strengthened and equipped • Ministerial decrees to support EE RAC production and application including technology transfer provisions and incentives will be issued
June 2014	*Institutional*	*EE Market & Financing Risk* • Unwillingness of consumers to buy EE RAC due to bad experiences in the past and high initial cost may lead to failure of the project to induce increased sales and widespread use of EE RAC. Risk Rating: Moderate	• Assisting and empowering consumers to make real time, informed decision making when buying EE products. • Promotion of suitable financing, incentives will be developed and the implementation facilitated under the project. • Providing ample technology and market information on economic and environmental benefits of EE RACs
June 2014	*Regulatory*	*Government procedures and processes may delay the implementation of MEPS* • The formulation, review, deliberation and approval by appropriate authorities in the government, in close consultation with the industry and other stakeholders might take long and could not happen within the timeframe of the project.	• Based on experience from the BRESL project implementation, there should be a supporting formulation of ministerial regulation on EE labelling to get the MEPS approved. Due to the influence of ongoing initiatives in the country, there will be a voluntary EE labelling and transition regime for MEPS. In case, if there is a

Date Identified	Risk Type	Risk Description	Risk Management
		Risk Rating: Moderate	delay in the enactment and mandatory implementation of MEPS, EE labelling will be used to guide the manufacturers to meet the requirement of labelling.
		Overall Risk Rating: Low to Moderate	

A.7. Coordination with other relevant GEF financed initiatives

A series of stakeholders' consultation workshops and coordination meetings were also conducted to discuss the common goals that they share in their respective programs and activities. As discussed in the sections above, the PENHRA Project is closely aligned with other government initiatives that are also supported by UNDP and/or GEF, particularly the BRESL (Barrier Removal to the Cost-Effective Development and Implementation of Energy Efficiency Standards and Labeling) Project and the HPMP (HCFC Phase-out Management Plan) Project and other regional and bilateral projects in a strategic, integrated and synergistic approach. These undertakings all demonstrate Indonesia's drive and commitment to further pursue a highly complementary project on RAC energy efficiency. The relevant government agencies and RAC industry players have been adequately consulted and have proactively identified barriers that could affect the successful implementation and achievement of PENHRA's program and goals. These consultation workshops also came up with the national activities that are proposed to be carried out under the PENHRA Project, including the project implementation and management arrangements.

The ongoing government programs in the RAC industry, particularly the HPMP Project for shifting to non-HCFC RACs, are good entry points for introducing the needed interventions and achieve synergistic effects. The proposed interventions should be properly coordinated in terms of timing and scope of activities towards common technology and environmental goals with the HPMP Project. Hence, the PENHRA project has been designed to define and establish specific complementary objective and outcome synergy between the two projects and among other related projects likewise. HPMP will act as an enabler for the establishment of regulations that will include health and safety standards for RAC refrigerants in the country. On the other hand, the PENHRA project will take the lead responsibility to complement the efforts under HPMP and ensure that such regulations are enforced by the relevant government authorities.

B. ADDITIONAL INFORMATION NOT ADDRESSED AT PIF STAGE:

B.1 Describe how the stakeholders will be engaged in project implementation.

During the conduct of the PPG activities, a number of government institutions, testing centers and private sector manufacturing companies were consulted about the PENHRA approach and the possible institutional arrangements. The stakeholder involvement plan lists down the stakeholders of the PENHRA Project and their respective roles. The Ministry of Environment (Kementrian Lingkungan Hidup - KLH) is the focal point for international environmental conventions and their implementation in Indonesia. The activities related to ozone layer protection and implementation of the Montreal Protocol, are coordinated through the National Ozone Unit, within the Climate and Atmosphere Division. The National Ozone Unit is partially supported through the Institutional Strengthening Project with financial

assistance from the Multilateral Fund and implemented by UNDP.

To support the market enhancements for EE RACs, the industry players need to be directly involved. The capabilities of the manufacturers need to be enhanced in producing EE RACs according to set international efficiency performance standards. Importers and distributors and service providers will have to apply these standards in the imported RACs as well. The industry players also needs assistance and will be involved in their public relation campaigns for their clients on EE RACs. But in order for the industry players to act effectively, they should be provided with adequate and updated information on technically and economically feasible EE technologies that can be applied by local RAC manufacturers. This means their capacity development is of primary importance in the coordination and development of energy standard, technical assistance provided to support AC manufacturers to meet the requirements under EE RAC plan, financing facility to support the manufacturers to implement the EE RAC production activities and awareness program that will be implemented for consumers, retailers and manufacturers themselves. The stakeholders particularly the private companies that will be involved in the shift to low GWP refrigerants and EE enhancements will be engaged by the project on a regular basis through the TWGs in coordination with the PMU according to their project commitments and plans.

B.2 Describe the socioeconomic benefits to be delivered by the Project at the national and local levels, including consideration of gender dimensions, and how these will support the achievement of global environment benefits (GEF Trust Fund/NPIF) or adaptation benefits (LDCF/SCCF):

The proposed project is expected to bring about the following socio-economic benefits to Indonesia at the national and local levels:

National Benefits:

- Clear policy, regulation and institutional framework promoting commercialization of energy efficient RACs.
- Increased technical capacity of local RAC manufacturers in developing and applying EE RAC technologies.
- Established national accreditation and certification agencies for EE RAC equipment and appliances.
- Increased capacity of national financing institutions in funding green business.
- Contribution in meeting the voluntary national target of reducing 26% of GHG emission by 2020.

Local Benefits:

- Local government officials acquired coordination capacity in working with the private sector.
- Increased awareness and knowledge of local government, manufacturers and consumers about benefits of energy efficient products.
- Households gain access to financing facility to purchase EE RACs.
- Decreased household cost for electricity from utilization of energy efficient RACs.

The PENHRA Project will result in a cumulative electricity savings of 581 GWh by 2017 or by the end of the project; and a projected cumulative electricity savings will be 1,956 GWh by year 2024 and 4,374 GWh by the year 2033. These electricity savings will translate into millions of dollars of avoided investments in new power plants and cumulative CO_2 emissions reductions equivalent to 1,481 kt CO_2 by the year 2024 and 3,311 kt CO_2 by the year 2033.

Currently, a large variety of low-priced RAC products are available in the Indonesian market. Due to this, the demand for EE RACs remains low as their price is higher compared to the existing RACs sold in the market. It is envisioned that the planned interventions will all lead to the increased production and sales of EE RACs; increased market share of EE RACs; improved technical capacities of RAC manufacturers in developing and applying energy efficient RAC technologies. Due to the steady economic development in the country, the local air conditioning equipment market has grown significantly in the past few years and is expected to continue for the next 10-20 years. At the baseline year 2012, the share of energy efficient RACs in the market is estimated at 19.8%. Considering market trending at significant growth rates and the impact of project interventions, this market share is projected to increase to 27.4% in 2016 at the end of the Project, to 38% in 2023 or 10 years after project start and to 60.5% in 2033 after 20 years since project start. The products targeted under the PENHRA project are consumer goods that are widely used particularly in households and commercial establishments. The project will give importance to the market development for RACs in terms of the feasibility studies, training and information, technical assistance and ensuring quality and EE performance of the RACs locally-produced and imported in Indonesia. Measures to address market risks include (a) assisting and empowering consumers, including women in the households, to make real time, informed decision making when buying EE products; and (b) promotion of suitable financing and market incentives which will be developed and the facilitated under the project. There is a great market potential with increased production and sale of EE RACs in Indonesia.

The project design and implementation have taken into account gender equality indicators, particularly in ensuring women participation in decision making process and access of women to knowledge, and benefits associated with the use of energy efficient air conditioners. The project has also considered the contribution towards empowering women through specific activities that promote awareness on energy efficient home appliances, calculation method on cost saving from utilization of energy efficient RACs, and involvement of women in monitoring implementation of energy efficient home appliances program in the market. The socio-economic benefits of using the energy efficient variety of such consumer goods have been adequately included in the project activities. The way to monitor the realization of such benefits and how information (including gender disaggregated data) will be collected, processed, evaluated and reported during the project implementation has been incorporated in the project monitoring and evaluation activities.

B.3.Explain how cost-effectiveness is reflected in the project design:

In the context of this project, the anticipated global environmental benefit is mainly the avoided GHG emissions from the utilization of locally manufactured EE RACs, without taking into consideration the reductions attributable to the avoidance of the use of currently used high GWP refrigerants. In addition, there are also the monetary benefits from energy savings that are realized from the use of EE RACs. It is envisioned that the planned interventions will all lead to the increased production and sales of EE RACs; increased market share of EE RACs; and, improved technical capacities of RAC manufacturers in developing and applying energy efficient RAC technologies. Considering the outputs of the activities carried out under the PENHRA project that are directly related to the application of EE RACs, the expected cumulative amount of GHG emissions reduction is about 440 $ktCO_2$ during the project duration. The lifetime direct GHG emissions avoided is about 1,481 $ktCO_2$ considering 10 years economic lifetime of project interventions during 3 years of project implementation. These global environmental benefits expressed in terms of emission reductions is considered as the sole contribution from the activities of PENHRA on the use of energy efficient RACs, but not from the changeover to low GWP refrigerants. Although HPMP is considered as baseline project, its environmental benefits are not accounted in this analysis under PENHRA to avoid any double counting. Considering the GEF contribution of US$ 5,020,822 for PENHRA, the unit abatement cost is about US$ 1.11/t CO_2.

C. DESCRIBE THE BUDGETED M &E PLAN:

The project will coordinate with all the project partners. The continuous monitoring and evaluation of all project activities, even after completion of the project period, will bring sustainability of the project with desired benefits in the long run. All evaluation reports will be uploaded to the project website for widespread dissemination. A formal Monitoring and Evaluation Strategy will be developed and implemented in the full-scale project to track the activities and contributions of the activities by all the project partners, in terms of both in-cash and in-kind contributions as detailed in the co-financing letters. These M&E findings will be reported on in the project's two in-depth independent reviews.

As the implementing agency for this proposed project, UNDP will allocate at total of US$ 90,000 for supporting full size project implementation and for M&E.

Table 2: Project M&E Budget

Type of M&E Activity	Responsible Parties	Budget US$*	Time frame
Inception Workshop (IW)	• Project Manager/ National Project Director /Executing Agency • UNDP Indonesia & UNDP/GEF BRH	• Included in Project Management	Within first 2 months of project start up
Inception Report (IR)	• Project Team (DGNREEC) • UNDP Indonesia & UNDP/GEF BRH	• Included in Project Management	a) Draft IR available before IW b) Final IR available immediately following IW
Measurement of Means of Verification of project results (baseline and end-of-project impact study)	• Project Manager /Executing Agency • Project team members	• Included in Project Management	Start, mid and end of project (during evaluation cycle) and annually when required
Measurement of Means of Verification for Project Progress and Performance (measured on an annual basis)	• Oversight by UNDP-GEF BRH Technical Advisor and PM • Measurements by regional field officers and local IAs	• Included in Project Management	Annually prior to APR/PIR and to the definition of annual work plans
APR and PIR	• Project Team (DGNREEC) • UNDP Indonesia, UNDP-GEF BRH, and UNDP EEG	• Included in Project Management	Annually
PAC/Tripartite Review Meetings	• Project Manager /Executing Agency • UNDP Indonesia	• Included in Project Management	Following Project IW and subsequently at least once a year
Periodic status reports	• Project Team (DGNREEC)	• Included in Project Management	To be determined by Project team and UNDP Indonesia
Technical reports	• Project Team (DGNREEC) • Hired consultants as needed	• Included in Component budget	To be determined by Project Team and UNDP Indonesia
Mid-term External Review	• Project Team (DGNREEC) • UNDP- Indonesia &	• $40,000	At the mid-point of project implementation.

Type of M&E Activity	Responsible Parties	Budget US$*	Time frame
	UNDP-GEF BRH • External Consultants (i.e. evaluation team)		
Terminal External Evaluation	• Project Team (DGNREEC) • UNDP Indonesia & UNDP-GEF BRH • External Consultants	• $40,000	At least three months before the end of project implementation
Project Terminal Report	• Project Team (DGNREEC) • UNDP Indonesia • External Consultant	• Included in Project Management	Included in Project Management
Lessons learned	• Project Team (DGNREEC) • UNDP Indonesia & UNDP-GEF BRH	• Included in Project Management	Included in Project Management
Audit	• UNDP Indonesia • Project Team (DGNREEC)	• Included in Project Management	Annually
Visits to field sites (UNDP staff travel costs to be charged to IA fees)	• UNDP Indonesia • UNDP-GEF BRH (as appropriate) • GOI/PAC representatives	• US$ 10,000	Annually
TOTAL INDICATIVE COST*		**US$ 90,000**	

Project monitoring and evaluation will be conducted in accordance with established UNDP and GEF procedures and will be provided by the project team and the UNDP Country Office (UNDP-CO) with support from UNDP/GEF. The Logical Framework Matrix in Section 3 of ProDoc provides performance and impact indicators for project implementation along with their corresponding means of verification. These will form the basis on which the project's Monitoring and Evaluation system will be built.

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

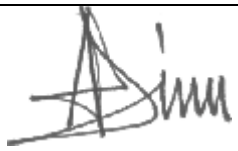
A. RECORD OF ENDORSEMENT OF GEF OPERATIONAL FOCAL POINT(S) ON BEHALF OF THE GOVERNMENT(S) :):

NAME	POSITION	MINISTRY	DATE
Mr. Dana Kartakusuma	GEF Operational Focal Point and Senior Advisor to the Minister of Environment	Ministry of Environment, Government of Indonesia	03/16/2012

B. GEF AGENCY(IES) CERTIFICATION

This request has been prepared in accordance with GEF/LDCF/SCCF/NPIF policies and procedures and meets the GEF/LDCF/SCCF/NPIF criteria for CEO endorsement/approval of project.

Agency Coordinator, Agency Name	Signature	Date *(Month, day, year)*	Project Contact Person	Telephone	Email Address
Adriana Dinu		20 February 2015	Butchaiah	+66 2304	butchaiah.gadde

Executive Coordinator UNDP/GEF			Gadde, Regional Technical Specialist EITT	9100 ext. 5048	@undp.org

ANNEX A: PROJECT RESULTS FRAMEWORK (either copy and paste here the framework from the Agency document, or provide reference to the page in the project document where the framework could be found).

This project will contribute to achieving the following Country Programme Outcome as defined in CPAP or CPD: Outcome 2.1. Enhanced capacity of GOI to manage natural resources and energy.					
Country Programme Outcome Indicators: 2.2.1 National energy policies and guidelines developed and integrated into sub-national development plan. 2.2.2 Sub-national authorities and key partners are able to implement programmes, mobilize resources and develop public private partnership for RE/EE, which will contribute to the reduction of national greenhouse gas emission.					
Primary applicable Key Environment and Sustainable Development Key Result Area: 1. Mainstreaming environment and energy**.**					
Applicable GEF Strategic Objective and Program: GEF-5 Strategic Objective 2. Promote market transformation for energy efficiency in industry and the building sectors. Climate Change Mitigation Programme.					
Applicable GEF Expected Outcomes: (1) Appropriate policy, legal and regulatory frameworks adopted and enforced, (2) Sustainable financing and delivery mechanisms established and operational, (3) GHG emissions avoided.					
Applicable GEF Outcome Indicators: (1) Extent to which EE policies and regulations are adopted and enforced, (2) Volume of investment mobilized, (3) Tons of CO_2 equivalent.					
	Indicator	**Baseline**	**Targets**	**Source of verification**	**Critical Assumptions**
Project Objective[7] Significantly improved energy efficiency of refrigeration and air conditioning (RAC) equipment and appliances manufactured and used in Indonesia.	• Cumulative CO_2 emissions reduction by end-of-project (EOP), *kt* • Cumulative electricity savings by EOP, *GWh*	• 0 • **0**	• 440 • 581	• Monitoring reports on changes in average equipment efficiency and sales from participating governments to the PMU • Official publications or documents on production and sales of RACs • Annual reporting on progress from PMU, the participating stakeholders and companies	• Continuous and committed support and participation from government agencies and RAC manufacturers • Awareness and interest by the public in using energy efficient RACs will continue to increase in the future • Commitment and active participation of RAC manufacturers, distributors, and service providers will continue to increase.
COMPONENT 1: POLICY, REGULATION AND STANDARDS DEVELOPMENT FOR THE RAC INDUSTRY					

[7] Objective (Atlas output) monitored quarterly ERBM and annually in APR/PIR

Outcome[8] 1: Appropriate enforcement of policies, laws, and regulatory support mechanism that ensure manufacturing and sale of certified quality energy efficient (EE) RACs increased in Indonesia	• No. of decrees on EE RACs manufacturing, import and sales issued and enforced by Year 3 • No. of local RAC manufacturers and suppliers that comply with enforced policies, laws, regulatory support mechanisms in the manufacture, import and sales of certified quality EE RACs	• None • 0	• 4 • 48	• Official publications or documents on energy-efficiency regulations and policies provided by GOI. • Annual reports by PMU • M&E or survey reports on policy/regulations compliance of local RAC manufacturers, suppliers and retailers	• Continued support by Government of Indonesia through MEMR to ensure decree enforcement
Output 1.1: Established and effectively enforced mandatory national MEPS for RACs	• No. of enacted MEMR Decrees on the enforcement of mandatory MEPs on RACs by Year 2	• None	• 1	• Official publications or documents on energy-efficiency regulations and policies provided by GOI. • Annual reports by PMU	• Continued support by Government of Indonesia through MEMR to ensure decree enforcement
Output 1.2: Adopted policy and regulations on the local manufacturing and import of EE RACs	• No. of enacted MOI decrees on local production and import of EE RAC equipment by Year 2 • No. of developed and completed training programs and materials on policy and implementing rules for Customs officers and Ministry of Trade staff each year starting Year 3 • No. of trained Customs and Ministry of Trade personnel each year starting Year 3 who are actively involved in the regulatory and inspection processes for imported and locally manufactured EE RACs	• 0 • 0 • 0	• 1 • 1 • 100	• Official publications or documents on energy-efficiency regulations and policies provided by GOI. • Annual reports by PMU • Post-training evaluation reports by lead trainers (a year after training)	• Continued support by Government of Indonesia through MOI to ensure decree enforcement
Output 1.3:Established and operational accreditation, inspection and certification system	• No. of enacted MOI Decrees on selection and accreditation of the certification and inspection institutions and testing centers by Year 2 • No. of successfully developed and	• 0 • 0	• 1 • 1	• Official publications or documents on energy-efficiency regulations and policies provided by GOI. • Annual reports by PMU	• Continued support by Government of Indonesia through MOI to ensure decree

[8] All outcomes monitored annually in the APR/PIR. It is highly recommended not to have more than 4 outcomes.

for all locally manufactured and imported RACs sold in Indonesia	implemented agreements among relevant government authorities[9], on market surveillance guideline by Year 3 • No. of testing laboratories/ institutions accredited under MOI Decree by Year 2 • No. of adequately and capably conducted tests by Customs Officers each year starting Year 3	• 0 • 0	• At least 3 • 50	• Official documents on the establishment of certification and inspection institutions • Referral requests by Custom officers	enforcement. • Continuous support by the Customs Office is fully committed and realized
Output 1.4: Established and operational consumer assistance and information dissemination service center on EE RACs	• No. of enacted and enforced MEMR Decrees on the Establishment of Consumer Assistance and Information Dissemination Service Center by Year 2 • No. of consumers and stakeholders served per year by the Center starting Year 3	• 0 • 0	• • 10,000	• Documentation of the Decree and operating guidelines • Documentation on the official designation of the Host Center and regular staff support • Operations, financial and accomplishment reports	• Continued support by Government of Indonesia through MOI and MEMR and all the stakeholders • Clients are willing to pay for special services received
Output 1.5: Established RAC industry-wide coordination and cooperation system and implemented EE RAC technology development and application program	• No. of established and operationalized RAC industry-wide coordination mechanisms and cooperation systems for EE RAC Technology by Year 2 • No. of harmonized testing protocols, EE standards and labeling procedures developed and endorsed by TWGs starting Year 2	• 0 • 0	• 1 • 1 each[10]	• Documentation of the MOU and operating guidelines • Documentation on the approved and enforced testing protocol, and harmonized EE standard and labeling procedures for each feasible product	• Continued support by relevant agencies of the Government of Indonesia and all the stakeholders and companies
Output 1.6: Completed performance evaluation of the EER/COP enhancement program in the RAC industry	• No. of required annual quarterly reports produced by the M&E System including lessons learned and success stories starting Year 2. • Average EER/COP for EE RACs included in the project improved by EOP	• 0 • 2.7 (COP); 9.1 (EER)	• 4 • 2.8 - 3.2 (COP); 9.5 - 10.8 (EER)	• Documentation of the M&E system and its operating guidelines • Project quarterly reports • Testing results • EER/COP performance evaluation report	• Continued support by relevant agencies of the Government of Indonesia and all the stakeholders and companies
COMPONENT 2: CAPACITY BUILDING AND AWARENESS ENHANCEMENT ON THE PRODUCTION AND UTILIZATION OF EE RACS					
Outcome 2.1:	• Growth rate in the no. of consumers	• Nil	• At least	• Documentation of the RAC	• RAC producers and

[9] Mainly the Ministry of Energy and Mineral Resources, Ministry of Trade, and Customs Office

[10] Harmonized testing protocol, standard and labelling procedure for each feasible product among all the targeted products

Increased awareness of the retailers and consumers on the benefits of energy efficient RACs in Indonesia	buying and using EE RACs that use low GWP and more energy efficient refrigerants and RAC technologies compared to previous year increased, % at EOP		10%[11]	industry's annual EE RACs production and statistics on sales/usage of EE RACs	distributors will fully support the production and sales data gathering and analysis
Output 2.1.1: Completed EE RAC retailer training and awareness program	• No. of RAC retailers assisted in acquiring and using basic information on EERAC technology and benefits starting in Year 2 • No. of retailer technicians trained in understanding and explaining EE RAC technology and benefits in models being marketed starting in Year 2 • No. of coordination mechanisms among relevant agencies designated to carry out the responsibility of overseeing the EE RAC retailer assistance program (in consultation with consumer protection groups) developed and implemented starting Year 2 • No. of trained RAC retailers benefitting from the program each year starting end of Year 2	• 0 • 0 • 0 • 0	• 500 • 300 • 2 • 2	• Documentation of training needs analysis • Documentation of the conduct and evaluation of training and directory of trained technicians who completed the courses • Documentation on training and awareness services rendered, post-training impacts and satisfaction of needs • Documentation on designation of responsibility for sustaining the project intervention in a relevant trade and commerce agency	• Retailers and their technicians will sustain the project's interventions and act their promotional and marketing roles reliably and effectively • RAC manufacturers, distributors and service providers will perform their roles reliably and effectively
Output 2.1.2: Completed consumer education campaign on the use and benefits of EE RACs	• No. of successfully conducted campaign programs each year starting Year 2 • No of issued newspaper advertisements each year starting Year 2 • No. of multimedia materials produced and disseminated for consumer education and campaign: • Short video clips by Year 1 • One week TV ads/year staring Year 2 • Radio talk shows/year starting Year 2	• 0 • 0 • 0	• 2 • 4 issues per year starting Year 2 • 2 • 2 • 1	• Campaign program report • Documentation and actual copy of designs • Report on multimedia dissemination by PMU.	• Continued support by relevant agencies of the Government of Indonesia and all the stakeholders and companies

[11] This was assumed as twice the growth rate of the number of RACs produced (at 5% per year). It will be confirmed during the inception of the project.

Output 2.1.3: Completed public relation campaigns for RAC industry players	• Number of Seminars, Workshops and Exhibitions conducted each year
	  • Seminars starting Year 2
	  • Workshops starting Year 2
	  • Exhibition starting Year 2
	• No. of successfully completed one-day PR events participated in by RAC industry companies by Year 2
		• 0
		
		• 0
			
			• 2
			• 2
			• 1
			• 3
				• Documentation and report on public relation needs analysis and design of Seminar/ Workshop and Exhibition and materials
				• Minutes of coordination meetings held
				• Minutes of meetings of Organizing committee and copies of brochures printed
				• Report on the 3 Seminar/Workshops and Exhibitions conducted
					• Continued support by relevant agencies of the Government of Indonesia and all the stakeholders and companies

Output 2.1.4: Completed awareness and capacity building on the use of non-HCFC RACs	• No. of completed awareness raising and capacity building activities each year starting Year 1 • No. of awareness/attitude surveys conducted on the benefits of EE RACs in Year 1 for baseline and in Year 3 for project impact	• 2 • 0	• 2 • 2	• Report on the activity • Report on the findings and analysis of the awareness/attitude surveys	• Continued support by relevant agencies of the Government of Indonesia and all the stakeholders and companies
Outcome 2.2: Enhanced technical capacities of appliances testing institutions to test the EE performance of RACs	• No. of accredited testing institutions for EE enhancements in RACs	• 0	• At least 3	• Documentation of testing laboratories/ institutions accredited based on approved regulations	
• *Output 2.2.1: Formulated and applied testing procedure for RACs EE prototypes and commercial availability*	• No. of approved and applied testing protocols for RACs by Year 3 • No. of approved and enforced standards for RACs by Year 3	• 0 • 0	• 3 • 3	• Documentation of approved testing protocols and standards	
• *Output 2.2.2: Completed training and accreditation of testing institutions in implementing the*	• No. of completed training workshops conducted for RAC testing institutions each year starting Year 2 • No. of testing laboratories/ institutions accredited for EE RACs testing work by	• 0 • 0	• 2 • At least 3	• Documentation of testing laboratories/ institutions accredited based on approved regulations	

adopted procedures and regulations for EE performance testing, verification and certification of RACs	Year 3.				
• *Output 2.2.3: Completed monitoring and evaluation for improvement of testing and certification institutions and validate recommendations for continuing EE enhancement*	• % implemented of the total no. of recommendations from completed evaluation reports for improvement of RAC testing institutions for quality testing of locally made and imported RAC units by Year 3	• No basis	• At least 80 %	• Copy of evaluation report • Report on improvements implemented	
COMPONENT 3: PROMOTING INVESTMENTS FOR EE ENHANCEMENTS IN THE RAC INDUSTRY					
Outcome 3.1: Enhanced capacities of RAC manufacturers to produce EE RACs **Outcome 3.2: Increased production and sale of EE RACs in Indonesia**	• Volume of investments mobilized as part of financial assistance program package for participating RAC industry players by Year 2 • Government of Indonesia, US$ million • Indonesia RAC Industry investments as leveraged by the project by Year 2, US$ million • Annual average % increase in production and sale (year-on-year) starting Year 3	• Nil • N. A.	 • About 10. 3 • About 9.5 • 10	• Report on the financial assistance program packages and approval • Report on production and sale of EE RACs	• Continued support by relevant agencies of the Government of Indonesia and all the stakeholders and companies and financing sector
Output 3.1.1: Designed and implemented financial assistance program	• No. of local financial institutions that support the financial assistance program by Year 2	• 0	• 10	• Documentation of the financial assistance program	• Banks and financing institutions will continuously commit to support the program

Output 3.1.2: Modified and optimized production lines for EE RAC manufacturing installed and operational	• No. of RAC companies that invested on, and implemented, installation of new RAC production lines or retrofitting of existing RAC production systems and processes to produce more EE RAC products by EOP	• None	• 48	• Report on purchase and training	
	• No. of RAC manufacturers that invested and implemented modification of production lines for EE RACs using new refrigerants by EOP	• 7 planned	• At least 7	• Completion report on results of coordination and working with HPMP • PENHRA project report on the fund disbursement to manufacturers	
1.	• No. of RAC manufacturers that have quality inspection and testing facilities for EE RAC units by Year 2	• 7 planned	• At least 7	• Completion report on results of coordination and working with HPMP	
2.	• No. of RAC manufacturers whose RAC products are certified for having met MEPS requirement by Year 2	• 6 planned	• At least 6	• Completion report on results of coordination and working with HPMP	
3.	• No. of RAC manufacturers employing trained staff in handling new alternative refrigerants and upgraded EE RAC production facilities by Year 2	• 20 planned	• At least 20	• Completion report on results of coordination and working with HPMP	
Output 3.2.1: Manufacturing companies implementing technology modifications for the production of EE RACs	• No. of RAC manufacturers that apply technology modifications for the production of EE RACs by Year 2	• 0	• 7	• Completion report on results of coordination and working with HPMP	
COMPONENT 4: TECHNICAL ASSISTANCE FOR RAC INDUSTRY IN EE ENHANCEMENTS					
Outcome 4: Enhanced knowledge and capacity on EE RAC technologies in the RAC industry	• No. of RAC manufacturers that make use of local experts (in-house or external) in the application of feasible EE RAC technologies in the RAC industry by EOP	• 0	• 48	• Survey of manufacturers receiving reports and technical assistance • Annual reports of PMU	• Active participation of and realization of objectives by RAC industry players and their customers
Output 4.1: Documented and publicly available	• No. of finalized/qualified FS Report on the Application of EE Technologies in RACs for assistance by banks by Year 1	• 0	• 8	• Periodic progress reports on the process of the conduct of the study and copies of the final	• Continued support by relevant agencies

information on technically and economically feasible EE technologies with low GWP that can be applied by local RAC manufacturers	• No. of workshops conducted for feasibility study dissemination and validation of feasibility study findings and recommendations by Year 2 • No. of easily accessible and affordable web-based information sources that are available for the local RAC industry for use in the design, engineering, manufacturing, promotion and marketing of EE RACs using alternative low GWP and energy efficient refrigerants by Year 3	• 0 • 0	• 3 • 1	Feasibility Study Report • Reports on the Seminars/Workshops conducted • Copies of final Feasibility Study Report incorporating results of the review and validation from the workshops conducted • Documentation on design and establishment of web-based information site	of the Government of Indonesia, the stakeholders and companies and financing sector
Output 4.2: Completed capacity development programs for local RAC manufacturers	• No. of seminar/workshops conducted that includes in-country and international experiences with continuing 2-week hands-on factory assistance on designing of EE RACs by Year 2 • No. of RAC manufacturers receiving technical assistance from EE RAC experts provided by the project by Year 1 • No. of completed EE RAC designs by local RAC manufacturers by Year 3 • No. of completed workshops on commercialization of EE RACs by Year 2 • No. of EE RAC prototypes commercialized by Year 3	• 0 • 0 • 0 • 0	• 1 Year 2 • 8 • At least 15 • 8 • At least 15	• Report on the Seminar/Workshop conducted • Progress reports on the conduct and outcomes of hands-on assistance by the experts • Progress report on the monitoring and evaluation and copy of Evaluation Report	.
Output 4.3: Regularly updated information on EE RAC market	• No. of bulletins published updating EE RAC market information by Year 2	• None	• 2	• Database created to store and analyze relevant data • EE RAC Information bulletins published	

ANNEX B: RESPONSES TO PROJECT REVIEWS (from GEF Secretariat and GEF Agencies, ar
Responses to Comments from Council at work program inclusion and the Convention Secretariat and
STAP at PIF).

STAP SCREENING OF THE PIF (4 FEBRUARY 2010)
STAP expresses its consent to the project involves linking energy efficiency incentives with the pha
out of HCFCs from refrigeration and air-conditioning (RAC) appliances. Indonesia has a good t
record for establishing a regulatory framework for controlling ODS which gives credibility to the con
of linking energy efficiency measures with the HCFC phase-out management plan. Training, capa
building and establishing test laboratories are included. STAP has the following recommendations t
addressed at the CEO endorsement stage.

Comment & Response	Referen
Comment 1: *1. RAC equipment manufacturers will be selected to lead the transition, but it is not stated what the selection criteria will be.* **Response**: The selection of RAC manufacturers will be based on the following criteria: (a) commitment of RAC manufacturers to participate in HPMP programme, (b) RAC manufacturers that has a larger market share in Indonesia, and (c) the RAC manufacturers expressed interest to participate as beneficiaries of PENHRA project.	ProDoc: Section 2, para 32, p Activity 3.1.1, p 3
Comment 2: *2. The barriers are clearly identified, but what share of total sales are the targets for energy efficient appliances in 2015, 2020 etc? No current market details are provided, other than it has "grown significantly". Detailed baseline assessment and ex-ante assessment of projected GHG emission reductions are needed to be developed.* **Response**: At the baseline year 2012, the share of energy efficient RACs in the market is estimated at 19.8%. Considering market trending at significant growth rates and the impact of project interventions, this market share is projected to increase to 27.4% in 2016 at the end of the Project, to 38% in 2023 or 10 years after project start and to 60.5% in 2033 after 20 years since project start. The detailed baseline assessment and projected levels of GHG emission reductions have been developed, summarized and explained in detail.	ProDoc: Section 2, Para 42, p ProDoc: Section 2. Para 43, Table 4, p 20; Annex A, 77
Comment 3: *3. What are the project indicators for success, based on MRV assessments? M&E system is needed to be developed.* **Response**: The project success indicators are summarized and listed in detail with the corresponding outputs and activities in the Project Planning Matrix.	ProDoc: Section 3,

Comment & Response	Reference
Activity 1.6 involves the development, establishment and institutionalization of a monitoring and evaluation (M&E) system in a designated agency that will keep track of the progress in achieving results and outcomes of the EE RAC policy and program led by the government using the success indicators of the project. The system will be sustained by the government after the project.	43; and Section 6, p 64
Comment 4: *4. The technologies are clearly identified, but no behavioral change discussion has been included. What will incentivise the customers to seek energy efficient options? Appropriate measures should be considered.* **Response**: Component 2 is mainly involved in encouraging the public to use EE RACs. Behavioural change techniques should be incorporated in the design of modules in retailer training, consumer education campaigns, public relation campaigns, and other awareness programs under the project. The cost and benefits of EE RACs will be effectively explained in order trigger decision in the acquisition and use of EE RACs in various applications.	ProDoc: Section 2, Para 50, p 27.
Comment 5: *5. PIF is silent on the specific activities/technology transfer? That would be "co-ordinated" with Japan and Australia. Who exactly will do that, and how will it be achieved?* **Response**: Technology transfer will be covered in many ways possible. Technology transfer for improving energy efficiency and local production capacity of RACs from multinational players is necessary but this is governed by intellectual property rights (IPR) and other related issues. In this regard, most manufacturers do not have capability to design an EE unit therefore they will need technical assistance to develop their capability otherwise they would have to purchase patent rights from multinationals. The specific EE RAC technologies that will be transferred to Indonesia and their sources will be confirmed through an intensive evaluation study at the beginning of project implementation starting with those technologies that were identified during the PPG process while keeping an eye on other available EE RAC technologies henceforth. The technology transfer approach will also be determined in consultation with the RAC industry stakeholders. Bilateral donors (Governments of Australia, Japan, USA, etc.) will provide support and partially finance adoption of low-GWP alternatives and energy-efficiency enhancements in RAC supplementary to the HPMP. The Australian government/AUSAID has been facilitating with MEMR to participate in various international knowledge exchange events that aim to strengthen understanding in ES&L policy and institutional development as well as to provide further needed support in the management planning and implementation of an ES&L program in Indonesia. On the other hand, a bilateral funding with the U.S. is involved in a demo project for an EE unit using R-32 which provides design software and equipment testing tools. Ministerial decrees to support EE RAC production and application including technology transfer provisions and incentives will be issued.	ProDoc: Section 1, Para 14, p 9 ProDoc: Annex D, Table D.1, p 88 ProDoc: Section 1, Para 21, p 11 ProDoc: Section 2, Component 2, p 27; Annex B, Table B.1, p 84

GEF COUNCIL COMMENTS

Comments and Responses	Reference
COMMENTS FROM GERMANY (APRIL 2013 GEF INTER-SESSIONAL WORK PROGRAM)	
Comment 1: *Germany is not yet ready to approve the PIF. We have serious concerns regarding the chosen technology (R32). We would like to consult with other GEF Council Members on the project and therefore kindly ask for more time for commenting.* **Comment 2**: *We have still some concerns that we would like to address before approval of the PIF and agree that it will be good for the coordination among the Council members and for the Agency to reconsider the project for the June Work Program.* **Response to Comment 1 and 2:** The PENHRA project has been proposed and approved to be complementary with the HPMP Project which is focused on HFC-32 to replace HCFC-22. Considering the importance of the refrigerant technology choice raised by the Council Member from Germany, the project will be involved in determining feasible technologies according to the desired technical, economic and environmental criteria and in identifying the technology transfer approach for the RAC manufacturers. On the other hand, the project is also is involved in conducting R&D in EE RACs using HFC-32 and possibly other non-HFC low-GWP refrigerant options and in prototyping selected designs that may be considered by interested RAC manufacturers and subsequently approved during PENHRA implementation. Detailed information on the technical consideration on the transition to non-HCFC under the HPMP and on how EER of RACs will be improved are presented. Resolved during the discussion on the June Work Program.	ProDoc: Activity 4.1.1 and Activity 4.2.2, p 37 ProDoc: Annex A, Table A.1, p 71
COMMENTS FROM U.S (APRIL 2013 GEF INTER-SESSIONAL WORK PROGRAM)	
Comment 3: *We applaud the efforts outlined in the PIF for addressing the critical needs facing Indonesia's cold chain infrastructure. We are hopeful that notable success stories of profitable adoption of energy efficient upgrades will emerge as a result of this project.* **Response:** Documentation and sharing of lessons learned and success stories on adoption and application of EE RACs resulting from the project will be an important part of the M&E system that will be developed and implemented in Activity 1.6.1. These reports will also be very valuable inputs to the various training and awareness activities of the project for the stakeholders and target EE RAC consumers under Component 2.	ProDoc: Activity 1.6.1, p 26; Component 2, Para 52, p 28
Comments from Canada (June 2013 GEF Work Program)	
Comment 4: • *We welcome this project and note that it will be an interesting example of GEF-MLF collaboration to achieve dual environmental benefits.* • *We support this project and note its approach is fully consistent with the co-financing*	

Comments and Responses	Reference
ideas we have supported under the Montreal Protocol. In the approach, the Multilateral Fund (MLF) provides incremental funding to assist a country in transitioning from HCFCs to low-GWP alternatives in a given sector, while another source of funding provides assistance in the same sector to ensure that this transition is carried out in a manner that maximizes the benefits to the climate. • *As noted in the proposal, when manufacturers convert their processes to manufacture non-HCFC based equipment, this provides an opportunity to address process modifications to optimize the energy efficiency of the equipment.* **Response:** The incremental operating costs (IOCs) will be covered with the additional financial grant assistance of PENHRA, which will be awarded to the RAC industry players who are involved in the HPMP project and encourage them to upgrade the production lines further to produce EE RACs. The IOCs will be used to compensate the incremental cost of consumable/component of the new RAC units for items such as compressor, expansion valve, refrigerants, copper tubes, etc. Further, some activities like the purchase of plate heat exchanger, aerodynamic shroud, and energy-efficient fan mounting fabrication facilities are aimed to increase their unit capacities and volume of production and sale of higher EER/COP RAC units in Indonesia.	ProDoc: Section 2, Activity 3.1.2, Table 8, p 33
Comments from Japan (June 2013 GEF Work Program)	
Comment 5: *In implementing this project, please utilize the lessons learnt by the following projects listed below in order to maximize synergy effect.* *[Japan UNDP Partnership Fund]*	ProDoc: Section 2, Activity 1.6.1, p 26; Component 2, Para 52, p 28

Global	UNDP/UNITAR/KIWC Training Workshop on Biodiversity in Asia and the Pacific	$159,923
Niger & Namibia	Community-Based Adaptation in Namibia and Niger	$400,000
Burkina Faso	CDM Capacity Development project in Burkina Faso	$300,000
Rwanda	Capacity Reinforcement of Clean Development Mechanism Projects in Rwanda under Kyoto Protocol	$300,000
Lao PDR & Philippines & Indonesia	Better informed environmental decision making through integrated spatial planning (ISP)	$100,000
Maldives	Project on developing guideline on life-cycle management of safe shelter facilities of vessels in Maldives	$300,000
Pacific and Caribbean	South-South Cooperation between Pacific and Caribbean SIDS on Climate Change Adaptation and Africa-Asia Drought Risk Management Peer	$420,510
Africa-Asia	Disaster Risk Management Assistance Project	$500,000
Mongol, Tonga, Solomon, Samoa, Parao, Marshall, Kiribati, Fiji	Regional Climate Change Ecosystems and Energy Programme from Reducing Emissions from Deforestation and Forest Degradation	$352,030
Indonesia	Support to Indonesia's Energy Efficiency Testing and Certification Facilities and Expertise	$491,558

Comments and Responses	Reference
Response: The suggestion is well taken and will be considered in the monitoring activities regarding lessons learned and success stories of Activity 1.6.	
Comments from Germany (June 2013 GEF Work Program)	
Comment 6: *Germany requests for the following projects that the Secretariat sends draft final project documents for Council review four weeks prior to CEO endorsement:* *Germany requests that the following requirements are taken into account during the design of the final project proposal:* • *Germany strongly asks for consideration of its comments made on March 28, June 7 and 12.* • *The project proposal at it is today, can be regarded as technology neutral. It lacks ambition regarding energy efficiency (standards) and does not promote the application and distribution of climate friendly, natural refrigerants. Germany expects a reconceptualization of the project and its components, so that the project clearly and measurably delivers climate benefits. Apart from existing efforts in the framework of the HPMP the Indonesian government shall be supported in developing and applying high energy efficiency standards for appliances in the cooling and AC sector. Support mechanisms shall clearly focus on the production and the application of highly efficient and climate-friendly refrigeration/cooling technology. Market development of climate-friendly refrigeration and AC-technology shall thus be the core of the project.* **Response:** The suggestion is well taken and has been incorporated in the design of activities of the project, particularly Activity 4.1.1, 4.1.2 and 4.2.1.	ProDoc: Section 2, Activity 4.1.1, and Activity 4.2.2, p 37
Comments from U.S (June 2013 GEF Work Program)	
Comment 7: • *The United States is encouraged by the high cost benefit ratio of this project in terms of finances as well as global environmental benefits.* • *The project could benefit from including a framework for what would constitute a successful project outcome, especially in terms of increased consumer awareness of energy efficient air conditioners and consequent behavioral change.* **Response:** Unit Abatement Cost (UAC) of the project is calculated to be US$ 1.11/ tCO_2. As mentioned above, documentation and sharing of lessons learned and success stories on adoption and application of EE RACs resulting from the project will be an important part of the M&E system that will be developed and implemented in Activity 1.6.1. These reports will also be very valuable inputs to the various training and awareness activities of	ProDoc: Section 2.6, para 57, p 39 & Activity 1.6.1, p 26; Component

Comments and Responses	Reference
the project for the stakeholders and target EE RAC consumers under Component 2. Behavioural change techniques will be incorporated in the training and awareness module designs.	2, Para 52, p 28
Comments from The Netherlands (June 2013 GEF Work Program)	
Comment: *In comments submitted prior to the Council approval on June 7, 2013, Netherlands commented that the project should support Indonesia's approved agreement with the MLF and help promote high efficiency appliances and low-GWP refrigerants. Please clarify and respond to the Netherlands comments.* **Response:** The proposed project is in line with the HPMP project that also takes into account and evaluate the feasibility of the application of other energy efficient, low GWP refrigerant alternatives to HCFCs for RACs in the case of Indonesia. Activity 4.2.2 of the project focuses on the development, implementation and evaluation of a technical assistance program, which will include transfer of knowledge in enhancing the versatility of the refrigeration and air conditioning system design and manufacturing to accept a wider range of prospective energy efficient, low-GWP refrigerants including hydrocarbon refrigerants. With these proposed interventions, the project does not limit the country to the technology that was recently approved by the MLF under the country's HPMP work. The proposed project actually helps the country prepare to consider other future feasible (in the context of Indonesia) refrigerant technologies that will contribute to the achievement of the country's HPMP objectives and targets. Further, as per design, the project is expected to contribute relevant inputs and insights to the HPMP Phase II project of Indonesia particularly the results of the evaluation work that will be done to assess the applicability and feasibility of alternative energy efficient, low GWP refrigerants for refrigeration and air conditioning devices that are produced, marketed and used in Indonesia.	

GEF SEC REVIEW COMMENTS

Comments and Responses	Reference
Comment: DER, September 17, 2012. *The response describes the types of equipment to be covered under this project as Refrigeration: includes commercial (< 12 HP) units such as retail food service and kitchen equipment, walk-in coolers/freezers and small commercial cold rooms. Air conditioning: includes those used in residential air conditioning (up to 3 HP), light commercial air conditioning (5 - 30 HP), and commercial air conditioning (35 HP and above). The only overlap with BRESL is small room air-conditioners. The response includes the following sentence: "The proposed PENHRA project will facilitate the development, approval and enforcement of MEPS for ACs." Is this correctly referring to "ACs" or was it meant to say "RACs"?* *Comment cleared. At the time of CEO endorsement, we expect a much clearer description of the priority types of equipment and how policies will be developed to address efficiency MEPs.* **Response:** This is addressed in the Outcome 1 through Outputs 1.1, 1.2, and Output 1.3.	ProDoc:

Comments and Responses	Reference
Comment: DER, July 19, 2012. *b) The revised document provides a better description of the planned activities in component 1 that will result in policies and MEPS for RACs. However there is no clarity on the proposed stringency of the policies or the schedule. More clarity is needed in these areas.* ***DER, September 17, 2012.*** *b) The covered equipment and schedule has been clarified. At CEO endorsement, we expect more clarity on the stringency levels that will be pursued in the policy development.*	Section 2, Activity 1.1.1, p 24
Response: The ProDoc now explains further on the covered equipment and the necessary policy development to be enunciated through ministerial decrees issued within the timeframe of the project.	ProDoc: Section 1, Table 1 and 2, p 12
Comment: DER, September 17, 2012. *Component 1* *At CEO endorsement we expect more details on policy stringency levels and priority RAC coverage.* *Component 2* *At CEO endorsement we expect a stronger explanation on how activities will lead to greater market penetration.* *Component 3* *At CEO endorsement, we expect a clear explanation for the competitive selection process that will be used to allocate the limited grant funding to prospective manufacturers.* *Component 4* *At CEO endorsement, we expect to see strong documentation on the options for technology adoption by the manufacturers and opportunities for North/South and South/South technology transfer.*	
Response: Done. The relevant activities have been described under each component considering these comments.	ProDoc: Section 2, Para 47 to 55
DER, September 17, 2012.*We appreciate the careful side-by-side comparison of the two projects. During project design phase, please coordinate with any future IBRD activities, if any, under project #4217. At CEO endorsement, we expect a clear description of any overlap in the area of chillers which appear to fit into the RACs by this project. Overlap has the potential to occur in component 2 and 4; therefore these should be addressed in the project design. Comment cleared.*	
Response: Done. Details are also provided in Component 3 to explain the technology coverage.	ProDoc: Section 1, Para 26, p 12; Component 3, Activity 3.1.2, p 32

Comments and Responses	Reference
COMMENTS FROM MLF SECRETARIAT	
DER, September 28, 2012. At the GEF request, the PIF was circulated to our colleagues at the MLF Secretariat. They provided the following comments in a September 28, 2012 email. Please address these comments at CEO endorsement. *(a) One thing that had been noted is that the timing is crucial; the whole project is based on synergies of joint implementation HPMP/project; under the schedule (p.14), implementation for the GEF project starts January 2014, implementation for HPMP finishes in June. Obviously even minor delays in project approval can derail the concept to have synergies. The GEF will certainly be in the best position to assess how high the probability for a delay is.* *(b) The Indonesia HPMP shows that there are multinational RAC manufacturers in Indonesia. While the project document mentions that the partners are essentially the same as under the HPMP (where this is taken into account), there is no clear information. The Executive Committee has specific guidelines about funding multinational manufacturers (i.e. assistance is provided using the percentage of local ownership only). The GEF has possibly different policies for these cases, and it might be important to ensure that there is consistency in the guidelines being used for assistance, or at the very least, a recognition of this, and a clarifications or assurances related to foreign owned/multinational companies and their participation and benefits.* *(c) With regards to double funding, while it is not very easy to determine whether this is a potential issue because of the minimum information in the document, it seems that the project concept clearly shows a differentiation of activities related to the MLF (conversion to non-HCFC, low GWP technology) and those related to the GEF (energy efficiency) funding as seen in page 4.* *(d) From the activities, it would seem that considerations to avoid double funding could be taken to ensure the following:* *a. That for policy work, the activities covered in this project are those that are in addition to what is already covered in the HPMP, possibly to ensure this, a table listing what is included in the HPMP and what this will cover might help in further review.* *b. The same concern is raised for awareness activities, that there should be an assurance of the clear linkage between the awareness activities to be undertaken in the HPMP and in this project;* *(e) However, on the operational side, some clarity needs to be provided. For instance, while the MLF is providing funding related to the need to test new heat exchangers, will the GEF fund heat exchanger conversion efforts? These could well run clearly separate, or overlap. It is not possible to identify that clearly from the PIF, since such very specific detail will be contained only in the more detailed project submission. This would be an area to look out for, for instance.* *(f) We also want to bring to your attention the fact that the RAC equipment is largely imported into Indonesia (78% of all room AC), in addition to the MNC ownership issue of the largest producer there. This reduces the impact of manufacturer-based initiatives, since the competition might continue to import cheap, low EE equipment. Success in the sense of improvement of EE of ACs is largely dependent on the impact*	

Comments and Responses	Reference
of the awareness campaign and the ability of the government to force manufacturers/importers to provide EE data accurately. **Response:** Considered in relevant sections of the ProDoc. Regarding the timing of the two (2) projects, as of end of 2013, HPMP is a half year delay from original schedule. Hence, PENHRA is able to catch up with schedule. While the MOE still aims to finish the HPMP program before October 2014, at the rate the project activities are going, some of the HPMPs activities will be delayed. For instance, the implementation in the large manufacturers is hampered by the delay of the third fund disbursement. The project is still ordering the equipment which will be arrive at the fourth quarter 2014. While for the second group of manufacturers i.e. SME manufacturers, the project activities have not been started yet. The cover note in PIF that was prepared in February and was just circulated in June 12, 2013 to the GEF council member clearly differentiate the two projects. The ProDoc has further explained how PENHRA is developed based on the baseline project HPMP in the RAC sector in Indonesia. Table 8 presents the cost-sharing in RAC production line modification to illustrate the complementarity between PENHRA and HPMP.	ProDoc: Section 2, Activity 3.1.2, Table 8, p 33 For both (b) and (c): Section 2, Table 9, p 35; Annex A, p 70 ProDoc: Section 2, Activity 3.1.2, Table 8, p 33 ProDoc: Section 2, Outcome 1: Outputs 1.1, 1.2, and Output 1.3, p 24 and Component 2, p 27

ANNEX C: STATUS OF IMPLEMENTATION OF PROJECT PREPARATION ACTIVITIES AND THE USE OF FUNDS[12]

A. PROVIDE DETAILED FUNDING AMOUNT OF THE PPG ACTIVITIES FINANCING STATUS IN THE TABLE BELOW:

PPG Grant Approved at PIF: USD 102,466			
Award ID / Project ID	**00072677 / 00085740 (IDN10)**		
Fund	62000		
Donor (Agency)	GEF TF (UNDP)		
Project Preparation Activities Implemented	**GEF Amount ($)**		
	Budgeted Amount	**Amount Spent To Date**	**Amount Committed / Balance 2013**
1. Revalidate Barriers and Baseline Projects/Activities	45,000	41,062.36	3,937.64
2. Identification, evaluation and selection of demonstrations	32,500	32,034	466
3. Conduct of Logical Framework Analysis (LFA) with the project stakeholders	7,000	7,000	0
4. Detailed Design of Project Components & Activities	15,466	14,466	1,000
5. Establishment of institutional framework for project partners/co-financiers in the project implementation and to ensure close coordination with co-financed baseline activities	2,500	2,500	0
Total	**102,466**	**97,062.36**	**5,403.64**

Note: the committed amount is expected to be delivered in June-August 2014 as it includes the cost for socialization of final (GEF-accepted) PENHRA ProDoc to stakeholders.

ANNEX D: CALENDAR OF EXPECTED REFLOWS (if non-grant instrument is used**)**

Provide a calendar of expected reflows to the GEF/LDCF/SCCF/NPIF Trust Fund or to your Agency (and/or revolving fund that will be set up)

No reflows of funds are foreseen under this Project.

[12]If at CEO Endorsement, the PPG activities have not been completed and there is a balance of unspent fund, Agencies can continue undertake the activities up to one year of project start. No later than one year from start of project implementation, Agencies should report this table to the GEF Secretariat on the completion of PPG activities and the amount spent for the activities.

United Nations Development Programme
Country: Indonesia

PROJECT DOCUMENT

Project Title:	**Promoting Energy Efficiency for Non-HCFC Refrigeration and Air Conditioning (PENHRA)**
UNPDF Outcome(s):	Strengthened climate change mitigation and adaptation, and environmental sustainability measures in targeted vulnerable provinces, sectors and communities
Expected CP Outcome(s) (2011-2015):	**Outcome 2.1.** Enhanced capacity of GOI to manage natural resources and energy *(Those linked to the project and extracted from the country programme document)*
Expected CPAP Output (s):	2.2.1 National energy policies and guidelines developed and integrated into sub-national development plan 2.2.2 Sub-national authorities and key partners are able to implement programmes, mobilize resources and develop public private partnership for RE/EE, which will contribute to the reduction of national greenhouse gas emission
UNDP Strategic Plan 2014-2017:	Outcome 1 Growth and development are inclusive and sustainable, incorporating productive capacities that create employment and livelihoods for the poor and excluded Output 1.5. Inclusive and sustainable solutions adopted to achieve increased energy efficiency and universal modern energy access (especially off-grid sources of renewable energy)
Implementing Partner:	Ministry of Energy and Mineral Resources (MEMR)
Responsible Partner:	Ministry of Energy and Mineral Resources (MEMR) and United Nations Development Programme (UNDP)

Brief Description

PENHRA aims at significantly improving energy efficiency (EE) of refrigeration and air conditioning (RAC) equipment and appliances manufactured and used in Indonesia. It is a unique demonstration of combining and sequencing different sources of funds and effective synergy with related projects, particularly from the HCFC Phase-Out Management Plan (HPMP) Project and the RAC Industry Players. Through the strategic investments, raising the manufacturing capability to locally-produce EE RACs and establish inspection and certification system in importing of EE RACs, the project is expected to achieve specific EE and technology performance goals and targets. This will bring about cumulative electricity savings of 581 GWh and cumulative GHG emissions reduction of 440 kt CO_2 by the year 3 of the project and beyond. This will be achieved through implementation of four Component Activities, namely, (1) Policy, regulatory and standard development for RAC industries, (2) Capacity Building and Awareness Enhancement on the Production and Utilization of EE RACs, (3) Promoting investment for EE enhancements in RAC industry, and (4) Technical Assistance for RAC Industry. The technical interventions will be carried out through investments in system redesign, plant and process modifications, awareness, technical assistance and training. Moreover, the technical assistance will be provided particularly to the targeted RAC companies that are also supported under the HPMP project. During the implementation, in addition to GEF fund of USD 5,020,822 and UNDP fund of USD 75,000; the project will be supported by in-kind and in-cash contributions to support parallel activities from the government (MEMR and MoE) to an amount of USD 10,349,112 and from RAC industries to an amount of USD 8,690,937. Thus, total resources for project implementation are USD 24,135,871.

Programme Period:	2015-2017
Atlas Award ID:	00081705
Project ID:	00090876
PIMS #	4945
Start date:	February 2015
End Date:	December 2017
Management Arrangements:	NIM
PAC Meeting Date:	

Total resources required	$ 24,135,871
Total allocated resources:	
UNDP	$ 75,000
GEF	$ 5,020,822
Government (Grant)	$ 7,585,162
Government (in-kind)	$ 2,763,950
Industry (Grant)	$ 7,651,669
Industry (in-kind)	$ 1,039,268

Agreed by (Implementing Partner): *Ministry of Energy and Mineral Resources*

Rida Mulyana
Director General for New and Renewable Energy and Energy Conservation

Date/Month/Year

Agreed by (Government):
Ministry of Finance

Robert Pakpahan
Expert Staff of the Minister of Finance on State Revenue
With Full Mandate as Director General of Debt Management

Date/Month/Year

Agreed by (UNDP):

Beate Trankmann
Country Director

Date/Month/Year

Table of Contents

List of Abbreviations &Acronyms

APR/PIR	Annual Project Reports and Project Implementation Review reports
APRC	Asia-Pacific Regional Centre
ASEAN	Association of Southeast Asian Nations
AUSAID	Australia Agency for International Development
AWP	Annual Work Plans
BAU	Business-as-Usual
BRESL	Barrier Removal to the Cost-Effective Development and Implementation of Energy Efficiency Standards and Labeling
CFL	Compact Fluorescent Lamp
CO_2	Carbon dioxide
CTA	Chief Technical Advisor
DGNREEC	Directorate General of New-Renewable Energy and Energy Conservation
EC&EE	Energy conservation and energy efficiency
EE	Energy efficiency, energy efficient
EECCHI	Energy Efficiency and Conservation Clearing House Indonesia
EER/COP	Energy efficiency ratio/Coefficient of performance
EERAC Center	EE RAC Consumer Assistance and Information Dissemination Service Center
EINCOPS	Energy Efficiency in Industrial, Commercial, and Public Sector
ES&L	Energy efficiency standards and labeling
GEF	Global Environmental Facility
GHG	Greenhouse gas
GoI	Government of Indonesia
GWh	Gigawatt-hour
GWP	Global warming potential
HCFC	Hydrochloro-fluorocarbons
HPMP	HCFC Phase-out Management Plan (HPMP)
IFC	International Finance Corporation
IOCs	Incremental operating costs
IPMVP	International Monitoring and Verification Protocol
kt	kilo tonne
LFA	Logical Framework Analysis
M&E	Monitoring and evaluation
MEMR	Ministry of Energy and Mineral Resources
MEPS	Minimum energy performance standards
MLF	Multilateral Fund
MMT	Million metric tons
MOE	Ministry of Environment
MoI	Ministry of Industry
MOT	Ministry of Trade
NEX	Nationally-executed
NPD	National Project Director
NPM	National Project Manager
ODS	Ozone depleting substances
PENHRA	Promoting Energy Efficiency for Non-HCFC Refrigeration and Air Conditioning
PIF	Project Identification Form
PMU	Project Management Unit
PPG	Project Preparation Grant
PPM	Project Planning Matrix

PSC	Project Steering Committee
QPR	Quarterly Progress Reports
R&D	Research and development
RAC	Refrigeration and air conditioning
RAN-GRK	National Action Plan to Reduce Green House Gases
RCU	Regional Coordination Unit
TWG	Technical Working Group
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention for Climate Change
USAID	United States Agency for International Development

1. SITUATION ANALYSIS

1.1. Context and Global Significance

1. Energy efficiency is a priority of the Government of Indonesia (GoI) as subsidies are being reduced for fossil fuel. There are national policies that focus of energy efficiency including demand side management, energy efficiency standards and labeling (ES&L), etc. Some of the existing policies in the country along with key targets are as mentioned below:

    - National Master Plan of Energy Conservation (RIKEN, 2005): to decrease energy intensity at least 1% per year until 2025.
    - Presidential Decree No 5/2006 (National Energy Policy): to achieve energy elasticity less than 1 in 2025.
    - Law No. 30/2007 on Energy: emphasis regarding (a) government, energy producers and energy consumer are responsible for the implementation of energy conservation (b) energy conservation is required from up-stream to downstream activities (c) government will provide incentive and disincentive for the implementation of energy efficiency and conservation.
    - Government Regulation on Energy efficiency No. 70/2009: (a) obligation for large energy consumer to conduct energy audit and designate energy manager, and (b) application of energy efficiency labeling for home appliances.
    - Presidential Instruction no. 13/2011 on Water and Energy Saving: obligation to all government-owned building, equipment and activities to save 20% energy consumption compared to the average consumption level in February 2011.

2. The Directorate General of New-Renewable Energy and Energy Conservation (DGNREEC) of Indonesia was established in August 2010 under the Ministry of Energy and Mineral Resources (MEMR). From March 2011, it began enforcing provisions under Government Regulation 70/2009, which requires that all entities with energy consumption more than 6,000 tonnes of oil equivalent per year shall establish an energy efficiency program, appoint an energy manager within the organization, conduct regular energy audits, and implement and report the audit recommendations. DGNREEC established the Energy Efficiency and Conservation Clearing House Indonesia (EECCHI), a facility to promote and share best practices knowledge in energy efficiency and conservation.

3. Furthermore, the recently issued Presidential Regulation No. 61/2011 on National Action Plan to Reduce Green House Gases (RAN-GRK) has set target to reduce greenhouse gas (GHG) emissions of 5.85 million tonnes of CO_{2e} by 2014 from the implementation of energy-efficient technologies for home appliances. This emissions reduction will contribute to the voluntary national target to reduce 26% of GHG emissions by 2020. This timeline for voluntary emissions reductions will fall during the peak implementation timeframe for compliance with the Hydrochloro-fluorocarbons (HCFC) Phase-out Management Plan (HPMP) Stage-I and Stage-II targets (freeze in HCFC consumption at baseline levels by 2013, 10% reduction from baseline levels from 2015 and 35% reductions from baseline levels from 2020). The technical interventions needed to improve energy efficiency, while converting to alternatives that are safe and with low- global warming potential (GWP), could significantly enhance contributions to these voluntary emission reduction targets, if implemented congruently with actions under HPMP.

4. Consistent with the guidance from the MOP Decision XIX/6 for maximizing climate change benefits from HCFC phase-out and also with Indonesia's voluntary national CO_2 emission reduction targets, the GoI and stakeholders would like to ensure that the proliferation of appliances with high GWP refrigerants is avoided, while promoting energy efficiency in appliances, equipment and buildings.[1] Considering the market potential of the refrigeration and air conditioning equipment and

[1] Indonesia HPMP Stage I Project Document (Final Approved Version)

devices or referred hereafter as RACs, the needed focus on RACs was deemed very important and practical.

5. Therefore, the GoI is proposing a project entitled "Promoting Energy Efficiency for Non-HCFC Refrigeration and Air Conditioning" or the PENHRA Project for funding by the Global Environmental Facility (GEF) and the United Nations Development Programme (UNDP) which is in line with the above-mentioned energy efficiency national policies and plans. Specifically, the project will help the government meet the targets set under National Master Plan of Energy Conservation, Presidential Decree No 5/2006 and National Action Plan in Reducing GHG Emissions. Also, the proposed project leverages the benefit of co-financing available under HPMP (which is also being implemented by UNDP). The highly beneficial complementarity between the two initiatives will bring in synergistic effects and compounding of impacts in the long run. The success will therefore depend on the strong collaboration and linkage between HPMP and PENHRA because of common and mutually reinforcing goals. An effective partnership between the government and the key stakeholders of the fast growing RAC industry is expected to influence other donors who may join the PENHRA Project during the project implementation and sustained at a later stage.

1.2. Summary of Barriers to Implementation of Programs in Promoting Energy Efficiency for Non-HCFC RACs

6. However, there are identified barriers that could affect the promotion and application of possible energy efficiency improvements in non-HCFC RACs consisting of policy/regulatory, institutional, technical, information and awareness, market and financial barriers. These are grouped and described briefly as follows:

Policy and Institutional Barriers

7. Still limited specific regulations on the application of energy efficiency standards and labels for energy consuming equipment and appliances. The adoption and enforcement of the minimum energy performance standards (MEPS) for RACs is still in the development stage and needs to be reinforced. Voluntary labeling regulation for energy efficient appliance is only available for Compact Fluorescent Lamp (CFL), as per Ministerial Regulation No. 06/2011. There is an ongoing UNDP-GEF regional project entitled Barrier Removal to the Cost-Effective Development and Implementation of Energy Efficiency Standards and Labeling (BRESL) which includes Indonesia among the six participating countries. BRESL has been facilitating MEMR in developing and building capacity for planning and implementing national energy efficiency standards and labeling for room air conditioners (ACs) and domestic refrigerators among other six target products. The draft of ministerial regulation for the energy performance standards and labeling of room ACs was finalized and submitted in early 2012 and was expected to be enacted within 2013. As an update, the Ministry of Industry issued Decree No. 34 in 2013 stating that air conditioning and refrigeration units should follow the SNI (Indonesian Standard) on safety operation, however, but not performance standard as originally planned. But the ES&L regulation for larger refrigerating equipment[2] is addressed neither by BRESL nor by other initiatives. Currently, none of the nationally-regulated and locally produced energy efficient RACs are available in the market. Presently, most of the energy efficient units are imported although there is no enforced policy that requires the local manufacturing or production of energy efficient appliances and equipment in Indonesia.

8. Still limited national drive to emphasize the importance of energy efficiency. There is a need to elevate the necessary priority given to the government's program on the energy efficiency at the same level given to other similar programs such as promoting renewable energy. There is only one

[2] Refrigeration covers commercial (< 12 HP) units such as retail food service and kitchen equipment, walk-in coolers/freezers and small commercial cold rooms.

enacted ES&L regulation for Compact Fluorescent Lamps that had been issued since 2011. There are only few (and limited to Japanese brands) manufacturing companies that operate accredited test facilities in Indonesia to test the products against applicable international EE standards due to unavailable national regulation on ES&L of the appliances.

9. Lack of clarity regarding which institutions are responsible for the formulation and enforcement of energy efficiency regulations for RACs. There is still the lack of clarity on role, coordination and cooperation among responsible institutions such as the MEMR, the Ministry of Industry and the Ministry of Trade in the implementation of energy efficiency programs for equipment/appliance like RACs.

Awareness and Market Barriers

10. Lack of awareness of the availability and benefits of the energy efficient RACs. This is because usually the concern of the users of RACs is on the initial price of the product. The RAC manufacturing industry is reluctant to implement the design and development of energy efficient RACs because of heavy market competition. Most manufacturers tend to lower the price of their products to increase sales volume and profitability, at the expense of quality. There is a lack of consumer awareness of energy efficient RACs and consequent behavioral change to design and implement public awareness campaigns and strategies to address this barrier.

11. Availability of a large variety of low-priced RAC products in the market. The appropriate EES&L rules and regulations on production and import of RACs are not yet in place, a situation that somehow poses no restriction on the entry of inefficient but relatively lower priced RACs in the local market. Due to this, the demand for EE RACs remains low as their price is higher compared to the existing RACs sold in the market. The energy consumers are not aware of the fact that although EE RACs cost higher, the higher energy efficiency performance of EE RACs results in lower energy consumption and lead to monetary benefits for them. The lack of promotion of the benefits of using EE RACs and the lack of confidence on performance assurance are the main factors for low market penetration of such products.

Financial Barriers

12. Financial institutions still consider energy efficiency projects as high risk ventures. The Bank of Indonesia regulations do not consider energy saving from energy efficiency projects as collateral fund that can be used by the companies to apply for loan/financing for their energy efficiency projects. Despite of several training courses and workshops conducted for the financial institutions by UNDP, IFC and USAID on evaluating EE projects, this situation still persists.

13. The present production lines of local RAC manufacturers/assemblers are not adequately equipped or tooled for the manufacture of EE RACs. The addition of new lines or upgrading/modification of existing ones will certainly require additional investment and leads to higher production cost. In developing the EE RAC market, there will be necessary changes required in existing RAC production lines which will require additional investments. Likewise, due to the price competition, there is a risk associated with the payback of these investments. Thus, this situation has an influence on the investors' interest attributable to possibility of low returns, long lead time, and high risk of operational failures until the end users or consumers are aware and are confident of energy efficiency benefits during the usage phase of the equipment or appliance.

Technical Barriers

14. Inadequate existing local capacity for developing and commercializing alternative EE technologies in the production and application of EE RACs. Technology transfer for improving energy efficiency and local production capacity of RACs from multinational players is necessary but this is governed by intellectual property rights (IPR) and other related issues. In this regard, most manufacturers do

not have capability to design an EE unit therefore they will need technical assistance to develop their capability otherwise they would have to purchase patent rights from multinationals. It is extremely difficult and expensive to acquire related intellectual property rights. PENHRA is not involved in IPR issues, hence it may have to focus on developing local EE design capability. It is noted that interventions such as the evaluation of the techno-economic feasibility of other alternative low GWP refrigerants, such as HCs, will be dealt with by the relevant baseline HPMP activity that is part and parcel of the PENHRA project. The project also includes activities that will further promote the use of applicable low GWP refrigerants and will involve the provision of technical assistance on the prototype development, testing, and commercialization of the EE RACs that will make used of feasible energy efficient, low GWP refrigerant alternatives.

15. Lack of technical performance assurance mechanisms that are affecting quality and market confidence on the RACs. At present, there are still the significant technical factors affecting quality assurance of locally available RACs and consumer confidence on RAC product performance. These include absence of enforceable technical standards and the lack of standardized technical testing, inspection and certification infrastructure.

16. Lack of accredited testing laboratories and institutions to evaluate and certify energy efficiency performance of RAC units being developed as EE RAC prototypes and those units that enter the RAC market. This is linked to the policy and institutional barriers mentioned above. Related to the planned imposition of the EE S&L rules and regulation to be promulgated, there is a critical lack of capacity and very low availability of accredited testing laboratories and institutions to support implementation of an EE RAC program. Once the EE S&L program is in place, the testing energy performance and technical attributes of the products should be assured and be the responsibility of accredited laboratories which are needed to implement the EE standards and labeling of RACs across the country.

These barriers will be addressed by the project towards resolving them to achieve the outcomes and overall objective of the project.

Identified Key Barriers	Activities Addressing the Barriers
Policy and institutional	
Still limited specific regulations on the application of energy efficiency standards and labels	Activities 1.1.1; 1.2.1; 1.3.1; 1.4.1; 1.4.2; 1.5.1
Still limited national drive to emphasize the importance of energy efficiency	Activities 1.3.1; 1.4.1; 1.5.1; 1.6.1; 4.3.1
Lack of clarity regarding institutional responsibility on EE RACs	Activities 1.5.1; 1.6.1; 4.2.1; 4.2.2; 4.3.1
Awareness and Market	
Lack of awareness of the availability and benefits of EE RACs	Activities1.6.1; 2.1.1; 2.2.1; 2.3.1; 2.4.1; 4.1.2
Availability of a large variety of low-priced RAC products in the market	Activities 4.1.1; 4.1.2; 4.2.1; 4.2.2; 4.3.1
Financial	
Financial institutions still consider energy efficiency projects as high risk ventures	Activities1.4.1; 1.4.2; 1.6.1; 2.3.1; 3.1.1; 3.1.2; 3.2.1; 4.1.1; 4.1.2; 4.2.2; 4.3.1
Necessary changes required in existing RAC production lines will certainly require additional investment	Activities 2.3.1; 3.1.1; 3.1.2; 3.2.1; 4.1.1; 4.1.2; 4.2.2; 4.3.1
Technical	
Inadequate existing local capacity for developing and commercializing alternative EE RAC technologies	Activities 2.1.1; 2.4.1; 3.1.1; 3.2.1; 4.2.1; 4.2.2
Lack of technical performance assurance mechanisms	Activities 1.1.1; 1.3.1; 1.5.1; 1.6.1; 2.4.1; 4.2.1; 4.2.2
Lack of accredited testing laboratories and institutions	Activities 1.3.1; 1.5.1; 1.6.1; 2.2.1; 2.2.2; 2.2.3

1.3. Baseline Scenario

17. The project baseline primarily consists of the relevant ongoing and planned activities, projects and programs on energy efficiency improvements and changeover to non-HCFC refrigerants in the RAC industry in Indonesia. To provide incentive for RAC industries in the country to manufacture or to assemble energy-efficient products, the MEMR, in close coordination with the Ministry of Finance has implemented import tax reduction for companies that import high-energy-efficiency RACs to the country.

18. As introduced above, the DG-NREEC of the MEMR is also a responsible agency for developing and establishing national energy performance standards and labeling. So far minimum energy performance standards (MEPS) are not yet imposed on any electrical products in Indonesia. Under the proposed project, MEPS will be made mandatory for RAC equipment where locally manufactured and imported units shall qualify the set performance standards. The DG-NREEC has been developing ministerial regulations on national energy standard and labeling for six home appliances, including ACs. Currently, this is being done through the BRESL Project, which is an ongoing UNDP-GEF regional project implemented in six countries in Asia. Indonesia is one of the participating countries of the BRESL Project. In Indonesia, the implementing partner for the national BRESL activities is the DG-NREEC. In brief, BRESL project focuses on removing barriers for energy efficiency standardization and labeling (ES&L) of home appliances through (1) policy making, (2) capacity building, (3) manufacture support, (4) regional cooperation, and (5) pilot projects. Although it cannot be considered as a baseline activity for the proposed project as far as co-financing is considered, the results, experiences and lessons learnt from BRESL can certainly be used as basis for potential incremental activities that may be necessary in PENHRA such as issuance of ES&L regulation for AC[3], capacity building for ES&L stakeholders in coordination and development of energy standard, technical assistance provided to support AC manufacturers to meet the requirements under ES&L, financing facility to support the manufacturers to implement the ES&L activities and awareness program that will be implemented for consumers, retailers and manufacturers.

19. It should be noted that so far, without the BRESL project in Indonesia, progress on ES&L would have been very slow. Among the results of the BRESL project in Indonesia is, the establishment of a database of energy efficient products and implementation of a consumer education scheme. Through the influence of the BRESL project, the government has come up with a procurement scheme to go for energy efficient products. BRESL project also offers training to selected personnel from appliance manufacturing companies regarding ES&L as well as MEPS and enables them to apply the concepts learned in workshops. Such trainings are expected to reduce the barrier related to the inadequate technical know-how in implementing energy efficiency measures when going for ES&L.

20. Apart from the BRESL project, the MEMR has also allocated budget for a program that involves the implementation of energy efficiency activities such as energy audits, fiscal policies, and regulations focusing ES&L. Specific activities of this program will be subsumed into PENHRA as baseline activities. Such baseline activities will support the achievement of the expected outputs under Component 1, 2 and 4 of PENHRA as discussed below.

21. Moreover, to support the implementation of ES&L for ACs, the Japan Government/Japan Partnership Fund has allocated budget to conduct demand-side management study on RACs and to support improvement of a RAC testing facility in Indonesia. The lessons learnt from this and other related projects have been considered during the project design and will also be taken into account

[3] The type of appliance/equipment covered under the BRESL project in Indonesia are (a) refrigerators (around 187 liters), (b) room air conditioners (12,000 BTU/h capacity; about 1.8 to 3.5 kW power capacity), (c) electric motors (around 4.2 kW capacity), (d) ballasts for FTLs, (e) electric fans (around 70 W capacity), and (f) Compact Fluorescent Lamps (CFL) of 13 W capacity. The room air conditioners typically use HCFC (R-22) as refrigerant.

during project implementation to maximize synergy effect. For instance, the Australian government/AUSAID has been facilitating with MEMR to participate in various international knowledge exchange events that aim to strengthen understanding in ES&L policy and institutional development as well as to provide further needed support in the management planning and implementation of an ES&L program in Indonesia. On the other hand, a bilateral funding with the U.S. is involved in a demo project for an EE unit using R-32 which provides design software and equipment testing tools. Both projects are under UNDP project supervision, so that the activities from the programs of the Australian and U.S. governments are considered as baseline activities under PENHRA to support the delivery of expected outputs in Components 1 and 4. Furthermore, the private sector comprising of beneficiary enterprises of the HPMP and this proposed project will co-finance specific activities of PENHRA to support the achievement of outputs under Components 1, 2 and 4. Among these are the multi-stakeholder discussions on policy and institutional framework, investment needs in companies to improve energy efficiency in RAC system and contribute to market development activities, such as consumer awareness campaign.

22. Through the coordination work of the Ministry of Environment (MoE) and in close collaboration with the Ministry of Industry (MoI), Indonesia is currently implementing its HCFC Phase-out Management Program (HPMP). It is funded through supports from UNDP (as lead funding agency) together with the Australian Government, the World Bank and UNIDO. The HPMP focuses on extraordinary efforts to curb the momentum of inevitable growth in HCFC consumption in the RAC sector[4]. HPMP activities aim to phase out HCFC use in the manufacturing of refrigeration and air conditioning products and equipment by 2015. Such activities include investment/financial assistance in RAC sectors, policy and regulation, supervision, coordination, monitoring, awareness and capacity building for targeted sectors. About 90% of the HCFC used in Indonesia is in air conditioning and the rest in refrigeration. The use of HCFC for refrigeration is quite low.

23. The manufacturing activities in Indonesia's RAC industry are concentrated in a relatively small number of well-organized enterprises (less than 50 enterprises). The use of HCFC is 85% of the total refrigerant consumption, while 15% is HFC such R-410A, R-507, R-134a, R-404A. During the PPG stage, the team developed a listing of the manufacturing companies for refrigeration and air conditioning units showing their production capacity, type of units and HCFC consumption based on 2009 data.

24. HCFC phase-out will be addressed in the HPMP through technology conversions in about 48 enterprises that belong to various RAC sub-sectors in Indonesia, and this will include technology conversion, modification of production lines from HCFC to non-HCFC technology that would be carried out at these enterprises. A total funding of US$ 8,953,902 has been approved by Multilateral Fund for covering eligible incremental capital and operating costs[5] for phase-out of HCFCs. Since specific HPMP activities are part and parcel of PENHRA (whether modified or enhanced), the PENHRA project is regarded and was developed as an improvement of the HPMP towards achieving EE in the refrigerant shifts and RAC production. This is expected to directly support the Component 3 of PENHRA, particularly the **Output 3.1.2**, i.e., Modified and optimized production lines for EE RAC manufacturing installed and operational. In line with this, financing institutions have also allocated loan programs for clean energy projects in Indonesia, which can support achievement of Component 3 of PENHRA.

25. It should be noted that HPMP conversion to non-HCFC RACs is one of the PENHRA baseline activities such that this starting point has to be established also within the scope of the Project. The focus of PENHRA in terms of coverage and technical performance benchmarks was the result of the baseline establishment exercise.

[4]The HCFC that is predominantly used in Indonesia is HCFC-22, mainly in the refrigeration and air conditioning sector, apart from other sectors such as foams, firefighting and solvents.

[5] In accordance with the Decision 60/44 of the Executive Committee of the Multilateral Fund.

The following information on the refrigeration and air conditioning equipment sub-sectors will serve as reference points for the baseline analysis of the proposed project.

26. The RAC sub-sector that is covered by the PENHRA Project is listed in **Table 1.**

Table 1: RAC Sub-Sector Applications Included in the PENHRA Project

RAC Applications	Units/systems in the Market
Included in PENHRA	
Commercial Refrigeration	Bottle Cooler, ice cream box, supermarket display cabinet
Industrial Refrigeration	Ice plant, cold storage, process industry refrigeration
Transport Refrigeration	Refrigerated truck and container van
Residential and Commercial Air Conditioning	Window-, split- and package-type air conditioner
Chiller	Water-cooled and air-cooled chiller
Not included in PENHRA	
Domestic (Household) Refrigeration	Refrigerator (covered by BRESL), water dispenser
Mobile Air Conditioning (MAC) and Transport Air Conditioning	Air conditioning for car, bus, railway wagon, ship

27. For RACs that are produced and marketed in Indonesia, the typical indices of energy efficiency ratio/coefficient of performance (EER/COP) in 2012 prior to the HPMP are listed in **Table 2** below.

Table 2: RAC Applications Covered by PENHRA, Number of Units Sold and Typical Energy Efficiency Indices in 2012

Industry Types	Description	Unit number in 2012	Typical EER/COP[6]* in 2012 Prior to HPMP[7]**
Commercial (<12 HP)	Retail food service and other commercial cold rooms	11,055	8.2 – 10.9 (EER) 2.4 – 3.2 (COP)
	Walk-in coolers/freezers and other commercial cold rooms		8.2 – 10.9 (EER) 2.4 – 3.2 (COP)
Industrial (> 12 HP)	Industrial cold rooms, chilling plants and refrigerated warehouse		8.2 – 12.6 (EER) 2.4 – 3.7 (COP)
Transport Refrigeration	Refrigerated truck and container van	15	8.2 – 10.9 (EER) 2.4 – 3.2 (COP)
Residential, Light Commercial and Commercial AC	Window-, split- and package-type AC	1,445,322	8.2 – 12.6 (EER) 2.4 – 3.7 (COP)
Chiller	Water cooled and air cooled chillers	511	8.2 – 10.9 (EER) 2.4 – 3.2 (COP)

28. **Table 3** presents the number of companies engaged in various RAC applications to be covered by PENHRA.

[6] COP ≈ EER/ 3412. While there are units that could reach the higher values of EER/COP, a great majority fall under the lower values.
[7] At the PPG stage, the difference between the constant frequency (CF) and variable frequency (VF or inverter type) RACs was not yet considered as there is no data available. Also, there is no segregated data on the number of CF and VF RACs sold in market. The EER for VF compressor for ACs is not defined yet, because there is no standard on how to test it. Some experts suggest to use Seasonal EER (SEER) but this has not been implemented either. Therefore, based on available data on EER, the project impacts on EE savings and GHG reduction were included herein as two separate cases: one for those manufactured RACs in Indonesia and the other including local RACs and imported ACs.

The groups of RAC industry players and their RAC production data were classified based on the survey conducted by the PPG Team during the ProDoc formulation in coordination with the HPMP Project. In summary, the project development has devoted sufficient time and efforts to gather primary and secondary information on the target PENHRA participants. As noted above, difference between the constant frequency (CF) and variable frequency (VF or inverter type) RACs was not yet considered as there is no data available. Also there is no segregated data on the number of equipment/appliances sold in market (as per CF and VF). The Team has also met several times with the HPMP Project Team and the industry players even on bilateral discussions. In this manner, there is a very good basis for the identification of specific needs in the modification of the manufacturing and assemble for the production of EE RACs. This extensive knowledge of the RAC sub-sector is very important also in communicating with them, getting commitments and achieving ownership of the project implementation so that the expected project outcomes and benefits to them will be effectively realized. It also provided vital information on the target industry players relevant to PENHRA, the number of companies and the required items and budgets to be included in the project. Since the RAC technology is moving towards the proliferation of VF or inverter type of RACs, which is also in line with EE technology improvements, this segmented classification and program management to consider the expanded market of VF types should be considered during the project implementation.

Table 3: The RAC Industry Players to be involved in the PENHRA Project

RAC Manufacturers, Distributors and Service Enterprises	Number of Companies
Air Conditioning	**21**
Residential	1
Commercial	4
Importer/Installer residential and light commercial	16
Refrigeration	**27**
Group I (Refrigeration– Cyclopentane) Manufacturer Assembler	 1 2
Group II (Refrigeration– HFC-245fa) Assembler	 24
TOTAL	**48**

29. The PENHRA Project will build upon all ongoing energy efficiency projects/programs in the country in the design, development and implementation of the project, including government and private sectors in order to explore and possibly make use of potential synergies, ensure complementarity and build on best practices and lessons learned.

    a. BRESL project made progress in terms of establishing energy efficiency ES&L for some of the equipment and appliances as mentioned above. But ES&L regulation for larger refrigeration equipment is addressed neither by BRESL nor by other initiatives. Therefore, it is necessary that PENHRA should take forward the issuance of ES&L regulation for ACs, and capacity building related activities including financing support needed to implement the ES&L activities.

    b. Ongoing cooperation in energy efficiency and conservation such as:

        - Indonesia-Denmark project on Energy Efficiency in Industrial, Commercial, and Public Sector (EINCOPS). The discussions will be conducted to assess possibility of involving energy efficient and non-HCFC refrigeration and ACs to be part of criteria in green building code in Indonesia.

- ASEAN project on Promotion of Energy Efficiency and Conservation. Engagement of MEMR representative will be ensured to participate in coordination meeting of ASEAN project on Promotion of Energy Efficiency and Conservation.

- UNIDO project on Promoting Energy Efficiency in the Industries through System Optimization and Energy Management Standard. Coordination with this project will include exchange relevant notes about strategy in promoting energy efficiency in industrial sectors.

c. Additional funding as co-financing. Discussions are in final stages with bilateral counter parts as they are interested in providing additional investments and funding support needed for implementing energy efficiency enhancements in refrigeration and air conditioning equipment manufacturing.

30. The Multilateral Fund (MLF) for implementation of the Montreal Protocol has provided grant funding to Indonesia for compliance with the phase-out schedule for HCFCs, through implementation of a performance-based HPMP. HCFCs are used as refrigerants in the air conditioning and refrigeration industry segments[8]. Under the HPMP, these industry segments in Indonesia will phase-out HCFCs by 2015, by converting to non-HCFC technologies. During this changeover process, the RAC manufacturing sector has a one-time window of opportunity for technology conversions in conjunction with the phasing out of HCFCs, involving intensive capital investments that have long economic life.

31. The important question would be: How would the efficiency levels of each of the PENHRA Target Products increase in the Business-as-Usual (BAU) Scenario without PENHRA Project in terms of the pace of market transformation to EE RACs? The technical considerations regarding the HPMP approach in the transition to non-HCFC production lines which is the baseline scenario of the PENHRA project have been discussed with the industry players. The improvement in EERs of the RACs is not covered directly by the HPMP and will therefore rely only on the individual manufacturer's own timing of his/her project/venture on production line modification or upgrade to enable the production of energy efficient RACs that use HPMP-promoted refrigerants; and/or the completion of baseline projects (such as BRESL), if at all. This would mean that, it is up for the manufacturer to decide whether he/she will do the modifications in his/her RAC design when accommodating the use of new refrigerants being promoted by the HPMP if there is no PENHRA Project. Therefore, the EER levels as a result of project intervention for three years can be evaluated for a period of 10 years with the HPMP as baseline and is aimed to be enhanced by PENHRA through a joint cooperation. In the year 2012, the baseline Energy Efficiency Ratios (EERs) of RACs (business-as-usual scenario) and are seen in **Table 2** above, with varying reference value ranges for each type of appliance or equipment. Due to the influence of the proposed PENHRA project, the COP values are expected to be enhanced from 2.8 in baseline to 3.2 in COP values (or from 9.5 to 10.8 in EER values) at the end of the project and to 3.3 COP (or 11.0 in EER values) after 20 years in 2033 with no distinction whether these are CF or VF (or inverter) types. With reference to EER labeling, the EER will be improved from 2 Stars value to 3 stars value within the project duration. Details are seen in **Table A.1**, **Annex A**.

[8]Refrigeration includes commercial (< 12 HP) units such as retail food service and kitchen equipment, walk-in coolers/freezers and small commercial cold rooms. Air conditioning includes those used in residential (up to 3 HP), light commercial (5 - 30 HP) and commercial (35 HP and above) types. The common refrigerant used in all these equipment is HCFC (R-22).

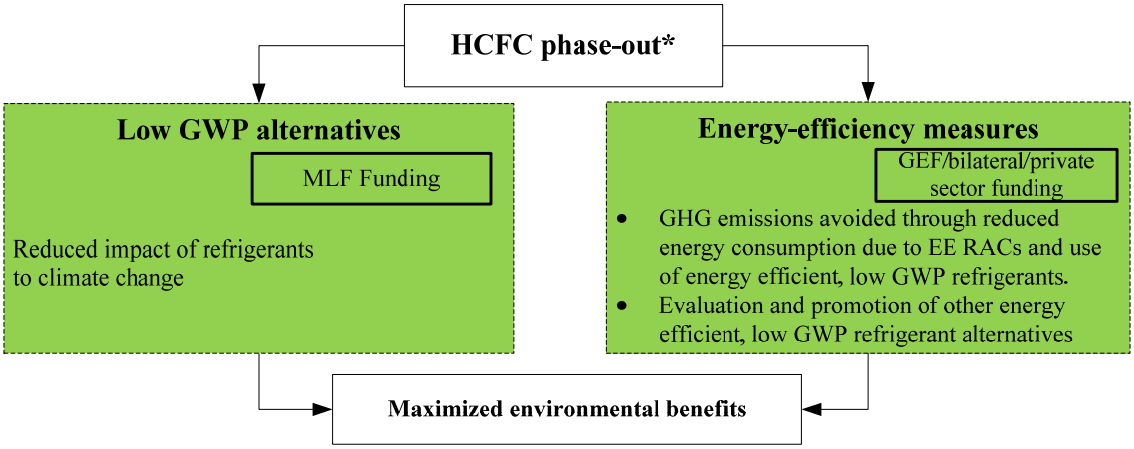
2. STRATEGY

2.1. Project Rationale and Policy Conformity

32. The basic concept and approach of this proposed GEF-supported alternative to the baseline scenario as described above is the realization of energy efficiency benefits while transitioning to non-HCFC technologies and significantly reduce the GHG emissions. This project is a unique demonstration of combining and sequencing different sources of funding that target specific common goals. During the changeover phase, RAC enterprises will need to make significant additional investments to enhance product design to produce improved energy efficiency equipment. The required additional costs must be borne by the enterprise and may need additional financial assistance from bank or financial institutions, since MLF will not fund any sort of such energy efficiency interventions and related investments as these are not eligible for funding through MLF. The MLF will cover only incremental costs involved in the technology conversion, change of equipment and appliance production line from HCFC to non-HCFC technology that would be carried out in selected RAC manufacturing enterprises in Indonesia. The HPMP project is considered as a one-time window of opportunity for local RAC manufacturers to carry out energy efficiency technology conversions in conjunction with the phasing out of HCFCs. The opportunity for such energy efficiency interventions will be facilitated through the proposed PENHRA project, which will mainly remove the current barriers to achieving the widespread production and application of energy efficient RAC appliances/equipment in Indonesia. Such barrier removal activities represent the bulk of the incremental activities of the proposed project that are eligible for GEF funding. Thus, the basic requirements to meet the HCFC phase-out are met through the technical and financial assistance from MLF, while, the GEF funding requested will focus on the energy efficiency improvements in the production, and sale of EE RACs after transitioning to non-HCFC technologies. RAC equipment manufacturers will be selected to lead the transition. The selection of RAC manufacturers will be based on the following criteria: (a) commitment of RACs manufacturers to participate in HPMP program, (b) RAC manufacturers that has a larger market share in Indonesia, and (c) the RAC manufacturers expressed interest to participate as beneficiaries of PENHRA project.

33. Under the HPMP, by 2015, RAC industry segments in Indonesia will phase-out HCFCs, and convert to non-HCFC technologies. During this changeover process, as mentioned earlier, the base cost required to meet mandatory production line changes will have to be borne by the enterprises. In some circumstances, during this changeover phase, enterprises may invest additional investments to expand the production capacity or enhance product design to produce improved energy efficiency equipment or may need to relocate to a different location considering safety aspects etc. Under all these circumstances, the required cost must be borne by the enterprise and may need additional financial assistance from bank or financial institutions. One proven way of encouraging the banks/financial institutions to become interested in supporting such projects is to introduce to them the financial benefits that the customer and the bank/FIs can realize from such projects. Also, by providing training to their personnel on how to evaluate the viability of such initiatives, they become more confident in venturing into the provision of financing. For that, the proposed project includes activities that will involve training of selected staffs of banks and financial institutions for the financial evaluation of EE RAC business proposals. Further modifications in the existing production lines, therefore, will be done to accommodate the enhanced energy efficiency features of specific RAC components that will make use of the new non-HCFC refrigerants. Collectively, this combination and sequencing of funding sources will enable the RAC industry in Indonesia to simultaneously adapt low carbon technologies that enhance system energy efficiency performance and lead to maximize environmental benefits of the changeover. While transitioning from HCFCs to non-ozone depleting substances (ODS) alternatives under the HPMP, technical interventions to introduce safe low-GWP alternatives (reduced impact of refrigerants to climate change) and to improve energy efficiency (reduced GHG emissions through reduced energy consumption) can be

most suitably and cost-effectively accomplished if implemented simultaneously with HPMP implementation timeframe (refer to **Figure 1**).



* It is inevitable to design interventions with dual objectives of ozone and climate protection

Figure 1: Pictorial Description of Anticipated Funding Flow for HCFC Phase-out along with Overall Objective of Maximizing Climate Benefits

34. Timely interventions to introduce optimum low-GWP, safe and energy-efficient alternative technologies, thus would lead to maximization of environmental benefits through significant direct and indirect CO_2 emission reductions in Indonesia in the context of the proposed project, the HPMP implementation and the Indonesia's voluntary CO_2 emission reduction targets. Thus, the proposed project enables Indonesia's RAC industry to transform towards low carbon green growth pathways and also demonstrate efficient use of different sources of funding that are available internationally.

35. The goal of the proposed PENHRA alternative conforms to the overall GEF objective. The overall goal of PENHRA is **the reduction of GHG emissions due to reduced electricity consumption by RACs which otherwise generated based on fossil fuel in Indonesia**. This PENHRA goal is aligned with GEF-5 Climate Change Mitigation Focal Area Objective No. 2 (CCM-2) which is to: *Promote Market Transformation for Energy Efficiency in Industry and the Building Sector*.

36. The major focus of the PENHRA Project, which aims to improve energy efficiency of RACs manufactured and used in Indonesia, is in line with the following GEF-5 Climate Change Mitigation strategic objective on Energy Efficiency, i.e., CCM-2: Promote market transformation for energy efficiency in industry and the building sectors.

2.2. Alternative Scenario

37. The goal of the project is reduction of GHG emissions due to reduced electricity consumption by RACs which otherwise is generated by fossil fuel-based power generation systems in Indonesia. This GHG emissions reduction does not include (to be conservative) avoided GHG emissions due to the conversion from high GWP refrigerants to low GWP refrigerants.

38. PENHRA project will bring about the Alternative Scenario from the mitigation of CO_2 emissions from the combustion of fossil fuels that would have been used in producing the electricity that will be used by RACs. The CO_2 emission reductions would therefore come from the electricity savings accrued during the utilization of EE RACs. That electricity is considered to be from fossil fuel-fired thermal power plants. Energy efficiency improvement has been demonstrated to be one of the most

economical and effective means of reducing GHG emissions. While selected HPMP activities (e.g., refrigerant enhancements) are part and parcel of PENHRA, there are clear differences and delineations between such activities and the activities that focus on the application of EE features in the design and system applications of EE RACs. In this regard, the PENHRA and the HPMP projects in a way that the former supplement the latter with additional features such as the upgrading of RAC production systems, and also the production of higher energy efficient RACs.

39. The various outputs and outcomes that will bring about the Alternative Scenario are the following:

Outcome 1: Appropriate enforcement of policies, laws, and regulatory support mechanism that ensure manufacturing and sale of certified quality energy efficient (EE) RACs increased in Indonesia.

- Output 1.1: Established and effectively enforced mandatory national MEPS for RACs
- Output 1.2: Adopted policy and regulations on the local manufacturing and import of EE RACs
- Output 1.3: Established and operational accreditation, inspection and certification system for all locally manufactured and imported RACs sold in Indonesia
- Output 1.4: Established and operational consumer assistance and information dissemination service center on EE RACs
- Output 1.5: Established RAC industry-wide coordination and cooperation system and implemented EE RAC technology development and application program
- Output 1.6: Completed performance evaluation of the EER/COP enhancement program in the RAC industry

Outcome 2.1: Increased awareness of the retailers and consumers on the benefits of energy efficient RACs in Indonesia

- Output 2.1.1: Completed EE RAC retailer training and awareness program
- Output 2.1.2: Completed consumer education campaign on the use and benefits of EE RACs
- Output 2.1.3: Completed public relation campaigns for EE RAC industry players
- Output 2.1.4: Completed awareness and capacity building on the use of non-HCFC RACs

Outcome 2.2: Enhanced technical capacities of appliances testing institutions to test the EE performance of RACs

- Output 2.2.1: Formulated and applied testing procedure for RACs EE prototypes and commercial availability
- Output 2.2.2: Completed training and accreditation of testing institutions in implementing the adopted procedures and regulations for EE performance testing, verification and certification of RACs
- Output 2.2.3: Completed monitoring and evaluation for improvement of testing and certification institutions and validated recommendations for continuing EE enhancements

Outcome 3.1: Enhanced capacities of RAC manufacturers to produce EE RACs

- Output 3.1.1: Designed and implemented financial assistance program
- Output 3.1.2: Modified and optimized production lines for EE RAC manufacturing installed and operational

Outcome 3.2: Increased production and sale of EE RACs in Indonesia

- Output 3.2.1: Manufacturing companies implementing technology modifications for the production of EE RACs

Outcome 4: Enhanced knowledge and capacity on EE RAC technologies in the RAC industry

- Output 4.1: Documented and publicly available information on technically and economically feasible EE technologies with low GWP that can be applied by local RAC manufacturers
- Output 4.2: Completed capacity development programs for local RAC manufacturers
- Output 4.3: Regularly updated information on EE RAC market

40. The significant developments that will manifest the realization of the various aspects of the Alternative Scenario is through the indicators listed in the Project Planning Matrix (PPM), which will include adoption and implementation of the EE standards on non-HCFC RACs, enactment of decrees and issuance of regulations on RAC minimum energy performance standards (MEPS), developed capability of testing institutions, enhanced level of awareness EE RAC benefits, increased availability of locally-produced and imported EE RACs, provided and promoted investments in EE RAC manufacture, increased utilization of EE RACs, and quantified energy savings resulting from the PENHRA. In order to achieve this, RAC EE policy and capacity development are important outcomes of the project where MEPS will be made mandatory and intensive training will be carried out to introduce these measures as well as additional activities for handling new EE technology alternatives that may come in the market during the actual implementation of the project. An activity involving the conduct of a study to other potential alternatives to R-32 that are cost-effective, energy efficient and has low GWP is also included in the project. While this topic was discussed by the manufacturers and government agencies during the PPG process to come up with the initial list of potential alternatives, the need for further detailed study in the first months of the project implementation was deemed necessary to ascertain the technical basis of the program.

41. For the Alternative Scenario, the improvements/enhancements that will be done to the baseline projects, programs, activities in the local RAC industry/market that Indonesia is currently implementing, which basically constitutes the HPMP and BRESL Projects will focus on the following: (a.) enforcing mandatory MEPs for RACs; (b.) regulating local production and import of RACs adhering to these standards; (c.) capacity building and awareness on producing, testing/certifying, retailing, using and monitoring EE RACs; (d.) promoting industry investment in shifting to energy efficient RAC technologies and (e.) documenting and disseminating technology improvements and their benefits. Such improvements/enhancements for purposes of ensuring the generation of global environmental benefits (i.e., more GHG emission reduction) will be facilitated through incremental activities (that will be done under PENHRA) to be funded by GEF.

42. With the improved baseline projects, programs and activities, as well as all relevant additional actions to be done and enabling conditions to be established under PENHRA. It is envisioned that the planned interventions will all lead to the increased production and sales of EE RACs; increased market share of EE RACs; improved technical capacities of RAC manufacturers in developing and applying energy efficient RAC technologies. Due to the steady economic development in the country, the local air conditioning equipment market has grown significantly in the past few years and is expected to continue for the next 10-20 years. At the baseline year 2012, the share of energy efficient RACs in the market is estimated at 19.8%. Considering market trending at significant growth rates and the impact of project interventions, this market share is projected to increase to 27.4% in 2017 at the end of the Project, to 38% in 2024 or 10 years after project start and to 60.5% in 2033 after 20 years since project start. The products targeted under the PENHRA project are consumer goods that are widely used particularly in households and commercial establishments. The project will give importance to the market development for RACs in terms of the feasibility studies, training and information, technical assistance and ensuring quality and EE performance of the RACs locally-produced and imported in Indonesia. Measures to address market risks include (a) assisting and empowering consumers, including women in the households, to make real time, informed decision making when buying EE products; and (b) promotion of suitable financing and

market incentives which will be developed and the facilitated under the project. There is a great market potential with increased production and sale of EE RACs in Indonesia.

2.3. PENHRA Goal, Objectives, Outcomes and Outputs/Activities

43. The goal of the PENHRA Project is the reduction of GHG emissions due to reduced electricity consumption by RACs, which otherwise generated based on fossil fuel in Indonesia. Energy efficiency improvement has been demonstrated to be one of the most economical and effective means of reducing GHG emissions. Assuming the project will start by 2015, PENHRA is expected to contribute to a cumulative electricity savings of 581 GWh by 2017 or at the end of the project in Year 3 against a baseline electricity consumption of 3,224 GWh/y in 2014.The equivalent reduction of CO_2 emissions is estimated at 440 kilotons (kt) CO_2 by year 2017 and 1,481 kt CO_2 by year 2024 or ten years after project starts.

Table 4: Summary of Expected Results of Baseline and Alternative Scenarios

	2014 Baseline Year 0	2017 End of project Year 3*	2024 10 years after Start	2033 20 years after Start
Baseline electricity consumption (*GWh/y*)	3,244	3,644	4,783	6,784
Alternative electricity consumption (*GWh/y*)	-	3,477	4,563	6,472
Cumulative Electricity Savings, *GWh*	-	581	1,956	4,374
Cumulative reduction of GHG emissions, *kt CO_2*	-	440	1,481	3,311

*Assuming the Project will start in 2015.

More details on project impacts in terms of energy savings and CO_2 emissions reductions are seen in **Table A.5**, **Annex A**.

Assuming the project starts in 2015 (Year 1), the calculation in electricity consumption for the BAU Scenarios under HPMP and BRESL and the Alternative Scenario of the PENHRA Project was done. The results using the calculation methodology provided by UNDP is seen in **Figure 2** which gives a graphical presentation of the past trend (2009 – 2013), baseline year 2014, projected 2015 -2017 (PENHRA Project influence during implementation), and projected 2024 (ten years after project start).

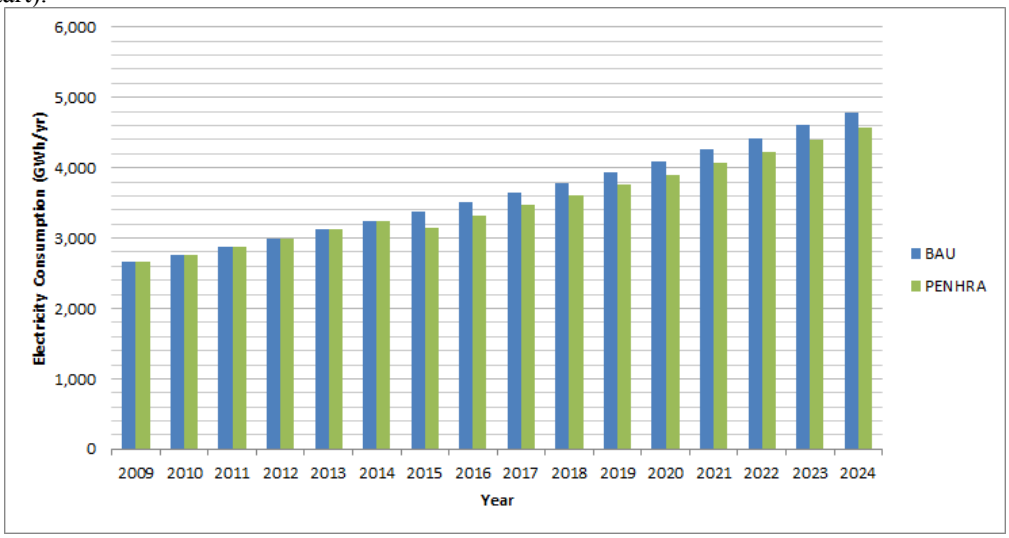


Figure 2: Graphical Summary of Expected Results Electricity Consumption of Baseline (HPMP & BRESL) and Alternative (PENHRA) Scenarios

Figure 3 presents the graphical summary of the PENHRA Project in terms of in terms of cumulative energy savings described in **Table 4** above.

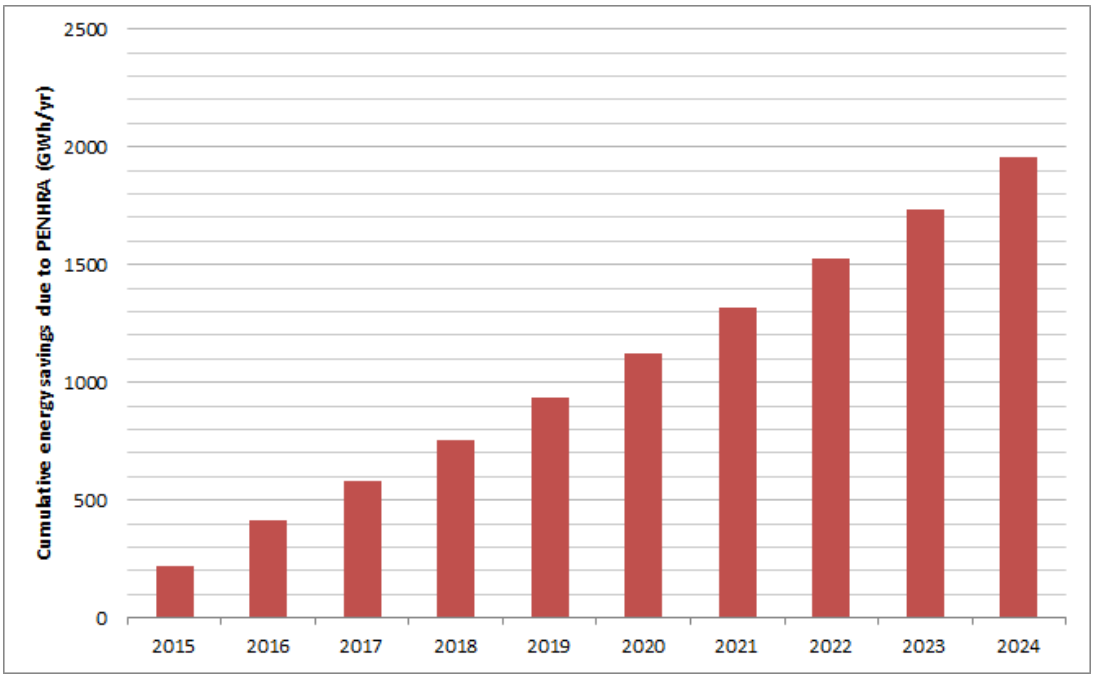


Figure 3: Graphical Summary of Expected Results in cumulative energy savings of the PENHRA Project

Figure 4 presents the graphical summary of expected results in annual CO_2 emission reductions.

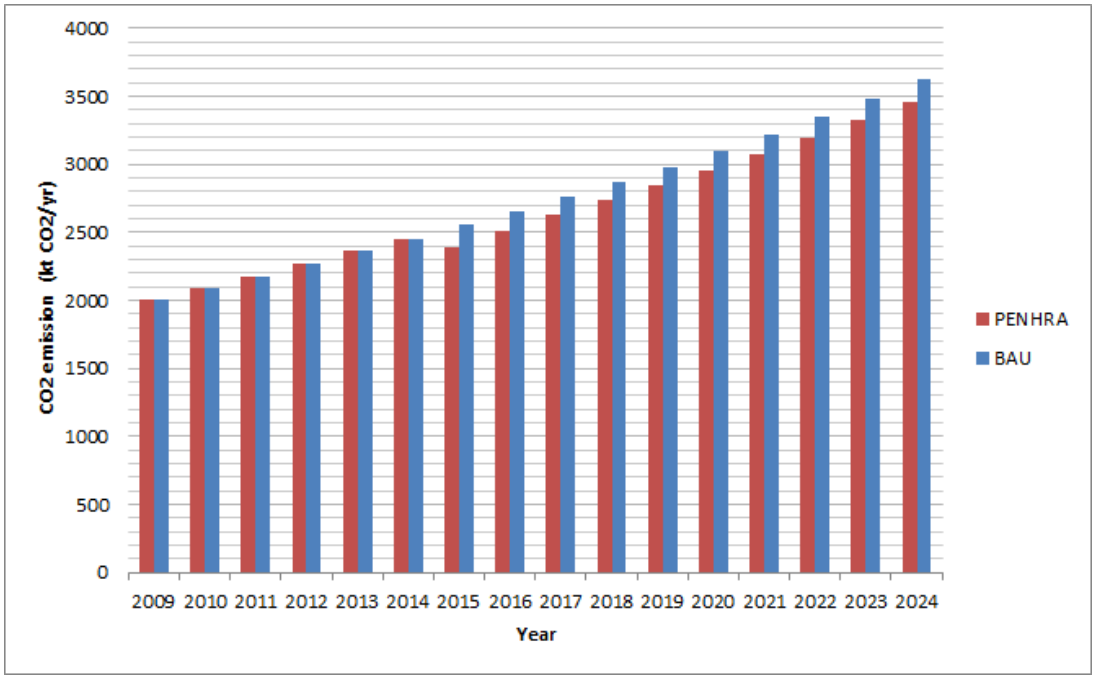


Figure 4: Graphical Summary of Expected Results in Annual CO_2 Emission Reductions

Figure 5 presents the graphical summary of the PENHRA Project in terms of cumulative CO_2 emission reductions as described in **Table 4** above.

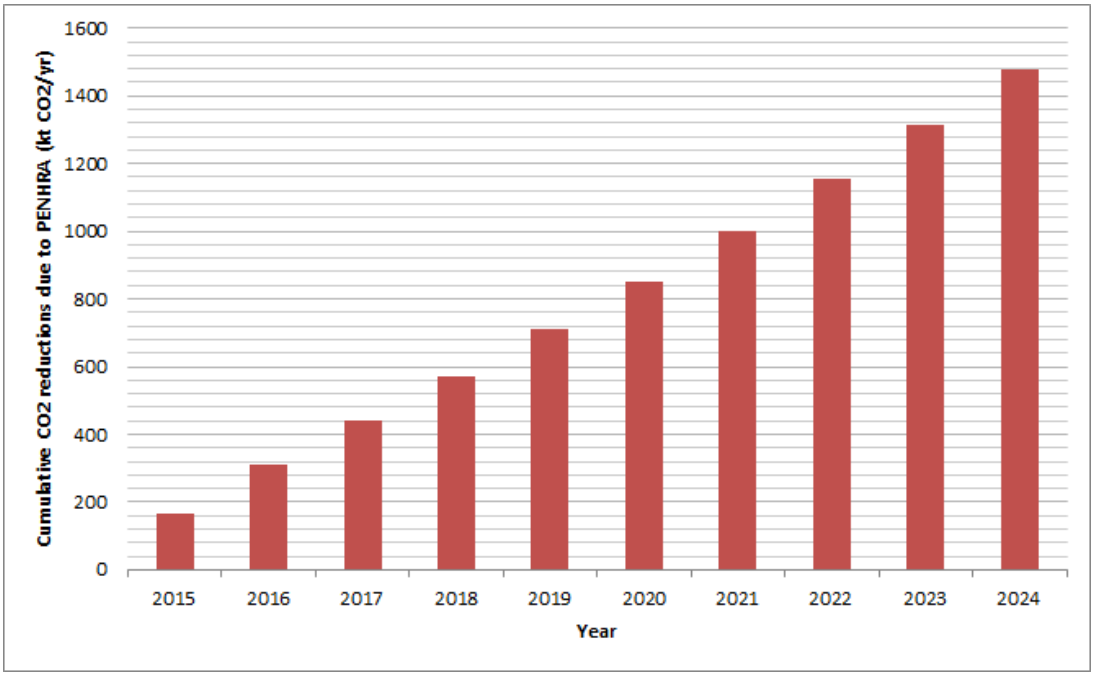


Figure 5: Graphical Summary of Expected Results of PENHRA in terms of Cumulative CO_2 Emission Reductions

44. The forecast annual average COPs is shown in Figure 6 for the four classes of RACs included in the project: large refrigeration, residential air conditioners, light commercial air conditioners and commercial air conditioners. The graph shows the trend in general among the four products. The details can be seen in Table A.1, Annex A.

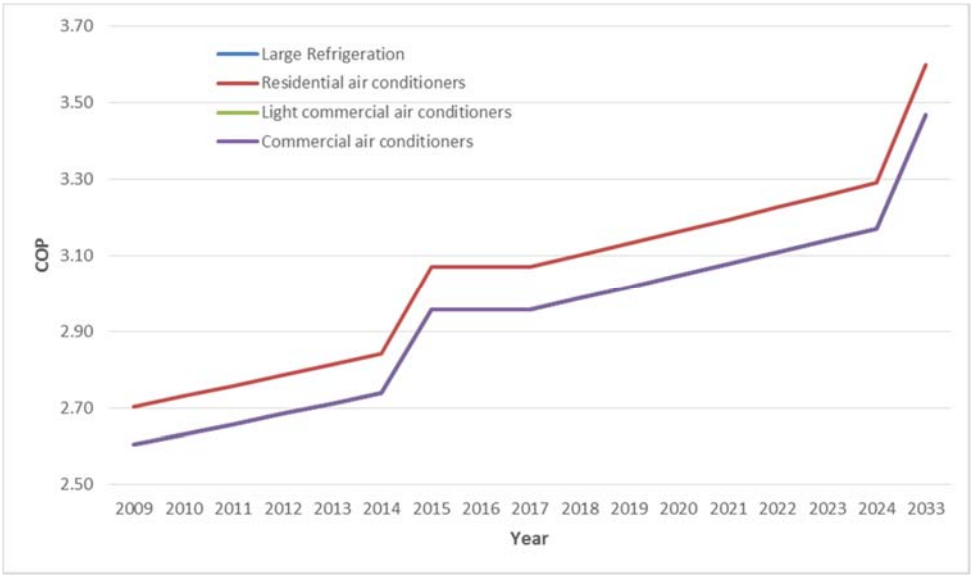


Figure 6: Forecast Annual Improvement in COP due to PENHRA Interventions

45. Main Objective of the PENHRA Project

<u>Project Objective</u>: Significantly improved energy efficiency of refrigeration and air conditioning (RAC) equipment and appliances manufactured and used in Indonesia

46. Major Project Components

PENHRA is comprised of the following components that will address the identified barriers to the manufacture, sale and use of energy efficient (EE) RACs:

- Component 1: Policy, Regulation and Standards Development for the RAC Industry
- Component 2: Capacity Building and Awareness Enhancement on the Production and Utilization of EE RACs
- Component 3: Promoting Investments for EE Enhancements in the RAC Industry
- Component 4: Technical Assistance for RAC Industry in EE Enhancements

2.4. List and Description of Major Activities and Sub-activities under each Component

The barrier removal activities in each of the project component comprise the incremental activities of the proposed project that will either be fully or partly funded by GEF resources. All these GEF-funded incremental activities will supplement the baseline activities under the HPMP and other co-financing from partners that will be subsumed under PENHRA. Altogether, the combined incremental and baseline activities are expected to result in the realization of the expected project outcomes.

COMPONENT 1: POLICY, REGULATION AND STANDARDS DEVELOPMENT FOR THE RAC INDUSTRY

47. This project component is for addressing the policy, regulatory and institutional barriers in promoting energy efficiency in manufacture, procurement and use of RACs.

The Expected Outcome of Component 1 is:

Outcome 1: Appropriate enforcement of policies, laws, and regulatory support mechanism that ensure manufacturing and sale of certified and standard quality energy efficient (EE) RACs increased in Indonesia.

48. The following paragraphs describe the Activities that will be conducted to come up with the expected Outputs whose delivery would contribute to realization of Outcome 1:

Table 5: Major Activities for Delivering Outputs Contributing to the Achievement of Outcome 1

Outcome	Outputs	Activities
1: Appropriate enforcement of policies, laws, and regulatory support mechanism that ensure manufacturing	1.1: Established and effectively enforced mandatory national minimum energy performance standards (MEPS) for RACs	1.1.1: Development of MEMR Decree on Mandatory MEPS for RACs
	1.2: Adopted policy and regulations on the local manufacturing and import of EE RACs	1.2.1: Development of MOI Decree on Local Production and Import of EE RACs 1.2.2: Development of training programs and materials for Customs officers and Ministry of

Outcome	Outputs	Activities
and sale of certified quality energy efficient (EE) RACs increased in Indonesia		Trade staff in the implementation of MOI Decree on import of EE RACs 1.2.3: Conduct of training programs for Customs officers and Ministry of Trade staff on EE S&L
	1.3: Established and operational accreditation, inspection and certification system for all locally manufactured and imported RACs sold in Indonesia	1.3.1: Development of MOI Decree on Accreditation, Inspection and Certification System on Testing Laboratory and Personnel for EE RAC 1.3.2: Agreement on market surveillance guideline of EE RACs among the Ministry of Energy, Ministry of Trade and Customs office
	1.4: Established and operational consumer assistance and information dissemination service center on EE RACs	1.4.1: Development of MEMR Decree on the Establishment of Consumer Assistance and Information Dissemination Service Center
		1.4.2: Operationalization of the Consumer Assistance and Information Dissemination Service Center
	1.5: Established RAC industry-wide coordination and cooperation system and implemented EE RAC technology development and application program	1.5.1: Development of a coordination mechanism for EE RAC Technology Program
	1.6: Completed performance evaluation of the EER/COP enhancement program in the RAC industry	1.6.1: Development and implementation of an EER/COP performance evaluation in the RAC industry

Output 1.1: Established and effectively enforced mandatory national MEPS for RACs

Activity 1.1.1: Development of MEMR Decree on Mandatory MEPS for RACs. This involves interventions that are intended to enhance the development of the national ES&L program to establish policy and regulations requiring MEPS that focus on RACs and facilitating its enactment. It will also involve a number of supporting policy research work, studies, drafting of the framework and development of an MEMR Decree which encourages energy efficiency through the mandatory MEPS on RACs. Further to the ES&L policies and program initiated through the BRESL project, this activity will focus on designing and formulating policies and regulations within the project period which could initiate more detailed work and guide the development of EE standards specific to local RAC equipment manufacturing and import. In terms of timeline, the project will build upon what were already started in similar programs by MEMR as a trigger and will work towards facilitating the consolidation of efforts instead of starting from scratch. Work will also be done to facilitate the approval, enactment and enforcement of such policies through socialization and advocacy work related to seeking approval of these policies. GEF support *will be for the conduct of workshops and expert consultations among the government, industry and other relevant stakeholders and on the lobbying/advocacy work to get the MEPs approved, enacted and enforced.*

Output 1.2: Adopted policy and regulations on the local manufacturing and import of EE RACs

Activity 1.2.1: Development of MOI Decree on Local Production and Import of EE RACs. This activity will involve drafting of the framework and development of an MOI Decree which encourages energy efficiency in the manufacturing and import of EE RACs. This activity also involves the provision of assistance for the facilitation for approval and enforcement of such policies. As explained in Activity 1.1.1, the development and issuance of the ministerial decree will be facilitated within the project period by building upon related initiatives in other MEMR programs with the project as the initiator and consolidator. The decree will provide policy and support for EE RAC production and application including technology transfer provisions and incentives.

Activity 1.2.2: Development of training programs and training materials for Customs officers and Ministry of Trade staff in the implementation of MOI Decree on the import of EE RACs. This will involve the training of relevant Customs officers and Ministry of Trade personnel in the inspection of imported RACs based on to the same quality standards for those manufactured in the country as per the MOI Decree. In this regard, suitable training programs will be designed with post-training evaluation on impacts of the training conducted, develop training materials and launch required number of training programs based on the skill set of the current personnel/officers. These programs will be developed in close consultation and coordination with the HPMP, as well as the Customs and Ministry of Trade.

Activity 1.2.3: Conduct of training programs for Customs officers and Ministry of Trade staff on energy efficiency standards and labelling. In close coordination with HPMP, a number of training programs will be conducted to relevant Customs officers and Ministry of Trade staff on energy efficiency, standards and simple testing protocols that can be implemented in the field. *GEF support will be for the conduct of the required training, workshops and expert consultations among the government, industry and other relevant stakeholders.*

Output 1.3: Established and operationalized accreditation, inspection and certification system for all locally manufactured and imported RACs sold in Indonesia

Activity 1.3.1: Development of MOI Decree on Accreditation, Inspection and Certification System on Testing Laboratory and Personnel for EE RAC. This activity will involve drafting of the framework and developing an MOI Decree for the establishment of the policy, regulations, program and guidelines for the selection and accreditation of the certification and inspection institutions and testing centers that will implement and enforce the MEPS for RACs. The decree shall also include important clauses on capacity, method of testing and certification, mandatory testing and how the system will be sustained over the years.

Activity 1.3.2: Agreement on market surveillance guideline of EE RACs among the Ministry of Energy, Ministry of Trade and Customs Office. This activity will involve forging an agreement among relevant national authorities, e.g. Ministry of Energy, Ministry of trade and Customs Office, to ensure that RACs being made available in the market meet the EE and environmental requirements by the applicable government regulations and decrees. A surveillance procedure and coordination mechanism for Customs officers in inspecting compliance with EE standards and labels for RACs will be developed.

GEF support is for the incremental requirements that may be required in the following activities: drafting of the accreditation, inspection and certification standards and procedures, the conduct of workshops and expert consultations in mobilizing necessary inputs and integrating various initiatives among the government, industry and other relevant stakeholders.

Output 1.4: Established and operationalized consumer assistance and information dissemination service center on EE RACs

Activity 1.4.1: Development of MEMR Decree on the Establishment of Consumer Assistance and Information Dissemination Service Center. This activity will address the lack of information on EE RAC technology and its development and application program. This will involve the drafting and development of MEMR Decree on the Establishment of the EE RAC Consumer Assistance and Information Dissemination Service Center in order to ensure that the policy and operational functions and responsibilities are defined and that a host center institution is designated for sustainability of services, operation and administration. The EE RAC Center will facilitate the information gathering and exchange as well as networking and cooperation among various stakeholders.

Activity 1.4.2: Operationalization of the Consumer Assistance and Information Dissemination Service Center. This activity will implement the decree and provide for the institutional, operational and administrative support to the Center for sustainable organization and rendering of necessary information services to consumers and other stakeholders during and after the Project. Over the years of operation, the Center shall endeavor self-sustainability in its operation. At the beginning the Project will ensure that funding support is available to augment income from services wherein clients are encouraged and are willing to pay for services received. *GEF support will be for the coordination and conduct of the workshops and meetings and services of consultants to mobilize inputs and integrate the various initiatives among the government, industry and other relevant stakeholders. The country is expected to provide support to the operationalization of the EERAC Center.*

Output 1.5: Established RAC industry-wide coordination and cooperation system and implemented EE RAC technology development and application program

Activity 1.5.1: Development of a coordination mechanism for EE RAC Technology Program. This activity will pave the way for the definition and agreement on the clarified roles and responsibilities of various institutions in implementing the regulations, technology development and application program, market development and research and development (R&D) of EE RAC. This activity will involve the development of a coordination mechanism among relevant government institutions and industry players to establish RAC industry-wide program implementation and cooperation system for EE RAC technology for the manufacture, sale and use of all imported and locally-produced RACs. A Memorandum of Understanding (MOU) will be drafted and formalized in close consultation with all stakeholders in order to define roles and responsibilities of the relevant government institutions and industry players through the organization and functioning of the Technical Working Groups (TWGs) under the supervision of MEMR/ DGNREEC and secretariat assistance of the PENHRA Project Management Unit (PMU). The TWGs will consist of three (3) groups: (1) Policies and Regulations, (2) Capacity building and Awareness, and (3) Industrial Investments and Technical Assistance. The TWGs will play a big role especially in the coordination and synchronization of refrigerant-related and EE design-related activities of the project. PENHRA will involve the RAC industry associations to a greater extent and will assume a facilitative function in further strengthening industry management, coordination and cooperation to achieve common goals.

The management arrangement and the scope of cooperation are described in **Part III** of this Project Document and the membership of each TWG is listed in detail in **Annex C**.

The TWGs will meet regularly at least quarterly with additional meetings to be scheduled by the TWGs as may be necessary and deliberate on issues and seize the opportunities by developing the EE RAC program and targets as their recommendations to the Government of Indonesia through the MEMR/ DGNREEC for all imported and locally manufactured RAC sold in Indonesia. This will be done in close consultation with the relevant government agencies and industry players with regards to pertinent programs such as the HPMP and other similar government projects. To ensure effective project implementation, the proposed project will work closely with the National Ozone Unit under the Ministry of Environment as it is the implementing partner of HPMP Indonesia. *GEF support will be for the conduct of workshops and expert consultations among the government, industry and other relevant stakeholders.*

Output 1.6: Completed performance evaluation of the EER/COP enhancement program in the RAC industry.

Activity 1.6.1: Development and implementation of an EER/COP performance evaluation in the RAC industry. In order to strengthen the above-mentioned coordination mechanism and to ensure achievement of EE RAC program goals and outcomes, an EER/COP performance evaluation will be conducted using the indicators and targets suggested for the PENHRA Project monitoring during

the project implementation with the objective of institutionalizing an EER/COP evaluation before the project ends as part of the project M&E system. The EER/COP evaluation shall be sustained beyond the project duration within the organizational and institutional structure of the MEMR/DGNREEC. Notable success stories of profitable adoption of energy efficient RAC technologies emerging from the project will be documented and shared in related activities in Component 2. *GEF support will be for the conduct of workshops and expert consultations among the government, industry and other relevant stakeholders.*

COMPONENT 2: CAPACITY BUILDING AND AWARENESS ENHANCEMENT ON THE PRODUCTION AND UTILIZATION OF EE RACS

49. Component 2 is expected to address the technical capacity related barriers that results in the proliferation of energy inefficient RACs in the local market and the low market penetration of EE RACs as well as build the capacity of testing and certification institutions on EE performance of RACs. The expected outcomes of Component 2 are:

Outcome 2.1: Increased awareness of the retailers and consumers on the benefits of energy efficient RACs in Indonesia
Outcome 2.2: Enhanced technical capacities of appliances testing institutions to test the energy efficiency performance of RACs[9].

50. The public awareness improvement activities of the PENHRA Project is designed taking into account the experiences and lessons learnt from the BRESL project and in close coordination with the public awareness program of the HPMP project. In Component 2, assistance will be provided to RAC manufacturers who need support in developing their own public relation campaign strategy to promote and market the energy saving features and environmental benefits of their EE RAC products. The design of the strategies and programs will be based on behavioral change and incorporate incentive mechanisms in retailer training, consumer education campaigns, public relation campaigns, and other awareness programs under the project. The costs and benefits of EE RACs will be effectively explained to influence consumer decisions in the acquisition and use of EE RACs for various applications. All these GEF-funded incremental activities will supplement the HPMP baseline activities and other co-financed activities that are subsumed under PENHRA. Altogether, the combined incremental and baseline activities are expected to result to an increased market share of EE RACs. It can be stated that the PENHRA project will at least involve an "Energy Star" style education and outreach effort. Specific indicators to monitor this have been developed to measure the progress of achieving outcomes of these activities. Notable success stories resulting from the project will be shared in the implementation of awareness raising activities under this component.

51. A major technical capacity-related barrier that has to be addressed under Component 2 is that of the lack of testing facilities for RACs (either locally produced and imported) for verifying their energy efficiency performance as per the MEPS adopted. This concern was amplified by the RAC industry and government testing and certification institutions during the PPG exercise. The approach to strengthen capacity of testing laboratories can be replicated from the implementation of "*Support to Indonesia's Energy Efficiency Testing and Certification Facilities and Expertise*" under BRESL project with support from the Japan-UNDP Partnership Fund. The project has supported to strengthen technical capacity, availability testing equipment and accreditation of testing facilities for BRESL appliances. Hence, under Component 2, the skills and knowledge development of technical, management personnel and certification of appliance testing laboratories for appliances covered by PENHRA will be enhanced.

52. The following are the planned Activities that will deliver the relevant outputs that will contribute to the realization of Outcomes 2.1 and 2.2.

[9] Imported RAC equipment shall comply with enforced mandatory national energy performance standards for EE RACs.

Table 6: Major Activities for Delivering Outputs Contributing to the Achievement of Outcome 2

Outcome	Outputs	Activities
2.1: Increased awareness of the retailers and consumers on the benefits of energy efficient RACs in Indonesia	2.1.1: Completed EE RAC retailer training and awareness program	2.1.1.1: Design and conduct of Training Workshops for Retailers on EE RAC Technology and Benefits
	2.1.2: Completed consumer education campaign on the use and benefits of EE RACs	2.1.2.1: Design and implementation of a Consumer Education and Campaign program on the use and benefits of EE RACs
	2.1.3: Completed public relation campaigns for RAC industry players	2.1.3.1: Design and implementation of a Public Relation Campaign Program of RAC Industry Players
	2.1.4: Completed awareness and capacity building on the use of non-HCFC RACs	2.1.4.1: Design and implementation of an Awareness and Capacity Building program on the Use of Non-HCFC RACs
2.2: Enhanced technical capacities of appliances testing institutions to test the energy efficiency performance of RACs	2.2.1: Formulated and applied testing procedure for RACs EE prototypes and commercial availability	2.2.1.1: Formulation and application of Testing Procedure for RACs
	2.2.2: Completed training and accreditation of testing institutions in implementing the adopted procedures and regulations for EE performance testing, verification and certification of RACs	2.2.2.1: Conduct of training on the EE performance testing, verification and certification of RACs 2.2.2.2: Accreditation of RAC testing institutions
	2.2.3: Completed monitoring and evaluation for improvement of testing and certification institutions and validated recommendations for continuing EE enhancements	2.2.3.1: Evaluation and recommendation for continuing improvement of testing institutions

Output 2.1.1: Completed EE RAC retailer training and awareness program

Activity 2.1.1.1: Design and conduct of Training Workshops for Retailers on EE RAC Technology and Benefits. This activity will include the conduct of training/workshops on EE RAC technologies, ES&L and MEPS for RAC retailers and their technicians for promoting energy efficient RACs (in addition to the application of environment-friendly refrigerants under the HPMP program) and the benefits derived from the technology shift. Training modules will be prepared for retailers and technicians. There will be expanded coverage of the training activities on ES&L and MEPS to include RAC retailers who will be trained and provided with information material of energy efficiency technologies and techniques implemented by local manufacturers and service enterprises. It is expected that retailers can influence the market promotion of energy efficient equipment and appliances as they are in between manufacturers and consumers. All these activities are coordinated through the launch of a retailer assistance program that will include retailer incentive schemes to sustain their interest and ensure that retailers will appreciate and perform their important role. It will also involve the establishment and maintenance of a follow up system which will see to it that retailers shall be encouraged to ensure that the trained retailer technicians will continue to apply their learnings from the courses on benefits of EE RAC technology and products. They will in turn retrain new technicians as needed or in case of separation from work. In the same token, RAC manufacturers, distributors and service providers will cooperate with and help sustain the effective marketing and retailing of their EE RAC products beyond the project. To ensure sustainability of this very important project intervention, the relevant GoI agency or designated commerce and trade

organization shall take lead in developing and implementing coordination mechanisms and in updating the arrangements as necessary during the project implementation. It will be responsible in carrying on this responsibility when the GEF assistance is already completed. A survey/evaluation will be conducted to evaluate the usefulness and effectiveness of such retailer assistance program including trainings to retailers and its successful implementation for in-store marketing. *GEF support will be for the development of the training modules, conduct of the training, logistical support for participants and training expert consultation, trainer's fees and facilitation and other related expenses.*

Output 2.1.2: Completed consumer education campaign on the use and benefits of EE RACs

Activity 2.1.2.1: Design and implementation of a Consumer Education and Campaign program on the use and benefits of EE RACs. This activity will involve the conduct of consumer educational campaign and public awareness program on energy efficient and environment-friendly RACs. A survey will be designed to determine the current level of awareness and what is the desired level that could be targeted by the program. As part of market promotion of energy efficient RACs, promotional materials will be developed based on survey results with the outcome of the desired increased level of consumer awareness to suite each target consumer group. Relevant information in such campaign materials shall include environmental benefits and energy cost savings in the utilization of energy efficient RACs. The experiences and lessons learnt from the RAC-related activities of the BRESL project and the complementary plans and programs of the HPMP project will also be presented in the campaigns.

As part of market promotion of energy efficient RACs, advertisement templates and materials required in public relation campaigns will be developed. Such advertisement templates shall describe monetary gains during the use phase of energy efficient RACs in relation to the lifecycle value of the product. These materials will also be used for public relation campaigns by the RAC industry players in the marketing of the EE RACs in *Activity 2.3.1*. In connection with these activities, consumer protection groups, such as the Indonesia Consumer Association (YLKI) will also be involved. YLKI, which is one of the stakeholders of the project, is the main NGO in the country that protect consumers' right as well as provider of products information to the Indonesian consumers. Such groups will also be involved in the project particularly in market development activities, among them are the design and implementation of consumer education programs and coordination mechanisms. *GEF support is required in the design and making of the campaign materials, publication of the promotional campaign in newspapers, and broadcast in TV and radio talk show advertisement.*

Output 2.1.3: Completed public relation campaigns for RAC industry players

Activity 2.1.3.1: Design and implementation of a Public Relation Campaign Program of RAC Industry Players. This activity will involve assisting RAC industry players, composed of manufacturers, distributors and service enterprises, in marketing their products and services, in developing such public relation campaigns and in sharing the use of promotional materials developed in *Activity 2.2*. Thus, a number of industry players shall be actively involved in the promotion of energy efficient RAC products and services through dissemination of information, conduct of seminars and workshops and holding of exhibitions. Similarly, industry players will be informed also about the experiences and lessons learnt from the RAC-related activities of the BRESL project and other related government EE programs. For technical guidance and competency requirements for retrofitting and recycling for refrigeration systems, the MoE Regulation 2/207 requires mandatory registration of service workshops and refrigeration technicians required to have a certificate of competency from approved institutions. This activity will also involve the design of Seminar/Workshop and Exhibition and brochure materials based on consumer-supplier public relation needs analysis, which will be facilitated through and Organizing Committee. The Seminar/Workshop and Exhibition will be conducted in three one-day events in three selected cities based on potential markets. Thus, a number of manufacturers and service enterprises will be actively

involved in the promotion of energy efficient RACs. *GEF support is required for the provision of experts in the preparation of the workshop/seminar packages, printing and dissemination of brochures and prospectus for the workshops, conduct of workshops and expert consultations among the government, industry and other relevant stakeholders and holding of an exhibition.*

Output 2.1.4: Completed awareness and capacity building on the use of non-HCFC RACs

Activity 2.1.4.1: Design and Implementation of an Awareness and Capacity Building Program on the Use of Non-HCFC RACs. This activity will focus on enhancing the awareness and capacity of the stakeholders in the HCFC phase-out and new non-HCFC RACs in line with the HPMP project activities and outputs. It will also involve the promotion of application of EE RACs that utilize low GWP refrigerants. This integrated approach will inculcate in the minds non-HCFC RACs users the combined energy saving and environmental benefits of the technology intervention and the increased market of these EE RACs in the coming years. This baseline activity under the HPMP is supported by incremental GEF funding for the provision of experts and participation of counterparts in the introduction of energy efficiency technologies in addition to the use of non-HCFC refrigerant technologies.

Output 2.2.1: Formulated and applied testing procedure for RACs EE prototypes and commercial availability.

Activity 2.2.1.1: Formulation and application of Testing Procedure for RACs. This activity will involve the development of testing protocol and standards for RAC units with small, medium and large capacity ranges. In conjunction with the work of the TWG on Capacity Building and Awareness in Activity 1.5, the testing procedures for prototypes and commercially available RACs which distinguishes between constant frequency (CF) and variable frequency (VF or inverter type) RACs shall developed to test their EE performance. Based on the TWG recommendations, the testing procedures for the selected RAC types shall be endorsed for adoption by relevant testing institutions through appropriate government instructions within the desired timeframe to meet the objectives of the project. *GEF assistance is required for the formulation of testing procedure, conduct of workshops and expert consultations related to TWG studies and meetings for selected testing institutions for EE RACs.*

Output 2.2.2: Completed training and accreditation of testing institutions in implementing the adopted procedures and regulations for EE performance testing, verification and certification of RACs

Activity 2.2.2.1: Conduct of training on the EE performance testing, verification and certification of RACs - In support of the MEPS developed and approved and the adopted testing protocols for CF and VF types of RACs, this activity will develop capability of designated, testing and certification institutions to implement the relevant decrees, MEPS and testing protocols as part of their authorities and responsibilities towards proliferation and market acceptance of EE RACs in the country. The pertinent manuals shall be developed and disseminated through training and publication to contain agreed standards, regulations and relevant operational and administrative requirements endorsed by the TWG in coordination with authorized government agencies and institutions. A post-training monitoring system to determine the effectiveness of the training programs shall be developed and sustained by the relevant government agency overseeing the EE RAC development and promotion program. *GEF assistance is required for the expert consultations, conduct of meetings for the development of the manuals and the conduct of the related training and dissemination activities*.

Activity 2.2.2.2: Accreditation of RAC testing and certification institutions. This activity will involve work done with the relevant GOI agencies in accrediting, qualification testing and certifying an institution to authorize it to closely check on RAC industry's compliance with relevant decrees, MEPS and testing protocols for CF and VF types that encourages the manufacture,

marketing and use of EE RACs in the country in line with approved standards as well as impose these standards also for imported CF and VF RACs. *GEF assistance is required for the formulation and facilitation of the approval and implementation of accreditation procedures and requirements and relevant consultations and studies.*

Output 2.2.3: Completed monitoring and evaluation for improvement of testing and certification institutions and validated recommendations for continuing EE enhancements

Activity 2.2.3.1: Evaluation and recommendation for continuing improvement of testing institutions. In pace with the growth of local technology development and import of EE RACs, this activity will involve development and utilization of a monitoring and evaluation system that would ensure that the capacity and competence of the testing and certification institutions in administering quality testing and certification process is achieved. The RAC testing and certification institutions shall submit monitoring reports on the results of the accreditation and implementation of the testing and certification activities. The institutions will be expected to continuously improve capacity and capability to render the desired services based on the evaluation and recommendations. *GEF assistance is required for the formulation and establishment of the monitoring and evaluation system and its implementation within the project timeframe including relevant expert consultations, meetings and pertinent studies.*

COMPONENT 3: PROMOTING INVESTMENTS FOR EE ENHANCEMENTS IN THE RAC INDUSTRY

53. Component 3 will address the removal of financial barriers to enable EE RAC manufacturers to access financial resources to achieve the expected outcomes, increased production and sales of EE RACs as well as enhanced capacities of RAC manufacturers to produce EE RACs in Indonesia.

The expected outcomes of Component 3 are:

- **Outcome 3.1: Enhanced capacities of RAC manufacturers to produce EE RACs**
- **Outcome 3.2: Increased production and sale of EE RACs in Indonesia**

54. The following describe the activities that are required to deliver the relevant outputs that will contribute to the realization of Outcomes 3.1 and 3.2.

Table 7: Major Activities for Delivering Outputs Contributing to the Achievement of Outcome 3

Outcome	Outputs	Activities
3.1: Enhanced capacities of RAC manufacturers to produce EE RACs	3.1.1: Designed and implemented financial assistance program	3.1.1: Design and implementation of a Financial Assistance Program for RAC Manufacturers for the manufacture of EE RACs
	3.1.2: Modified and optimized production lines for EE RAC manufacturing installed and operational	3.1.2: Facilitation of capital investment on technology modifications in the RAC manufacturing lines in order to produce EE RACs
3.2: Increased production and sale of EE RACs in Indonesia	3.2.1: Manufacturing companies implementing technology modifications for the production of EE RACs	3.2.1: Facilitate the implementation of technology modifications for the production and application of EE RACs

Outcome 3.1: Enhanced capacities of RAC manufacturers to produce EE RACs

Output 3.1.1: Designed and implemented financial assistance program

Activity 3.1.1: Design and Implementation of a Financial Assistance Program for RAC Manufacturers for the manufacture of EE RACs. This will involve the design, coordination and implementation of financial assistance to EE RAC manufacturers. Financial support will be provided to the manufacturers in the form of grant based on a set of eligibility criteria, including: (a) commitment of RAC manufacturers to participate in HPMP project, (b) market share of RAC manufacturer, and (c) the RACs manufacturers expressed interest to participate as beneficiaries of PENHRA project. The specific GEF financial assistance arrangements for EE enhancements on top of the refrigerant conversion under the HPMP were determined and agreed during the PPG phase. The financial assistance proposals are based on each manufacturer's specific needs to develop and produce EE RAC units that make use of refrigerants promoted by the HPMP. The amount granted will be confirmed at the start of project implementation and shall be coordinated very closely with the HPMP Project in terms of coverage, scheduling and specific financial support that will be shared between PENHRA and HPMP. The amount of GEF financial assistance that will be provided to manufacturers under PENHRA shall be the incremental cost that will be incurred in upgrading product design and the production line for the production of energy efficient RAC appliance and equipment that are MEPS compliant. The financial assistance program package as discussed with HPMP is the basis of the incremental reasoning that is placed under the GEF funding request. *GEF resources will be used for improvements of RAC production lines to enable manufacturing of energy efficient non-HCFC RACs produced in Indonesia in terms of design software purchase, training on its application and actual usage by the selected manufacturers.*

Output 3.1.2: Modified and optimized production lines for EE RAC manufacturing installed and operational

Activity 3.1.2: Facilitation of capital investment on technology modifications in the RAC manufacturing lines in order to produce EE RACs

This activity entails the preparations and requirements necessary to implement the proposed technology modifications in the RAC manufacturing lines and the specific outputs of the sub-activities in coordination with HPMP, as shown in **Table 8**. The incremental investment costs will be covered with the GEF financial grant assistance of PENHRA, which will be awarded to the RAC industry players who are involved in the HPMP project and encourage them to upgrade the production lines further to produce EE RACs through EE technology enhancements. The incremental costs will be used to compensate the additional cost of manufacturing facilities for producing the components of the new RAC units such as compressor, expansion valve, refrigerants, copper tubes, etc., to make the units energy efficient. Further, some activities like the purchase of plate heat exchanger, aerodynamic shroud, and energy-efficient fan mounting fabrication facilities are aimed to increase their unit capacities and volume of production and sale of higher EER/COP RAC units in Indonesia. These investment activities are combined also with activities in Components 1, 2, and 4.

Table 8. Technology Modifications in the RAC Manufacturing Lines and the Specific Outputs of the Sub-activities

Capital Investments Sub-activity	Manufacturing Capability Status Resulting from the HPMP Program	PENHRA Outputs for EE Enhancements
1. System, component, and process design		
Software for Heat Exchanger design	Manufacturers have capability to design heat exchangers for RAC system	Purchased software for HX design; Completed on the use of the software for design EE RAC systems and implementation of the design process

Capital Investments Sub-activity	Manufacturing Capability Status Resulting from the HPMP Program	PENHRA Outputs for EE Enhancements
Software for RAC system performance evaluation	Manufacturers have capability to simulate the performance of their large capacities units. Their simulation can be verified by the authorized body that has similar software.	Purchased software for RAC system performance evaluation; Completed training on the use of the software to simulate the performance of large capacity RAC systems and implementation of the use of the software in evaluating performance of RAC systems
2. Heat Exchanger Processing Modification		
Modification of heat exchanger fabrication facilities for new refrigerant	Manufacturers have capability to produce high effectiveness condenser and evaporator for new refrigerant	Purchased components for energy efficient heat exchanger production; Completed, tested and commissioned modified RAC production lines
Heat Exchanger Fabrication facilities to produce EE RAC unit	Manufacturers have capability to produce EE RAC unit	Purchased components for HX fabrication facilities; Completed commissioning, and training on the use, of the HX fabrication units
3. Sheet Metal Processing Modifications		
Modification of sheet metal processing facilities for new refrigerant	Manufactures have capabilities to fabricate all metal processing needed for new refrigerant	N/A, Supported fully under HPMP Project
Fabrication facilities of aerodynamics shroud and mounting for fan	Manufacturers have the capability to fabricate the fan's aerodynamic shroud and mounting	Purchased fan shroud and mounting fabrication facilities; Completed commissioning, and training on the use, use of fabrication facilities for aerodynamic fan shrouds and vapor injection system
Fabrication facilities for EE motor controller and mounting	Manufacturers have the capability to fabricate the EE motor controller mounting	Purchased EE motor controller fabrication facilities; Completed commissioning, and training on the use, of the fabrication equipment for EE motor controller and mounting
4. Assembly Line Production		
Modification of assembly line production for new refrigerant	Manufacturers will have new production line for the production of RAC units with non-HCFC refrigerants with the support of HPMP project	Technical advice on design and operation of new production lines for the production of EE RAC units that can also handle alternative environmental friendly and commercially available non-HCFC refrigerants
5. Quality inspection, finishing, and testing modification	Manufacturers have the capability to do quality inspection, finishing and testing of the new RAC unit	Completed final quality inspection and unit testing facilities for energy efficiency in the new RAC units
6. Product certification from external agencies	Manufacturers are able to verify/certify their new RAC unit by the external certification agencies	Verified MEPS compliant RAC units produced by the manufacturers
7. Prototype manufacturing, trial and testing		
Improvement of testing facilities	Manufacturers have capability to test their units before it is sent to the certification laboratory	Purchased and commissioned equipment and instrumentation for testing facilities; Tested EE RAC products

Capital Investments Sub-activity	Manufacturing Capability Status Resulting from the HPMP Program	PENHRA Outputs for EE Enhancements
8. Process, operation, maintenance and safety training	Manufacturers have capability to carry out training related to handling new alternative refrigerants and necessary changes in RAC production facilities	Trained RAC manufacturers staffs on the operation of new EE RAC production facilities

GEF support is required for the incremental cost of purchasing and application of computer-based design software for EE RACs, heat exchanger fabrication facilities, equipment and instrumentation for testing facilities for prototype fabrication for EE RACs various sheet metal processing modifications.

Outcome 3.2: Increased production and sale of EE RACs in Indonesia

Output 3.2.1: Manufacturing companies implementing technology modifications for the production of EE RACs

Activity 3.2.1: Facilitation of the implementation of technology modifications for the production and application of EE RACs. This activity covers coordination of the implementation requirements resulting from the technology modifications for the production of EE RACs.

Both capital investments in Activity 3.1.2 and implementation activities in Activity 3.2.1 will provide financial support to the industry players participating in the HPMP and PENHRA Projects so that they will have the capacity to produce RAC units with new refrigerant technology (under the HPMP) and energy efficiency (under PENHRA).

Under the HPMP, the participating RAC companies, will implement the modification of the manufacturing lines to accommodate the use of non-HCFC. Under the PENHRA, while the shift to low-GWP refrigerants is being undertaken, the incremental modification of the same facilities will additionally involve the re-configuration of the manufacturing lines so that the RACs produced will be energy efficient in compliance with the established MEPS and testing procedures for CF and VF EE RACs. The first prototypes that will be produced in the modified manufacturing systems shall be tested and evaluated for EE and environmental performance in order to determine if further enhancements should be done until the desired EE and environmental performance levels vis-à-vis the MEPs are achieved and ready for mass production. The investment activities in Component 3 therefore are the financial assistance provision to modify and optimize the RAC production lines per company involved in both the HPMP and PENHRA Projects to locally produce EE and environmental-compliant RACs. These will involve the incremental costs under a cost-sharing arrangement as shown in Table 9.

Table 9: Cost-Sharing[10] in EE RAC Production Line Modifications

Technical Interventions to Enhance Energy Efficiency	Cost Share Provided (US$)		
	HPMP (Shift to non-HCFC)	PENHRA (for energy efficiency)	RAC Industry (counterpart)
Activity 3.1.1 Financial Assistance Program to RAC industry players to enhance EE in RACs	8,250	0	0

[10] The HPMP and PENHRA cost-sharing arrangement as arrived at based on incremental cost principles has been confirmed during the PPG process in line with manufacturing technology and RAC design modifications to produce EE RACs as defined in **Table 8**.

Technical Interventions to Enhance Energy Efficiency	Cost Share Provided (US$)		
	HPMP (Shift to non-HCFC)	PENHRA (for energy efficiency)	RAC Industry (counterpart)
Activity 3.1.2: Capital investment on technology modifications in the RAC manufacturing lines in order to produce EE RACs			
1. System, component, and process design			
• Software for Heat Exchanger design	126,640	18,000[a]	398,000
• Software for RAC system performance	26,640	18,000[a]	74,000
2. Heat Exchanger Processing Modification			
• Modification of heat exchanger fabrication facilities for new refrigerant	865,300	380,000	1,023,900
• Heat Exchanger Fabrication facilities to produce EE RAC unit	17,760	900,000	2,310,000
3. Sheet Metal Processing Modifications			
• Modification of sheet metal processing facilities for new refrigerant	577,550	0	1,688,780
• Fabrication facilities of aerodynamics shroud and mounting for fan	26,640	411,000	41,100
• Fabrication facilities for EE motor controller mounting	26,640	70,000	7,000
4. Assembly Line Production			
• Modification of assembly line production for new refrigerant	1,435,350	0	1,036,694
5. Quality inspection, finishing, and testing modification	58,000	0	26,560
6. Product certification from external agencies	105,000	0	10,000
7. Prototype manufacturing , trial and testing	0	0	0
• Improvement of testing facilities	327,760	0	237,000
8. Process, operation, maintenance and safety training	243,000	280,000[b]	75,250
Totals	3,844,530	2,077,000	6,928,284

Notes:

[a] Includes purchase of software and the training on how to use it.

[b] Cost of new machine which is more modern and sophisticated to ensure better performance and energy efficient components such as Plate Heat Exchanger (PHE) fabrication machine.

COMPONENT 4: TECHNICAL ASSISTANCE FOR RAC INDUSTRY IN EE ENHANCEMENTS

55. Component 4 will focus in improving the technical capacities of the RAC manufacturing enterprises to develop and implement energy efficient RAC manufacturing technologies. This will address the technical barriers that hinder the implementation of energy efficiency measures in the RAC industry and increase the local capacity to develop indigenous alternative EE technologies and measures applicable to the RAC industry.

The expected outcome from various deliverables under this component is **Outcome 4: Enhanced knowledge and capacity on EE RAC technologies in the RAC industry**[11].

The outputs of this project component are:

4.1: Documented and publicly available information on technically and economically feasible EE technologies with low GWP that can be applied by local RAC manufacturers

4.2: Completed capacity development programs for local RAC manufacturers

4.3: Regularly updated information on EE RAC market.

Some of the possible energy efficiency improvement interventions in the EE RAC design and manufacturing may include, but not limited to: (1) increase versatility of the system design to accept a wider range of prospective low-GWP refrigerants including hydrocarbon refrigerants; (2) improvement and optimization of heat exchanger design including not-in-kind and additional heat transfer components to improve energy utilization efficiency, i.e., energy efficiency ratio (EER), such as increased frontal coil area and tube rows; increased fin density; and, improved fin and tube design; (3) improvement of condenser fan motors and its aerodynamics; (4) improvement of RAC compressor efficiency, such as compressor motor efficiency improvements; application of variable speed systems; and application of noise & vibration reduction systems; (5) upgrading controls and instrumentation for improved part-load performance; and, (6) improvement of air conditioner housing/casing. The technical interventions mentioned above will be carried out through investments in system redesign, plant and process modifications, technical assistance and training. Moreover, the technical assistance will be provided particularly to the targeted companies under HPMP for air conditioning and refrigeration sector.

In line with this Expected Outcome 4, the following are the Expected Outputs and the Activities that will be done by the Project:

Table 10: Major Activities for Delivering Outputs Contributing to the Achievement of Outcome 4

Outcome	Outputs	Activities
4: Enhanced knowledge and capacity on EE RAC technologies in the RAC industry	4.1: Documented and publicly available information on technically and economically feasible EE technologies with low GWP that can be applied by local RAC manufacturers	4.1.1: Conduct of Technical, Economic, and Market Feasibility Study on the Application of Possible EE Technologies in RACs
		4.1.2: Validation and Dissemination of the Feasibility Study Results
	4.2: Completed capacity development programs for local RAC manufacturers	4.2.1: Technical Assistance on Design of EE RACs
		4.2.2: Technical Assistance on Prototype Development, Testing, and commercialization of the EE RACs; including evaluation and promotion of other low GWP refrigerant alternatives
	4.3: Regularly updated information on EE RAC market	4.3.1: Monitoring and Evaluation for Entry of EE RACs in the Market

Output 4.1: Documented and publicly available information on technically and economically feasible EE technologies with low GWP that can be applied by local RAC manufacturers

[11] Imported RAC equipment shall also comply with enforced mandatory national energy performance standards for EE RACs.

Activity 4.1.1: Conduct of Technical, Economic, and Market Feasibility Study on the Application of Possible EE Technologies in RACs. This involves the conduct of an evaluation and documentation of feasible energy efficiency technologies (both technically and economically) using refrigerants with low GWP that can be applied by local RAC manufacturers. The study shall recommend what technology transfer on specific EE techniques that offer low GWP as well as enhanced energy efficiency.

Activity 4.1.2: Validation and Dissemination of the Feasibility Study Results. This will involve the conduct of a seminar/workshop presenting the results of the feasibility study and finalization and dissemination of the feasibility study report based on the feedback during the Seminar/Workshop. The participants will come from the stakeholders of the project with particular involvement of representatives from the banks and financial institutions who will share inputs from the financial point of view the thereby help validate the results of the feasibility study conducted which includes the viability of investments for the manufacture and use of EE RACs. For more effective and easily-accessible means of dissemination of results of feasibility studies conducted, a web-based information site will be developed and established by the project to be made available for the local RAC industry for use in the design, engineering, manufacturing, promotion and marketing of EE RACs using alternative low GWP and energy-efficient refrigerants.

GEF support is required for the conduct of feasibility studies, consultant fees, development and establishment of web-based information site to disseminate results of the feasibility studies and conduct of workshops and expert consultations among the government, industry and other relevant stakeholders in order to disseminate and validate results of the feasibility studies conducted.

Output 4.2: Completed capacity development programs for local RAC manufacturers

Activity 4.2.1: Technical Assistance on Design of EE RACs. This activity will involve the design and implementation of a capacity development program that include in-country and international training courses and workshops to enable the local RAC manufacturers to meet the international standards on the design of EE RACs to comply with the adopted mandatory MEPS. The program will include activities on the implementation of necessary adjustments for applying new EE technology alternatives focusing on heat exchanger design where further significant EE enhancements is expected. A tracking system on progress monitoring is part of the activity. *GEF assistance is required for conduct of workshops and expert consultations in the factories of selected manufacturers for heat exchanger design for EE RACs.*

Activity 4.2.2: Technical Assistance on Prototype Development, Testing, and commercialization of the EE RACs including evaluation and promotion of other low GWP refrigerant alternatives. This activity will focus on the development, implementation and evaluation of the technical assistance program, which will include transfer of knowledge in the areas of increased versatility of the system design to accept a wider range of prospective low-GWP refrigerants including hydrocarbon refrigerants. Further, it supports prototype development, testing, commercialization, installation, operation and maintenance, thereby greatly improving the 'learning by doing' process for EE RACs production and use. Technical assistance will also be provided under PENHRA for designing and local manufacturing or at least facilitating local manufacturers (from EE perspective) of RACs using alternatives to R-32 such as hydro carbons and testing its cost-effectiveness. Technical assistance will also be provided on proper installation, operation and maintenance of EE RACs. A tracking system on progress monitoring will be in place, which is a part of the activity. *GEF assistance is required for conduct of workshops and expert consultations in the factories of selected manufacturers for prototype development for EE RACs.*

Output 4.3: Regularly updated information on EE RAC market

Activity 4.3.1: Monitoring and Evaluation for Entry of EE RACs in the Market. This activity will involve the monitoring of the manufacturers' data of energy efficient RACs produced and sold and

other related technical information. This also includes data analysis and publishing in bulletins for dissemination of updated EE RAC market information to the public. *GEF assistance is required for the design and implementation of the monitoring system.*

2.5. Project Indicators (corresponding with the Project Planning Matrix)

56. The following are the success indicators and targets of the PENHRA Project:

- Reduction of GHG emissions due to reduced electricity consumption by RACs which otherwise generated based on fossil fuel in Indonesia
  Indicator & Targets: Cumulative CO_2 emissions reduction by end-of-project (EOP), kt = 440

- Significantly improved energy efficiency of refrigeration and air conditioning (RAC) equipment and appliances manufactured and used in Indonesia.
  Indicator & Targets: Cumulative electricity savings due to project intervention starting Year 1, GWh = 581

- Appropriate enforcement of policies, laws, and regulatory support mechanism that ensure manufacturing and sale of certified quality energy efficient (EE) RACs in Indonesia.
  Indicator & Targets: No. of local RAC manufacturers and suppliers that comply with enforced policies, laws, regulatory support mechanism in the manufacture, import and sales of certified quality EE RACs = 48

- Increased awareness of the retailers and consumers on the benefits of energy efficient RACs in Indonesia
  Indicator & Targets: Growth rate in the no. of consumers buying and using EE RACs that use low GWP and more energy efficient refrigerants and RAC technologies compared to previous year increased, % at EOP = At least 10%

- Enhanced capacities of appliance testing institutions to test the energy efficiency performance of RACs
  Indicator & Targets: No. of accredited testing institutions for EE enhancements in RACs = At least 3

- Enhanced capacities of RAC manufacturers to produce EE RACs
  Indicator & Targets: Volume of investments mobilized as part of financial assistance program package for participating RAC industry players by Year 2: Government of Indonesia, about US$ 10. 3 million and Indonesia RAC Industry investments as leveraged by the project, about US$ 9.5 million

2.6. Expected Global, National and Local Benefits

57. The anticipated global environmental benefit through the implementation of this project is avoided GHG emissions from the utilization of locally manufactured EE RACs, but not from the avoidance of the current high GWP refrigerants. In addition, there are also the monetary benefits from energy savings that are realized from the use of EE RACs. It is envisioned that the planned interventions will all lead to the increased production and sales of EE RACs (NOTE: The ratio of CF type RAC and VF type RAC will be ascertained during the project implementation); increased market share of EE RACs; and, improved technical capacities of RAC manufacturers in developing and applying energy efficient RAC technologies. Considering the outputs of the activities carried out under the PENHRA project that are directly related to the application of EE RACs, the expected cumulative amount of GHG emission reduction is about 440 kt CO_2 during the project duration. The lifetime

direct GHG emissions avoided is about 1,481 kt CO_2[12] considering 10 years economic lifetime of project interventions during 3 years of project implementation. These global environmental benefits (GEB) expressed in terms of emission reductions is considered as the sole contribution from the activities of PENHRA on the use of energy efficient RACs, but not from the changeover to low GWP refrigerants. Although HPMP is part and parcel of PENHRA, its environmental benefits (i.e., avoided use of high GWP refrigerants) are not accounted in the emissions reduction analysis on a conservative basis. The influence of the ongoing BRESL project is also considered in the GEB analysis and is part of baseline emission reductions analysis. It must be noted that refrigerators and water coolers are not part of the proposed PENHRA project, as these are not covered under the HPMP since refrigerators do not contain HCFCs. However, other refrigeration equipment are very much part of the HPMP and thus also considered under PENHRA. Refrigeration units such as commercial units (< 12 HP) such as in retail food service and kitchen equipment, walk-in coolers/freezers and other commercial cold rooms) as well as industrial units (> 12 HP) such as in industrial cold rooms, chilling plants and refrigerated warehouses) are part of PENHRA. With the total GEF funds of US$ 5,020,822 and total GHG reductions (direct and direct post-project) of 4,527,747 kt CO_2, the unit abatement cost is 1.11 US$/t CO_2.

I – Direct	
Cumulative emission reductions during project duration (tCO_2)	439,581
Lifetime direct GHG emissions avoided (tCO_2)	1,480,750
II - Direct post project	
Lifetime direct post-project GHG emissions avoided (t CO_2)	3,046,997
III – Indirect	
Lifetime indirect GHG emissions avoided - bottom-up (tCO_2)	13,583,241
Lifetime indirect GHG emissions avoided - top-down (tCO_2)	3,622,198
GEF finance (US $)	5,020,822
Unit Abatement Cost (UAC) ($/$tCO_2$) - (Direct + Direct post-project) as per GEF CO_2 emission reduction calculation methodology ($/$tCO_2$)	1.11

The proposed project is expected to bring about the following socio-economic benefits to Indonesia at the national and local levels.

National Benefits:

1. Clear policy, regulation and institutional framework promoting commercialization of energy efficient RACs.
2. Increased technical capacity of local RAC manufacturers in developing and applying EE RAC technologies.
3. Established national accreditation and certification agencies for EE RAC equipment and appliances.
4. Increased capacity of national financing institutions in funding green business.
5. Contribution to meeting the voluntary national target of 26% GHG emission reduction by 2020.

Local Benefits:

1. Local government officials acquired coordination capacity in working with the private sector.

[12] Three types of air conditioners are considered, i.e. residential, light commercial, commercial types with their 2009 baseline energy efficiency ratio (EER) of 2.4. Due to the project intervention, it is expected that the EER would be reaching to a maximum of 3.2. The total number of sold units in 2009, as sourced from the HPMP document, was 1,211,649; 69,218; and 167, respectively. It is expected that the annual increase in sales of these systems is 5%. Since the refrigeration equipment (Commercial (< 12 HP) units such as retail food service and kitchen equipment, walk-in coolers/freezers and small commercial cold rooms) number is not available currently, the GEBs with the project influence are not considered in the analysis, but this would be analyzed during PPG phase.

2. Increased awareness and knowledge of local government, manufacturers and consumers about benefits of energy efficient products.
3. Households gain access to financing facility to purchase EE RACs.
4. Decreased household cost for electricity from utilization of energy efficient RACs.

Due to the steady economic development in the country, the local refrigeration and air conditioning equipment market has grown significantly in the past few years and is expected to continue for the next 10-20 years. As listed in **Table 2**, the products targeted under the PENHRA project are commercial (<12 HP), industrial (> 12 HP), transport refrigeration, residential, light commercial and commercial AC and chiller units that are widely used particularly in the industry, commercial establishments and households. The project design has taken, and the project implementation will take, into account gender equality indicators, particularly in ensuring women participation in decision making process and access of women to knowledge, and benefits associated with the use of energy efficient refrigeration and air conditioners. The project has been designed to also considered the contribution towards empowering women through specific activities that promote awareness on energy efficient RACs, calculation method on cost saving from utilization of energy efficient RACs, and involvement of women in monitoring implementation of energy efficient RACs program in the market. The socio-economic benefits of using the energy efficient variety of such consumer goods have been adequately included in the project activities. The way to monitor the realization of such benefits and how information will be collected, processed, evaluated and reported during the project implementation has been incorporated in the Monitoring Framework and Evaluation Plan in section 6.

2.7. Comparative Advantage of UNDP to Implement the PENHRA Project

58. According to the Comparative Advantages of GEF Agencies (GEF Council Paper C.31.5.rev.1), it is acknowledged that UNDP has a comparative advantage in implementing energy projects, particularly in providing integrated policy development, human resources development, institutional strengthening and non-governmental and community participation, which are key features of the barrier removal activities of this proposed project. The Government of Indonesia has designated UNDP as the lead implementing agency for overall HPMP in Indonesia and also as the implementing agency for the Refrigeration, Air Conditioning and Firefighting sectors.

59. This project is supported by UNDP because it contributes to the achievement of Outcome: Enhanced capacity of Government of Indonesia (GoI) to manage natural resources and energy as stated in the UNDP-Indonesia Country Program Document 2011 – 2015. It also contributes to the achievement of the Country Programme Output: Developed policy framework to promote energy efficiency and renewable energy strengthened and renewable energy and energy efficiency roadmap. It also contributes to the achievement of the Primary Outcome 5: Strengthened climate change mitigation and adaptation and environmental sustainability measures in targeted vulnerable provinces, sectors and communities on Climate Change and Environment, as mentioned in the UNPDF 2011-2015.

60. UNDP-Indonesia, with its presence in the country is well-positioned to implement this proposed project. It has a proven track record of successful implementation of energy efficiency and renewable energy projects in the country. It has sufficient staff to supervise the implementation of this project. It is the leading UN-agency in Indonesia supporting the GoI in addressing climate change issues in the country with a staff complement possessing substantial experience in the successful implementation of GEF-funded projects in the country. The current staffing of the Energy and Environment Unit of the UNDP Indonesia Country Office (CO) can adequately support the implementation of projects related to the different GEF focal areas, including biodiversity, climate change, land degradation and chemical management. A dedicated program officer of the unit will solely be responsible for project implementation oversight, quality assurance and reporting requirements. Apart from this, the implementation of the HPMP is specifically being supervised also by another program officer of the unit. Its overall substantial experience and expertise, working

in partnership at the decentralized level with local communities, private sector, policy makers and civil society, justify its capacity and qualification to implement this proposed project. Furthermore, UNDP-Indonesia CO will be backstopped by technical expertise available in the UNDP Bangkok Regional Hub (BRH) based in Bangkok, Thailand.

2.8. Country Ownership: Country Eligibility and Country Drivenness

61. The Government of Indonesia has ratified the United Nations Framework Convention for Climate Change (UNFCCC) on June 29, 1994 and since then has been implementing a number of projects supportive of the Framework and the related National Communications. The GOI has also been participating in many regional and sub-regional projects to promote energy and environment for sustainable development.

62. A series of stakeholders' consultation workshops and coordination meetings were also conducted to discuss the common goals that they share in their respective programs and activities. As discussed in the sections above, the PENHRA Project is closely aligned with other government initiatives that are also supported by UNDP and/or GEF, particularly the BRESL Project and HPMP Project and other regional and bilateral projects in a strategic, integrated and synergistic approach. These undertakings all demonstrate Indonesia's drive and commitment to further pursue a highly complementary project on RAC energy efficiency. The relevant government agencies and RAC industry players have been adequately consulted and have proactively identified barriers that could affect the successful implementation and achievement of PENHRA's program and goals. These consultation workshops also came up with the national activities that are proposed to be carried out under the PENHRA Project, including the project implementation and management arrangements.

63. The stakeholders have also identified their own resources to co-finance the Project requirements to top up the GEF grant requested which is intended to remove barriers and establish capability and capacity to pursue the EE RAC program as a whole. Representatives of the key stakeholders and the industry are represented in the Project Steering Committee (PSC) on the policy and program level as well as in the various TWGs on the operational and technical level to guide the production of EE RACs and largely influence the market transformation envisioned in the widespread use of energy efficient RACs, whether locally-produced in or imported into Indonesia.

2.9. Sustainability

64. Component 1 of the project will lay the legal, regulatory and policy bases for pursuing the EE RAC Program with active participation of the relevant government agencies and RAC industry players in Indonesia. Component 3 on investments for necessary facilities and training to realize the energy efficiency enhancement in RAC technologies will see to it that the modifications in the manufacturing lines will be geared towards the desired improvement in the quality and dependability of EE RACs that will be manufactured in the country. The other project components are likewise supportive in the sustainability objectives of the PENHRA. The regulations and the standards developed and adopted officially by the country will continue to guide the development, prototyping and commercialization of EE RAC models during the and beyond the project. With strong commitment and participation of relevant government agencies and industry players, there is no doubt that the PENHRA initiatives will be sustained over the years and will therefore deliver the expected outcomes on increased production and use of EE RACs in the country, while also checking on the entry of EE RACs that are imported from other countries.

65. The successful implementation of the BRESL Project and the HPMP Project will also influence the effectiveness of the PENHRA implementation and therefore, together these projects will reinforce each other in sustaining the EE goals, objectives and impact benefits that these projects share in common.

66. With the leadership of MEMR, MOI and MOE, among other government institutions, their active national programs and administrative functions are geared towards promoting and supporting energy efficiency as a key for environmental and conservation in the long term.

2.10. Replicability

67. PENHRA has been designed also with replicability of interventions initiated and established in order to optimize the impacts over the long term in terms of direct and indirect benefits. Within the project duration, the activities and outputs will be closely monitored and evaluated for best practices and lessons learned so that certain desirable and replicable modes and standards in the technical aspects and policy guidelines can be repeated across the industry sector and across varied RAC products and services. For example, the policies and regulations will officially make the interventions permanent and can be referred to always by new entrants to the EE RAC program. In training and awareness, the project starts by assessing the training and awareness needs of industry players and target customers and then modules are developed to suit those needs. The resulting training materials are used to train trainers in selected training institutes over and over again, through a series of evaluation on the conduct of training and impact assessments on application of the learnings by the graduates. This replication objective and approach are also reflected in the components and activities on investments, technical assistance and testing institutions development. All outputs and information derived from the project will be documented that may further influence directly or indirectly other similar initiatives.

3. PROJECT RESULTS FRAMEWORK

This project will contribute to achieving the following Country Programme Outcome as defined in CPAP or CPD: Outcome 2.1. Enhanced capacity of GOI to manage natural resources and energy.					
Country Programme Outcome Indicators: 2.2.1 National energy policies and guidelines developed and integrated into sub-national development plan. 2.2.2 Sub-national authorities and key partners are able to implement programmes, mobilize resources and develop public private partnership for RE/EE, which will contribute to the reduction of national greenhouse gas emission.					
Primary applicable Key Environment and Sustainable Development Key Result Area: 1. Mainstreaming environment and energy.					
Applicable GEF Strategic Objective and Program: GEF-5 Strategic Objective 2. Promote market transformation for energy efficiency in industry and the building sectors. Climate Change Mitigation Programme.					
Applicable GEF Expected Outcomes: (1) Appropriate policy, legal and regulatory frameworks adopted and enforced, (2) Sustainable financing and delivery mechanisms established and operational, (3) GHG emissions avoided.					
Applicable GEF Outcome Indicators: (1) Extent to which EE policies and regulations are adopted and enforced, (2) Volume of investment mobilized, (3) Tons of CO_2 equivalent.					
	Indicator	**Baseline**	**Targets**	**Source of verification**	**Critical Assumptions**
Project Objective[13] Significantly improved energy efficiency of refrigeration and air conditioning (RAC) equipment and appliances manufactured and used in Indonesia.	• Cumulative CO_2 emissions reduction by end-of-project (EOP), *kt* • Cumulative electricity savings by EOP, *GWh*	• 0 • **0**	• 440 • 581	• Monitoring reports on changes in average equipment efficiency and sales from participating governments to the PMU • Official publications or documents on production and sales of RACs • Annual reporting on progress from PMU, the participating stakeholders and companies	• Continuous and committed support and participation from government agencies and RAC manufacturers • Awareness and interest by the public in using energy efficient RACs will continue to increase in the future • Commitment and active participation of RAC manufacturers, distributors, and service providers will continue to increase.

[13] Objective (Atlas output) monitored quarterly ERBM and annually in APR/PIR

COMPONENT 1: POLICY, REGULATION AND STANDARDS DEVELOPMENT FOR THE RAC INDUSTRY					
Outcome[14] 1: Appropriate enforcement of policies, laws, and regulatory support mechanism that ensure manufacturing and sale of certified quality energy efficient (EE) RACs increased in Indonesia	• No. of decrees on EE RACs manufacturing, import and sales issued and enforced by Year 3 • No. of local RAC manufacturers and suppliers that comply with enforced policies, laws, regulatory support mechanisms in the manufacture, import and sales of certified quality EE RACs	• None • 0	• 4 • 48	• Official publications or documents on energy-efficiency regulations and policies provided by GOI. • Annual reports by PMU • M&E or survey reports on policy/regulations compliance of local RAC manufacturers, suppliers and retailers	• Continued support by Government of Indonesia through MEMR to ensure decree enforcement
Output 1.1: Established and effectively enforced mandatory national MEPS for RACs	• No. of enacted MEMR Decrees on the enforcement of mandatory MEPs on RACs by Year 2	• None	• 1	• Official publications or documents on energy-efficiency regulations and policies provided by GOI. • Annual reports by PMU	• Continued support by Government of Indonesia through MEMR to ensure decree enforcement
Output 1.2: Adopted policy and regulations on the local manufacturing and import of EE RACs	• No. of enacted MOI decrees on local production and import of EE RAC equipment by Year 2 • No. of developed and completed training programs and materials on policy and implementing rules for Customs officers and Ministry of Trade staff each year starting Year 3 • No. of trained Customs and Ministry of Trade personnel each year starting Year 3 who are actively involved in the regulatory and inspection processes for imported and locally manufactured EE RACs	• 0 • 0 • 0	• 1 • 1 • 100	• Official publications or documents on energy-efficiency regulations and policies provided by GOI. • Annual reports by PMU • Post-training evaluation reports by lead trainers (a year after training)	• Continued support by Government of Indonesia through MOI to ensure decree enforcement
Output 1.3:Established and operational	• No. of enacted MOI Decrees on selection and accreditation of the certification and	• 0	• 1	• Official publications or documents on energy-efficiency	• Continued support by Government of Indonesia through MOI

[14] All outcomes monitored annually in the APR/PIR. It is highly recommended not to have more than 4 outcomes.

accreditation, inspection and certification system for all locally manufactured and imported RACs sold in Indonesia	inspection institutions and testing centers by Year 2 • No. of successfully developed and implemented agreements among relevant government authorities[15], on market surveillance guideline by Year 3 • No. of testing laboratories/ institutions accredited under MOI Decree by Year 2 • No. of adequately and capably conducted tests by Customs Officers each year starting Year 3	• 0 • 0 • 0	• 1 • At least 3 • 50	regulations and policies provided by GOI. • Annual reports by PMU • Official documents on the establishment of certification and inspection institutions • Referral requests by Custom officers	to ensure decree enforcement. • Continuous support by the Customs Office is fully committed and realized
Output 1.4: Established and operational consumer assistance and information dissemination service center on EE RACs	• No. of enacted and enforced MEMR Decrees on the Establishment of Consumer Assistance and Information Dissemination Service Center by Year 2 • No. of consumers and stakeholders served per year by the Center starting Year 3	• 0 • 0	• • 10,000	• Documentation of the Decree and operating guidelines • Documentation on the official designation of the Host Center and regular staff support • Operations, financial and accomplishment reports	• Continued support by Government of Indonesia through MOI and MEMR and all the stakeholders • Clients are willing to pay for special services received
Output 1.5: Established RAC industry-wide coordination and cooperation system and implemented EE RAC technology development and application program	• No. of established and operationalized RAC industry-wide coordination mechanisms and cooperation systems for EE RAC Technology by Year 2 • No. of harmonized testing protocols, EE standards and labeling procedures developed and endorsed by TWGs starting Year 2	• 0 • 0	• 1 • 1 each[16]	• Documentation of the MOU and operating guidelines • Documentation on the approved and enforced testing protocol, and harmonized EE standard and labeling procedures for each feasible product	• Continued support by relevant agencies of the Government of Indonesia and all the stakeholders and companies
Output 1.6: Completed performance evaluation of the EER/COP enhancement	• No. of required annual quarterly reports produced by the M&E System including lessons learned and success stories starting Year 2. • Average EER/COP for EE RACs included in the project improved by EOP	• 0 • 2.7 (COP);	• 4 • 2.8 - 3.2 (COP);	• Documentation of the M&E system and its operating guidelines • Project quarterly reports • Testing results	• Continued support by relevant agencies of the Government of Indonesia and all the stakeholders and companies

[15] Mainly the Ministry of Energy and Mineral Resources, Ministry of Trade, and Customs Office

[16] Harmonized testing protocol, standard and labelling procedure for each feasible product among all the targeted products

program in the RAC industry		9.1 (EER)	9.5 - 10.8 (EER)	• EER/COP performance evaluation report	
COMPONENT 2: CAPACITY BUILDING AND AWARENESS ENHANCEMENT ON THE PRODUCTION AND UTILIZATION OF EE RACS					
Outcome 2.1: Increased awareness of the retailers and consumers on the benefits of energy efficient RACs in Indonesia	• Growth rate in the no. of consumers buying and using EE RACs that use low GWP and more energy efficient refrigerants and RAC technologies compared to previous year increased, % at EOP	• Nil	• At least 10%[17]	• Documentation of the RAC industry's annual EE RACs production and statistics on sales/usage of EE RACs	• RAC producers and distributors will fully support the production and sales data gathering and analysis
Output 2.1.1: Completed EE RAC retailer training and awareness program	• No. of RAC retailers assisted in acquiring and using basic information on EERAC technology and benefits starting in Year 2 • No. of retailer technicians trained in understanding and explaining EE RAC technology and benefits in models being marketed starting in Year 2 • No. of coordination mechanisms among relevant agencies designated to carry out the responsibility of overseeing the EE RAC retailer assistance program (in consultation with consumer protection groups) developed and implemented starting Year 2 • No. of trained RAC retailers benefitting from the program each year starting end of Year 2	• 0 • 0 • 0 • 0	• 500 • 300 • 2 • 2	• Documentation of training needs analysis • Documentation of the conduct and evaluation of training and directory of trained technicians who completed the courses • Documentation on training and awareness services rendered, post-training impacts and satisfaction of needs • Documentation on designation of responsibility for sustaining the project intervention in a relevant trade and commerce agency	• Retailers and their technicians will sustain the project's interventions and act their promotional and marketing roles reliably and effectively • RAC manufacturers, distributors and service providers will perform their roles reliably and effectively

[17] This was assumed as twice the growth rate of the number of RACs produced (at 5% per year). It will be confirmed during the inception of the project.

Output 2.1.2: Completed consumer education campaign on the use and benefits of EE RACs	• No. of successfully conducted campaign programs each year starting Year 2
	• No of issued newspaper advertisements each year starting Year 2
	• No. of multimedia materials produced and disseminated for consumer education and campaign:
	  • Short video clips by Year 1
	  • One week TV ads per year staring Year 2
	  • Radio talk shows per year starting Year 2
		• 0
		• 0
		• 0
			• 2
			• 4 issues per year starting Year 2
			  • 2
			  • 2
			  • 1
				• Campaign program report
				• Documentation and actual copy of designs
				• Report on multimedia dissemination by PMU.
					• Continued support by relevant agencies of the Government of Indonesia and all the stakeholders and companies

Output 2.1.3: Completed public relation campaigns for RAC industry players	• Number of Seminars, Workshops and Exhibitions conducted each year
	  • Seminars starting Year 2
	  • Workshops starting Year 2
	  • Exhibition starting Year 2
	• No. of successfully completed one-day PR events participated in by RAC industry companies by Year 2
		• 0
		• 0
			• 2
			• 2
			• 1
			• 3
				• Documentation and report on public relation needs analysis and design of Seminar/ Workshop and Exhibition and materials
				• Minutes of coordination meetings held
				• Minutes of meetings of Organizing committee and copies of brochures printed
				• Report on the 3 Seminar/Workshops and Exhibitions conducted
					• Continued support by relevant agencies of the Government of Indonesia and all the stakeholders and companies

Output 2.1.4: Completed awareness and capacity building on the use of non-HCFC RACs	• No. of completed awareness raising and capacity building activities each year starting Year 1 • No. of awareness/attitude surveys conducted on the benefits of EE RACs in Year 1 for baseline and in Year 3 for project impact	• 2 • 0	• 2 • 2	• Report on the activity • Report on the findings and analysis of the awareness/attitude surveys	• Continued support by relevant agencies of the Government of Indonesia and all the stakeholders and companies
Outcome 2.2: Enhanced technical capacities of appliances testing	• No. of accredited testing institutions for EE enhancements in RACs	• 0	• At least 3	• Documentation of testing laboratories/ institutions accredited based on approved regulations	

institutions to test the EE performance of RACs					
• *Output 2.2.1: Formulated and applied testing procedure for RACs EE prototypes and commercial availability*	• No. of approved and applied testing protocols for RACs by Year 3 • No. of approved and enforced standards for RACs by Year 3	• 0 • 0	• 3 • 3	• Documentation of approved testing protocols and standards	
• *Output 2.2.2: Completed training and accreditation of testing institutions in implementing the adopted procedures and regulations for EE performance testing, verification and certification of RACs*	• No. of completed training workshops conducted for RAC testing institutions each year starting Year 2 • No. of testing laboratories/ institutions accredited for EE RACs testing work by Year 3.	• 0 • 0	• 2 • At least 3	• Documentation of testing laboratories/ institutions accredited based on approved regulations	
• *Output 2.2.3: Completed monitoring and evaluation for improvement of testing and certification institutions and validate recommendations for continuing EE enhancement*	• % implemented of the total no. of recommendations from completed evaluation reports for improvement of RAC testing institutions for quality testing of locally made and imported RAC units by Year 3	• No basis	• At least 80 %	• Copy of evaluation report • Report on improvements implemented	
COMPONENT 3: PROMOTING INVESTMENTS FOR EE ENHANCEMENTS IN THE RAC INDUSTRY					
Outcome 3.1: Enhanced capacities	• Volume of investments mobilized as part of financial assistance program package	• Nil		• Report on the financial assistance program packages and approval	• Continued support by relevant agencies of

of RAC manufacturers to produce EE RACs **Outcome 3.2: Increased production and sale of EE RACs in Indonesia**	for participating RAC industry players by Year 2 • Government of Indonesia, US$ million • Indonesia RAC Industry investments as leveraged by the project by Year 2, US$ million • Annual average % increase in production and sale (year-on-year) starting Year 3	 • N. A.	 • About 10. 3 • About 9.5 • 10	• Report on production and sale of EE RACs	the Government of Indonesia and all the stakeholders and companies and financing sector
Output 3.1.1: Designed and implemented financial assistance program	• No. of local financial institutions that support the financial assistance program by Year 2	• 0	• 10	• Documentation of the financial assistance program	• Banks and financing institutions will continuously commit to support the program
Output 3.1.2: Modified and optimized production lines for EE RAC manufacturing installed and operational	• No. of RAC companies that invested on, and implemented, installation of new RAC production lines or retrofitting of existing RAC production systems and processes to produce more EE RAC products by EOP	• None	• 48	• Report on purchase and training	
	• No. of RAC manufacturers that invested and implemented modification of production lines for EE RACs using new refrigerants by EOP	• 7 planned	• At least 7	• Completion report on results of coordination and working with HPMP • PENHRA project report on the fund disbursement to manufacturers	
	• No. of RAC manufacturers that have quality inspection and testing facilities for EE RAC units by Year 2	• 7 planned	• At least 7	• Completion report on results of coordination and working with HPMP	
	• No. of RAC manufacturers whose RAC products are certified for having met MEPS requirement by Year 2	• 6 planned	• At least 6	• Completion report on results of coordination and working with HPMP	
	• No. of RAC manufacturers employing trained staff in handling new alternative refrigerants and upgraded EE RAC production facilities by Year 2	• 20 planned	• At least 20	• Completion report on results of coordination and working with HPMP	

Output 3.2.1: Manufacturing companies implementing technology modifications for the production of EE RACs	• No. of RAC manufacturers that apply technology modifications for the production of EE RACs by Year 2	• 0	• 7	• Completion report on results of coordination and working with HPMP	
COMPONENT 4: TECHNICAL ASSISTANCE FOR RAC INDUSTRY IN EE ENHANCEMENTS					
Outcome 4: Enhanced knowledge and capacity on EE RAC technologies in the RAC industry	• No. of RAC manufacturers that make use of local experts (in-house or external) in the application of feasible EE RAC technologies in the RAC industry by EOP	• 0	• 48	• Survey of manufacturers receiving reports and technical assistance • Annual reports of PMU	• Active participation of and realization of objectives by RAC industry players and their customers
Output 4.1: Documented and publicly available information on technically and economically feasible EE technologies with low GWP that can be applied by local RAC manufacturers	• No. of finalized/qualified FS Report on the Application of EE Technologies in RACs for assistance by banks by Year 1 • No. of workshops conducted for feasibility study dissemination and validation of feasibility study findings and recommendations by Year 2 • No. of easily accessible and affordable web-based information sources that are available for the local RAC industry for use in the design, engineering, manufacturing, promotion and marketing of EE RACs using alternative low GWP and energy efficient refrigerants by Year 3	• 0 • 0 • 0	• 8 • 3 • 1	• Periodic progress reports on the process of the conduct of the study and copies of the final Feasibility Study Report • Reports on the Seminars/Workshops conducted • Copies of final Feasibility Study Report incorporating results of the review and validation from the workshops conducted • Documentation on design and establishment of web-based information site	• Continued support by relevant agencies of the Government of Indonesia, the stakeholders and companies and financing sector
Output 4.2: Completed capacity development programs for local RAC manufacturers	• No. of seminar/workshops conducted that includes in-country and international experiences with continuing 2-week hands-on factory assistance on designing of EE RACs by Year 2 • No. of RAC manufacturers receiving technical assistance from EE RAC experts provided by the project by Year 1	• 0 • 0	• 1 Year 2 • 8	• Report on the Seminar/Workshop conducted • Progress reports on the conduct and outcomes of hands-on assistance by the experts • Progress report on the monitoring and evaluation and copy of Evaluation Report	.

	• No. of completed EE RAC designs by local RAC manufacturers by Year 3 • No. of completed workshops on commercialization of EE RACs by Year 2 • No. of EE RAC prototypes commercialized by Year 3	• 0 • 0 • 0	• At least 15 • 8 • At least 15		
Output 4.3: Regularly updated information on EE RAC market	• No. of bulletins published updating EE RAC market information by Year 2	• None	• 2	• Database created to store and analyze relevant data • EE RAC Information bulletins published	

4. TOTAL BUDGET AND WORK PLAN

Award ID:	00081705
Award Title:	Promoting Energy Efficiency for Non-HCFC Refrigeration and Air Conditioning (PENHRA)
Business Unit:	IDN10
Project ID:	00090876
PIMS no.:	4945
Project Title:	Promoting Energy Efficiency for Non-HCFC Refrigeration and Air Conditioning (PENHRA)
Implementing Partner (Executing Agency)	Ministry of Energy and Mineral Resources (MEMR)

#	GEF Outcome/ATLAS Activity	Responsible Party / Implementing Agent	Fund ID	Donor Name	ATLAS Budgetary Account Code	ATLAS Budget Description	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Total (USD)	Budget Note
1	**Outcome 1:** Appropriate enforcement of policies, laws, and regulatory support mechanism that ensure manufacturing and sale of certified quality energy efficient (EE) RACs increased in Indonesia	UNDP	62000	GEF	71200	Int'l. Consultant	52,000	-	-	**52,000**	**1**
		MEMR	62000	GEF	71300	Local Consultants	50,000	25,000	-	**75,000**	**2**
		MEMR	62000	GEF	71400	Contr. Services – Ind.	60,000	60,000	60,000	**180,000**	**3**
		MEMR	62000	GEF	71600	Travel	20,000	20,000	-	**40,000**	**4**
		MEMR	62000	GEF	72100	Contr. Services – Co.	90,500	50,000	9,500	**150,000**	**5**
		MEMR	62000	GEF	74200	Audio Visual & Printing Prod Costs	6,500	-	-	**6,500**	**6**
	Total Outcome 1						**279,000**	**155,000**	**69,500**	**503,500**	
2	**Outcome 2.1:** Increased awareness of the retailers and consumers on the benefits of energy efficient RACs in Indonesia **Outcome 2.2:** Enhanced capacities of testing	UNDP	62000	GEF	71200	Int'l. Consultant	31,200	-	-	**31,200**	**7**
		MEMR	62000	GEF	71300	Local Consultants	50,000	50,000	50,000	**150,000**	**8**
		MEMR	62000	GEF	71400	Contr. Services – Ind.	60,000	60,000	60,000	**180,000**	**9**
		MEMR	62000	GEF	71600	Travel	25,000	25,000	25,000	**75,000**	**10**

#	GEF Outcome/ATLAS Activity	Responsible Party / Implementing Agent	Fund ID	Donor Name	ATLAS Budgetary Account Code	ATLAS Budget Description	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Total (USD)	Budget Note
	institutions to test the performance of EE RACs	MEMR	62000	GEF	72100	Contr. Services – Co.	337,650	565,000	402,000	**1,304,650**	**11**
		MEMR	62000	GEF	74200	Audio Visual & Printing Prod Costs	-	4,500	5,300	**9,800**	**12**
		MEMR	62000	GEF	74500	Miscellaneous	-	-	2,650	**2,650**	**13**
	Total Outcome 2						**503,850**	**704,500**	**544,950**	**1,753,300**	
3	**Outcome 3.1**: Enhanced capacities of RAC manufacturers to produce EE RACs. **Outcome 3.2**: Increased production and sale of EE RACs in Indonesia	MEMR	62000	GEF	71600	Travel	10,000	10,000	5,000	**25,000**	**14**
		MEMR	62000	GEF	71400	Contr. Services – Ind.	60,000	60,000	-	**120,000**	**15**
		UNDP	62000	GEF	72100	Contr. Services – Co.	1,797,000	-	-	**1,797,000**	**16**
		MEMR	62000	GEF	72100	Contr. Services – Co.	35,000	65,100	34,900	**135,000**	**17**
	Total Outcome 3						**1,902,000**	**135,100**	**39,900**	**2,077,000**	
4	**Outcome 4:** Enhanced knowledge and capacity on EE RAC technologies in the RAC industry	MEMR	62000	GEF	71300	Local Consultants	37,500	37,500	-	**75,000**	**18**
		MEMR	62000	GEF	71400	Contr. Services – Ind.	60,000	60,000	60,000	**180,000**	**19**
		MEMR	62000	GEF	71600	Travel	10,000	10,000	10,000	**30,000**	**20**
		MEMR	62000	GEF	72100	Contr. Services – Co.	80,000	40,000	40,000	**160,000**	**21**
		MEMR	62000	GEF	74200	Audio Visual & Printing Prod Costs	-		4,022	**4,022**	**22**
	Total Outcome 4						**187,500**	**147,500**	**114,022**	**449,022**	
5	**Project Management**	UNDP	62000	GEF	71200	International consultant	15,000.00	-	15,000.00	30,000	**23**
		MEMR	62000	GEF	71300	Local Consultants	15,000	15,000	15,000	45,000	**24**
		MEMR	62000	GEF	71400	Contr. Services – Ind.	34,000	34,000	34,000	102,000	**25**
		MEMR	62000	GEF	71600	Travel	4,500	4,500	4,500	13,500	**26**

#	GEF Outcome/ATLAS Activity	Responsible Party / Implementing Agent	Fund ID	Donor Name	ATLAS Budgetary Account Code	ATLAS Budget Description	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Total (USD)	Budget Note
		MEMR	62000	GEF	72100	Contr. Services – Co.	7,000	7,000	10,000	24,000	**26**
		MEMR	62000	GEF	72500	Supplies	3,000	3,000	2,257	8,257	**27**
		MEMR	62000	GEF	74100	Professional Services	3,000	3,000	3,000	9,000	**28**
		UNDP	62000	GEF	74500	UNDP Cost Recovery Charges – DPC	3,120	3,123	-	6,243	**29**
	Total Project Management						**84,620**	**69,623**	**83,757**	**238,000**	
TOTAL							2,956,970	1,211,723	852,129	**5,020,822**	

Budget Notes

Budget Note	Description of Cost Items
	OUTCOME 1:
1	Intl consultant to support MEPs study and laboratory certification system policy recommendation. Cost 100 days*520/day = USD 52,000
2	Short term national consultants to conduct study on MEPS, lab testing accreditation/certification and legal drafting on MEPS. Cost: 3 consultants * 100 days* USD 250/day = USD 75,000.
3	Technical expert EE policies. Cost 36 months * USD 5000 = USD 180,000
4	Travel and daily allowance cost for study visit involving Ministry of Energy, Industry, Trade and Finance to other countries in regions on MEPS policy and testing lab accreditation and collaborative agreement. Cost 10 participants * USD 4,000 = USD 40,000
5	Public consultations for development of MEPS policy, importation of EE RACs and lab testing accreditation system. Cost 25 meetings * 40 participants * USD 150/person = USD 150,000 (including meeting package, local travel and resource person fee).
6	Lump sum for printing and publication production cost USD 6,500.
	OUTCOME 2
7	Intl consultant to train application of flammable refrigerant. Cost 60 days*520/day = USD 31,200.
8	Short term national consultants to facilitate training for RACs retailers, consumer education, development of M&E. Cost 4 consultants *150 days* USD 250/day = USD 150,000.
9	Technical expert Public Communication. Cost 36 months * USD 5000 = USD 180,000.
10	Travel and daily allowance for trainings, campaign in 5 big cities. Cost: 15*6 persons*USD 500 = USD 75,000.
11	Service package to develop public campaign materials. Cost: Lump sum USD 179,650. Trainings for retailers and consumer education campaign in 5 big cities in Indonesia, media advertisement. Cost: 5 cities * 3 times campaign and trainings * USD 75,000 = USD 1,125,000. Total cost: USD 1,304,650.
12	Production cost of publication materials for wider dissemination. Cost: Lump sum USD 9,800.
13	Miscellaneous expenses to anticipate sundries required to support public awareness activities. Cost: USD 2650
	OUTCOME 3:
14	Local travel cost for manufacturers trainings. Cost: 25*10 persons*USD 100 = USD 25,000.
15	Technical expert on RACs industry. Cost 24 months * USD 5000 = USD 120,000.
16	Grants for 7 RACs manufacturing companies as capita investment in changing production line for producing EE RACs. Cost Lump sum USD 1,797,000 (based on Letter of Agreement including company's cost-sharing).
17	Training on operation, maintenance and safety of EE RACs manufacturing. Cost 20 meetings * 45 participants * USD 150/person = USD 135,000 (including meeting package, local travel and resource person fee).
	OUTCOME 4:
18	Short term national consultants to conduct technical, economic and market Feasibility Study for EE RACs technology. Cost 2 consultants *150 days* USD 250/day = USD 75,000.
19	Technical expert on EE in RACs design and manufacture. Cost 36 months * USD 5000 = USD 180,000.
20	Travel and daily allowance for trainings EE RACs design, prototype development and testing. Cost: 30*10 persons*USD 100 = USD 30,000.
21	Training on EE RACs prototype development and testing. Cost 20 meetings * 40 participants * USD 200/person = USD 160,000 (including meeting package, local travel and resource person fee).
22	Production cost for training materials and dissemination. Cost: Lump sum USD 4,022.
	PROJECT MANAGEMENT:
23	Intl. consultant to conduct mid-term and final review of the project. Cost: 2 persons*30 days*USD 500/day = USD 30,000.
24	National consultant to support mid-term and final review of the project (2 persons * 45 days * USD 200/day = USD 18,000) and one monitoring and reporting officer (1 person * 6 months* USD 4,500/month = USD 27000). Total cost USD 45,000.

25	Salary of Project manager (12 months*USD 3500/mo = USD 42,000); salary for 2 project admin and finance associates (2 persons * 12 months * USD 2000/mo). Total cost= USD 90,000.
26	Travel and daily allowance for project board meeting and monitoring. USD 13,500 Meeting package for project board meeting and monitoring. Cost: 10*12 persons*USD 200 = USD 24,000.
27	Lump sum cost for office supplies. USD 8,257
28	Budget set up for Audit cost USD 9,000 (USD 3,000 per year)
29	Cost for services provided by UNDP CO, mainly for hiring international consultants and procurement of goods & services, USD 6,243. Draft LOA (Annex F) will be reviewed and finalized at DOA stage.

Summary of Project Co-Financing (US$):

Co-financing Details (Refer to Annex G)	in kind	in cash	Total
MEMR	2,777,450	335,355	3,112,805
MoE	-	7,236,307	7,236,307
UNDP		75,000	75,000
sub total	***2,777,450***	***7,646,662***	***10,424,112***
Panasonic	-	3,172,709	3,172,709
Fata Sarana	62,594	436,267	498,861
Alpine Cool	158,094	1,263,224	1,421,318
Tata Udara	62,594	577,940	640,534
Mandiri Teknik	62,594	405,978	468,572
Sumo Elco Mandiri	167,594	1,558,932	1,726,526
Rotaryana Prima	53,094	709,323	762,417
sub total	***566,564***	***8,124,373***	***8,690,937***
Total	**3,344,014**	**15,771,035**	**19,115,049**

Details of co-financing and annual expenditures	Amount Year 1	Amount Year 2	Amount Year 3	Total
GEF	**2,956,970**	**1,211,723**	**852,129**	**5,020,822**
CO-FINANCING				
Government				
Cash	6,586,252	664,080	334,830	7,585,162
In-kind	1,192,050	1,124,200	447,700	2,763,950
Total Government	7,778,302	1,788,280	782,530	10,349,112
Industry				
Cash	7,619,954	18,577	13,138	7,651,669
In-kind	630,770	192,421	216,077	1,039,268
Total Industry	8,250,724	210,998	229,215	8,690,937
UNDP	25000	25000	25000	75000
TOTAL CO-FINANCING	**16,054,026**	**2,024,278**	**1,036,745**	**19,115,049**

5. MANAGEMENT ARRANGEMENTS

68. As practiced in all UNDP/GEF-supported projects, UNDP always endeavors to seek adaptive management approach in the implementation of projects. Based on the partnerships defined and firmed up during the project development, the management arrangements for PENHRA are anchored on co-operation and mutual sharing of benefits where accountability and responsibility for implementing the project and achieving the project outputs. Such arrangements are also be based on collective decision making through a Project Steering Committee (PSC) composed of the project key stakeholders, viz., MEMR/DGNREEC, MOE, MOI and MOT and UNDP. The PENHRA Project Organizational Structure is seen in **Figure 7** below:

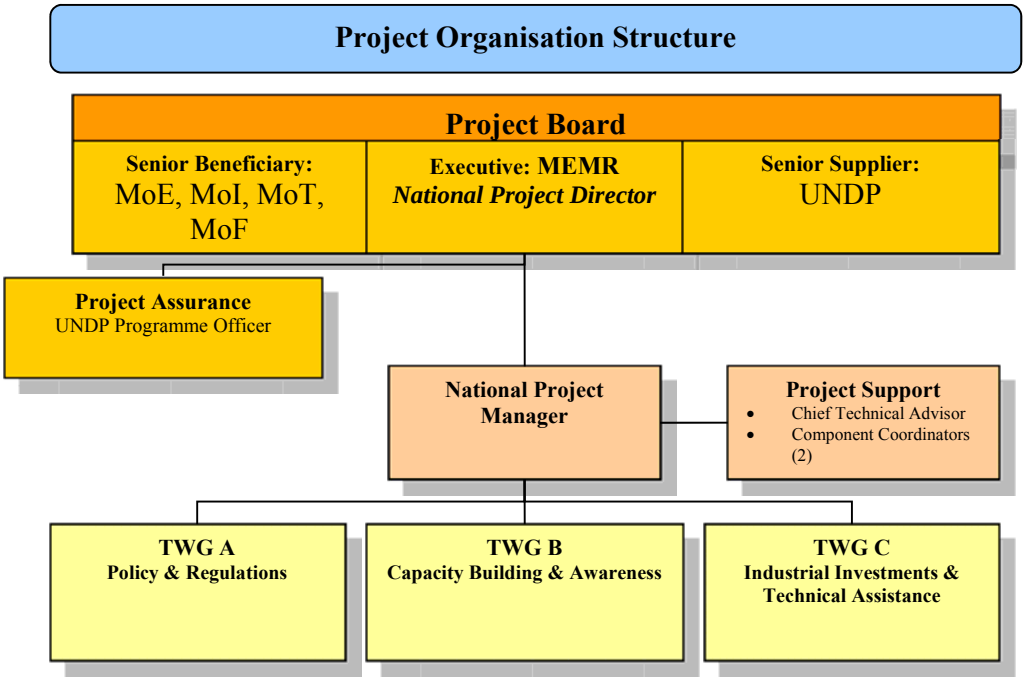


Figure 7: PENHRA Project Organizational Structure

69. The TWGs represent the teams for the technical inputs and coordination among the RAC industry players composed of manufacturers, distributors and service providers in carrying out the activities according to agreed plan and approach. The table below briefly describes the scope of cooperation in the work areas:

TWGs	Scope of Cooperation
TWG A on Policy and Regulations	Policy, Regulation and Standards Development for the RAC Industry
TWG B on Capacity Buildings and Awareness	Training, knowledge enhancement and Public Awareness on Benefits of EE RACs and Capacity Building of Testing, Verification and Certification Institutions
TWG C on Industrial Investments and Technical Assistance	Promoting Investments for EE Enhancements and Financial Assistance Package and Technical Assistance and Training for the RAC industry;

70. The PENHRA Project will be managed and coordinated at two levels: (a) the policy and institutional level; and, (b) industry sectoral and operational level. The first level will primarily be

where the national policy and project coordination in order to make the Project responsive to the country's needs while also complying with policies and standards of the UNDP and GEF as far as the project implementation is concerned. A Project Steering Committee (PSC) will be established and will comprise of the representatives of the UNDP-Indonesia, and the participating government agencies: MEMR/DGNREEC, MOE, MOI and MOT, National Ozone Officer of HPMP project, and the Director of the Project Management Unit (PMU). The National Project Director (NPD) and the National Project Manager (NPM) will come from the Executing Agency which is the MEMR/DGNREEC and be appointed by the Government of Indonesia through the MEMR/DGNREEC.

71. The PSC will play the role of an advisory committee. The PSC members will also be invited to participate in the annual project review meetings. The Chairperson of the PSC is the designated NPD. The NPM provides the management oversight to the whole project and assists the NPD in the operational and industry sectoral aspects of the project implementation. The PMU will be established to be responsible for day-to-day coordinating and implementing the activities of the project and carrying out the prescribed monitoring system. The PMU Director will serve as the Secretary of the PSC.

72. PENHRA will be Nationally-Implemented (NIM) on behalf of the Government of Indonesia through MEMR/DGNREEC as the Executing Agency. The Executing Agency will assume the overall responsibility of ensuring that all activities are executed accordingly and as per the approved Project Document. The NPD will be responsible for the achievement of the project objectives through institutional coordination with the key stakeholder members of the PSC and overall alignment of the PENHRA Project with the relevant national EE programs of Indonesia. He/she takes overall responsibility for all projects' timely reporting, including the submission of Annual Work Plans (AWP), Annual Project Report/Project Implementation Review (APR/PIR) and financial reports. He/She will ensure the delivery of the project outputs and the judicious use of the project resources. This will ensure that expected outputs are delivered using the most efficient and cost-effective implementation strategies and procedures. The NPM shall also see to it that the Executing Agency (DGNREEC) supports the project in the planning, coordination, secretariat, administration and financial management of the project in coordination with UNDP-Indonesia. As the project's Main Implementing Partner, the MEMR will also provide in-kind contribution to implement the PENHRA Project.

73. The PSC will be responsible for the following: (a) Reviewing of annual progress reports for necessary guidance; (b) Reviewing and approving the annual work plans and budgets; (c) Providing guidance on the effectiveness of PENHRA project implementation, and its linkages to corporate UNDP policy decisions, and other UNDP initiatives; and, (d) Monitoring and evaluating the implementation of PENHRA towards the intended outputs, after a year and half year of project execution. As a minimum, the PSC will meet at least once a year, allowing for the stakeholders to review the progress with the project implementation and to agree on a coordinated annual project implementation strategy and plan. The first PSC meeting should be held within the first 12 months following the inception workshop.

74. UNDP-Indonesia, in close coordination with the UNDP-GEF Regional Technical Advisor for Climate Change in the Bangkok Regional Hub (BRH) will carry out the GEF oversight and ensure that expected project performance standards are met. It will be also responsible for monitoring and evaluation (M&E), including organizing project reviews, approving annual implementation work plans and budget revisions, monitoring progress, identifying problems, suggesting actions to improve project performance, facilitating timely delivery of project inputs, and provide linkages to other sub-regional, Asia-Pacific regional and global initiatives. All M&E functions will be carried out in line with standard UNDP and UNDP-GEF procedures. UNDP Indonesia will also provide country office support for activities of the project as coordinated with the Executing Agency.

75. A Project Management Unit (PMU) will be established and is responsible for the day-to-day management of all the project activities including those on capacity building, demonstration sub-projects and dissemination activities at the national level. The PMU will be managed by a National Project Manager (NPM), who will be supported by Chief technical advisor, administrative staff and at least two Coordinators with one (1) coordinator to coordinate activities under two (2) Components, e.g. Component 1&2 and Component 3&4. A Chief Technical Advisor (CTA) provides strategic technical support and advice to ensure that the project is implemented according to the agreements in the Project Document and the standards of UNDP and GEF in project implementation.

6. MONITORING FRAMEWORK AND EVALUATION

The project will be monitored through the following M& E activities. The M& E budget is provided in the table below.

Project start:

A Project Inception Workshop will be held within the first 2 months of project start with those with assigned roles in the project organization structure, UNDP country office and where appropriate/feasible regional technical policy and programme advisors as well as other stakeholders. The Inception Workshop is crucial to building ownership for the project results and to plan the first year annual work plan.

The Inception Workshop should address a number of key issues including:

a) Assist all partners to fully understand and take ownership of the project. Detail the roles, support services and complementary responsibilities of UNDP CO and Bangkok Regional Hub (BRH) staff vis-à-vis the project team. Discuss the roles, functions, and responsibilities within the project's decision-making structures, including reporting and communication lines, and conflict resolution mechanisms. The Terms of Reference for project staff will be discussed again as needed.
b) Based on the project results framework and the relevant GEF Tracking Tool if appropriate, finalize the first annual work plan. Review and agree on the indicators, targets and their means of verification, and recheck assumptions and risks.
c) Provide a detailed overview of reporting, monitoring and evaluation (M&E) requirements. The Monitoring and Evaluation work plan and budget should be agreed and scheduled.
d) Discuss financial reporting procedures and obligations, and arrangements for annual audit.
e) Plan and schedule Project Board meetings. Roles and responsibilities of all project organization structures should be clarified and meetings planned. The first Project Board meeting should be held within the first 12 months following the inception workshop.

An Inception Workshop report is a key reference document and must be prepared and shared with participants to formalize various agreements and plans decided during the meeting.

Quarterly:

- Progress made shall be monitored in the UNDP Enhanced Results Based Management Platform.
- Based on the initial risk analysis submitted, the risk log shall be regularly updated in ATLAS. Risks become critical when the impact and probability are high. Note that for UNDP GEF projects, all financial risks associated with financial instruments such as revolving funds, microfinance schemes, or capitalization of value chain actors are automatically classified as critical on the basis of their innovative nature (high impact and uncertainty due to no previous experience justifies classification as critical).
- Based on the information recorded in ATLAS, a Project Progress Reports (PPR) can be generated in the Executive Snapshot.
- Other ATLAS logs can be used to monitor issues, lessons learned etc. The use of these functions is a key indicator in the UNDP Executive Balanced Scorecard.

Annually:

- Annual Project Review/Project Implementation Reports (APR/PIR): This key report is prepared to monitor progress made since project start and in particular for the previous reporting period (30 June to 1 July). The APR/PIR combines both UNDP and GEF reporting requirements.

The APR/PIR includes, but is not limited to, reporting on the following:

- Progress made toward project objective and project outcomes - each with indicators, baseline data and end-of-project targets (cumulative)
- Project outputs delivered per project outcome (annual).
- Lesson learned/good practice.
- AWP and other expenditure reports
- Risk and adaptive management
- ATLAS Project Progress Report (PPR)
- Portfolio level indicators (i.e. GEF focal area tracking tools) are used by most focal areas on an annual basis as well.

Periodic Monitoring through site visits:

UNDP CO and the UNDP BRH will conduct visits to project sites based on the agreed schedule in the project's Inception Report/Annual Work Plan to assess first hand project progress. Other members of the Project Board may also join these visits. A Field Visit Report/BTOR will be prepared by the CO and UNDP BRH and will be circulated no less than one month after the visit to the project team and Project Board members.

Mid-term of project cycle:

The project will undergo an independent Mid-Term Review at the mid-point of project implementation (June 2016). The Mid-Term Review will determine progress being made toward the achievement of outcomes and will identify course correction if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation; will highlight issues requiring decisions and actions; and will present initial lessons learned about project design, implementation and management. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the project's term. The organization, terms of reference and timing of the mid-term review will be decided after consultation between the parties to the project document. The Terms of Reference for this Mid-term Review will be prepared by the UNDP CO based on guidance from the BRH and UNDP-GEF. The management response and the evaluation will be uploaded to UNDP corporate systems, in particular the UNDP Evaluation Office Evaluation Resource Center (ERC). The relevant GEF Focal Area Tracking Tools will also be completed during the mid-term evaluation cycle.

End of Project:

An independent Terminal Evaluation (TE) will take place three months prior to the final Project Board meeting and will be undertaken in accordance with UNDP and GEF guidance. The TE will focus on the delivery of the project's results as initially planned (and as corrected after the mid-term evaluation, if any such correction took place). The TE will look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefits/goals. The Terms of Reference for this evaluation will be prepared by the UNDP CO based on guidance from the BRH and UNDP-GEF. The TE should also provide recommendations for follow-up activities and requires a management response which should be uploaded to PIMS and to the UNDP Evaluation Office Evaluation Resource Center (ERC). The relevant GEF Focal Area Tracking Tools will also be completed during the final evaluation.

During the last three months, the project team will prepare the Project Terminal Report. This comprehensive report will summarize the results achieved (objectives, outcomes, outputs), lessons learned, problems met and areas where results may not have been achieved. It will also lay out recommendations for any further steps that may need to be taken to ensure sustainability and replicability of the project's results.

Learning and knowledge sharing:

Results from the project will be disseminated within and beyond the project intervention zone through existing information sharing networks and forums.

The project will identify and participate, as relevant and appropriate, in scientific, policy-based and/or any other networks, which may be of benefit to project implementation though lessons learned. The project will identify, analyze, and share lessons learned that might be beneficial in the design and implementation of similar future projects.

Finally, there will be a two-way flow of information between this project and other projects of a similar focus.

Communications and visibility requirements:

Full compliance is required with UNDP's Branding Guidelines. These can be accessed at http://intra.undp.org/coa/branding.shtml, and specific guidelines on UNDP logo use can be accessed at: http://intra.undp.org/branding/useOfLogo.html. Amongst other things, these guidelines describe when and how the UNDP logo needs to be used, as well as how the logos of donors to UNDP projects needs to be used. For the avoidance of any doubt, when logo use is required, the UNDP logo needs to be used alongside the GEF logo. The GEF logo can be accessed at: http://www.thegef.org/gef/GEF_logo. The UNDP logo can be accessed at http://intra.undp.org/coa/branding.shtml.

Full compliance is also required with the GEF's Communication and Visibility Guidelines (the "GEF Guidelines"). The GEF Guidelines can be accessed at: http://www.thegef.org/gef/sites/thegef.org/files/documents/C.40.08_Branding_the_GEF%20final_0.pdf. Amongst other things, the GEF Guidelines describe when and how the GEF logo needs to be used in project publications, vehicles, supplies and other project equipment. The GEF Guidelines also describe other GEF promotional requirements regarding press releases, press conferences, press visits, visits by Government officials, productions and other promotional items.

Where other agencies and project partners have provided support through co-financing, their branding policies and requirements should be similarly applied.

M& E Work Plan and Budget

Type of M&E Activity	Responsible Parties	Budget US$*	Time frame
Inception Workshop (IW)	• Project Manager/ National Project Director /Executing Agency • UNDP Indonesia & UNDP/GEF BRH	• Included in Project Management	Within first 2 months of project start up
Inception Report (IR)	• Project Team (DGNREEC) • UNDP Indonesia & UNDP/GEF BRH	• Included in Project Management	a) Draft IR available before IW b) Final IR available immediately following IW
Measurement of Means of Verification of project results (baseline and end-of-project impact study)	• Project Manager /Executing Agency • Project team members	• Included in Project Management	Start, mid and end of project (during evaluation cycle) and annually when required
Measurement of Means of Verification for Project Progress and Performance (measured on an annual basis)	• Oversight by UNDP-GEF BRH Technical Advisor and PM	• Included in Project Management	Annually prior to APR/PIR and to the definition of annual work plans

Type of M&E Activity	Responsible Parties	Budget US$*	Time frame
	• Measurements by regional field officers and local IAs		
APR and PIR	• Project Team (DGNREEC) • UNDP Indonesia, UNDP-GEF BRH, and UNDP EEG	• Included in Project Management	Annually
PAC/Tripartite Review Meetings	• Project Manager /Executing Agency • UNDP Indonesia	• Included in Project Management	Following Project IW and subsequently at least once a year
Periodic status reports	• Project Team (DGNREEC)	• Included in Project Management	To be determined by Project team and UNDP Indonesia
Technical reports	• Project Team (DGNREEC) • Hired consultants as needed	• Included in Component budget	To be determined by Project Team and UNDP Indonesia
Mid-term External Review	• Project Team (DGNREEC) • UNDP- Indonesia & UNDP-GEF BRH • External Consultants (i.e. evaluation team)	• $40,000	At the mid-point of project implementation.
Terminal External Evaluation	• Project Team (DGNREEC) • UNDP Indonesia & UNDP-GEF BRH • External Consultants	• $40,000	At least three months before the end of project implementation
Project Terminal Report	• Project Team (DGNREEC) • UNDP Indonesia • External Consultant	• Included in Project Management	Included in Project Management
Lessons learned	• Project Team (DGNREEC) • UNDP Indonesia & UNDP-GEF BRH	• Included in Project Management	Included in Project Management
Audit	• UNDP Indonesia • Project Team (DGNREEC)	• Included in Project Management	Annually
Visits to field sites (UNDP staff travel costs to be charged to IA fees)	• UNDP Indonesia • UNDP-GEF BRH (as appropriate) • GOI/PAC representatives	• US$ 10,000	Annually
TOTAL INDICATIVE COST*		**US$ 90,000**	

Project monitoring and evaluation will be conducted in accordance with established UNDP and GEF procedures and will be provided by the project team and the UNDP Country Office (UNDP-CO) with support from UNDP/GEF. The Logical Framework Matrix in Section 4 provides *performance* and *impact* indicators for project implementation along with their corresponding *means of verification*. These will form the basis on which the project's Monitoring and Evaluation system will be built.

General

(i) UNDP support services

MEMR has entered into an agreement with UNDP for direct project support services in the form of procurement of goods and services during the project implementation process (see Annex F). In such a case, appropriate cost recovery will be charged as per UNDP rules and regulations. The support services will be outlined in the form of Letter of Agreement signed between MEMR and UNDP.

(ii) Prior obligations and prerequisites

No prior obligations or prerequisites have been identified.

(iii) Audit Clause

Audit will be conducted according to UNDP Financial Regulations and Rules and applicable Audit policies. The Government of Indonesia will provide the UNDP Resident Representative with certified periodic financial statements, and with an annual audit of the financial statements relating to the status of UNDP (including GEF) funds expended on the project according to the established procedures set out in the appropriate UNDP programming and finance manuals. The audit will be conducted by the legally recognized auditor of the Government of Indonesia, or by a commercial auditor engaged by the Government.

(iv) Agreement on the intellectual property rights and use of logo on the project's deliverables

In order to accord proper acknowledgement to GEF for providing funding, a GEF logo will appear on all relevant GEF-supported project publications, including among others, project hardware, if any, purchased with GEF funds. Any citation on publications regarding projects funded by GEF should also accord proper acknowledgement to GEF. The UNDP logo should be prominent – and separated from the GEF logo. Alongside GEF and UNDP logo, the MERE logo may also feature as the Implementing Partner of the project.

(v) Assets

The ownership of the assets procured under the project from GEF grant money lies with the UNDP Resident Representative until the end of the project. At the end of the project, the assets would be transferred to the implementing Ministry of the Government of Indonesia (MEMR) following UNDP applicable rules and regulations.

7. LEGAL CONTEXT

This document together with the CPAP signed by the Government and UNDP which is incorporated by reference constitute together a Project Document as referred to in the SBAA and all CPAP provisions apply to this document.

Consistent with the Article III of the Standard Basic Assistance Agreement, the responsibility for the safety and security of the implementing partner and its personnel and property, and of UNDP's property in the implementing partner's custody, rests with the implementing partner.

The implementing partner shall:

a) Put in place an appropriate security plan and maintain the security plan, taking into account the security situation in the country where the project is being carried;
b) Assume all risks and liabilities related to the implementing partner's security, and the full implementation of the security plan.

UNDP reserves the right to verify whether such a plan is in place, and to suggest modifications to the plan when necessary. Failure to maintain and implement an appropriate security plan as required hereunder shall be deemed a breach of this agreement.

The implementing partner agrees to undertake all reasonable efforts to ensure that none of the UNDP funds received pursuant to the Project Document are used to provide support to individuals or entities associated with terrorism and that the recipients of any amounts provided by UNDP hereunder do not appear on the list maintained by the Security Council Committee established pursuant to resolution 1267 (1999). The list can be accessed via http://www.un.org/Docs/sc/committees/1267/1267ListEng.htm. This provision must be included in all sub-contracts or sub-agreements entered into under this Project Document.

The UNDP Resident Representative in Indonesia is authorized to effect in writing the following types of revision to this Project Document, provided that he/she has verified the agreement thereto by the UNDP Regional Coordination Unit and is assured that the other signatories to the Project Document have no objection to the proposed changes:

- Revision of, or addition to, any of the annexes to the Project Document;
- Revisions which do not involve significant changes in the immediate objectives, outputs or activities of the project, but are caused by the rearrangement of the inputs already agreed to or by cost increases due to inflation;
- Mandatory annual revisions which re-phase the delivery of agreed project inputs or increased expert or other costs due to inflation or take into account agency expenditure flexibility; and
- Inclusion of additional annexes and attachments only as set out here in this Project Document

Standard text has been inserted in the template. It should be noted that although there is no specific statement on the responsibility for the safety and security of the executing agency in the SBAA and the supplemental provisions, the second paragraph of the inserted text should read in line with the statement as specified in SBAA and the supplemental provision, i.e. "the Parties may agree that an Executing Agency shall assume primary responsibility for execution of a project."

8. ANNEXES

Annex A: Rationale of the Project, Conformity with the HPMP and Project Impacts
Annex B: Project Risks Analysis
Annex C: Project Annual Targets, Monitoring and Evaluation Plan
Annex D: Stakeholders Engagement Plan
Annex E: Terms of Reference for key personnel at Project Management Unit
Annex F: Country Office Support Service (COSS) Agreement
Annex G: Co-financing Agreements

Annex A: Rationale of the Project, Conformity with the HPMP and Project Impacts

Expected market enhancement for EE RACs

Currently, a large variety of low-priced RAC products are available in the Indonesian market. Due to this, the demand for EE RACs remains low as their price is higher compared to the existing RACs sold in the market. It is envisioned that the planned interventions will all lead to the increased production and sales of EE RACs; increased market share of EE RACs; improved technical capacities of RAC manufacturers in developing and applying energy efficient RAC technologies. Due to the steady economic development in the country, the local air conditioning equipment market has grown significantly in the past few years and is expected to continue for the next 10-20 years. At the baseline year 2013, the share of energy efficient RACs in the market is estimated at 19.8%. Considering market trending at significant growth rates and the impact of project interventions, this market share is projected to increase to 28.7% in 2017 at the end of the Project, to 38% in 2024 or 10 years after project start and to 60.5% in 2033 after 20 years since project start. The products targeted under the PENHRA project are consumer goods that are widely used particularly in households and commercial establishments. The project will give importance to the market development for RACs in terms of the feasibility studies, training and information, technical assistance and ensuring quality and EE performance of the RACs locally-produced and imported in Indonesia. Measures to address market risks include (a) assisting and empowering consumers, including women in the households, to make real time, informed decision making when buying EE products; and (b) promotion of suitable financing and market incentives which will be developed and the facilitated under the project. There is a great market potential with increased production and sale of EE RACs in Indonesia.

Necessary involvement of the RAC Industry Players

At the beginning, the RAC manufacturing industry is reluctant to implement the design and development of energy efficient RACs because of heavy market competition. Most manufacturers tend to lower the price of their products to increase sales volume and profitability, at the expense of quality. To support the market enhancements for EE RACs, the industry players need to be directly involved. The capabilities of the manufacturers need to be enhanced in producing EE RACs according to set international efficiency performance standards. Importers and distributors and service providers will have to apply these standards in the imported RACs as well. The industry players also needs assistance and will be involved in their public relation campaigns for their clients on EE RACs. But in order for the industry players to act effectively, they should be provided with adequate and updated information on technically and economically feasible EE technologies that can be applied by local RAC manufacturers. This means their capacity development is of primary importance in the coordination and development of energy standard, technical assistance provided to support RAC manufacturers to meet the requirements under EE RAC plan, financing facility to support the manufacturers to implement the EE RAC production activities and awareness program that will be implemented for consumers, retailers and manufacturers themselves.

Baseline Scenario*:* Technical Considerations on the Transition to non-HCFC and Implications on how EER of RACs will be improved under the HPMP

1. Background of HPMP

HPMP will only concentrate on the modifications of the production lines of HCFC-using industries including the RACs. HCFCs are classified as controlled substances under Annex-C Group-I of the Montreal Protocol and are subjected to the adjusted control schedule for Article 5(1) (mostly developing countries) countries i.e. to freeze the consumption at baseline levels from 2013 and reduction of 10% from baseline levels by 2015. To this effect, parties may receive financial assistance from the MLF for the implementation of HCFC Phase-out Management Plans (HPMPs).

The adjusted control steps under Montreal Protocol for these parties are: (a) "freeze" of HCFC production and consumption by 2013 (the baseline being the average of 2009 and 2010); (b) reduction of 10% by 1st January 2015; (c) 35% reduction by 2020; (d) 67.5% reduction in 2025; (e) 97.5% reduction by 2030; and (f) 100% phase-out by 2040. HPMP (Stage-I) for Indonesia will result in limiting HCFC consumption levels to the baseline level (average of 2009 and 2010) by 2013 and further reducing 10% to meet the 2015 target. This target is expected to be achieved by Indonesia as it has a good track record with phase-out of Ozone Depleting Substances (ODS). Indonesia has established a comprehensive regulatory framework for controlling ODS and achieved its obligations and controlled use (such as prohibited imports of CFCs, Halons and CTC) since 2008 which was two years earlier than required by the Montreal Protocol.

PENHRA is proposed to complement the HPMP which will serve as the Business-as-Usual Scenario. Certainly, implementing the proposed energy efficiency project in parallel with Indonesia's HPMP will maximize the environmental benefits through reduction of GHG emissions apart from achieving objectives (mainly phase-out of HCFCs) under HPMP.

a. PENHRA Conformity with the HPMP Project

The ongoing government programs in the RAC industry, particularly the HPMP Project for shifting to non-HCFC RACs, are good entry points for introducing the needed interventions and achieve synergistic effects. The proposed interventions should be properly coordinated in terms of timing and scope of activities towards common technology and environmental goals with the HPMP Project. Hence, the PENHRA project has been designed to define and establish specific complementary objective and outcome synergy between the two projects and among other related projects likewise. HPMP will act as an enabler for the establishment of regulations that will include health and safety standards for RAC refrigerants in the country. On the other hand, the PENHRA project will take the lead responsibility to complement the efforts under HPMP and ensure that such regulations concerning energy efficiency are enforced by the relevant government authorities.

Part of the interventions in PENHRA involves the provision of financial support to the RAC industry players participating in the project (including those under the HPMP) in terms of capital for selected manufacturers to put up the necessary production facilities for EE RACs and the operating cost during the actual production so that they will have the capacity to produce energy efficient RAC units with new refrigerant technology (under the HPMP). Among the technical interventions to the production lines for the production of energy efficient RACs include: mold for plate heat exchanger, facilities for improvement of aerodynamic shroud, and energy-efficient fan mounting fabrication facilities are aimed to increase their unit capacities and volume of production and sale of higher EER/COP RAC units in Indonesia. These investment activities are described in Component 3 with supporting activities.

The investment activities needed therefore are in the form the financial assistance to modify and optimize the RAC production lines for each company involved in both the HPMP and PENHRA Projects under a cost-sharing arrangement to ensure no duplication or redundancy in the equipment and devices to be supported by HPMP, PENHRA and the RAC industry participants.

b. COP/EER Improvement in the Baseline and Alternative Scenario

The efficiency levels of each of the Target RAC Products will still increase, albeit at a lower rate, in the Business-as-Usual (BAU) Scenario even without PENHRA Project. The forecast annual average COPs

Table A.1: Forecast Annual Average COPs in Baseline and Alternative (due to PENHRA) Scenarios

	2013	2017	2024	2033
Baseline				
Large Refrigeration	2.71	2.79	3.02	3.31

Residential air conditioners	2.81	2.90	3.14	3.43
Light commercial air conditioners	2.71	2.79	3.02	3.31
Commercial air conditioners	2.71	2.79	3.02	3.31
Alternative				
Large Refrigeration	2.71	2.96	3.17	3.47
Residential air conditioners	2.81	3.07	3.29	3.60
Light commercial air conditioners	2.71	2.96	3.17	3.47
Commercial air conditioners	2.71	2.96	3.17	3.47

From the HPMP, in the selection of alternative technologies to replace HCFC-22, technical and safety factors considered the following:

Technical
- Processing characteristics
- Functionality of the end-product
- Proven and mature technology, and,
- Energy Efficiency gains through refrigerant changeover

Safety
- Low risk to occupational health
- Low risk for physical safety (flammability, etc.)

It is noted that among the factors considered in the selection is also energy efficiency. Two refrigerants were identified to nearly match the above selection criteria: R-32 and Hydrocarbons, with the following characteristics and remarks on their use on RACs:

Table A.2: Alternative refrigerants and its application

Substance	GWP	Application	Remark
Hydrocarbons	<15	Small capacity domestic and commercial refrigeration equipment	Flammability issues; not widely used in large capacity systems Theoretically, in vapor compression refrigeration system energy consumption of HC-R510 is 20.4% less than HFC-R134a (*Source: Bolaji, B.O., 2012. Proceeding 9th: Industrial and Commercial Use of Energy Conference (ICUE)*).
R-32	675	Small and medium-capacity commercial refrigeration and air conditioning applications	Single component refrigerant. Mildly flammable. Higher working pressures than HCFC-22. Higher refrigeration capacity per unit charge. Main component of R-410A. R-32 is expected to achieve better overall performance than R-410A.

Source: HPMP

R-32 is a single component refrigerant with zero ODP, GWP 675 (which is a third of that of R-410A) and is the main component of R-410A. Its working pressure is higher than R-410A, with good heat transfer properties, volumetric refrigerating capacity and theoretical energy efficiency. The charge amount of HFC-32 is about 60-80% of R-22 for the same refrigerating capacity, depending on the application. R-32 is expected to achieve better overall performance than R-410A. R-32 is

commercially available and mature, with favorable price as compared to R-410A, though slightly higher than HCFC-22.

However, R-32 is mildly flammable therefore safety measures will need to be introduced in manufacturing, installation and servicing. In accordance with EN378-1:2008, for machine room and open-to-air air-conditioning units using R-32, the charge of R-32 should be limited to 40.4 kg. R-32 can only be used as working fluid in air conditioning equipment fulfilling this standard. The HPMP TWG for this sector has carefully considered and applied the above-mentioned factors and has concluded that R-32 technology is suited for application in residential and medium-capacity light commercial air conditioning equipment, due to its expected technical performance and significant potential benefit with respect to global warming impact as compared to HCFC-22.

Hydrocarbons such as cyclopentane, n-pentane, etc., are zero-ODP and very low-GWP option, which makes hydrocarbons another possible alternative refrigerant but require extensive safety-related provisions/investments due to their flammability. It is the preferred conversion technology for large and organized users, where safety requirements can be complied with and investments can be economically justified.

Based on the above considerations by the HPMP TWG, large and organized enterprises in the sector will select hydrocarbon technology, while the small and medium-sized enterprises will select HFC-245fa (also a blowing agent) in the interim, until reliable and economic availability of other low-GWP options is established.
In the course of technology conversion, the shift to R-32 or other possible substances will involve, among others:

- *System redesign*. The overall system, components and process would need to be redesigned for adaptation with the new technology. This will include design and calculations, simulation, reengineering of the system components, such as compressors, expansion valves, heat exchangers, unit structure, electrical systems, and compilation of production process, drawings and complete bill of materials.

- *Prototype manufacturing, trials and testing*. A pilot-level quantity of the selected models will need to be subjected to prototype production, trials and testing to establish the process and fine-tune as needed and establish product performance through testing. The results would be fed back into the process and product design, to ensure smooth conversion.

- *Product Certification*. Evaluation and certification of product performance will need to be obtained from external agencies.

The PENHRA project has been proposed and approved to be complementary with the HPMP Project which is focused on HFC-32 to replace HCFC-22. Considering the importance of the refrigerant technology choice raised by the Council Member from Germany, the project will be involved in determining feasible technologies according to the desired technical, economic and environmental criteria and in identifying the technology transfer approach for the RAC manufacturers. In addition, the project is also involved in the validation and testing of EE RACs using HFC-32 and possibly the demonstration, validation and testing of other non-HFC low-GWP refrigerant options and in prototyping selected designs that may be considered by interested RAC manufacturers and subsequently approved during PENHRA implementation.

CO_2 Emissions Reduction Estimates

Methodology

Calculations have been based on some forecast scenarios both for the baseline (business-as-usual) case and the alternative case including forecast annual average EERs/COPs of the RACs (with no distinction

as to CF and VF types due to non-availability of data) considering a baseline scenario (wherein no improved EE features are incorporated in the new locally manufactured and/or imported RACs – using and/or not using low GWP refrigerants). The forecast annual average EERs/COPs of the RACs considering an alternative scenario (wherein improved EE features are incorporated in the new locally manufactured and/or imported RACs – using and/or not using low GWP refrigerants). The PENHRA project will be facilitating the realization of the alternative scenario.

The basic assumptions in the calculation of the Energy Savings and the CO_2 Emission Reduction can be seen in detail for the different groups of RAC industry players. The baseline for the energy saving and GHG reduction calculation is the BRESL consumption. This is because when the PENHRA Project starts, BRESL has already taken place and has also influenced the electricity consumption according to its own objectives. PENHRA aims to enhance the impact that is already expected to be given by BRESL and HPMP in Indonesia. Since BRESL covers only the residential ACs with R-22 based technology, therefore PENHRA will not only cover other RACs (e.g. commercial AC) but also aims to enhance the residential AC sector by implementing EE-related technological improvements.

Steps in the Calculations

1. Starting from the various assumptions below, the power consumption per type of RAC product was computed. The basic assumptions in the calculation of the impacts on energy saving and emission reductions for the different RAC technology applications are as follows. The methodology used in the calculation is the prescribed excel-based spreadsheet by UNDP. The baseline for the energy saving and GHG reduction calculation is the BRESL consumption. This is because when the PENHRA Project starts, BRESL has already taken place and has also influenced the electricity consumption according to its own objectives. PENHRA aims to enhance the impact that is already expected to be given by BRESL in Indonesia. Since BRESL covers only the residential ACs with R-22 based technology, therefore PENHRA will not only cover other RACs (e.g. commercial AC) but also aims to enhance the residential AC sector by implementing EE-related technological improvements.

Parameter	Refrigeration	Air conditioners			Unit of Measure
	Large (Commercial and Industrial)	Residential	Light commercial	Commercial	
Average cooling capacity	1,345,112	9,844	120,715	293,165	BTU/h
Assumed number of operational hours	3,000	3,000	3,000	3,000	hours
Population in 2009	3,178	1,211,649	69,218	167	units
1 TR air conditioning unit	12,000	12,000	12,000	12,000	BTU/h
Power input - min (compressor rating)	134.51	0.89	12.07	29.32	kW
Power input - max (compressor rating)	158.25	1.20	14.20	34.49	kW
Coefficient of Performance (COP) - max	2.93	3.22	2.93	2.93	Watt/Watt
Coefficient of Performance (COP) - min	2.49	2.40	2.49	2.49	Watt/Watt
Coefficient of Performance (COP) - average	2.71	2.81	2.71	2.71	Watt/Watt
Energy Efficiency Ratio (EER) - max	10.00	11.00	10.00	10.00	BTU/Watt h
Energy Efficiency Ratio (EER) - min	8.50	8.20	8.50	8.50	BTU/Watt h
Energy Efficiency Ratio (EER) - average	9.25	9.60	9.25	9.25	BTU/Watt h
Annual energy consumption (kWh)	431,933	3,076	38,763	95,081	kWh
Baseline and GEF Assumption	5.0%	Annual increase in sales			

1 HP compressor power 0.75 kW

Type of Appliance/Equipment	BAU increase in efficiency	Proposed PENHRA increase in efficiency (during project implementation)	After PENHRA
			Due to effect of standards & labels (mandatory MEPS)
Refrigeration	1.0%	8.0%	1.0%
Air conditioners	1.0%	8.0%	1.0%

National Grid CO2 Emission Factor (EF), country total CO2 emissions and emissions due to Elec Gen in 2008

Country	EF (t CO_2/MWh)	Total national CO_2 emissions in 2008 (Mt CO_2/y)	Total CO_2 emissions from Elec Gen - 2008 (Mt CO_2/y)
Indonesia	0.757	406	145
	Source: UNDP	Source: WDI (2011)	

DEFINITIONS & COMMON RULE OF THUMBS FOR RAC

Cooling Capacity

1	TR	□	12,000	BTU/hour
	(Ton of Refrigeration)	□	3,517	Watt heat
1	Watt heat	□	3.412	BTU/hour
1	BTU/hour	□	0.2931	Watt heat
5,000	BTU/hour	□	1,465	Watt heat
7,000	BTU/hour	□	2,052	Watt heat
9,000	BTU/hour	□	2,638	Watt heat
18,000	BTU/hour	□	5,276	Watt heat
24,000	BTU/hour	□	7,034	Watt heat
		□		

Unit Class/Size

1	HP	□	746	Watt electricity
	(Horse Power or PK)			

Energy & Efficiency Performance

EER	□	Btu / Watt elect hour
(Energy Efficiency Ratio)		
COP	□	EER / 3.412
(Coefficient of Performance)		

2. In this calculation, the power consumption is calculated as follows:

Determine the average value of the compressor power (e.g. for residential AC the average value of compressor power is 1.375 Horse Power) then multiply it with EER value

$$\text{average cooling capacity} = \text{current unit power input } x \text{ current EER value}$$

$$9,843\ \frac{\text{BTU}}{\text{h}} = 1.375\ \text{HP}\ \left(745\ \frac{\text{W}}{\text{HP}}\right) x\ 9.60\ \frac{\text{BTU}}{\text{W h}}$$

The average cooling capacity then used as fixed pivot value for calculating improved unit power input

$$\text{improved unit power input} = \frac{\text{average cooling capacity}}{\text{improved EER value}}$$

$$1{,}015\ \text{Watt} = \frac{9{,}843\ \frac{\text{BTU}}{\text{h}}}{9.70\ \frac{\text{BTU}}{\text{W h}}}$$

And so on with better EER value in following years.

3. Energy savings due to the implementation of the project are calculated as follows.

<u>Step 1:</u> Number of appliances and their energy consumption per year

$$\text{BEC}_y = \frac{\sum AS_i \times EC_i}{10^6} \qquad \rightarrow \text{Eq (1)}$$

Wherein,

BEC_y = Baseline electricity consumption in year y (GWh/y)
AS_i = No. appliances/equipment sold/y
EC_i = Business As-Usual (BAU) electricity consumption/y (kWh/y)
i = Type of appliance/equipment

$$\text{PEC}_y = \frac{\sum AS_i \times REC_i}{10^6} \qquad \rightarrow \text{Eq (2)}$$

Wherein,

PEC_y = Project electricity consumption in year y (GWh/y)
REC_i = Reduced electricity consumption due to PENHRA project/y (kWh/y)

<u>Step 2:</u> Calculation of energy savings

Energy savings (in GWh) of the project activity in year y,

$$\text{ES}_y = \text{BEC}_y - \text{PEC}_y \qquad \rightarrow \qquad \text{Eq (3)}$$

Where:

ES_y = Energy savings due to the BRESL project activity in year y (GWh/y)

<u>Step 3:</u> Calculation of Emission Reductions (ER)

Emission Reductions (ER) due to the project activity in year y,

$$\text{ER}_y = \left[\frac{ES_y}{1000}\right] \times EF \qquad \rightarrow \qquad \text{Eq (4)}$$

Where:

ER_y = Emissions Reduction due to the project activity in year y (Mt CO_2/y)
EF = Emission factor of the national grid (t CO_2/MWh)

4. The cases investigated are: a.) locally manufactured, b.) imported ACs and combination of locally manufactured and imported ACs.

5. The power unit input obtained is then multiplied with the average operational hour per year (assumed 3,000 hours), thus the annual electricity consumption can be known.

6. The GHG emission then calculated by multiply the electricity consumption with GHG emission factor (assumed 0.757 tonne CO_2/MWh).

    a) For all equipment/appliances the assumed annual work hour is 3,000 hours.
    b) The sold RAC unit growth is assumed 5% per year (based on GABEL/Indonesia Electronic Producer Association data).
    c) CO_2 emission is following EF assumption of 0.757 t CO_2/MWh.
    d) Unit power input obtained from unit capacity divide by COP
    e) The annual electricity consumption per unit obtained by multiplying:
        - Number of unit sold X unit work hour X unit power input.

    f) The annual GHG emission obtained by multiplying annual electricity consumption with CO_2 emission factor.
    g) The results from the calculation are:

        - Projected annual electricity consumption from year 2009 to 2033 for BAU scheme and with baseline and PENHRA intervention.
        - Projected annual electricity consumption from year 2005 to 2031 for BAU scheme and with PENHRA intervention.
        - Projected annual electricity saving from year 2005 to 2031 due to baseline and PENHRA intervention.
        - Projected annual CO2 reduction and the cumulative value from year 2009 to 2033 due to baseline and PENHRA intervention.
        - Projected annual electricity consumption per appliance from year 2009 to 2033.

Results of Impact Calculations

The goal of PENHRA project is the reduction of GHG emissions due to reduced electricity consumption by RACs which otherwise generated based on fossil fuel in Indonesia. Assuming the project will start in 2015, The PENHRA Project will result in a cumulative electricity savings of 581 GWh by 2017 or at the end of the project in Year 3 against a baseline electricity consumption of 3,244 GWh/y in 2014.The equivalent reduction of CO_2 emissions is estimated at 440 kilotons (kt) CO_2 by the year 2017 and 1,481 kt CO_2 by the year 2024, or after 10 years of project start.

Table A.3 and **A.4** present the summary of the expected energy savings and expected CO_2 emission reductions, respectively, during and sustained after the project.

Table A.3: Expected Energy Savings During and After PENHRA Implementation

Year	BAU Electricity Consumption (GWh/yr)	GEF Alternative Electricity Consumption* (GWh/yr)	PENHRA Electricity Savings (GWh/yr)	Percent Electricity Savings (%)	Cumulative PENHRA Electricity Savings (GWh)
2013	3,120	3,120	0	-	-
2017	3,644	3,477	168	4.6%	581
2024	4,783	4,563	220	4.6%	1,956
2033	6,784	6,472	312	4.6%	4,374

*Unit volumes of products that are locally manufactured imported and directly supported by PENHRA.

Table A.4: Expected CO_2 Emission Reductions During and After PENHRA Implementation

Year	BAU CO_2 Emissions (MMT/yr)	GEF Alternative CO_2 Emissions (MMT/yr)*	PENHRA CO_2 Reduction (kt/yr)	Percent CO_2 Reduction (%)	Cumulative PENHRA CO_2 Reduction (kt/yr)
2013	2.362	2.362	0	-	-
2017	2.759	2.632	127	4.6%	440
2024	3.621	3.454	167	4.6%	1,481
2033	5.136	4.899	236	4.6%	3,311

*National grid CO_2 Emission Factor for Indonesia is 0.757 (Source: UNDP)

PENHRA Project	Value	Notes
I – Direct		
Cumulative emission reductions during project duration (tCO_2)	439,581	(1)
Lifetime direct GHG emissions avoided (tCO_2)	1,480,750	(2)
II - Direct post project		
Lifetime direct post-project GHG emissions avoided (t CO_2)	3,046,997	(3)
III – Indirect		
Lifetime indirect GHG emissions avoided - bottom-up (tCO_2)	13,583,241	(4)
Lifetime indirect GHG emissions avoided - top-down (tCO_2)	3,622,198	(5)
GEF finance (US $)	5,020,822	
Unit Abatement Cost (UAC) ($/$tCO_2$) - (Direct + Direct post-project) as per GEF CO_2 emission reduction calculation methodology ($/$tCO_2$)	1.11	

(1) Direct GHG emission reductions avoided during the project duration of 3 years are estimated to be 439,581 tCO_2 (by the end 2017). This is the end-of-project target for the indicator of the project goal. This estimate is based on the quantities of EE RAC units that are manufactured by selected local RAC manufacturers that were directly assisted by the PENHRA project. These are assumed to be sold and utilized during the duration of the PENHRA project.

(2) Further, considering the average 10 year useful lifetime of the locally manufactured, sold and utilized EE RAC units in Item (a) above, the total lifetime direct GHG emission reductions is estimated at 1,480,750 tCO_2.

(3) Since the PENHRA project includes activities related to the implementation of enabling policy and regulations for the importation of EE RACs; as well as established and operational accreditation, inspection and certification system for all imported RACs that are sold in Indonesia, the energy savings from the use of these imported EE RACs (assuming this will happen after end-of-project) are considered directly attributable to PENHRA. In this regard, the GHG emission reductions associated with the energy savings are also attributable to the project. Hence, the total lifetime direct post-project GHG emissions avoided is estimated at 3,046,997 tCO_2.

(4) The bottom-up assessment of lifetime indirect GHG emissions avoided are calculated to be 13,583,241 tCO_2. A replication factor of 3 (as prescribed in the GEF GHG emission reduction estimation methodology for projects involving demonstrations) was used ((1,480,750+3,046,997) x 3 = 13,583,241 tCO_2).

(5) The top-down assessment of lifetime indirect GHG emissions avoided are considered to be the sum of lifetime direct plus lifetime direct post-project GHG emissions avoided multiplied by a causality factor of 0.8, i.e. 3,622,198 tCO_2 as the project focuses of importation as well as local manufacturing. As per GEF CO_2 emission reduction calculation methodology, causality factor of 0.8 (Level 4 = "The GEF contribution is dominant, but some of this reduction can be attributed to the baseline," GEF causality = 80 percent) is considered as HPMP will also have an impact..

	PENHRA project	
	Direct	**Direct post project**
Influence of projects when compared to total country specific GHG emissions	0.36%	0.75%
Influence of projects when compared to total country specific GHG emissions from electricity generation	1.02%	2.10%

Table A.5: Summary of Calculations on Energy Saving and Emission Reduction

Case 1: Without Imports	Past Years Trend						PENHRA Direct			PENHRA Direct Post-Project						
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
No. of appliance/ equipment sold in the year y (units)[18]																
Large Refrigeration	3,178	3,345	3,522	3,707	3,902	4,097	4,302	4,517	4,743	4,980	5,229	5,491	5,765	6,053	6,356	6,674
Residential air conditioners (‘000)	266	279	293	308	324	340	357	375	394	414	434	456	479	503	528	554
Light commercial air conditioners (‘000)	8.8	9.2	9.7	10.2	10.7	11.2	11.8	12.4	13.0	13.7	14.3	15.1	15.8	16.6	17.4	18.3
Commercial air conditioners	14	15	15	16	17	18	19	20	21	22	23	24	25	26	28	29
BAU Energy consumption (kWh/y per appliance/ equipment)																
Large Refrigeration (‘000)	454	450	445	440	436	432	428	423	419	415	411	407	403	397	395	391
Residential air conditioners	3,202	3,170	3,139	3,107	3,076	3,046	3,016	2,986	2,956	2,927	2,898	2,869	2,841	2,813	2,785	2,757
Light commercial air conditioners (‘000)	40.7	40.3	39.9	39.5	39.1	38.8	38.4	38,.0	37.6	37.2	36.9	36.5	36.2	35.8	35.4	35.1
Commercial air conditioners (‘000)	97.0	98.0	97.0	96.0	95.1	94.1	93.2	92.2	91.4	90.5	89.6	88.7	87.8	86.9	86.1	85.2
Electricity consumption (GWh/y																
	2,658	2,766	2,879	2,997	3,120	3,244	3,372	3,506	3,644	3,789	3,939	4,095	4,257	4,425	4,601	4,783
In terms of COP																
Large Refrigeration	2.60	2.63	2.66	2.68	2.71	2.74	2.77	2.79	2.82	2.85	2.88	2.91	2.94	2.97	2.99	3.02
Residential air conditioners	2.70	2.73	2.76	2.79	2.81	2.84	2.87	2.90	2.93	2.96	2.99	3.02	3.05	3.08	3.11	3.14
Light commercial air conditioners	2.60	2.63	2.66	2.68	2.71	2.74	2.77	2.79	2.82	2.85	2.88	2.91	2.94	2.97	2.99	3.02
Commercial air conditioners	2.60	2.63	2.66	2.68	2.71	2.74	2.77	2.79	2.82	2.85	2.88	2.91	2.94	2.97	2.99	3.02
In terms of EER																
Large Refrigeration	8.89	8.98	9.07	9.16	9.25	9.34	9.44	9.53	9.63	9.72	9.82	9.92	10.02	10.12	10.22	10.32

[18] **Unit numbers of local manufacturer directly supported by PENHRA**

Case 1: Without Imports	Past Years Trend						PENHRA Direct			PENHRA Direct Post-Project						
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Residential air conditioners	9.22	9.31	9.41	9.50	9.60	9.70	9.79	9.89	9.99	10.09	10.19	10.29	10.40	10.50	10.60	10.71
Light commercial air conditioners	8.89	8.98	9.07	9.16	9.25	9.34	9.44	9.53	9.63	9.72	9.82	9.92	10.02	10.12	10.22	10.32
Commercial air conditioners	8.89	8.98	9.07	9.16	9.25	9.34	9.44	9.53	9.63	9.72	9.82	9.92	10.02	10.12	10.22	10.32
Energy consumption due to PENHRA (kWh/y per appliance/equipment)																
Large Refrigeration (‘000)	454.1	449.6	445.1	440.7	436.3	431.9	399.9	399.9	399.9	395.9	392.0	388.2	384.3	380.5	376.8	373.0
Residential air conditioners	3,202	3,170	3,139	3,107	3,076	3,046	2,820	2,820	2,820	2,792	2,765	2,737	2,710	2,683	2,657	2,630
Light commercial air conditioners (‘000)	40.7	40.3	39.9	39.5	39.2	38.8	35.9	35.9	35.9	35.5	35.2	34.8	34.5	34.1	33.8	33,.5
Commercial air conditioners (‘000)	97.0	98.0	97.0	96.0	95.1	94.1	87.2	87.2	87.2	86.3	85.4	84.6	83.8	82.9	82.1	81.3
Electricity consumption due to PENHRA project intervention (GWh/y)																
	2,658	2,766	2,879	2,997	3,120	3,244	3,153	3,311	3,477	3,614	3,757	3,906	4,061	4,222	4,389	4,563
In terms of COP																
Large Refrigeration	2.60	2.63	2.66	2.68	2.71	2.74	2.96	2.96	2.96	2.99	3.02	3.05	3.08	3.11	3.14	3.17
Residential air conditioners	2.70	2.73	2.76	2.79	2.81	2.84	3.07	3.07	3.07	3.10	3.13	3.16	3.19	3.23	3.26	3.29
Light commercial air conditioners	2.60	2.63	2.66	2.68	2.71	2.74	2.96	2.96	2.96	2.99	3.02	3.05	3.08	3.11	3.14	3.17
Commercial air conditioners	2.60	2.63	2.66	2.68	2.71	2.74	2.96	2.96	2.96	2.99	3.02	3.05	3.08	3.11	3.14	3.17
In terms of EER																
Large Refrigeration	8.89	8.98	9.07	9.16	9.25	9.34	10.09	10.09	10.09	10.19	10.29	10.40	10.50	10.60	10.71	10.82
Residential air conditioners	9.22	9.31	9.41	9.50	9.60	9.70	10.47	10.47	10.47	10.58	10.68	10.79	10.90	11.01	11.12	11.23
Light commercial air conditioners	8.89	8.98	9.07	9.16	9.25	9.34	10.09	10.09	10.09	10.19	10.29	10.40	10.50	10.60	10.71	10.82
Commercial air conditioners	8.89	8.98	9.07	9.16	9.25	9.34	10.09	10.09	10.09	10.19	10.29	10.40	10.50	10.60	10.71	10.82
Electricity Savings - due to PENHRA intervention (GWh/y)																
	0	0	0	0	0	0	219	194	168	174	181	188	196	204	212	220

Case 1: Without Imports	Past Years Trend						PENHRA Direct			PENHRA Direct Post-Project						
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Cumulative Electricity Savings - due to PENHRA intervention (GWh)																
	0	0	0	0	0	0	219	413	581	755	936	1125	1321	1524	1736	1956
CO_2 emission reductions due to PENHRA project intervention (kt CO_2/y)																
	0	0	0	0	0	0	165	147	127	132	137	143	148	154	160	167
Cumulative CO_2 emission reductions due to PENHRA project intervention (kt CO_2)																
	0	0	0	0	0	0	165	313	440	572	709	851	1000	1154	1314	1481
Total BAU GHG emission (kt CO_2/y)	2012	2094	2180	2269	2362	2455	2553	2654	2759	2868	2982	3100	3222	3350	3483	3621
Total PENHRA GHG emission (kt CO_2/y)	2012	2094	2180	2269	2362	2455	2387	2507	2632	2736	2844	2957	3074	3196	3323	3454
Annual GHG reduction (%)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.5%	5.5%	4.6%	4.6%	4.6%	4.6%	4.6%	4.6%	4.6%	4.6%

Case 2: With Imported ACs	Past Years Trend						PENHRA Direct			PENHRA Direct Post-Project						
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
No. of appliance/ equipment sold in the year y (units)[19]																
Large Refrigeration																
Residential air conditioners (‘000)	945.0	992.2	1,041.9	1,094.0	1,148.7	1,206.1	1,266.4	1,329.7	1,396.2	1,466.0	1,539.3	1,616.3	1,697.1	1,782.0	1,871.0	1,964.6
Light commercial air conditioners (‘000)	60.4	63.4	66.6	69.9	73.4	77.1	81.0	85.0	89.2	93.7	98.4	103.3	108.5	113.9	119.6	125.6
Commercial air conditioners	153	155	156	158	159	161	162	164	166	167	169	171	172	174	176	178
BAU Energy consumption (kWh/y per appliance/equipment)																
Large Refrigeration (‘000)	454.1	449.6	445.1	440.6	436.3	431.9	427.7	423.4	419.2	415.1	411.0	406.9	402.9	398.9	394.9	391.0
Residential air conditioners	3,202	3,170	3,139	3,107	3,076	3,046	3,016	2,986	2,956	2,927	2,898	2,869	2,841	2,813	2,785	2,757
Light commercial air conditioners (‘000)	40.8	40.3	39.9	39.5	39.2	38.8	38.4	38.0	37.6	37.3	36.9	36.5	362	35.8	35.4	35.1
Commercial air conditioners (‘000)	99.0	98.0	97.0	96.0	95.1	94.1	93.2	92.3	91.4	90.5	89.6	88.7	87.8	86.9	86.1	85.2
Electricity consumption (GWh/y)																
	5,504	5,720	5,946	6,180	6,423	6,677	6,941	7,215	7,501	7,797	8,105	8,426	8,759	9,105	9,465	9,839
In terms of COP																
Large Refrigeration	2.60	2.63	2.66	2.68	2.71	2.74	2.77	2.79	2.82	2.85	2.88	2.91	2.94	2.97	2.99	3.02
Residential air conditioners	2.70	2.73	2.76	2.79	2.81	2.84	2.87	2.90	2.93	2.96	2.99	3.02	3.05	3.08	3.11	3.14
Light commercial air conditioners	2.60	2.63	2.66	2.68	2.71	2.74	2.77	2.79	2.82	2.85	2.88	2.91	2.94	2.97	2.99	3.02
Commercial air conditioners	2.60	2.63	2.66	2.68	2.71	2.74	2.77	2.79	2.82	2.85	2.88	2.91	2.94	2.97	2.99	3.02
In terms of EER																
Large Refrigeration	8.89	8.98	9.07	9.16	9.25	9.34	9.44	9.53	9.63	9.72	9.82	9.92	10.02	10.12	10.22	10.32
Residential air conditioners	9.22	9.31	9.41	9.50	9.60	9.70	9.79	9.89	9.99	10.09	10.19	10.29	10.40	10.50	10.60	10.71
Light commercial air conditioners	8.89	8.98	9.07	9.16	9.25	9.34	9.44	9.53	9.63	9.72	9.82	9.92	10.02	10.12	10.22	10.32

[19] **Unit numbers include locally manufactured, imported and directly supported by PENHRA**

Case 2: With Imported ACs	Past Years Trend						PENHRA Direct			PENHRA Direct Post-Project						
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Commercial air conditioners	8.89	8.98	9.07	9.16	9.25	9.34	9.44	9.53	9.63	9.72	9.82	9.92	10.02	10.12	10.22	10.32
Energy consumption due to PENHRA (kWh/y per appliance/equipment)																
Large Refrigeration (‘000)	454.1	449.6	445.1	440.6	436.2	431.9	399.9	399.9	399.9	396.0	392.0	388.2	384.3	380.5	376.8	373.0
Residential air conditioners	3,202	3,170	3,139	3,107	3,076	3,046	2,820	2,820	2,820	2,792	2,765	2,737	2,710	2,683	2,657	2,630
Light commercial air conditioners (‘000)	40.7	40.3	39.9	39.5	39.1	38.8	35.9	35.9	35.9	35.5	35.2	34.8	34.5	34.1	33.8	33.5
Commercial air conditioners (‘000)	99.0	98.0	97.0	96.0	95.1	94.1	87.2	87.2	87.2	86.3	85.4	84.6	83.8	82.9	82.1	81.3
Electricity consumption due to PENHRA project intervention (GWh/y)																
	5,504	5,720	5,946	6,180	6,423	6,677	6,491	6,815	7,155	7,438	7,732	8,038	8,356	8,686	9,029	9,386
In terms of COP																
Large Refrigeration	2.60	2.63	2.66	2.68	2.71	2.74	2.96	2.96	2.96	2.99	3.02	3.05	3.08	3.11	3.14	3.17
Residential air conditioners	2.70	2.73	2.76	2.79	2.81	2.84	3.07	3.07	3.07	3.10	3.13	3.16	3.19	3.23	3.26	3.29
Light commercial air conditioners	2.60	2.63	2.66	2.68	2.71	2.74	2.96	2.96	2.96	2.99	3.02	3.05	3.08	3.11	3.14	3.17
Commercial air conditioners	2.60	2.63	2.66	2.68	2.71	2.74	2.96	2.96	2.96	2.99	3.02	3.05	3.08	3.11	3.14	3.17
In terms of EER																
Large Refrigeration	8.89	8.98	9.07	9.16	9.25	9.34	10.09	10.09	10.09	10.19	10.29	10.40	10.50	10.60	10.71	10.82
Residential air conditioners	9.22	9.31	9.41	9.50	9.60	9.70	10.47	10.47	10.47	10.58	10.68	10.79	10.90	11.01	11.12	11.23
Light commercial air conditioners	8.89	8.98	9.07	9.16	9.25	9.34	10.09	10.09	10.09	10.19	10.29	10.40	10.50	10.60	10.71	10.82
Commercial air conditioners	8.89	8.98	9.07	9.16	9.25	9.34	10.09	10.09	10.09	10.19	10.29	10.40	10.50	10.60	10.71	10.82
Electricity Savings - due to PENHRA intervention (GWh/y)																
	0	0	0	0	0	0	450	400	345	359	373	388	403	419	436	453
Cumulative Electricity Savings - due to PENHRA intervention (GWh)																
	0	0	0	0	0	0	450	850	1,195	1,554	1,927	2,315	2,718	3,137	3,572	4,025
CO_2 emission reductions due to PENHRA project intervention (kt CO_2/y)																

Case 2: With Imported ACs	Past Years Trend						PENHRA Direct			PENHRA Direct Post-Project						
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
	0	0	0	0	0	0	341	303	261	272	282	294	305	317	330	343
Cumulative CO_2 emission reductions due to PENHRA project intervention (kt CO_2)																
	0	0	0	0	0	0	341	644	905	1,176	1,459	1,752	2,057	2,375	2,704	3,047
Total BAU GHG emission (kt CO_2/y)	4,166	4,330	4,501	4,678	4,863	5,055	5,254	5,462	5,678	5,902	6,136	6,378	6,630	6,892	7,165	7,448
Total PENHRA GHG emission (kt CO_2/y)	4,166	4,330	4,501	4,678	4,863	5,055	4,914	5,159	5,417	5,631	5,853	6,085	6,325	6,575	6,835	7,105
Annual GHG reduction (%)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.5%	5.5%	4.6%	4.6%	4.6%	4.6%	4.6%	4.6%	4.6%	4.6%

Annex B: Project Risk Analysis

Within the confines of the project, the project design took into consideration the success factors that would make the realization of the Project goal and objectives possible and within controllable and manageable limits. These are described as internal factors and should be within the control and authority of the Project Team. However, there are factors beyond the control of the Project and therefore the success of the project in attaining its goal and targets relies on the assumptions that certain desired situations or conditions will exist or happen. However, these assumptions if worded in the negative sense are considered as the risks of the project implementation.

The Project Planning Matrix (Section 3) shows a detailed overview of the project's assumptions for successful project implementation. To address these risks, the project has to establish effective means to monitor and to the extent possible mitigate these risks. Mitigation measures include a strong emphasis on hands-on and adaptive project management and participation of each stakeholder, mobilizing private sector participation and a continuous dialogue between the project's donors, implementing Partner, executing agency, and government agencies. The different risks that were identified during the PENHRA project formulation and the recommended mitigation measures and risk rating are the following:

Table B.1: Project Risks and Mitigation Measures

Date Identified	Risk Type	Risk Description	Risk Management
June 2014	*Political*	*Insufficient, discontinuous and/or uncommitted support from government and coordination among line Ministries and the RAC manufacturers* • Shifting of government energy program priorities leading to reduced technical and budgetary support to ES&L program; poor coordination among line ministries and RAC industry may lead to slow policy execution and poor implementation of the program. Risk Rating: Low	• Government commitment to the project will be clearly established and confirmed. • Regular coordination meetings among relevant line ministries and RAC industry. • Government issuing policies and acting lead role on EE RAC program
June 2014	*Institutional*	*Lack of support, participation and commitment from local RAC manufacturers* • Private sector not participating adequately in the project, due to lack of interest, disruption to operation and business priorities. Financing of investments for manufacturers to modify their production facilities may not be available. Risk Rating: Moderate	• Industry associations, professional organizations, and private individuals will be consulted and involved in the annual project work planning. • Working relationships with industry and commercial sector associations will be further enhanced to ensure cooperation. • Commitment and active participation of RAC manufacturers, distributors, and service providers. • Awareness and interest by the public in using energy efficient RACs will be facilitated • Close collaboration with HPMP

Date Identified	Risk Type	Risk Description	Risk Management
June 2014	*Technology*	*EE Technology Risk* • Failure of EE products (equipment and appliances) to perform as claimed by manufacturers resulting to customer dissatisfaction. • Proliferation of illegally traded and unreliable RACs. Risk Rating: Low	• Serious implementation of EE standards, labelling and warranty • Consumer education activities focus on use and application of EE RAC as well as consumer protection programs of the government. • Testing and certification institutions to be strengthened and equipped • Ministerial decrees to support EE RAC production and application including technology transfer provisions and incentives will be issued
June 2014	*Institutional*	*EE Market & Financing Risk* • Unwillingness of consumers to buy EE RAC due to bad experiences in the past and high initial cost may lead to failure of the project to induce increased sales and widespread use of EE RAC. Risk Rating: Moderate	• Assisting and empowering consumers to make real time, informed decision making when buying EE products. • Promotion of suitable financing, incentives will be developed and the implementation facilitated under the project. • Providing ample technology and market information on economic and environmental benefits of EE RACs
June 2014	*Regulatory*	*Government procedures and processes may delay the implementation of MEPS* • The formulation, review, deliberation and approval by appropriate authorities in the government, in close consultation with the industry and other stakeholders might take long and could not happen within the timeframe of the project. Risk Rating: Moderate	• Based on experience from the BRESL project implementation, there should be a supporting formulation of ministerial regulation on EE labelling to get the MEPS approved. Due to the influence of ongoing initiatives in the country, there will be a voluntary EE labelling and transition regime for MEPS. In case, if there is a delay in the enactment and mandatory implementation of MEPS, EE labelling will be used to guide the manufacturers to meet the requirement of labelling.
		Overall Risk Rating: Low to Moderate	

Annex C: Project Annual Targets, Monitoring and Evaluation Plan

The PENHRA project is comprised of 4 components consisting of complementing activities designed to achieve the project goal and objectives. For the activities, outputs and outcomes under each component, **Table C.1** shows the yearly indicative targets for the 3-year project.

Table C.1. Project Annual Targets

	Indicator	Baseline	Targets	Target Y1	Target Y2	Target Y3
Project Objective[20] Significantly improved energy efficiency of refrigeration and air conditioning (RAC) equipment and appliances manufactured and used in Indonesia.	• Cumulative CO_2 emissions reduction by end-of-project (EOP), *kt*	• 0	• 440	• 71	• 215	• 440
	• Cumulative electricity savings due to project intervention starting Year 1, *GWh*	• **0**	• 581	• 219	• 194	• 168
COMPONENT 1: POLICY, REGULATION AND STANDARDS DEVELOPMENT FOR THE RAC INDUSTRY						
Outcome[21] *1: Appropriate enforcement of policies, laws, and regulatory support mechanism that ensure manufacturing and sale of certified quality energy efficient (EE) RACs increased in Indonesia*	• No. of decrees on EE RACs manufacturing, import, and sales issued and enforced by Year 3	• None	• 4	• 1	• 3	• 0
	• No. of local RAC manufacturers and suppliers that comply with enforced policies, laws, regulatory support mechanisms in the manufacture, import and sales of certified quality EE RACs	• 0	• 48	• 10	• 20	• 18
COMPONENT 2: CAPACITY BUILDING AND AWARENESS ENHANCEMENT ON THE PRODUCTION AND UTILIZATION OF EE RACS						
Outcome 2.1: Increased awareness of the retailers and consumers on the benefits of energy efficient RACs in Indonesia	• Growth rate in the no. of consumers buying and using EE RACs that use low GWP and more energy efficient refrigerants and RAC technologies compared to previous year increased, % at EOP	• Nil	• At least 10%[22]	• At least 5%	• At least 5%	• At least 10%[23]
Outcome 2.2: Enhanced technical capacities of appliances testing institutions to test the EE performance of RACs	• No. of accredited testing institutions for EE enhancements in RACs	• 0	• At least 3	• At least 1	• At least 1	• At least 3

[20] Objective (Atlas output) monitored quarterly ERBM and annually in APR/PIR

[21] All outcomes monitored annually in the APR/PIR. It is highly recommended not to have more than 4 outcomes.

[22] This was assumed as twice the growth rate of the number of RACs produced (at 5% per year). It will be confirmed during the inception of the project.

[23] This was assumed as twice the growth rate of the number of RACs produced (at 5% per year). It will be confirmed during the inception of the project.

COMPONENT 3: PROMOTING INVESTMENTS FOR EE ENHANCEMENTS IN THE RAC INDUSTRY						
Outcome 3.1: Enhanced capacities of RAC manufacturers to produce EE RACs **Outcome 3.2: Increased production and sale of EE RACs in Indonesia**	• Volume of investments mobilized as part of financial assistance program package for participating RAC industry players by Year 2 • Government of Indonesia, US$ • Indonesia RAC Industry investments as leveraged by the project by Year 2, US$ • % increase in production and sale (year-on-year) starting Year 3	• Nil • N. A.	• About US$ 10. 3 million • About US$ 9.5 million • 10 % yoy average	• 0 • 0 • 0	• US$ 6 million • US$ 5 million • 5%	• US$ 10.3 million • • US$ 9.5 million • 10% in average
COMPONENT 4: TECHNICAL ASSISTANCE FOR RAC INDUSTRY IN EE ENHANCEMENTS						
Outcome 4: Enhanced knowledge and capacity on EE RAC technologies in the RAC industry	• No. of RAC manufacturers that make use of local experts (in-house or external) in the application of feasible EE RAC technologies in the RAC industry by EOP	• 0	• 48	• 10	• 20	• 18

Annex D: Stakeholder Engagement Plan

During the conduct of the PPG activities, a number of government institutions, testing centers and private sector manufacturing companies were consulted about the PENHRA approach and the possible institutional arrangements. The Table D.1 lists down the stakeholders of the PENHRA Project and their respective roles:

TABLE D.1. ROLE OF STAKEHOLDERS OF PENHRA PROJECT

Stakeholder	Role
Ministry of Energy and Mineral Resources (MEMR) Directorate General for New and Renewable Energy and Energy Conservation (DG-NREEC)/	Lead agency for implementing PENHRA in close coordination with the Ministry of Environment (MoE) and Ministry of Industry. MEMR is responsible in enactment of energy efficiency policy and regulation for RACs and providing technical assistance in relation to improving energy efficiency measures of RACs.
Ministry of Industry (MoI) – Directorate for Electronics and Telematics Industry Directorate for Machineries and Agriculture Equipment Industry Center of Studies for Green Industry and Environment Product Certification Agency (LSPRO) Center for Materials and Technical Products (B4T)	Supporting agency for home appliances, including small scale RACs to MoE in the implementation of HPMP project. MoI will be the focal point for coordinating with RAC industries in Indonesia. Supporting agency for larger capacity RACs Recommendations for policy and regulations for appliances including EE RACs Certification of products and equipment quality and performance, including energy efficiency if included in the standard Provision of laboratory testing services for small appliances and engineering materials
Ministry of Environment (MoE) Deputy Minister's Office for Climate Change Mitigation and Environmental Damage Control	Lead agency in implementation of HPMP and will be the focal point for coordinating HPMP activities and HPMP beneficiaries with PENHRA activities.
Ministry of Trade - Directorate General of Domestic Trade Directorate General of Standardization and Consumer Protection	Lead agency for market and distribution of appliances, including EE RACs Market surveillance to ensure that RACs being made available in the market meet the EE and environmental requirements by the applicable government regulations and decrees Lead agency for disseminating and ensuring that standards are followed in the products
Ministry of Finance Customs Office	Import regulation implementation to ensure that RACs being imported meet the EE and environmental requirements according to market surveillance agreement (MEMR, MoT and MoF/Customs Office) and guidelines developed
National Standards Bureau (BSN)	Issue national standards on energy performance of RACs and non-HCFC refrigerant.
Agency for Assessment and Application of Technology (BPPT) Thermodynamics, engine and propulsion laboratory (BTMP) Center for Energy conversion and Conservation (PTKKE)	BPPT will provide technical expertise as required in development of energy efficiency testing procedures and administering the bench marking of energy efficiency for larger capacities of RAC

Stakeholder	Role
Industry organizations (ASHRAE Indonesia Chapter, GABEL)	ASHRAE Indonesia Chapter and GABEL will be the partner associations for sector-wide activities in PENHRA implementation. The company members (manufacturers of RACs) will be the direct beneficiaries of PENHRA.
RAC Manufacturers	Technology development and beneficiary for PENHRA EE improvement in production lines
Banks and financial institutions, e.g. Bank Mandiri , Bank BNI, etc.	Source of financial packages for supporting EE projects for RAC manufacturers
Indonesia Consumer Association (YLKI)	Association that protect consumers' right as well as providing products information for consumers. The association will be involved in market development activities in which consumer education program will be implemented.
Local Government	Local government will be partner of PENHRA in implementing energy efficiency related regulations for RACs at local level.
Ministry of Finance	Provision of policies and regulations for financial packages in supporting EE RAC manufacturing
Bilateral Donors (Governments of Australia, USA, etc.)	Bilateral donors will partially finance adoption of low-GWP alternatives and energy-efficiency enhancements in RAC supplementary to the HPMP.

The Ministry of Environment (Kementrian Lingkungan Hidup - KLH) is the focal point for international environmental conventions and their implementation in Indonesia. The activities related to ozone layer protection and implementation of the Montreal Protocol, are coordinated through the National Ozone Unit, within the Climate and Atmosphere Division. The National Ozone Unit is partially supported through the Institutional Strengthening Project with financial assistance from the Multilateral Fund and implemented by UNDP.

TABLE D.2. PARTICIPATING STAKEHOLDERS IN PENHRA TECHNICAL WORKING GROUP (TWG)

Stakeholder	TWG 1 Policy and Regulations	TWG2 Capacity Building & Awareness	TWG 3 Industrial Investments & Technical Assistance
• Ministry of Energy and Mineral Resources (MEMR)	✓	✓	✓
– Directorate General for New and Renewable Energy and Energy Conservation (DG-NREEC)/	✓	✓	✓
• Ministry of Industry (MoI)	✓	✓	✓
– Directorate for Electronics and Telematics Industry	✓	✓	✓
– Directorate for Machineries and Agriculture Equipment industry	✓	✓	✓
– Center of Studies for Green Industry and Environment – Product Certification Agency (LSPRO)	✓	✓	
Center for Materials and Technical Products (B4T)	✓	✓	
• Ministry of Trade	✓	✓	
– Directorate General of Domestic Trade	✓	✓	

– Directorate General of Standardization and Consumer Protection	✓	✓	
• Ministry of Environment (MoE) Deputy Minister's Office for Climate Change Mitigation and Environmental Damage Control	✓	✓	✓
• National Standards Bureau (BSN)		✓	
• Agency for Assessment and Application of Technology (BPPT)	✓	✓	✓
– Thermodynamics, engine and propulsion laboratory (BTMP)	✓	✓	✓
– Center for Energy conversion and Conservation (PTKKE)	✓		✓
• Industry organizations (ASHRAE Indonesia Chapter, GABEL)	✓	✓	
• RAC Manufacturers	✓	✓	✓
• Banks and financial institutions, e.g. Bank Mandiri , Bank BNI, etc.		✓	✓
• Indonesia Consumer Association (YLKI)	✓	✓	
• Local Government		✓	
• Ministry of Finance	✓		
• Bilateral Donors (Governments of Australia, Japan, USA, etc.)	✓	✓	

Annex E: Terms of Reference for Key Personnel at Project Management Unit (PMU)

Project Manager, Project Management Unit (PMU)

Level of Effort: 20 person-months over 3 years

Scope of Work:

The PENHRA Project is a 3-year project designed to **significantly improve energy efficiency of refrigeration and air conditioning (RAC) equipment and appliances manufactured and used in Indonesia**. The day-to-day operational management of the Project will be the responsibility of the PMU based within the designated Executing Agency Ministry of Energy and Mineral Resources (MEMR) for the project. A Project Steering Committee (PSC) will be established to act as a Project Board for overall guidance and approval of key project activities including fund commitments and co-financing arrangements. It shall be the role of the PMU to undertake the following activities under the PMU Manager's direct responsibility:

- Coordination with the PMUs of other related on-going projects for the purpose of facilitating the implementation of top management's decision on delineation of project thrusts and direction
- Preparation of work plans, budget, and TORs of consultants, trainers, and subcontractors;
- Assist MEMR in the selection and hiring of other national professionals, administrative staff and subcontractors needed in the Project;
- Monitoring and evaluation of progress of project activities;
- Arranging of regular review meetings and ensuring effective coordination of project activities;
- Preparation and dissemination of project reports and other information materials. The primary goal of this activity will be to enhance the transparency of project implementation.
- Oversee the financial record-keeping and internal control management of the PMU and the Project as a whole;
- Submission of timely and accurate financial reports and progress reports to UNDP
- Provide technical and administrative support for the initial operation of the PSC.

The Project Manager will take responsibility for the management and administration of the PENHRA Project. He/she will report directly to the MEMR and UNDP in the overall operation and management of the Project with the following functions:

- Be ultimately responsible for the fiscal management of the project
- Manage the PMU staff and be responsible for ensuring high staff performance and motivation
- Directly and indirectly manage and coordinate multi-faceted local and international consultant contracts to ensure their timely completion and high quality
- Manage the monitoring and evaluation of both the overall project and its components
- Be responsible for ensuring that project objectives are being met in terms of budget and project outputs and must be prepared to recommend changes to the PSC to ensure that all outputs are realized over the project life
- Be the primary project advocate and representative and meet regularly with stakeholders from the public, the RAC industry, relevant agencies of Government of Indonesia and international donors to further project objectives.

Specific responsibilities will include:

- Regular reporting to MEMR or its designated agency and PSC on the status of the project activities;
- Synthesis of the works and outputs of consultants and subcontractors to identify potential issues and problems
- Chairing of the quarterly Project Monitoring Committee meetings;
- Preparation of quarterly financial and project progress reports;
- Preparation of annual work plans (AWP), annual project reports (APR), Project Implementation Review (PIR) and others as required by the UNDP.

Qualifications and Experience:

- A university graduate of business, science or engineering course
- At least 10 years of proven track record of project management experience preferably in the area of energy;
- Senior management reporting skills;
- Excellent English communication skills, both written and verbal. Skilled presenter of ideas in one-on-one situations, conferences and meetings;
- Proven track record of experience in successful contract management;
- A self-motivated individual with good leadership skills capable of planning, initiating and managing multi-disciplinary activities within the context of a multi-donor international project;
- An understanding of and links with the Indonesian RAC industry.

Position: Chief Technical Advisor

Level of Effort: 10 person-months over 3 years

Scope of Work:

To provide technical oversight and assistance to the Project Management Unit (PMU) through the Project Manager. The CTA will:

- Advise the PMU on the implementation of the project so as to ensure that it satisfies its objectives and targets and meets the requirement of the MEMR as Executing Agency and UNDP and GEF;
- Provide advice and technical inputs in the review of outputs by consultants hired under the component activities;
- Actively participate in Technical Working Groups (TWGs), various teams and other ad-hoc task forces for the conduct of specific activities and tasks under the Project;
- Provide technical inputs in the preparation of annual work plan (AWP), annual project reports (APR), project implementation review (PIR), and others as required by the UNDP and Project Manager;
- Provide technical inputs to the conduct of the project Mid-Term Review and Terminal Evaluation and drafting and implementation of the Action Plan to address the Terminal Evaluation Recommendations;
- Act as PMU deputy in various meetings, workshops and other activities, as may be instructed by Project Manager;
- Provide suggestions for resolving problems and barriers as they emerge in the process of implementation, especially in external communications, and in meeting various aspects of UNDP working processes and practice;
- Provide other support services as may be required by Project Manager.
- Conduct synthesis of the works, reports and other outputs of consultants and subcontractors involved in the Project;
- Assist PMU to organize and arrange international workshops, conferences and surveys.

Required Deliverables:

- An inception report identifying key issues, tasks and schedules for the project;
- In-country trip reports at the completion of each visit to Indonesia;
- Annual reports complete with strategies to address key issues to be addressed.

Qualifications and Proven Experience:

- Having a Master or Doctorate degree in engineering, economics or other scientific/technical field with relevance to energy efficiency;
- More than 5 years working experience in energy efficiency area;
- Having extensive experience in energy efficiency program development and implementation;
- Demonstrated experience in capacity development initiatives in developing countries, notably at the systemic, institutional and technical levels;
- Having technical knowledge on energy efficiency of typical products;
- Understanding well the project participating countries' economic, energy and environment situation;
- Strong existing relationships with energy efficiency institutions as well as a ready-network of international experts;
- Strong coordinative capability with international and domestic experts;
- Excellent spoken and written English capability;
- Familiar with projects supported by UNDP/GEF;
- Outstanding speaking, reading and writing skills in English

Position: Component Coordinators

Duration: 3 years

Responsibilities:

There will be two (2) Component Coordinators: one (1) for Component 1 & 2 and another for Components 3 & 4 under the PMU. He/She will report directly to the Project Manager and be responsible for:

- Providing support in the smooth operation of the PENHRA Project by being directly responsible for the oversight management of various aspects of the Project Components assigned to him/her as required and for the regular monitoring and reporting of progress to the Project Manager
- The promotion of Component activities and services amongst existing and potential energy-EE RAC manufacturers and users;
- The production and dissemination of educational and information materials relevant to overcoming the main barriers to EE RAC production and application;
- The planning and programming of events under the project;
- The promotion of the PENHRA mechanisms, capacity building and technical support to EE RAC manufacturers and users;
- Other responsibilities that may be assigned by the Project Manager towards the effective delivery of outputs under the assigned Components.

Qualifications and Experience:

- A relevant degree in business, engineering or economics;
- With working knowledge in computer-aided management;
- Proven experience and background in energy efficiency project development and EE motor production, application and marketing and promotion issues;
- Proven experience with the planning and development of promotional materials;
- Ability to understand and communicate technical and financial issues to an audience and project management

Annex F: Country Office Support Service (COSS) Agreement

Remark: *draft LOA will be finalized as per standard Letter of Agreement between UNDP and the Government for the provision of support services

Dear [*name of government official*],

1. Reference is made to consultations between officials of the Government of *[the name of programme country]* (hereinafter referred to as "the Government") and officials of UNDP with respect to the provision of support services by the UNDP country office for nationally managed programmes and projects. UNDP and the Government hereby agree that the UNDP country office may provide such support services at the request of the Government through its institution designated in the relevant programme support document or project document, as described below.

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

3. The UNDP country office may provide, at the request of the designated institution, the following support services for the activities of the programme/project:
(a) Identification and/or recruitment of project and programme personnel;
(b) Identification and facilitation of training activities;
(a) Procurement of goods and services;

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

5. The relevant provisions of the [*Insert title and date of the UNDP standard basic assistance agreement with the Government*] (the "SBAA"), including the provisions on liability and privileges and immunities, shall apply to the provision of such support services. The Government shall retain overall responsibility for the nationally managed programme or project through its designated institution. The responsibility of the UNDP country office for the provision of the support services described herein shall be limited to the provision of such support services detailed in the annex to the programme support document or project document.

6. Any claim or dispute arising under or in connection with the provision of support services by the UNDP country office in accordance with this letter shall be handled pursuant to the relevant provisions of the SBAA.

7. The manner and method of cost-recovery by the UNDP country office in providing the support services described in paragraph 3 above shall be specified in the annex to the programme support document or project document.

8. The UNDP country office shall submit progress reports on the support services provided and shall report on the costs reimbursed in providing such services, as may be required.

9. Any modification of the present arrangements shall be effected by mutual written agreement of the parties hereto.

10. If you are in agreement with the provisions set forth above, please sign and return to this office two signed copies of this letter. Upon your signature, this letter shall constitute an agreement between your Government and UNDP on the terms and conditions for the provision of support services by the UNDP country office for nationally managed programmes and projects.

Yours sincerely,

_____
Signed on behalf of UNDP
[Name]
[Title: Resident Representative]

_____
For the Government
[*Name/title*]
[*Date*]

DESCRIPTION OF UNDP COUNTRY OFFICE SUPPORT SERVICES

1. Reference is made to *consultations* between Ministry of Energy and Mineral Resources, the institution designated by the Government of Indonesia and officials of UNDP with respect to the provision of support services by the UNDP country office for the nationally managed project "Promoting Energy Efficiency for Non-HCFC Refrigeration and Air Conditioning (PENHRA)".

2. In accordance with the signing of project document on [_____], the UNDP country office shall provide support services for the Project as described below.

3. Indicative support services to be provided[24]:

#	Type of Service	Price list /service (USD)	Cost to UNDP of providing such support services (where appropriate) - Total estimated UPL charges (USD)	Method of reimbursement to UNDP
1	**Purchasing of goods (**computer software, communication & audio visual)	$ 469.34/purchasing order $ 31.44/payment voucher	$ 1,502.34	ATLAS billing
2	**Contractual service** Of 4 Individual Consultant for mid-term and final review	$ 203.49/contract; $ 48.22/payment voucher and vendor ID	$ 1,258.36	ATLAS billing
3	Issuance of LoA with private sectors	$ 469.34/purchasing order; 48.22/payment voucher and vendor ID	$ 3,482.64	ATLAS billing
	TOTAL		$ 6,243.34	

[24] The project implementation modality is full NIM, thus the recruitment of project personnel and goods are aimed to be conducted by the government implementing partner.

Annex G: Co-financing Letters

GOVERNMENT

1. Ministry of Energy and Mineral Resources
2. Ministry of Environment

INDUSTRY

1. PT. Panasonic Manufacturing Indonesia
2. PT. Fata Sarana Makmur
3. PT. Alpine Cool Utama
4. PT. I.T.U. Airconco
5. PT. Mandiri Teknik
6. PT. Sumo Elco Mandiri
7. PT. Rotaryana Prima

OTHERS

1. UNDP

GOVERNMENT

Ministry of Energy and Mineral Resources

MINISTRY OF ENERGY AND MINERAL RESOURCES
DIRECTORATE GENERAL OF NEW RENEWABLE ENERGY AND ENERGY CONSERVATION
JALAN PEGANGSAAN TIMUR NO. 1A, JAKARTA 10320
Phone : +6221 3983007 Fax : +6221 31901087 Website : www.ebtke.esdm.go.id Email : info@ebtke.esdm.go.id

Our Ref : 629/05/DJE/2013 03 Oktober 2013

Subject : **Confirmation of Co-financing and Support for the PENHRA Project**

Chief Executive Officer and Chairperson
Global Environment Facility (GEF)
1818 H Street, NW, MSN G6-602
USA, Washington, DC 20433

Dear Dr. Naoko Ishii,

With this letter, we wish to confirm the formal intention and commitment of the **Directorate General of New, Renewable Energy and Energy Conservation, Ministry of Energy and Mineral Resources** of Indonesia to support the project proposal to GEF for funding of the full-size project on Promoting Energy Efficiency for Non-HCFC Refrigeration and Air Conditioning (PENHRA) as it pursues the objective of significantly improving energy efficiency in refrigeration and air conditioning (RACs) sectors in Indonesia.

In order to manifest our cooperation to further develop and subsequently implement the PENHRA project, we will provide **US$ 2,777,450 in-kind and US$ 335,355 in-cash** as our co-financing inputs and act as implementing partner of PENHRA project activities and technical working group meetings including five (5) components which are very relevant to us:

- Component 1 : Policy, Regulation and Standards Development for the RAC Industry
- Component 2 : Training and Public Awareness on Benefits of EE RACs
- Component 3 : Promoting Investments for EE Enhancements in the RAC Industry
- Component 4 : Technical Assistance and Training for RAC Industry in EE Enhancements
- Component 5 : Capacity Building of Testing Institutions for EE Enhancements in RACs

We are looking forward to the commencement of this laudable project.

Yours sincerely,

Rida Mulyana
Director General for New Renewable Energy and Energy Conservation

Cc:
- GEF Indonesia Focal Point
- UNDP Indonesia Country Director

Ministry of Environment

KEMENTERIAN LINGKUNGAN HIDUP
REPUBLIK INDONESIA
JALAN DI. PANJAITAN, KEBON NANAS, JAKARTA 13410, INDONESIA • KOTAK POS 7777 JAT 13000
TELEPON : 021-8517148, 8580067-69 (OPERATOR) • FAKSIMILE 021-8517147 • SITUS : www.menlh.go.id

No : B- 5091 E /Dep. III/LH/PPLH/11/2013 November 2013
Attachment : -
Subject : Confirmation of Co-financing and Support for PENHRA Project

Dr. Naoko Ishii
Chief Executive Officer and Chairperson
Global Environment Facility (GEF)
1818 H Street, NW, MSN G8-802
USA, Washington, DC 20433

Dear Dr. Ishii,

With this letter, we wish to confirm the formal intention and commitment of Deputy Minister of Environmental Degradation Control and Climate Change, Ministry of the Environment, to support the Government of Indonesia's project proposal to GEF for funding of the full-size project on Promoting Energy Efficiency for Non-HCFC Refrigeration and Air Conditioning (PENHRA).

We support this proposal since PENHRA project demonstrates complementarity with the HCFC-Phase Out Management Plan (HPMP) Project implemented by our Ministry. These two projects combine the ozone and climate protection objectives which result to significant energy savings and greenhouse gas emissions which are beneficial to all.

In order to manifest our cooperation to PENHRA project we will provide US$ 7,238,307 in-cash as our co-financing through implementation of parallel activities of HPMP project and to participate actively in the technical working group of PENHRA.

We are looking forward to your endorsement for the commencement and successful implementation of this project.

Deputy Minister for Environmental Degradation Control and Climate Change

Arief Yuwono

Cc:
1. Minister of Environment, The Republic of Indonesia (as a report)
2. GEF Indonesia Focal Point
3. UNDP Indonesia Country Director

INDUSTRY

PT. Panasonic Manufacturing Indonesia

Panasonic

PT Panasonic Manufacturing Indonesia
Jl. Raya Bogor Km. 29, Pekayon, Pasar Rebo, Jakarta 13710, Indonesia
Tel.: 62-21-8710221; Fax.: 62-21-8710851
http://www.panasonic.co.id

Jakarta, 27 October 2014
Reference No. : 01/AC/PMI/X/2014

Subject : **Letter of Intent to Support the implementation of PENHRA Project**

To:

CEO of Global Environtment Facility (GEF)
GEF Secretariat
1818 H Street, NW, Mail Stop P4-400
Washington, DC 20433 USA

Dear Dr. Naoko Ishii,

PT. Panasonic Manufacturing Indonesia has been committed to contribute in the achievement of the global objectives to phase-out ozone depleting substances as well as to reduce green-house gases emission that causing global warming. The commitment is manifested in Indonesia through signed Memorandum of Agreement (MoA) for participation of PT. Panasonic Manufacturing Indonesia in the Government of Indonesia's program of HPMP (HCFC PHASE-OUT MANAGEMENT PLAN STAGE-I) led by the Indonesian Ministry of Environment. In line with the MoA and in order to achieve the global objectives, we pledge to do self-investment as listed in Milestone 1 of the MoA in the amount of USD 3,172,709 (MoA is enclosed).

Acknowledging the relevance of PENHRA project (*Promoting Energy Efficiency for Non-HCFC Refrigeration and Air Conditioning*) with our commitment to reduce green-house gases emission through application of Minimum Energy Performance Standard (SKEM) in refrigeration and air conditioning sub-sector, herewith, we express our intention to support the implementation of PENHRA project in reference to our scale of business and with MoA under the HPMP project including the pledge for self-investment as mentioned above.

Panasonic

PT Panasonic Manufacturing Indonesia
Jl. Raya Bogor Km. 29, Pekayon, Pasar Rebo, Jakarta 13710, Indonesia
Tel.: 62-21-8710221; Fax.: 62-21-8710851
http://www.panasonic.co.id

As mutual collaboration, PT. Panasonic Manufacturing Indonesia will receive grant from PENHRA project amounted of USD 145,000 and be responsible to conduct the following investment as part of the investments stated in the Milestone 1 of the MoA under HPMP project:

- Modification of sheet metal processing facility
- Prototype manufacturing, trial and testing

We are looking forward to the commencement and successful implementation of this highly relevant project.

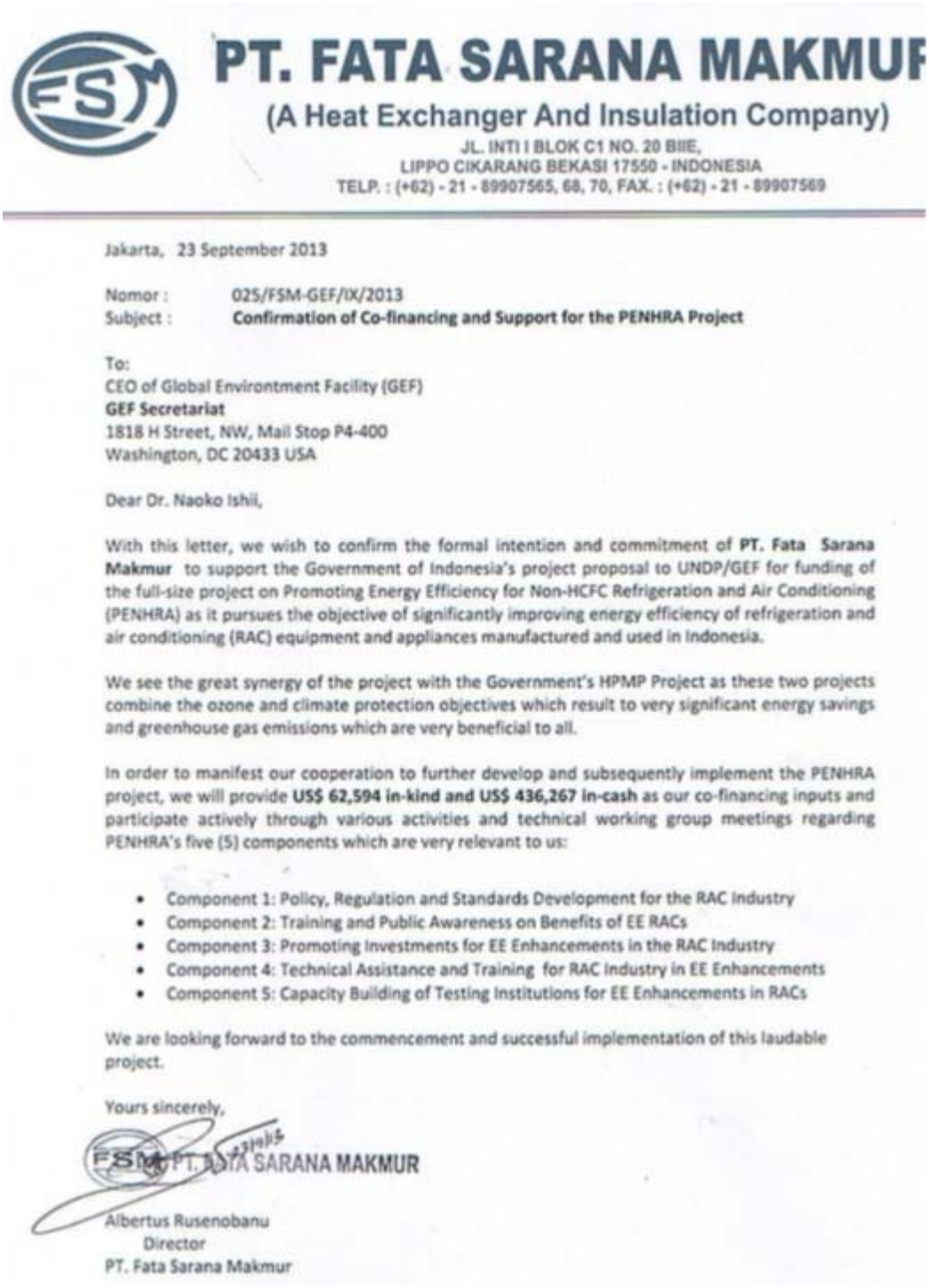
Yours sincerely,

PT Panasonic Manufacturing Indonesia

Ichiro Suganuma
President Director
PT Panasonic Manufacturing Indonesia

cc: - GEF Indonesia Focal Point
- UNDP Indonesia Country Director

PT. Fata Sarana Makmur



PT. FATA SARANA MAKMUR
(A Heat Exchanger And Insulation Company)
JL. INTI I BLOK C1 NO. 20 BIIE,
LIPPO CIKARANG BEKASI 17550 - INDONESIA
TELP. : (+62) - 21 - 89907565, 68, 70, FAX. : (+62) - 21 - 89907569

Jakarta, 23 September 2013

Nomor : 025/FSM-GEF/IX/2013
Subject : **Confirmation of Co-financing and Support for the PENHRA Project**

To:
CEO of Global Environtment Facility (GEF)
GEF Secretariat
1818 H Street, NW, Mail Stop P4-400
Washington, DC 20433 USA

Dear Dr. Naoko Ishii,

With this letter, we wish to confirm the formal intention and commitment of **PT. Fata Sarana Makmur** to support the Government of Indonesia's project proposal to UNDP/GEF for funding of the full-size project on Promoting Energy Efficiency for Non-HCFC Refrigeration and Air Conditioning (PENHRA) as it pursues the objective of significantly improving energy efficiency of refrigeration and air conditioning (RAC) equipment and appliances manufactured and used in Indonesia.

We see the great synergy of the project with the Government's HPMP Project as these two projects combine the ozone and climate protection objectives which result to very significant energy savings and greenhouse gas emissions which are very beneficial to all.

In order to manifest our cooperation to further develop and subsequently implement the PENHRA project, we will provide **US$ 62,594 in-kind and US$ 436,267 in-cash** as our co-financing inputs and participate actively through various activities and technical working group meetings regarding PENHRA's five (5) components which are very relevant to us:

- Component 1: Policy, Regulation and Standards Development for the RAC Industry
- Component 2: Training and Public Awareness on Benefits of EE RACs
- Component 3: Promoting Investments for EE Enhancements in the RAC Industry
- Component 4: Technical Assistance and Training for RAC Industry in EE Enhancements
- Component 5: Capacity Building of Testing Institutions for EE Enhancements in RACs

We are looking forward to the commencement and successful implementation of this laudable project.

Yours sincerely,

PT. FATA SARANA MAKMUR

Albertus Rusenobanu
Director
PT. Fata Sarana Makmur

PT. Alpine Cool Utama

PT. ALPINE COOL UTAMA

Jl. Pangeran Jayakarta No. 87, Jakarta - Pusat 10730, INDONESIA
Phone : (62-21) 6268211, 6397217 Fax : (62-21) 6596407

Jakarta, October 18, 2013
Reference No. : 063/ACU/X/2013

Subject : **Confirmation of Co-financing and Support for the PENHRA Project**

To:
CEO of Global Environtment Facility (GEF)
GEF Secretariat
1818 H Street, NW, Mail Stop P4-400
Washington, DC 20433 USA

Dear Dr. Naoko Ishii,

With this letter, we wish to confirm the formal intention and commitment of **PT. Alpine Cool** to support the Government of Indonesia's project proposal to UNDP/GEF for funding of the full-size project on Promoting Energy Efficiency for Non-HCFC Refrigeration and Air Conditioning (PENHRA) as it pursues the objective of significantly improving energy efficiency of refrigeration and air conditioning (RAC) equipment and appliances manufactured and used in Indonesia.

We see the great synergy of the project with the Government's HPMP Project as these two projects combine the ozone and climate protection objectives which result to very significant energy savings and greenhouse gas emissions which are very beneficial to all.

In order to manifest our cooperation to further develop and subsequently implement the PENHRA project, we will provide **US$ 158,094 In-kind and US$ 1,263,224** in-cash as our co-financing inputs and participate actively through various activities and technical working group meetings regarding PENHRA's five (5) components which are very relevant to us:

- Component 1: Policy, Regulation and Standards Development for the RAC Industry
- Component 2: Training and Public Awareness on Benefits of EE RACs
- Component 3: Promoting Investments for EE Enhancements in the RAC Industry
- Component 4: Technical Assistance and Training for RAC Industry in EE Enhancements
- Component 5: Capacity Building of Testing Institutions for EE Enhancements in RACs

We are looking forward to the commencement and successful implementation of this laudable project.

Yours sincerely,

PT. ALPINE COOL UTAMA
JAKARTA

C. TINI
Director
PT. ALPINE COOL UTAMA
cc:
- GEF Indonesia Focal Point
- UNDP Indonesia Country Director

PT. Industri Tata Udara Indonesia Airconco

PT. I.T.U. AIRCONCO
Quality-Reliability-Speed

Jakarta, September 16th, 2013
Reference No. : 113/ITU/EXT/IX/2013

Subject : **Confirmation of Co-financing and Support for the PENHRA Project**

To:
CEO of Global Environtment Facility (GEF)
GEF Secretariat
1818 H Street, NW, Mail Stop P4-400
Washington, DC 20433 USA

Dear Dr. Naoko Ishii,

With this letter, we wish to confirm the formal intention and commitment of **PT. INDUSTRI TATA UDARA INDONESIA AIRCONCO (PT. I.T.U AIRCONCO)** to support the Government of Indonesia's project proposal to UNDP/GEF for funding of the full-size project on Promoting Energy Efficiency for Non-HCFC Refrigeration and Air Conditioning (PENHRA) as it pursues the objective of significantly improving energy efficiency of refrigeration and air conditioning (RAC) equipment and appliances manufactured and used in Indonesia.

We see the great synergy of the project with the Government's HPMP Project as these two projects combine the ozone and climate protection objectives which result to very significant energy savings and greenhouse gas emissions which are very beneficial to all.

In order to manifest our cooperation to further develop and subsequently implement the PENHRA project, we will provide **US$ 62,594 in-kind and US$ 577,940** in-cash as our co-financing inputs and participate actively through various activities and technical working group meetings regarding PENHRA's five (5) components which are very relevant to us:

- Component 1: Policy, Regulation and Standards Development for the RAC Industry
- Component 2: Training and Public Awareness on Benefits of EE RACs
- Component 3: Promoting Investments for EE Enhancements in the RAC Industry
- Component 4: Technical Assistance and Training for RAC Industry in EE Enhancements
- Component 5: Capacity Building of Testing Institutions for EE Enhancements in RACs

We are looking forward to the commencement and successful implementation of this laudable project.

Yours sincerely,
PT. I.T.U AIRCONCO

PT ITU AIRCONCO

Ir. Victor P. Sitorus, MM
Director

cc:
- GEF Indonesia Focal Point
- UNDP Indonesia Country Director

Head Office & Factory
Jl. Raya Serang Km12 Cikupa-Tangerang 15710
Phone : +62 21 5960673-75
Fax : +62 21 5963250
E-mail : factory@aircon.co.id

Marketing & Sales Division
Gedung Jaya Teknik Indonesia Lt 2
Jl. Johar No. 10 Jakarta Pusat 10340
Phone : +62 21 3156568-69
Fax : +62 21 3156570
E-mail : sales@aircon.co.id
www.aircon.co.id

Services & Parts Division
Jl. Raya Serang Km12 Cikupa-Tangerang 15710
Phone : +62 21 5960704
Fax : +62 21 5963250
E-mail : service@aircon.co.id

PT. Gita Mandiri

PT GITA MANDIRI TEHNIK
Jl. Danau Sunter Utara, Rukan Sunter Permai Blok B No. 1-2 Jakarta Utara 14350
Phone : +62 21 6530 7798, (Hunting) Fax : +62 21 6530 7795
www.aicoolonline.com

AICOOL AC & CHILLER

Jakarta, 28th September, 2013
Reference No. : 059/SEK-GMT/IX/2013

Subject : **Confirmation of Co-financing and Support for the PENHRA Project**

To:
CEO of Global Environtment Facility (GEF)
GEF Secretariat
1818 H Street, NW, Mail Stop P4-400
Washington, DC 20433 USA

Dear Dr. Naoko Ishii,

With this letter, we wish to confirm the formal intention and commitment of **PT. Gita Mandiri Teknik** to support the Government of Indonesia's project proposal to UNDP/GEF for funding of the full-size project on Promoting Energy Efficiency for Non-HCFC Refrigeration and Air Conditioning (PENHRA) as it pursues the objective of significantly improving energy efficiency of refrigeration and air conditioning (RAC) equipment and appliances manufactured and used in Indonesia.

We see the great synergy of the project with the Government's HPMP Project as these two projects combine the ozone and climate protection objectives which result to very significant energy savings and greenhouse gas emissions which are very beneficial to all.

In order to manifest our cooperation to further develop and subsequently implement the PENHRA project, we will provide **US$ 62,594 in-kind and US$ 405,978 in-cash** as our co-financing inputs and participate actively through various activities and technical working group meetings regarding PENHRA's five (5) components which are very relevant to us:

- Component 1: Policy, Regulation and Standards Development for the RAC Industry
- Component 2: Training and Public Awareness on Benefits of EE RACs
- Component 3: Promoting Investments for EE Enhancements in the RAC Industry
- Component 4: Technical Assistance and Training for RAC Industry in EE Enhancements
- Component 5: Capacity Building of Testing Institutions for EE Enhancements in RACs

We are looking forward to the commencement and successful implementation of this laudable project.

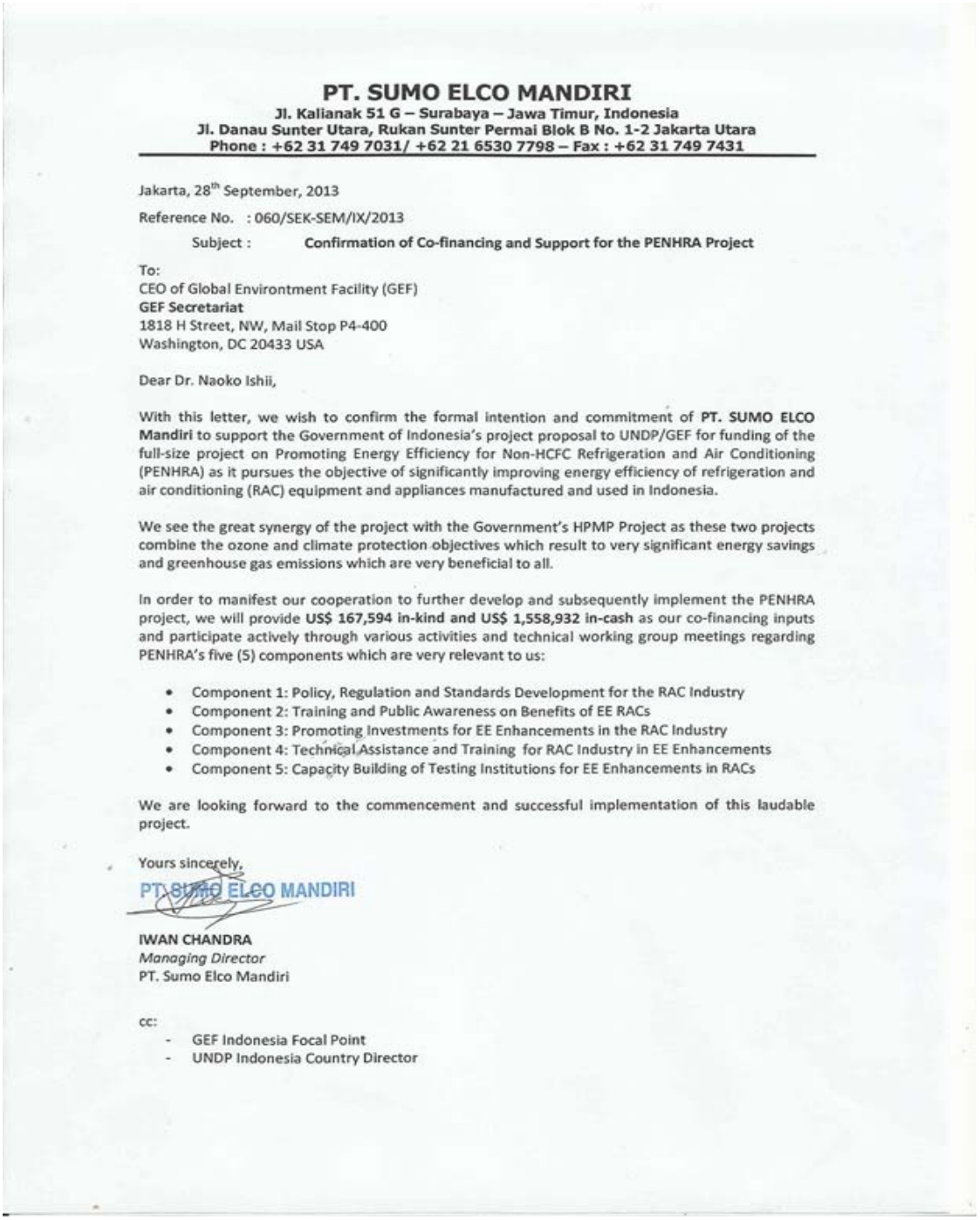
Yours sincerely,
PT. GITA MANDIRI TEHNIK

SENJAYA ADITAMA
General Manager
PT. Gita Mandiri Tehnik

cc:
- GEF Indonesia Focal Point
- UNDP Indonesia Country Director

--- Every Cooling Solutions..... We Have It ---

PT. Sumo Elco Mandiri



PT. SUMO ELCO MANDIRI

Jl. Kalianak 51 G – Surabaya – Jawa Timur, Indonesia
Jl. Danau Sunter Utara, Rukan Sunter Permai Blok B No. 1-2 Jakarta Utara
Phone : +62 31 749 7031/ +62 21 6530 7798 – Fax : +62 31 749 7431

Jakarta, 28th September, 2013

Reference No. : 060/SEK-SEM/IX/2013

Subject : **Confirmation of Co-financing and Support for the PENHRA Project**

To:
CEO of Global Environtment Facility (GEF)
GEF Secretariat
1818 H Street, NW, Mail Stop P4-400
Washington, DC 20433 USA

Dear Dr. Naoko Ishii,

With this letter, we wish to confirm the formal intention and commitment of **PT. SUMO ELCO Mandiri** to support the Government of Indonesia's project proposal to UNDP/GEF for funding of the full-size project on Promoting Energy Efficiency for Non-HCFC Refrigeration and Air Conditioning (PENHRA) as it pursues the objective of significantly improving energy efficiency of refrigeration and air conditioning (RAC) equipment and appliances manufactured and used in Indonesia.

We see the great synergy of the project with the Government's HPMP Project as these two projects combine the ozone and climate protection objectives which result to very significant energy savings and greenhouse gas emissions which are very beneficial to all.

In order to manifest our cooperation to further develop and subsequently implement the PENHRA project, we will provide **US$ 167,594 in-kind and US$ 1,558,932 in-cash** as our co-financing inputs and participate actively through various activities and technical working group meetings regarding PENHRA's five (5) components which are very relevant to us:

- Component 1: Policy, Regulation and Standards Development for the RAC Industry
- Component 2: Training and Public Awareness on Benefits of EE RACs
- Component 3: Promoting Investments for EE Enhancements in the RAC Industry
- Component 4: Technical Assistance and Training for RAC Industry in EE Enhancements
- Component 5: Capacity Building of Testing Institutions for EE Enhancements in RACs

We are looking forward to the commencement and successful implementation of this laudable project.

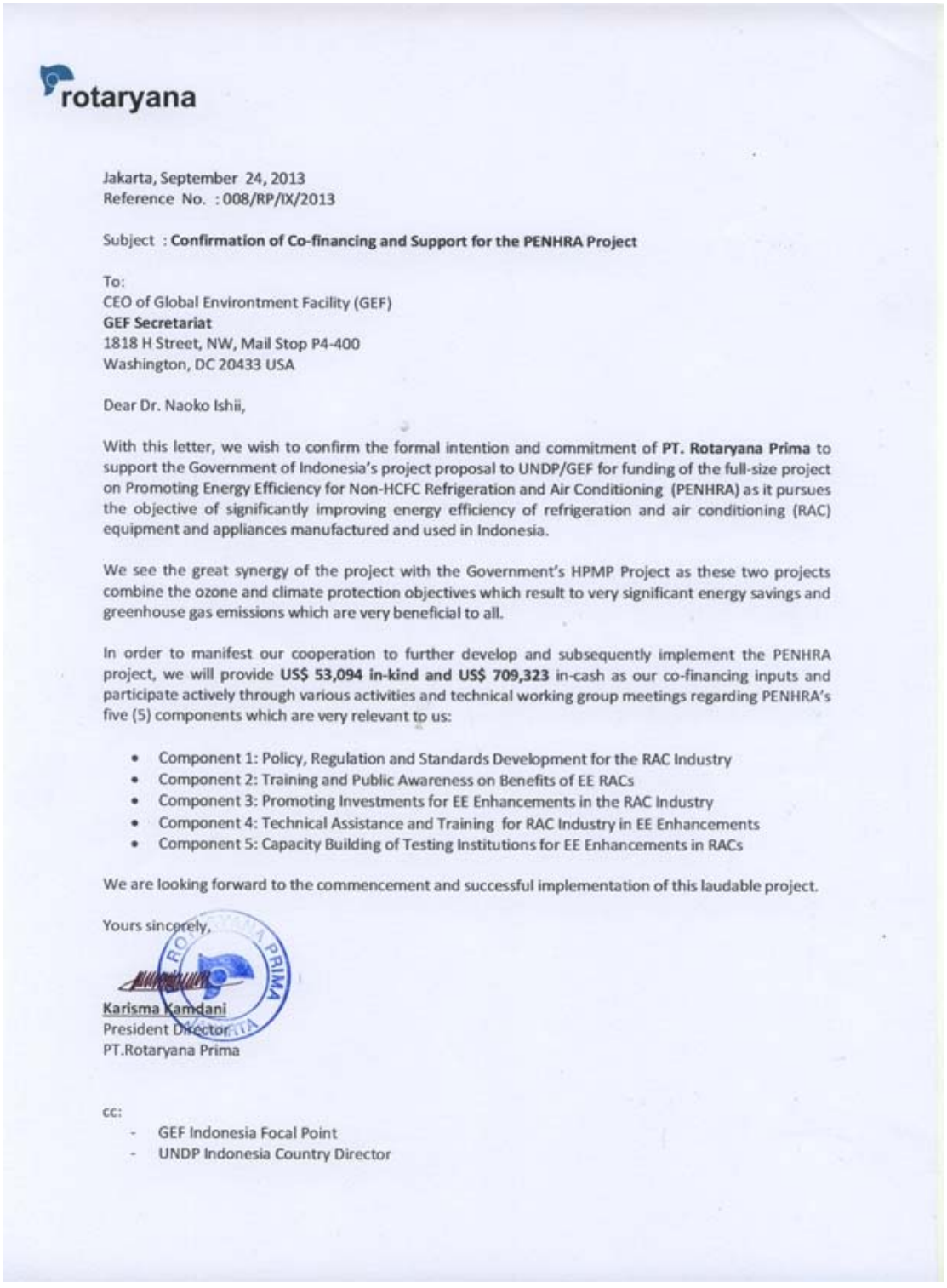
Yours sincerely,

PT. SUMO ELCO MANDIRI

IWAN CHANDRA
Managing Director
PT. Sumo Elco Mandiri

cc:
- GEF Indonesia Focal Point
- UNDP Indonesia Country Director

PT. Rotaryana Prima



rotaryana

Jakarta, September 24, 2013
Reference No. : 008/RP/IX/2013

Subject : **Confirmation of Co-financing and Support for the PENHRA Project**

To:
CEO of Global Environtment Facility (GEF)
GEF Secretariat
1818 H Street, NW, Mail Stop P4-400
Washington, DC 20433 USA

Dear Dr. Naoko Ishii,

With this letter, we wish to confirm the formal intention and commitment of **PT. Rotaryana Prima** to support the Government of Indonesia's project proposal to UNDP/GEF for funding of the full-size project on Promoting Energy Efficiency for Non-HCFC Refrigeration and Air Conditioning (PENHRA) as it pursues the objective of significantly improving energy efficiency of refrigeration and air conditioning (RAC) equipment and appliances manufactured and used in Indonesia.

We see the great synergy of the project with the Government's HPMP Project as these two projects combine the ozone and climate protection objectives which result to very significant energy savings and greenhouse gas emissions which are very beneficial to all.

In order to manifest our cooperation to further develop and subsequently implement the PENHRA project, we will provide **US$ 53,094 in-kind and US$ 709,323** in-cash as our co-financing inputs and participate actively through various activities and technical working group meetings regarding PENHRA's five (5) components which are very relevant to us:

- Component 1: Policy, Regulation and Standards Development for the RAC Industry
- Component 2: Training and Public Awareness on Benefits of EE RACs
- Component 3: Promoting Investments for EE Enhancements in the RAC Industry
- Component 4: Technical Assistance and Training for RAC Industry in EE Enhancements
- Component 5: Capacity Building of Testing Institutions for EE Enhancements in RACs

We are looking forward to the commencement and successful implementation of this laudable project.

Yours sincerely,

Karisma Kamdani
President Director
PT.Rotaryana Prima

cc:
- GEF Indonesia Focal Point
- UNDP Indonesia Country Director

UNDP Co-financing letter

United Nations Development Programme

Empowered lives.
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27 January 2015

Dear Dr. Ishii,

Subject: **UNDP Indonesia Co-financing Confirmation for PENHRA Project**

I am pleased to confirm a total of USD 75,000 as co-financing from UNDP Indonesia to support project management activities of the *Promoting Energy Efficiency for Non-HCFC Refrigeration and Air Conditioning* (PENHRA) project to meet its GEF project objectives.

The co-financing will be contributed from UNDP core fund as well as from parallel activities of relevant initiatives.

We thank you for your continuous support.

Yours sincerely,

Stephen Rodriques
Deputy Country Director

Dr. Naoko Ishii
Chief Executive Officer and Chairperson
Global Environment Facility
1818 H Street, NW, MSN G6-602
Washington, DC 20433
USA

3. Jalan M. H. Thamrin (or : P.O. Box 2338), Jakarta 10250, Tel : (62-21) 3141308, Fax : (62-21) 3145251, E-mail : registry.id@undp.org