



REQUEST FOR CEO ENDORSEMENT/APPROVAL

PROJECT TYPE: FULL-SIZED PROJECT

THE GEF TRUST FUND

Date of submission: 31st August 2010
Date of resubmission: 28th February 2011

PART I: PROJECT IDENTIFICATION

GEFSEC PROJECT ID: 3554

GEF AGENCY PROJECT ID: 4044

COUNTRY(IES): India

PROJECT TITLE: Improving Energy Efficiency in the Indian Railways system

GEF AGENCY(IES): UNDP

OTHER EXECUTING PARTNERS: INDIAN RAILWAYS (IR);

MINISTRY OF RAILWAYS

GEF FOCAL AREAS: Climate Change

GEF-4 STRATEGIC PROGRAM(S): CC-SP2 - Promote market transformation for energy efficiency in industry and the building sector

NAME OF PARENT PROGRAM/ UMBRELLA PROJECT:

PROGRAMMATIC FRAMEWORK FOR EE IN INDIA

A. PROJECT FRAMEWORK

INDICATIVE CALENDAR	
Milestones	Expected Dates
Work Program (for FSP)	Nov. 2008
CEO Endorsement/Approval	March 2011
GEF Agency Approval	April 2011
Implementation Start	May 2011
Mid-term Review	October 2012
Implementation Completion	June 2014

Project Objective: To improve energy efficiency in the Indian Railways system (and thereby reducing greenhouse gas emissions) by removing some of the key barriers that prevent the wide adoption of energy efficiency technologies and measures in the Indian Railways system

Project Components	Indicate whether Inv.,TA or STA ²	Expected Outcomes	Expected Outputs	GEF Financing ¹		Co-Financing ¹		Total (\$) c=a+ b
				(\$ a)	%	(\$ b)	%	
1. Institutional Capacity Development and Technical Training	TA	1.1: Strengthened IR institutional capacity 1.2: Improved EE management & technical capacity of IR staff	1.1.1 Documented energy efficiency (EE) best practices (measures and technologies) and defined EE benchmarks for railways systems 1.1.2 Established and supported Centre of Excellence (COE) 1.2.1 Trained and qualified staff members of the relevant IR departments capable of implementing EE technologies, measures, and best practices	1,095,000	65%	600,000	35%	1,695,000
2. Implementation of proven EE technologies and measures	TA/Inv.	Proven EE technologies and measures in traction and non-traction operations are implemented and energy savings realized	2.1 Documented detailed information on available EE technologies and measures 2.2 Developed and implemented energy audit procedures 2.3 Completed implementation of ready and proven technologies and measures 2.4 Developed and implemented incentive schemes	1,573,500	11%	12,835,750	89%	14,409,250

3. Pilot demonstration of EE technologies and measures	TA/Inv.	Increased confidence in the application of EE technologies and practices piloted in the IRS	3.1 Completed demonstration of EE technologies and measures	1,290,000	18%	6,035,750	82%	7,325,750
4. Information and knowledge sharing;	TA	Information and knowledge on EE technologies and measures are widely available and accessible for IRS divisions and their affiliates	4.1 Collected lessons learned and developed knowledge sharing products 4.2 Developed post-project action plan for DOE	950,000	73%	350,000	27%	1,300,000
5. Project management				291,500	20%	1,178,500	80%	1,470,000
Total project costs				5,200,000		21,000,000		26,200,000

¹ List the \$ by project components. The percentage is the share of GEF and Co-financing respectively of the total amount for the component.

² Inv. = Investments, TA = Technical Assistance; STA = Scientific & Technical Analysis.

B. SOURCES OF CONFIRMED CO-FINANCING FOR THE PROJECT (expand the table line items as necessary)

<i>Name of Co-financier (source)</i>	<i>Classification</i>	<i>Type</i>	<i>Project</i>	<i>%*</i>
Indian Railway	Government	Cash	20,000,000	95%
		Kind	1,000,000	5%
			21,000,000	

* Percentage of each co-financier's contribution at CEO endorsement to total co-financing.

C. FINANCING PLAN SUMMARY FOR THE PROJECT (\$)

	<i>Project Preparation a</i>	<i>Project b</i>	<i>Total c = a + b</i>	<i>Agency Fee</i>	<i>For comparison (*) GEF and Co-financing at PIF</i>
GEF Grant	100,000	5,200,000	5,300,000	530,000	5,200,000
Co-financing (Cash & Kind)	150,000	21,000,000	21,150,000		21,000,000
Total	250,000	26,200,000	26,450,000		26,200,000

(*) Excluding project preparation

D. GEF RESOURCES REQUESTED BY AGENCY(IES), FOCAL AREA(S) AND COUNTRY(IES)¹

Not applicable, as this is a single focal area, single country and single GEF Agency project.

E. CONSULTANTS WORKING FOR TECHNICAL ASSISTANCE COMPONENTS:

<i>Component</i>	<i>Estimated person weeks (GEF)</i>	<i>GEF amount(\$)</i>	<i>Co-financing (\$)</i>	<i>Project total (\$)</i>
<i>Local consultants*</i>	2,515	1,290,650	300,000	1,590,650
<i>International consultants*</i>	306	916,500		916,500
Total	2,821	2,207,150	300,000	2,507,150

*Details to be provided in Annex C.

F. PROJECT MANAGEMENT BUDGET/COST

<i>Cost Items</i>	<i>Total Estimated person weeks (GEF)</i>	<i>GEF amount (\$)</i>	<i>Co-financing (\$)</i>	<i>Project total (\$)</i>
<i>Local consultants*</i>	275	243,250	861,650	1,104,900
<i>International consultants*</i>	0	0	0	0
<i>Office facilities, equipment, vehicles and communications*</i>		26,378	131,197	157,575
<i>Travel*</i>		21,872	185,653	207,525
Total	275	291,500	1,178,500	1,470,000

*Details to be provided in Annex C.

G. DOES THE PROJECT INCLUDE A “NON-GRANT” INSTRUMENT? yes no

H. DESCRIBE THE BUDGETED M & E PLAN:

The following main project monitoring and evaluation activities will be carried out: (1) Measurement of means of verification for project progress and performance (baseline and impact analysis); (2) Annual project reporting, including project implementation review (PIR); (3) Tripartite review meetings; (4) Periodic status reporting; (5) Audits; (6) Mid-term external review; (7) Final external review; and, (8) Visits to field sites. These activities have been included in the budget under project management.

Type of M&E activity	Responsible Parties	Budget USD Excluding project team staff time	Time frame
Inception Workshop and Report	<ul style="list-style-type: none"> ▪ Implementing Partner (National Project Director and National Project Coordinator) ▪ UNDP CO 	Indicative cost: \$10,000	Within first two months of project start up
Measurement of Means of Verification of project results (baseline and end-of-project impact studies)	<ul style="list-style-type: none"> ▪ UNDP GEF RTA/ NPC will oversee the hiring of specific studies and institutions, and delegate responsibilities to relevant team members. 	Indicative cost: \$120,000	Start, mid and end of project (during evaluation cycle) and annually when required.
Measurement of Means of Verification for Project Progress on <i>output and implementation</i>	<ul style="list-style-type: none"> ▪ Oversight by National Project Coordinator ▪ Project team 	Indicative cost: \$8,000 (to be determined more precisely) as part of the Annual Work Plan's preparation.	Annually prior to ARR/PIR and to the definition of annual work plans
APR/PIR	<ul style="list-style-type: none"> ▪ NPD, NPC and Project team ▪ UNDP CO ▪ UNDP RTA ▪ UNDP EEG 	Already included in the PMU cost	Annually
Periodic status/ progress reports	<ul style="list-style-type: none"> ▪ NPD, NPC and Project team 	Already included in the PMU cost	Quarterly

Type of M&E activity	Responsible Parties	Budget USD Excluding project team staff time	Time frame
Mid-term Evaluation	<ul style="list-style-type: none"> ▪ NPD, NPC ▪ UNDP CO ▪ UNDP RCU ▪ External Consultants (i.e. evaluation team) 	Indicative cost: \$25,000	At the mid-point of project implementation.
Final Evaluation	<ul style="list-style-type: none"> ▪ NPD, NPC ▪ UNDP CO ▪ UNDP RCU ▪ External Consultants (i.e. evaluation team) 	Indicative cost : \$25,000	At least three months before the end of project implementation
Project Terminal Report	<ul style="list-style-type: none"> ▪ NPD, NPC ▪ UNDP CO ▪ Consultant 	None	At least three months before the end of the project
Audit	<ul style="list-style-type: none"> ▪ UNDP CO ▪ NPD, NPC and Project team 	Indicative cost per year: \$4,000	Yearly
Visits to field sites	<ul style="list-style-type: none"> ▪ UNDP CO ▪ UNDP RCU (as appropriate) ▪ Government representatives 	From IA fees and operational budget	Yearly
TOTAL indicative COST Excluding project team staff time and UNDP staff and travel expenses		US\$200,000 (3.8% of total GEF budget)	

PART II: PROJECT JUSTIFICATION:

A. STATE THE ISSUE, HOW THE PROJECT SEEKS TO ADDRESS IT, AND THE EXPECTED GLOBAL ENVIRONMENTAL BENEFITS TO BE DELIVERED:

Indian Railways has a total state monopoly on India's rail transport. It is one of the largest and busiest rail networks in the world. It has a network of about 63,273 km transported 18 million passengers and 2.18 million tonnes of freight daily in year 2007-08. The Indian Railway system is headed by the Indian Railways Board and managed through 16 Zones with operating Divisions. There are six production units engaged in manufacturing rolling stock, wheels and axles and other ancillary components to meet Railways requirements. Various IR-owned organizations, such as the Research, Designs and Standards Organization (RDSO), Indian Railways Institute of Electrical Engineering (IRIEEN) function as advisory, research and training centres for Indian Railways

The electricity consumption of Indian Railways (IR) is around 2.2% of India's total electricity consumption, around 15.6 billion kWh in 2009/10. Due to rapid electrification (replacement of diesel-fuelled traffic), power consumption might sore to 101 billion kWh by 2031/32. There is an enormous energy savings potential in the Indian Railways system, which up to now hardly has been tapped. Therefore, IR is about to initiate an energy efficient programme for traction and non-traction with a quantified target for non-traction of saving 10% of the total consumption in absolute terms, called Energy Efficiency and Conservation Programme (EECP). A number of initiatives has been planned, such as DC-to-AC conversion in selected zonal railways, energy-speed monitoring systems and driver-advice systems in locomotives and training of loco pilots on energy-efficient driving in traction operations, as well as replacing incandescent bulbs with CFLs and replacing inefficient fluorescent lamps in non-traction (buildings services). While such initiatives have been initiated and policy directives are issued, in general implementation faces a number of barriers, such as: (1) weak institutional arrangement and institutional capacity to promote and implement energy efficiency (EE) technologies and measures; (2) lack of in-house technical information on existing EE options and opportunities, and of technical

skills to implement them; (3) lack of proper incentives to favor the adoption and implementation of EE measures; (4) limited number of EE technologies and measures tested and available in India, and (5) lack of adequate resources to adopt and implement energy efficiency technologies and measures or replace obsolete technologies and high investment costs among other barriers. For example, Zonal and Division managers tend to focus on organizing the passenger and freight transport effectively, rather than on containing operational cost. In fact, decision-making on capital cost (e.g. investment in EE equipment) is separated from the operational cost account (i.e. paying recurrent expenses, such as the electricity bills). At central level, procurement decisions are guided by the principle of competitiveness of primarily prices rather than energy efficiency considerations. There is lack of awareness at unit manager level on EE; while technical staff members are aware but may lack knowledge about the latest state-of-the art EE technologies.

The project will remove the identified barriers to energy efficiency in Indian Railways, through a comprehensive and integrated approach that will focus on (detailed in the table below)

- Institutional capacity development and technical training;
- Implementation of already proven and low-risk EE technologies and measures;
- Pilot demonstration of EE technologies and measures;
- Monitoring and evaluation and knowledge dissemination.

Table 1: Overview of barriers to energy efficiency in Railways

Barrier	Measures supported by the project to address the identified barriers
(1) Institutional barriers	
- Lack of an EE Corporate Policy	The project will support the creation of a Centre of Excellence (COE) within IR which will be responsible for (i) promoting and coordinating EE activities within IR; (ii) providing technical support and advice on EE technologies and measures, including trainings; and (iii) collecting and disseminating information on EE technologies and measures (Output 1.2).
- Lack of institutional set-up to promote and monitor EE measures	
- Lack of adequate capacity within training and testing facilities	The project will support existing training institutes in upgrading/strengthening their capacity for delivering trainings and conducting tests on EE (Output 1.3).
- Lack of consideration for EE measures and energy conservation practices in standard specifications for the purchase of material and equipment	The project will support the creation of a Centre of Excellence (COE) which will be responsible, among other tasks, to collect and disseminate information on EE technologies. One of the tasks of the COE will be the review and development of improved EE specifications for technologies, installation, testing, and operation and maintenance procedures, and of audit manuals/guidelines on EE for specific railway operations (Output 1.2). Within the COE, a Technology Information Resource and Facilitation Desk (TIRFAD) will be established to disseminate information on EE technologies and measures to equipment vendors (Output 1.2).
Information and capacity barriers	
- Insufficient information/awareness among IR officials and staff about existing EE measures	The project will support the creation of a Centre of Excellence (COE) which will be responsible, among other tasks, to collect and disseminate information on EE technologies and measures (Output 1.2). One of the tasks of COE will be to assess the existing EE technologies adopted by different units of the IR, and come-up with a list of priority technologies to be implemented in IR (Output 2.1). The COE will also develop and implement energy audit procedures for each railway operation to identify energy intensive departments and benchmarks for EE, and produce audit manuals for IR staff to monitor the key parameters of EE (Output 2.2). Finally, some of the activities that the project will support are the creation of a web-based portal for the dissemination of information of EE technologies and measures, benchmarks, training material and best practices to IR staff (Output 1.2), and the production of publications, leaflets, reports, and newsletters to disseminate the information and lessons learnt through the implementation of the project (Output 4.1).
- Lack of proper technical skills and capacity among IR staff to assess, test and implement EE technologies and measures	The project will support existing training institutes in developing and delivering trainings on EE technologies and best practices (Output 1.3). The project will in addition support the implementation of already proven EE technologies and measures to build confidence and capacity among IR staff to adopt and implement EE technologies (Output 2.3).
(2) Incentive barriers	
- Lack of incentives to staff to implement EE measures	The project will support (i) the review of existing incentive and award schemes, both within and outside India, (ii) the development of suitable incentive schemes to encourage the adoption and implementation of EE measures, and (iii) the institutionalization of the incentive schemes, if successful (Output 2.4).
- Lack of incentives to vendors and manufacturers to develop/retail EE products	The project will indirectly provide incentives to vendors and manufactures to develop/retail EE products by (a) providing technical assistance to manufactures, vendors, importers, and new entrepreneurs to design and produce EE equipments (Output 2.3), and (b) supporting the implementation of already proven EE technologies and measures (Output 2.3).
(3) Technology barriers	
- Limited adoption of proven EE technologies abroad	The project will support (a) the interaction of IR staff with 'units of excellence' of railways systems of other countries to identify/familiarize with other countries' EE best practices (Output 1.1); (b) the development and implementation of training plans on EE best practices (Output 1.3); and (c) the piloting and testing of selected energy

	efficiency technologies and measures that have proven to be successful abroad, but have not yet been tested in India, to check their applicability in India (Output 3.1).
- Lack of specific R&D focused on EE	The project will not directly support activities aiming at addressing this specific barrier.

To strengthen the institutional capacity of IR system for mainstreaming EE issues, a Centre of Excellence (COE) is planned under the Railways Board, as resource and support centre for the zonal and production units of IR and various autonomous organizations. Activities of the COE will be to (a) identify and review the existing technologies as compared to the leading technologies of the developed countries or elsewhere, (b) interact with world's leading institutions and manufacturers, (c) assess and identify gaps regarding EE technologies and measures application in IR, (d) take appropriate steps to develop improved EE-friendly 'material & workmanship' (M&W) specifications to induct the technologies, installation, testing and maintenance procedures, (e) to develop audit manuals for all railway operations (traction and non-traction), (f) assist existing training institutions (within and outside Indian Railways) in providing training to staff at various levels on EE techniques and measures, and (g) provide guidance to various Zonal production and other IR units on the implementation and cost-effectiveness of EE measures and technologies.

The project will support the establishment of the COE. Initially, the Project Management Unit will function as proto-COE (PMU-COE), which will be institutionalized within IR during the course of the project to ensure sustainability. The project will furthermore support the PMU-COE in providing guidance to trainers to develop requisite training module and to in-house and external testing houses on measurement and calibration of EE equipment of Indian Railways. Information on EE measures will be disseminated through an EE-dedicated web portal to IR staff and for general awareness. COE's Technology Information Resource & Facilitation Desk (TIRFAD) will disseminate the information to industry sector for vendor development, adaptation and implementation interaction with equipment and product providers in India.

The project will facilitate pilot implementation and demonstration of EE technology and measures in various units of IR. Being implemented monitored and promoted, these would then be replicated through IR's own operations. Thus, knowledge sharing and learning is an important component of the project. International and national best practices on specific railway operations will be documented, while the project's experiences and lesson learned will be documented and disseminated within IR and to other stakeholders. The international best practices will be shared with relevant IR staff through regular training courses.

Once the EE programme is underway within IR, specific incentive schemes will be institutionalized to encourage measures and initiatives that lead to energy conservation. These incentives could be either in cash or in kind and would be instituted across different levels. Incentive scheme will be enhanced to include awards/rewards to individual employees (i.e. rolling trophy and public recognition) for identifying innovative ideas that result in energy efficiency. Details of such a scheme will be developed at the beginning of the project.

B. DESCRIBE THE CONSISTENCY OF THE PROJECT WITH NATIONAL AND/OR REGIONAL PRIORITIES/PLANS:

With the introduction of the Energy Conservation (EC) Act 2001, the Government of India in recent years has been promoting energy efficiency in different industrial sectors. Under the EC Act, Indian Railways (IR) has been listed as a so-called 'designated consumer', which implies that IR needs to initiate an energy efficiency programme. Therefore Indian Railways (IR) is developing a long-term Energy Efficiency and Conservation Program (EECP) (2010-2032). The Program aims at progressively introducing a number of energy efficiency technologies and measures in the railways system.

The objective of this Program is to save 10% of the electricity consumption in absolute terms by 2032, in line with the targets of national initiatives on energy conservation and climate change. The Railways Minister has committed to energy efficiency and GHG reduction in the railways system and this commitment has been extended to this project by means of a USD 21 million co-financing letter.

C. DESCRIBE THE CONSISTENCY OF THE PROJECT WITH GEF STRATEGIES AND STRATEGIC PROGRAMS:

The proposed project is in line with the GEF objective of the Operational Program 5, i.e. “to promote energy-efficient technologies and practices in industrial production and manufacturing processes” and the related Strategic Program 2 (SP-2) “Promoting energy efficiency in the industrial sector”.

D. JUSTIFY THE TYPE OF FINANCING SUPPORT PROVIDED WITH THE GEF RESOURCES:

Without the support from GEF, Indian Railways would continue implementing some EE initiatives in accordance with the Energy Conservation Act and IR’s EECF, but in practice at quite a low pace due to the prevailing barriers mentioned in the previous section. In the absence of the project’s interventions, the EECF will not be fully implemented. Consequently the level of energy consumption per passenger or freight per kilometre will remain the same as in the baseline scenario due to the slow or no uptake of new or emerging technologies and practices. Division managers will remain ignorant of the potential of EE and information dissemination on EE practices will remain hampered, if no well-structured demonstration of best practices and monitoring of energy and financial savings. Institutional capacity to implement innovative EE measures will remain limited and fragmented over the various zones and division of Indian Railways. As in a vicious circle, this will also fail to provide incentives for equipment vendors in India to adopt more energy-efficient designs and products for the railways sector.

E. OUTLINE THE COORDINATION WITH OTHER RELATED INITIATIVES:

This project has been selected under the ‘umbrella EE programme’ *Programmatic Framework Project for Energy Efficiency in India* (GEF project 3538) and has thus been prioritized by India’s Bureau of Energy Efficiency (BEE) and Department of Economic Affairs (DEA). Five projects on energy efficiency are proposed under this program: (i) Energy Efficiency Improvements in commercial Buildings (UNDP); (ii) Chillers Energy Efficiency Project (World Bank); (iii) Financing Energy Efficiency in Small and Medium Enterprises (World Bank); (iv) Promoting Energy Efficiency and Renewable Energy in Selected SME Clusters in India (UNIDO); and, (v) Improving Energy Efficiency in the Indian Railways System (UNDP).

F. DISCUSS THE VALUE-ADDED OF GEF INVOLVEMENT IN THE PROJECT DEMONSTRATED THROUGH INCREMENTAL REASONING :

Baseline scenario

Indian Railways has in the past carried out few initiatives on energy efficiency in accordance with the Energy Conservation Act, and policy directives are periodically issued to promote the adoption of energy efficiency measures. However, the implementation of such initiatives and measures has been rather ad-hoc (i.e. based on the good will of sensitive officers) and uncoordinated. In general, the uptake of energy efficiency technologies and measures has been rather slow.

To promote the adoption of energy efficiency technologies and measures in a more comprehensive and effective way, Indian Railways is developing a long-term Energy Efficiency and Conservation Program (EECP) (2010/11-2031/32) with the objective of saving 10% of the total electricity consumption in absolute terms by 2032.

However, considering the pace with which energy efficiency measures have been implemented in the past, there is an inherent risk that the implementation of the EECP would also be slow. During project preparation a number of barriers have been identified as being responsible for low absorption rate of energy efficiency technologies and measures (ref. Section 3.3 of UNDP ProDoc for more details). Unless these barriers are addressed, it is likely that the implementation of the EECP would also be slow.

Without GEF intervention (i.e. baseline scenario), Indian Railways is expected to move from the current (2009-10) estimate of 15.7 billion kWh of electricity consumption in the railways sector to 100.5 billion kWh in 2031-32 (about 1,030 billion kWh cumulatively for the period 2010/11-2031/32). These figures are equivalent to the emission of about 12.8 and 82.4 million tonnes of CO₂ respectively. Details on the baseline scenario are provided in Annex D of the UNDP Project Document.

GEF-supported alternative scenario

With GEF intervention (i.e. GEF alternative), it is assumed that, thanks to improved institutional set-up, improved capacity, confidence and awareness, improved incentive system, etc., energy efficiency technologies and measures will be adopted and implemented at a faster pace and on a wider scale.

As a result of the GEF intervention, the adoption of energy efficiency technologies and measures will be faster in the Indian Railways’ EECPP thereby reduction in energy consumption and related CO₂ emissions when compared to baseline scenario. It is estimated that due to GEF intervention, total CO₂ emissions during the period 2031-32 will be about 75.4 million tCO₂, which is less than the estimated emissions under the baseline scenario for the same period. Table 19 in Annex D of UNDP ProDoc compares total energy consumption (per year and cumulative), energy savings (per year and cumulative), and CO₂ emissions (per year and cumulative) under the baseline and GEF scenarios for the years 2010-11 (beginning of the project) up to 2031-32, however considering up to the year 2020-21 is advised on a conservative basis.

Annual direct CO₂ emission savings are estimated at 0.117 million tCO₂ (ref. Box 4 and 5 of UNDP ProDoc). Cumulative direct CO₂ emission reductions over 10-year investment lifetime (average) are estimated at 1.17 million tonnes of CO₂ (tCO₂). Considering the total avoided GHG emission reductions that are attributable to the project, which amounts to 1.17 million tCO₂, the corresponding unit abatement cost (UAC¹) (i.e. GEF\$ per tCO₂) is USD 4.45/tCO₂.

After the project’s completion, investments will be affected by the long-term outcomes of the barrier-removal activities, e.g. capacity building and institutional strengthening. The corresponding CO₂ emissions reduction is referred to as indirect emission reduction. A replication factor of “3” has been chosen as a conservative estimate for Indian Railways based on the market transformation and demonstration approach of the project. Thus, indirect emission reductions (bottom-up) over 10-year investment lifetime are estimated at 1.17 million tCO₂ * 3 = 3.50 million tCO₂.

In the alternative scenario the cumulative amount of 4.16 MtCO₂ would be reduced over the period 2011/12-2020/21 (that is, a total duration of 10 years during and after the project’s lifetime). Of course, this potential cannot be fully attributed to the GEF intervention as the project may have an influence over the entire IR system. Uptake of EE technologies would also take place to some extent due to ongoing (and future) national efforts and future donor-funded initiatives. Therefore applying a ‘causality factor’ 4 of 80% on a conservative basis will give an indirect emission reduction of (top-down) 4.16 MtCO₂ * 80% = 3.32 MtCO₂.

SUMMARY OF THE EMISSION REDUCTION IMPACTS OF THE PROJECT			
(a) Direct savings			
			2010-13
Alternative scenario (i.e. implementation of EECP <u>with</u> GEF support)	Energy Savings	Electricity consumption (billion kWh)	0.142
	CO₂ emission savings	CO ₂ emission savings (million tonnes)	0.117 1.168 (cumulatively for 10 years)

Savings directly due to the specific energy saving technologies and measures implemented during the project (i.e.

¹ Only direct emission reductions are considered for 10 years of economic lifetime as per GEF guidelines. There are no direct post-project emissions pertain to the project. Therefore, GEF finance of USD 5,200,000/1,167,581 tCO₂.

implementation of proven technologies and measures and pilot demonstrations - ref. Box 4 and 5 of UNDP ProDoc). Cumulative emissions over 10-years are 1.168 million tCO₂, assuming a 10 year lifetime of equipment on average.

(b) Indirect savings (bottom-up)

		During 10 years of lifetime
Alternative scenario (i.e. implementation of EECP <u>with</u> GEF support)	CO₂ emission savings (million tonnes)	3.503

Based on direct emissions reduction, applying replication factor of 3.

(c) Indirect savings (top-down)

		2009-10	2012-13	Cumulative 2010/11- 12/13	2020-21	Cumulative 2011/12- 20/21
Baseline scenario (i.e. implementation of EECP <u>without</u> GEF support)	Electricity consumption (billion kWh)	15.65	19.90	55.21	38.60	273.00
	CO ₂ Production (million tonnes)	12.83	16.32	45.27	31.66	223.86
Alternative scenario (i.e. implementation of EECP <u>with</u> GEF support)	Electricity consumption (billion kWh)	15.65	19.82	55.07	37.21	267.93
	CO ₂ Production (million tonnes)	12.83	16.25	45.16	30.52	219.71
Energy Savings	Electricity consumption (billion kWh)			0.14		5.07
CO₂ Savings	CO ₂ Production (million tonnes)			0.11		4.16

Savings due to the progressive uptake of energy efficiency technologies and measures indirectly induced by the activities of the project (e.g. awareness raising, capacity building, etc.).

Applying a causality factor of 80%, indirect (top-down) emission reduction is estimated at 3.32 million tCO₂

G. INDICATE RISKS, INCLUDING CLIMATE CHANGE RISKS, THAT MIGHT PREVENT THE PROJECT OBJECTIVE(S) FROM BEING ACHIEVED AND OUTLINE RISK MANAGEMENT MEASURES:

Risks are mainly related to institutional inefficiencies of IR to successfully implement the EE programme and carry out the political and institutional mandate to conserve electricity. As part of this project institutional capacity of IR, its proposed Energy Efficiency and Conservation Programme (EECP) will be strengthened to mitigate this risk. The failure of obtaining support from stakeholders within and outside IR is a main risk. A summary of risks and ways to address them is given in the UNDP ProDoc in Section 7.3 and its Annex A.

H. EXPLAIN HOW COST-EFFECTIVENESS IS REFLECTED IN THE PROJECT DESIGN:

The project aims to use EE technology with an average service life of EE equipment of 10 years. Assuming that the equipment will function over this period, the cumulative GHG reduction is considered over 10 years.

The GEF support is expected to result in (details are presented in Annex D of the ProDoc):

- Direct emission reduction (cumulative emissions due to project-related investment, assuming an average lifetime of 10 years):
 - 1.167 million tCO₂

- Considering the total avoided GHG emission reductions that are attributable to the project, which amounts to 1.17 million tCO₂, the corresponding unit abatement cost (UAC²) (i.e. GEF\$ per tCO₂) is USD 4.45/tCO₂.
- Indirect emission reduction, estimated at ranging from:
 - 3.50 million tCO₂ (bottom-up)
 - 3.32 million tCO₂ (top-down)

PART III: INSTITUTIONAL COORDINATION AND SUPPORT

A. INSTITUTIONAL ARRANGEMENTS:

No other GEF agencies are involved in the proposed project. The project will be coordinated with other projects overall “Programmatic Framework Project for Energy Efficiency in India” (GEF project 3538). Five projects on energy efficiency are proposed under this programme: (i) Energy Efficiency Improvements in commercial Buildings (UNDP); (ii) Chillers Energy Efficiency Project (World Bank); (iii) Financing Energy Efficiency in Small and Medium Enterprises (World Bank); (iv) Promoting Energy Efficiency and Renewable Energy in Selected SME Clusters in India (UNIDO); and, (v) Improving Energy Efficiency in the Indian Railways System (UNDP).

B. PROJECT IMPLEMENTATION ARRANGEMENTS:

Indian Railways is the Implementing Partner for the project. Project is planned to be implemented through a Project Management Unit which will transform into a Centre of Excellence (COE). Later institutionalized within IR to identify the needs of EE on Indian Railways, promote best practices and EE technologies to the various IR zonal, production and other units. Also develop specifications and code of practices for implementation of EE measures. Details on project management as well as project monitoring and evaluation are provided in Sections 12 and 13 of the accompanying UNDP ProDoc.

PART IV: EXPLAIN THE ALIGNMENT OF PROJECT DESIGN WITH THE ORIGINAL PIF:

During the PPG phase, consultations with the different Railway divisions, more clarity was obtained of the energy efficiency technologies and measures. A detailed cost analysis was also performed for the implementation of proven and pilot demonstration of energy efficiency technologies and measures. This had subsequently led to a change in related outputs and related budget allocation. The overall contribution of GEF and co-financing will remain the same. Apart from these changes re-positioning, re-budgeting and editing the text of the various outputs in the project framework, there is no major re-alignment from the original project design as presented in the PIF.

Table 2: Overview of changes from PIF to ProDoc

Expected Outputs		Rationale for Changes in PIF Outputs/Activities in the ProDoc
GEF-Approved PIF	Project Document	
Component 1. Institutional Capacity Development and Technical Training	Component 1. Institutional capacity development and technical training	No change
1.1 At least 1000 Railway technical staff (officers, supervisors, engineers) trained	1.1 Documented energy efficiency (EE) best practices (measures and technologies) and defined EE benchmarks for	Reorganized the outputs in a sequential manner and rephrased the outputs.
1.2 Testing House staff trained for		Change in budget: There is a slight reduction

² Only direct emission reductions are considered for 10 years of economic lifetime as per GEF guidelines. There are no direct post-project emissions pertain to the project. Therefore, GEF finance of USD 5,200,000/1,167,581 tCO₂.

Expected Outputs		Rationale for Changes in PIF Outputs/Activities in the ProDoc
GEF-Approved PIF	Project Document	
measurement and calibration of the equipments used in railways 1.3 Support the Center of Excellence	railways systems 1.2 Established and supported Centre of Excellence (COE) 1.3 Trained and qualified staff members of the relevant IR departments capable of implementing EE technologies, measures, and best practices	in the total budget for this component when compared to the amount mentioned in PIF.
Component 2. Implement. of EE technologies and measures	Component 2. Implementation of proven energy efficiency technologies and measures	Rephrased based on the clarity obtained during the PPG phase. Now priority is given for the implementation of proven energy efficiency technologies and measures.
2.1 Information on technology status and best operating practices compiled for Lighting, EE Pump, Power Devices, Green Building, HVAC, DG Set, Sensors and Automatic Metering of Energy 2.2 Prepare and implement energy audit procedures for each railway operation e.g., production unit, traction Substations, Workshop, Production Unit, Maintenance depot and Buildings 2.3 Cost/ benefit' analyses for priority technologies/ measures conducted 2.4 Railway's internal incentives scheme for implementing EE tech/ measures created and implemented	2.1 Documented detailed information on available EE technologies and measures 2.2 Developed and implemented energy audit procedures 2.3 Completed implementation of ready and proven technologies and measures 2.4 Developed and implemented incentive schemes	During the PPG phase, extensive consultations were conducted with different divisions of Indian Railways for selecting the energy efficiency technologies and measures. Based on the analysis, ready and proven energy efficiency technologies and measures are selected. Then a detailed analysis was conducted on the cost details of these technologies and measures. Therefore based on the clarity of interventions, changed the outputs accordingly under this component in the ProDoc. Change in budget: Subsequently to reflect the above changes (more clarity on the cost details of the interventions); there is an increase in total budget. GEF funds allocated in the ProDoc are slightly higher than previously anticipated in the PIF.
Component 3. Pilot demonstration of EE technologies and measures	Component 3. Pilot demonstration of energy efficiency technologies and measures	Rephrased
3.1 Piloting and Demonstrating tech./ measures in Testing House, EE Rolling Stock, Static installation, Workshop and Production Facilities	3.1 Completed demonstration of EE technologies and measures	Based on the clarity obtained during PPG phase, some of these of technologies and/or measures changed. Change in budget: Some of this budget mentioned in the PIF is now shifted to implement the ready and proven technologies. Thus the funds allocated in ProDoc are nearly half when compared to the amount anticipated in the PIF.
Component 4. Knowledge sharing and learning	Component 4. Information and knowledge sharing	Rephrased
4.1 Identify international best practice from Japan, Germany France and others 4.2 Facilitate dissemination of knowledge between the Center of Excellence and similar institutes abroad	4.1 Collected lessons learned and developed knowledge sharing products 4.2 Developed post-project action plan for DOE	Change in the output: As most of these best practices are, to certain extent, sourced through secondary information. More focus/attention is given in the ProDoc towards collecting and dissemination of the lessons learned from the implementation of ready and proven technologies and/or

Expected Outputs		Rationale for Changes in PIF Outputs/Activities in the ProDoc
GEF-Approved PIF	Project Document	
		measures. Change in budget: A slight decrease in the GEF funds allocation.
OTHERS		
Project Management:	Project Management:	Change in budget: In order to reflect the above changes, there is a slight increase in the GEF funds allocation.
Overall Budget	Overall Budget	

PART V: AGENCY(IES) CERTIFICATION

This request has been prepared in accordance with GEF policies and procedures and meets the GEF criteria for CEO Endorsement.

Agency Coordinator, Agency name	Signature	Date (Month, day, year)	Project Contact Person	Telephone	Email Address
Yannick Glemarec UNDP/GEF Executive Coordinator	<i>Y. Glemarec</i>	August 31, 2010	Martin Krause, UNDP RCB, Bangkok	+66-2288-2722	Martin.krause@undp.org

ANNEX A: PROJECT RESULTS FRAMEWORK

Applicable GEF Strategic Objective and Program: Strategic Programme 2 (SP-2): Promoting Energy Efficiency in the Industrial sector
Applicable GEF Expected Outcomes: Increased deployment of energy efficient technologies and practices
Applicable GEF Outcome Indicators: (a) amount of energy saved (b) tonnes of CO ₂ avoided, (c) number of energy efficient technologies and measures promoted

Table 3: Project Planning Matrix (PPM)

Strategy	Objectively Verifiable Indicators			Means of Gauging Success/Source of verification	Assumptions
	Indicator	Baseline	Targets		
Project Goal: Reduction of GHG emissions in the Indian Railways System (IRS)	Cumulative emission reductions ³ achieved in the IRS by EOP ⁴ (million t CO ₂)	• 0	• 0.117	<ul style="list-style-type: none"> M&E reports of the pilot/model projects and documents available with IRS. 	<ul style="list-style-type: none"> Timely execution of planned activities planned with adequate resource mobilization Efficient and quality measurement & recording systems are available Field units of IR extend the support in desired manner and effectively implement the identified EE measures
Project Objective Removal of key barriers that prevent the wide adoption of energy efficiency technologies and measures in the IRS	Total direct energy savings ⁵ by EOP (billion kWh)	• 0	• 0.142	<ul style="list-style-type: none"> See Annex D Energy bills verified by IR and technical reports 	<ul style="list-style-type: none"> Timely implementation of all identified measures IR zonal, division and other unit managers are willing to give EE importance in their investment decisions

Strategy	Objectively Verifiable Indicators			Means of Gauging Success/Source of verification	Assumptions
	Indicator	Baseline	Targets		
Component 1: Institutional capacity development and technical training⁶					
Outcome 1.1: Strengthened IR institutional capacity	Status report of targeted EE technologies / measures, its availability in India/abroad and gap analysis for its implementation	• 0	1	<ul style="list-style-type: none"> Status report Letter of appointment of head and staff Office space allocated 	<ul style="list-style-type: none"> Managers and technical staff are willing to benefit from training and supporting materials Subjected to the availability of the funds

³ Total direct emission reductions (from year 3 of the project i.e. final year)

⁴ The use of words “End of Project (EOP)” and “Year 3” are interchangeably used, which means the same

⁵ Total direct energy savings (from year 3 of the project i.e. final year)

⁶ The objective and all outcomes monitored annually in the APR/PIR, according to the suggested list of indicators.

Strategy	Objectively Verifiable Indicators			Means of Gauging Success/Source of verification	Assumptions
	Indicator	Baseline	Targets		
	Established and functioning of EE Centre of Excellence (COE) in IRS by EOP	• 0	• 1 ⁷	<ul style="list-style-type: none"> • APR/PIR and other progress reports produced 	<ul style="list-style-type: none"> • Identified training and testing institutes are competent and capable staff are retained on long-term • Competent website administrator appointed
	TIRFAD established and functioning by EOP	• 0	• 1		
	COE website established and operational by EOP	• 0	• 1	<ul style="list-style-type: none"> • URL domain 	
	Number of training and testing institutes with capacity to provide trainings and test EE measures/equipment respectively by year 3	• 0	<ul style="list-style-type: none"> • At least 8⁸ • At least 2⁹ 	<ul style="list-style-type: none"> • List of training modules of training institutes • Inventory list of testing institutes 	
	Number of training courses conducted by the training institutes each year starting from year 3	• 0	• 64 ¹⁰		
Outcome 1.2: Improved EE management & technical capacity of IR staff	Number of managers and staff members trained on EE best practices and technologies by EOP	• 0	• At least 325 managers and 675 staff	<ul style="list-style-type: none"> • Training attendance sheets 	
	Number of successful EE projects implemented by the trained managers and staff members by EOP	• 0	• 45 ¹¹	<ul style="list-style-type: none"> • APR/PIR and other progress reports produced 	
Component 2: Implementation of proven energy efficiency technologies and measures					

⁷ Centre of Excellence established with full staff completed by year 3

⁸ Training institutes with the capacity (i.e. equipment and trained staff) to provide trainings on EE

⁹ Testing institutes with the capacity (i.e. test benches, calibration) to test EE measures

¹⁰ At least one training program conducted quarterly in each of the 16 divisions starting from the third year of the project.

¹¹ A Project is defined as the implementation of defined technology in a specific location. The target is given assuming that all the 5 identified technologies (ref. Box 4 in ProDoc) are implemented across the 9 Railway zones

Strategy	Objectively Verifiable Indicators			Means of Gauging Success/Source of verification	Assumptions
	Indicator	Baseline	Targets		
Outcome 2 Proven EE technologies and measures in traction and non-traction operations are implemented and energy savings realized.	Potential energy savings from the implementation of EE technologies and/or measures by year 3, million kWh/yr Traction Non-Traction	• 0	• 1.58 • 110.4	<ul style="list-style-type: none"> • Project progress reports • Energy audit reports • Project reports on implemented EE measures • Energy bills 	<ul style="list-style-type: none"> • Relevant details are shared by the respective field units. • Standard tools/ methods/ procedures of evaluations are used • Criterion & significant factors considered for prioritization. • Prioritization is identified by a competent team/ energy managers/ auditors
	Percentage of savings derived from EE measures implemented allocated as incentives to EE implementers by EOP	• NA	• At least 10%	<ul style="list-style-type: none"> • Cash outflow report • IRS Project progress reports 	
	Number of project proposals (technical and financial) prepared by EOP for EE technology / measure application projects	• 0	• 45 ¹²	<ul style="list-style-type: none"> • Prepared detailed project proposals (technical and financial) 	
Component 3: Pilot demonstration of energy efficiency technologies and measures					
Outcome 3 Increased confidence in the application of piloted EE technologies and practices in the IRS	Number of energy audits conducted in IRS units above 0.5 MW load by year 3	• NA	50	<ul style="list-style-type: none"> • Energy audit reports • Project progress reports • Project reports on implemented EE measures • Energy bills • Documentation on demonstration project design and financial closure and/or budget allocation • Project progress reports 	<ul style="list-style-type: none"> • The developed countries agree to share the information on technology • Transfer of technology is negotiated. • Prioritization is identified by a competent team / energy managers / auditors • An interaction is established with developed countries to absorb the technologies on IR • Resources are mobilized in time • Efficient and quality measurement & recording systems are available for measurement
	Number of pilot demonstrations designed and implemented by year 3	• NA	• At least 8 ¹³		
	Total energy savings achieved from pilot projects by EOP, million kWh	• 0	• 30.40		
	Percentage of successful pilot demonstrations adopted by IRS for replication by EOP	• NA	• At least 25% ¹⁴	<ul style="list-style-type: none"> • Budget report to verify funds allocated for implementation of successful projects 	

¹² A Project is defined as the implementation of defined technology in a specific location. The target is given assuming that all the 5 identified technologies (ref. Box 4 of ProDoc) are implemented across the 9 Railway zones

¹³ Pilot/demo activities implemented and audited per selected technology (as in indicated in Box 5 and Annex D of ProDoc)

¹⁴ For replication by the end of the project and initiated

Strategy	Objectively Verifiable Indicators			Means of Gauging Success/Source of verification	Assumptions
	Indicator	Baseline	Targets		
	Based on energy audits, number of EE technologies and measures identified as feasible for implementation (planned and budgeted) by year 3	• NA	• At least 5 ¹⁵	<ul style="list-style-type: none"> • Documentation on demonstration project design and financial closure and/or budget allocation • Project implementation progress reports 	
Component 4: Information and knowledge sharing					
Outcome 4 Information and knowledge on EE technologies and measures are widely available and accessible for IRS divisions and their affiliates	Average number of visitors visiting the web portal each year starting year 2	• NA	• 24,000	• Web portal counter	<ul style="list-style-type: none"> • Captured all the information, updated knowledge and documented the results • The web portal is created and operational • TIRFAD is created and operational
	Number of sets of knowledge sharing products (KSPs) developed and disseminated by EOP	• NA	• 13 ¹⁶	• Annual report	
	Number of awareness campaigns conducted per division per year starting year 3	• 0	• 552 ¹⁷	• Annual report	
	Number of IRS divisions that are actively participating in IRS EE programs by EOP	• 0	• 68	• Annual report at the divisional level	
	Number of vendors registering with TIRFAD each year starting year 3 (i.e. from 2013)	• NA	• About 3 ¹⁸	• TIRFAD registration log	
	Cumulative number of vendors attending TIRFAD campaigns by the EOP	• 0	• At least 39 ¹⁹		

¹⁵ Pilots design for implementation as per selected technology and/or measure (as in indicated in Box 4 and Annex D of ProDoc)

¹⁶ At least one leaflet/booklet for each technology or a measure that will be demonstrated will be produced. This information is included in a regular (project) newsletter and also uploaded onto the web.

¹⁷ At least 2 campaigns per division per year conducted by the end of the project (i.e. 68 divisions + 16 zonal headquarters + 1 railways + IRIEEN + IDSO + 5 production units x 3 years) over 16 zonal headquarters

¹⁸ Per successful pilot technology register with TIRFAD

¹⁹ At least three vendors per technology (13 numbers)

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

RESPONSES TO GEFSEC COMMENTS (16 FEBRUARY 2011)

Comments and Responses					Reference																									
COMMENTS ON CEO ENDORSEMENT (FSP)																														
<p>Question 19:</p> <p><i>[08- Feb-11] The issue is not yet properly addressed. It was explained that "based on a detailed analysis of the anticipated cost for the management of the project, a total amount of roundabout US\$1,470,000 was estimated." Hence "US \$1,470,000 can be maintained in total. However as GEF funding and cofinancing for the whole project is \$5,200,000 and \$21,000,000 respectively, GEF funding for project management should be round \$ 290,000(= 1,470,000 x 5,200,000/26,200,000).</i></p> <p>Response: [08-Feb-11] As suggested, the GEF funding for project management has been adjusted. Accordingly, the co-financing share of the project management cost has been increased to balance the required total project management cost of US\$ 1,470,000. The revised details could be seen from the table below.</p> <table border="1"> <thead> <tr> <th>Budget Items</th> <th>Person weeks</th> <th>GEF Amount (\$)</th> <th>Co-financing (\$)</th> <th>Project management Total (\$)</th> </tr> </thead> <tbody> <tr> <td>Local consultants and staff</td> <td>275</td> <td>243,250</td> <td>861,650</td> <td>1,104,900</td> </tr> <tr> <td>Office facilities, equipment</td> <td></td> <td>26,378</td> <td>131,197</td> <td>157,575</td> </tr> <tr> <td>Travel</td> <td></td> <td>21,872</td> <td>185,653</td> <td>207,525</td> </tr> <tr> <td>Total</td> <td></td> <td>291,500</td> <td>1,178,500</td> <td>1,470,000</td> </tr> </tbody> </table>					Budget Items	Person weeks	GEF Amount (\$)	Co-financing (\$)	Project management Total (\$)	Local consultants and staff	275	243,250	861,650	1,104,900	Office facilities, equipment		26,378	131,197	157,575	Travel		21,872	185,653	207,525	Total		291,500	1,178,500	1,470,000	<p>CER, Part I, Table A, p 2 & Table F, p 3. and ProDoc, section 11, Table 13B, p 50</p>
Budget Items	Person weeks	GEF Amount (\$)	Co-financing (\$)	Project management Total (\$)																										
Local consultants and staff	275	243,250	861,650	1,104,900																										
Office facilities, equipment		26,378	131,197	157,575																										
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Total		291,500	1,178,500	1,470,000																										

RESPONSES TO GEFSEC COMMENTS (20 JANUARY 2011)

Comments and Responses					Reference
COMMENTS ON CEO ENDORSEMENT (FSP)					
<p>Question 19:</p> <p><i>[19- Nov-10]The total amount for the project management was significantly increased from the budget originally proposed (from \$1.47 million to \$2.62 million), which is not acceptable. Please keep the same level of the total amount as originally proposed (\$1,470,000) and revise the GEF amount instead of cofinancing. The resources remaining can be used for the other components.</i></p>					

Comments and Responses

Reference

Response:

[19-Nov-10] As suggested, the co-financing share of the project management cost has been adjusted. However, the proposed GEF contribution to the PM cost is retained as can be gleaned and explained in the paragraphs below.

Budget Items	Person weeks	GEF Amount (\$)	Co-financing (\$)	Project Total (\$)
Local consultants and staff	459	406,050	698,850	1,104,900
Office facilities, equipment		77,470	80,105	157,575
Travel		36,480	171,045	207,525
Total		520,000	950,000	1,470,000

Indian Railway (IR) is the single largest organization with the highest electricity consumption in India. With the aim of realizing the project objective, the project specifically targets traction and non-traction activities of IR. To realize the project objective, the PMU will have an enormous task of properly managing and coordinating the project activities. The PMU shall coordinate with IR's six production units that are engaged in the manufacturing of rolling stock, wheels and axles and other ancillary components to properly direct and manage the project activities. In this regard, the PMU must have specific skill set of project managers and office staff that will oversee the implementation of these specific project activities in 16 Zones of Indian Railways and are further subdivided into 68 Divisions. These Zones and Divisions are spread across India and needs extensive travelling of PMU staff in order to coordinate and manage the project activities. Considering the required additional project management personnel and PMU officers/staff members, and based on the estimated person-weeks for each type of PMU staff, the estimated cost for such local consultants and staff is US\$ 406,050. IR will provide the other staff members that will be assigned to carry out project management tasks in the various Zones and Divisions of Indian Railways. The cost for such personnel amounts to US\$ 698,850.

PM Budget Item	GEF Budget (USD)	Remarks
National Project Coordinator (NPC) with a total of 156 person weeks (pw) @ USD 950/pw	148,200	<ul style="list-style-type: none"> Assist NPD in the preparation of the project execution scheme/work plan; Support the NPD, in the provision of guidance in the organization and implementation of all activities specified in the project document and ensuring timely completion; Responsible for day-to-day planning, operation and monitoring project activities; Provision of substantive inputs on project implementation results and issues to the NPD, consultants and stakeholders; Organization and coordination of project meetings (across Division and Zones), workshops and other expected deliverables from the Project; Responsibility for the monitoring of overall project implementation, project review and facilitate independent project mid-term and terminal review; Coordination of financial auditing of the project according to the standards and rules established by UNDP and

CER, Part I, Table A, p 2 & Table F, p 3. and ProDoc, section 11, Table 13B, p 50

ProDoc, section 12, para 98, p 54

ProDoc, section 12, Table 14, p 53 and

CER, Annex C, p 28.

Comments and Responses			Reference
		<p>prepare work plans, reports, budgets, and terms of reference for sub-contractors and consultants;</p> <ul style="list-style-type: none"> • Liaison with Indian Railways units, equipment and technology providers, national R&D institutions, test laboratories and technology institutes of the project and promote exchanges of information among project participants; • Review of drafts of any working documents to be submitted to meetings or emanating from project activities, and communicate comments to consultants; • Represent the project at forums and meetings. 	
Project Manager, TR with a total of 62 person weeks (pw) @ USD 950/pw	58,900	<ul style="list-style-type: none"> • Support the planning and monitoring of “rolling stock” and “Traction distribution” related railway operation activities; • Review and provide comments on outputs pertain to traction; • Assistance in the formulation of TORs and activity descriptions where appropriate; • Provision of substantive inputs on project activity implementation to the expert consultants and stakeholders. 	
Project Manager, NT with a total of 62 person weeks (pw) @ USD 950/pw	58,900	<ul style="list-style-type: none"> • Support the planning and monitoring of non-traction related activities and services; • Review and provide comments on outputs pertain to non-traction; • Assistance in the formulation of TORs and activity descriptions where appropriate; • Provision of substantive inputs on project activity implementation to the expert consultants and stakeholders. 	
Project Manager, EE with a total of 104 person weeks (pw) @ USD 950/pw	98,800	<ul style="list-style-type: none"> • Support for the planning, implementation, monitoring and reporting of energy efficiency related activities such as energy audits, awareness creation, training and capacity building; • Assistance in the formulation of TORs and activity descriptions where appropriate. 	
Office manager (F&A) with a total of 75 person weeks (pw) @ USD 550/pw	41,250	<ul style="list-style-type: none"> • Responsible for administrative and secretarial matters; • Perform project-related communication and liaison work: arrangement of logistics, including travel and organization of meetings/workshops; • Make annual budget and review its implementation, making adjustment correspondingly; • Carry out and manage the project contract payments; • Conduct annual financial audit of the project in line with the UNDP, produce the required statements as needed, keep checks and balances in place to ensure proper use of finances under various heads and report the financial progress; • Assist processing and reporting project incomes and expenditures. 	
Travel (in-country)	36,480	<ul style="list-style-type: none"> • Travel expenses of the Project Coordinator and the project managers for their project monitoring work in the different project sites under the various Zones and Divisions of IR. 	

Comments and Responses			Reference
Office facilities, equipment	77,470	<ul style="list-style-type: none"> • Cost of office space rental for the PMO. • Equipment such as computers and their peripherals, document reproduction equipment as well as office supplies (e.g., stationeries) • Purchase and use of telecommunication equipment and the monthly payment for the communication costs (e.g., phone bills, internet service fees, etc.). 	ProDoc, section 12, para 99, p 54
Total	520,000		
<p>As part of the PM work, office facilities such as computers and their peripherals, document reproduction equipment as well as office supplies (e.g., stationeries) are required. The proposed budget for office facilities and equipment also includes the purchase and use of telecommunication equipment and the monthly payment for the communication costs (e.g., phone bills, internet service fees, etc.). The cost of office space rental for the PMO is also part of this PM budget line item. The co-financing for this budget line item, which is about the same as the GEF contribution, includes the in-kind contribution for office space and office equipment, as well as testing facilities, for project activities that will be hosted by the various Zones and Divisions of Indian Railways.</p> <p>The travel budget to be paid for by GEF funds, which is about 18% of the total travel budget for project management, is for the travel expenses of the Project Coordinator and the project managers for their project monitoring work in the different project sites under the various Zones and Divisions of Indian Railways. The counterpart financing for the travel budget, includes the travel costs of various IR staff members who will be involved in the project implementation, including in-kind contribution for the utilization of Indian Railways transport services during monitoring missions.</p> <p>The management of the proposed project will entail the deployment of personnel and office facilities, equipment and supplies described above, as well as travel for the project management staff. With the abovementioned project management requirements, a total of about US\$ 520,000 is needed and is being requested from the GEF. This amount represents 10% of the total GEF contribution to the proposed project. The total co-financing for the PM activities amounts to US\$ 950,000, which is about 65% of the estimated total PM cost of US\$ 1.47 million.</p>			<p>ProDoc, section 12, para 100, p 54</p> <p>ProDoc, section 12, para 101, p 54</p>

RESPONSES TO THE GEF REVIEW COMMENTS ON CEO ENDORSEMENT (20 SEPTEMBER 2010)

Comments and Responses	Reference
COMMENTS ON CEO ENDORSEMENT (FSP)	
Component 1	
<p>Question 9.1: <i>As appreciable EE technologies have already been identified and will be implemented in Component 2 and Component 3, it is not clear what would be the objective in conducting comparative analysis between technologies etc. The relationship between these efforts needs to be clarified.</i></p> <p>Response:</p> <ul style="list-style-type: none"> - There is a difference between interventions mentioned in Component 2 and Component 3. Component 2 focuses on “Implementation of proven energy efficiency technologies and measures in India”, whereas Component 3 focuses on “Pilot demonstration of energy efficiency technologies and measures that have already been successfully applied in 	ProDoc, section 6, para 43, p 24

Comments and Responses	Reference
<p>developed countries but have not yet been successfully demonstrated in India”. The objective of conducting a comparative analysis is to assess the efficacy and the compatibility of energy efficiency technologies applied and practiced in developed countries to the Indian context. This also helps to achieve interaction with entities in industrialized countries that have expertise in EE technology applications in railway systems.</p> <p>Question 9.2: <i>As EE benchmark will be defined, it needs to be applied in certain situations and monitored.</i></p> <p>Response:</p> <ul style="list-style-type: none"> - Agree. The defined EE benchmarks will certainly be applied and the Technology Information Resource Facilitation Desk (TIRFAD) that will be established during the project implementation will play a key role. EE benchmark will be applied first within different divisions of the Indian Railways Systems (IRS). The information on energy efficiency technologies, measures, and benchmarks will then be documented and disseminated to the Indian Railway divisions and production units, suppliers and the various associations within each operating zones and divisions of the company through the web portal. The established benchmarks will be monitored through the conduct of energy audits and revised based on the best energy efficiency achieved in the field units. 	<p>ProDoc, section 6, para 44, p 24</p> <p>&</p> <p>ProDoc, section 6, para 53 and 57, p 28</p>
<p>Component 2 and Component 3</p> <p>Question 9.3: <i>Please specify that both Component 2 and Component 3 have investment component in table A</i></p> <p>Response:</p> <ul style="list-style-type: none"> - Corrected as suggested. <p>Question 9.4: <i>As for the Component 2 will implement proven technologies, the key is how to disseminate and deploy these technologies in wider scale in IR context rather than just demonstrating these technologies. Specific strategies need to be developed and implemented for each technology for that purpose. Audit procedures and incentive schemes should have close linkage to these technologies to be deployed. (Audits procedures needs to be designed to lead to proper actions.) In addition, it needs to be secured that regulatory/ policy frameworks will be put in place if it is found necessary to enforce them.</i></p> <p>Response:</p> <ul style="list-style-type: none"> - As mentioned above, TIRFAD will play a key role in the information dissemination of proven energy efficiency technologies, measures, and benchmarks to the Indian Railway divisions and production units, suppliers and the various associations within each operating zones and divisions of the company. Also, information gathered and processed will be placed in the web portal for effective dissemination. Having recognized the importance of energy audits, the activities that will be carried out to produce Output 2.2 are geared towards developing and implementing energy audit procedures for railways operation. Similarly, the activities that are designed to deliver Output 2.4 are meant to develop and implement an incentive scheme to provide incentives to Indian Railways 	<p>CER, Table A, p 1</p> <p>ProDoc, section 6, para 51 and 52, p 27</p> <p>&</p> <p>ProDoc, section 6, para 60, p 29</p>

Comments and Responses	Reference
<p>(IR) departments and their staff to adopt and implement energy efficiency technologies and measures.</p> <p>Concerning the regulatory and policy frameworks, IR is the single largest organization in India that has a total state monopoly on the country's rail transport. IR is managed through its 16 Zones which are subdivided into 68 Divisions. The EC Act 2001 mandates the Bureau of Energy Efficiency (BEE) to work with designated consumers such as IR and other agencies to enforce the provisions of the Act, i.e. energy efficiency and energy conservation measures. IR will be responsible for implementing the project, achieving the results outlined in the project proposal. Moreover, certainly IR will be finally responsible to implement the policy formulation activity under the project and also work on the advocacy and lobbying efforts that would ultimately secure the approval and enforcement of the formulated policies and associated implementing rules and regulations.</p> <p>The project is a part of the "Programmatic Framework for EE in India", which is implemented by the BEE. Thus, the learning from here has the potential to get implemented not only in IR but in other energy consuming sectors too and the above programmatic framework provides such a platform.</p>	<p>ProDoc, Box 2, p 7 & ProDoc, Box 1, p 6 & CER, Part II, section B, p 7 & ProDoc, Table 2, p 10</p> <p>ProDoc, section 4, para 35, p 22</p>
<p>Question 9.5: <i>Diffusion of these technologies need to be monitored (not only the number of projects proposed in general but the number of each technology put in place).</i></p>	
<p>Response:</p> <ul style="list-style-type: none"> - The Centre of Excellence (COE) that will be established through the project will play a key role in monitoring and implementing the EE initiatives. It will also be charged with the responsibility to monitor and evaluate the uptake of various EE technologies in terms of the number of projects employing these technologies but also the performance of the technology applications. The COE not only implements and monitors the present set of initiatives but is expected to evolve as a resource centre that will, among others, set up guidelines on EE technology developments and applications in the future. Capacity building targeted under activity 1.3.5 also ensures effective monitoring of energy efficiency technologies and measures, and maintenance of energy efficiency project assets. 	<p>ProDoc, Box 3, p 25 & ProDoc, section 6, para 47 and 48, p 26</p>
<p>Question 9.6: <i>Annex A looks like that the audit procedures are under Component 3, while in other places under Component 2.</i></p>	
<p>Response:</p> <ul style="list-style-type: none"> - Indeed energy audits are conducted under Component 2 as well. The activities that will be carried out to produce Output 2.2 are aimed at developing energy audit procedures, as well as guidelines in the implementation of energy audits using the developed energy audit procedures. <p>Concerning the Pilot interventions under Component 3 it is mentioned that energy audits will be carried out, obviously applying the procedures</p>	<p>ProDoc, section 6, para 53, p28</p> <p>ProDoc, Box 5, p 30</p>

Comments and Responses	Reference					
<p>developed in Component 2, for traction (i.e. the energy audit of rolling stock) and non-traction (i.e. energy audit of stations, workshops and railway offices) activities. These activities are definitely different from the energy audit-related activities mentioned under Component 2.</p> <p>Energy audits <i>per se</i> will not bring about the energy savings. The energy audits prompt or influence the actions to save energy. The actions that were taken, as recommended by the energy audit, will lead to the energy savings.</p> <p>Question 9.7: <i>Please explain how the technologies implemented in Component 2 and Component 3 will be maintained after the completion of the project</i></p> <p>Response:</p> <ul style="list-style-type: none"> - As mentioned in the response to question 9.5, COE will play a key role in the deployment and M&E of the EE technologies. In this regard, whatever replications of the EE technology applications that were showcased in Components 2 &3 will be monitored, evaluated and reported by COE. It should be noted that its capacity is built towards maintenance of energy efficiency assets. The functions of the COE will be initially carried out by the Project Management Unit (PMU) for the duration of the project. As an exit strategy, it is expected that staff of the PMU will be absorbed in the COE at the completion of the project, so as to retain the capacity and expertise developed during the project implementation. COE is expected to continue EE measures by setting guidelines and monitoring compliance even after the project period. 	<p>ProDoc, Box 3, p 26</p>					
<p>Component 4</p> <p>Question 9.8: <i>The distinction of the role of this component and the Center of Excellence is not yet clear. Please explain.</i></p> <p>Response:</p> <ul style="list-style-type: none"> - As mentioned above, the functions of COE will be initially carried out by the PMU for the duration of the project. Under this component, a post-project action plan for the COE will be developed. As an exit strategy, it is anticipated that staff of the PMU will be absorbed in the COE at the completion of the project, so as to retain the capacity and expertise developed during project implementation. 	<p>ProDoc, Box 3, p 26 & CER, Part III, section B, p 11</p>					
<p>Question 19: <i>Is the GEF funding level of project management budget appropriate? The ratio between GEF funding and co-financing of project management budget should be the same as that of project cost. The total amount looks appropriate (reduced from the PIF stage).</i></p> <p>Response:</p> <ul style="list-style-type: none"> - Based on a detailed analysis of the anticipated cost for the management of the project, a total amount of roundabout US\$ 1,470,000 was estimated. Inasmuch as 10% of the total GEF funding has been in the past used as benchmark for the maximum GEF contribution towards the project management budget, the proposed GEF budget for project management was set at US\$ 520,000. <table border="1" data-bbox="248 1864 1133 1902"> <tr> <td>PMU</td> <td>Person</td> <td>GEF</td> <td>Co-</td> <td>Project</td> </tr> </table>	PMU	Person	GEF	Co-	Project	<p>CER, Part I, Table A, p 2 & Table F, p 3.</p>
PMU	Person	GEF	Co-	Project		

Comments and Responses					Reference
		weeks (GEF)	Amount (\$)	financing (\$)	Total (\$)
Local consultants and staff	459	406,050	698,850	1,104,900	
International consultants					
Office facilities, equipment		77,470	1,230,105	1,307,575	
Travel		36,480	171,045	207,525	
Total		520,000	2,100,000	2,620,000	
<p>- The corresponding co-financing share to the project management cost has also been adjusted to US\$ 2,100,000, in order to match the 10% of the GEF. Bulk of this co-financing is from the project management costs of the various co-financed EE technology application demonstrations that have been subsumed into this project.</p>					

STAP Comments on PIF (30th November 2008) [STAP makes the following recommendations for consideration during project development] and UNDP Response

Comment & Response	Reference
<p><u>Comment 1:</u> <i>Scientific Criteria for Technological Interventions:</i> <i>There are a number of potential technological interventions available on the market, some of which are referred to in the PIF, such as: mass reduction, aerodynamics and friction modifications, space utilization, reduction of conversion losses, introduction of direct injection technologies in diesel combustion engines, regenerative breaking, high-speed passenger trains and etc. It is desirable to conduct an analysis using scientific criteria, based on Energy Conservation Potential, Benefit-Cost Analysis, Mitigation Potential (tCO2), Cost-Effectiveness (\$/tCO2), etc., to identify and rank the technological interventions.</i></p> <p><u>Response:</u> Certainly it is necessary to conduct the analysis based on scientific criteria.</p> <p>Indian Railways has done first hand analysis on energy conservation technologies and measures which is identified based on national and international data e.g. such as available from the International Union of Railways Companies (UIC). These are also listed in the publication of Energy Conservation in Indian Railways by the Ministry of Railways in March 2009.</p> <p>However during the PPG phase a thorough analysis was conducted in selecting the technologies and measures by involving all divisional staff and come up with all the possible technologies and measures listed in the section 3.2 of UNDP ProDoc. Among these identified technologies, only few technologies have been chosen based on the criteria detailed in the section 4.3 of UNDP ProDoc. This criterion also includes the</p>	<p>ProDoc: Sec 3, Table 3, Para 18, p 13</p> <p>& Sec 4, Table 6, p 20 & Table 7, p 21</p>

Comment & Response	Reference
implementability of a technology and/or measure at the Zonal level as well.	
<p>Comment 2: Barrier Analysis: <i>The project has identified three barriers namely; weak institutional arrangement, lack of in-house technical skill and lack of economic incentives for promoting energy efficiency in Railways. There could be other barriers as well. Thus, it is suggested to carry out a scientific analysis of barriers to rank and prioritise the barriers, to enable effective targeting of the measures to overcome the barriers.</i></p> <p>Response: During the PPG phase, the technology options and barriers to their implementation were discussed during a one day workshop with representatives from various zonal, production and R&D units of Indian Railways as well as by the national consultant in private consultations. The barriers identified are mainly those relating to institutional, information and capacity, as well as some incentive, technology, and financial barriers. Based on this, the project proponents have included a detailed analysis of the barriers which are now described in the UNDP ProDoc.</p>	ProDoc: Sec 3, Table 4, Para 20, p 14
<p>Comment 3: Risks and Mitigation Measures: <i>A detailed analysis of the risks and potential mitigation measures would enable the project authorities to be better prepared to overcome the risks. The financial / incremental cost risks need to be addressed. The risks involved in scaling up energy efficiency program beyond the pilot project needs to be assessed.</i></p> <p>Response: A list of risks and mitigation options are prepared and presented in the Annex A of the ProDoc.</p> <p>Without GEF intervention (i.e. baseline scenario), Indian Railways is expected to move from the current (2009-10) estimate of 15.7 billion kWh of electricity consumption in the railways sector to 100.5 billion kWh in 2031-32 (about 1,030 billion kWh cumulatively for the period 2010/11-2031/32). However, with the GEF intervention, energy savings in terms of reduced electricity consumption will be 142 million kWh per year.</p> <p>To promote the adoption of energy efficiency technologies and measures in a more comprehensive and effective way, the project is supporting Indian Railways' Energy Efficiency and Conservation Program (EECP) (2010/11-2031/32). It is assumed that there will be an improved capacity, confidence and awareness, improved incentive system, etc. so that energy efficiency technologies and measures will be adopted and implemented at a faster pace and on a wider scale.</p>	ProDoc: Annex A, Table 16, p 61 ProDoc: Sec 8, p 35 and p 36

GEFSEC Review Sheet Comments on PIF and UNDP Response (February 4, 2008)

2. Has the operational focal point endorsed the project?

The OFP endorsed the Programmatic Framework for EE in India, which includes this PIF, for a total of \$40m. It does not specify the amount for this PIF. The total amount associated with this PIF is unclear and inconsistent. Table A indicates \$6m for the project, but Table B gives \$5.3m for the project, \$100k for PPG, and \$600k for the agency fee. The figures in Table B simply do not add up (to \$6m), and the agency fee was calculated incorrectly

UNDP Response: This has been corrected in tables A and B. In line with the EE Programmatic framework the requested amounts are 5,200,000 + 100,000 for project preparation. The agency fee is 530,000 which makes a total of 5,830,000.

4. Does the Agency have a comparative advantage for the project?

It is not known that UNDP has any comparative advantage in this field. There is no discussion in Section H.

UNDP Response: The project supports institutional strengthening of Indian Railways and a suite of technical assistance activities to implement IR's energy efficiency programme. UNDP's comparative advantage is that it has adequate experience in technical assistance, capacity building and institutional strengthening on energy efficiency issues at various levels and of different stakeholders both in India and globally.

8. Is the project design sound, its framework consistent sufficiently clear

The project objective is to introduce EE technologies and measures in the India Railways system. Given this objective, the basic project framework appears reasonable. The substantive components are:

1. Institutional CB and technical training
2. Implementation of EE technologies and measures
3. Knowledge sharing and learning

Component 1 mentions project support for the Centre of Excellence. Please provide more information on what this entails.

UNDP Response: To strengthen the institutional system within IR for addressing EE issues, a Centre of Excellence is planned. The role of this Centre will be to develop energy audit manuals for all railway operations, provide training to staff at various levels on EE techniques and measures, provide guidance to testing houses on measurement and calibration of equipments used in IR, etc. The project will focus on institutional capacity development and technical training to develop and operate the Centre of Excellence.

Component 2 involves both TA and demonstration (i.e., investment -- please indicate both in Table A). It would be helpful to better define the scope of each, especially the demonstration part, including the budget (GEF and cofinancing). It may be helpful to break them down into two separate components.

UNDP Response: This component has been split in two separate components defining the scope of each in response to this comment.

Activity 2.4 involves internal incentives scheme for implementing EE measures. This seems critical in the Indian IR context. It may be useful to look into this issue in a broader context under institutional development of Component 1.

UNDP Response: A paragraph has been inserted in Part A as follows: Once the Energy Efficiency programme is underway within IR, specific incentive schemes would be institutionalized to encourage measures and initiatives that lead to energy conservation. These incentives could be either in cash or kind and would be instituted across different levels, viz, Zonal level to individual employee level. Details of such a scheme will be developed at the beginning of the project.

Component 3 mentions identification of international best practices from Japan, Germany, and France. Are there not any within the IR system? The two activities identified under this component focus only on international cooperation, instead of internal dissemination. Please clarify. If internal dissemination will be considered, what will be its scope, beyond the demonstration and TA activities mentioned in Components 1 and 2?

UNDP Response: Energy Efficiency is a relatively new concept for IR. No good practice is available from within the company hence the need to learn from other railway operators. The Centre of Excellence will be the liaison with overseas partners (to learn and share lessons) but will also lead in disseminating successful EE measures and technologies internally within IR.

11. Is the proposed project likely to be cost-effective?

Section E mentions, under incremental reasoning, estimated energy savings of 374m KWh or 314,813 tons of CO2. What is the time frame? What is the basis for this estimate? Section G states that the project will reduce approximately 95k tons of CO2 a year. What is the basis for this estimate? From the above numbers, the potential for energy savings and CO2 emission reduction does not appear to be very significant.

UNDP Response: Estimation of emission reductions has been revised in line with the new methodology. Based on IR projections total electricity consumption of IR will be 15,6 billion kwh in 2009 (of which 12,5b is from traction operations and 3,1b from non-traction). With a successful implementation of GEF supported EE measures and technologies the energy saving potential is estimated at approx. 15m kwh/year which results in direct CO2 reductions of 14,850 t/CO2 in the first year (15,000 MWh x 0,99 = 14,850). Considering a time span of 20 years calculations are as follows: an annual growth of electricity consumption of 5,5% and a penetration rate that increases from 2% in the first year to 80% by year 16 the cumulative energy savings are 15,6m MWh which results in savings of 15,444,000 t/CO2.

17. Is the GEF funding level of project management budget appropriate?

The GEF funding for PM in Table A is \$600k, or 10% of \$6m. This seems too high for this type of project. In fact, if the GEF amount for the project is \$5.3m as indicated in Table B, this would even exceed 10%. The amount of co-financing for PM seems to be set at 10% or \$3m. Is this realistic?

UNDP Response: The management budget has been reduced to 460k which is less than 9% of the GEF budget. Co-financing amounts have also been revised. Total co-financing is USD 21,150,000 million of which approx. 2 million is set aside for the EE Centre of Excellence which is managing this project as a part of managing the EE programme of IR

19. Is the indicative co-financing adequate for the project?

Indicative co-financing includes \$20m cash and \$10m in-kind contribution from the government (IR). If these numbers are realistic, it begs the question on the cost-effectiveness of this project, given the limited scope of energy savings. How much energy/electricity can be expected from this project? Can they justify IR committing \$20-30m to this project?

UNDP Response: IR is committing USD 21,150,000 million to this project which is a co-financing ratio of approx. 1:4. The scope of energy savings have been revised according to the new methodology and savings are significant (please see response to previous comment #11).

ANNEX C: CONSULTANTS TO BE HIRED FOR THE PROJECT USING GEF RESOURCES

#	Position Titles	USD per person per week	Estimated person* weeks	TASKS TO BE PERFORMED
Project Management Unit (PMU) – national consultants				
1	National Project Coordinator (NPC)	950	93	<ul style="list-style-type: none"> • Assist NPD in the preparation of the project execution scheme/work plan; • Support the NPD, in the provision of guidance in the organization and implementation of all activities specified in the project document and ensuring timely completion; • Responsible for day-to-day planning, operation and monitoring project activities; • Provision of substantive inputs on project implementation results and issues to the NPD, consultants and stakeholders; • Organization and coordination of project meetings (across Division and Zones), workshops and other expected deliverables from the Project; • Responsibility for the monitoring of overall project implementation, project review and facilitate independent project mid-term and terminal review; • Coordination of financial auditing of the project according to the standards and rules established by UNDP and prepare work plans, reports, budgets, and terms of reference for sub-contractors and consultants; • Liaison with Indian Railways units, equipment and technology providers, national R&D institutions, test laboratories and technology institutes of the project and promote exchanges of information among project participants; • Review of drafts of any working documents to be submitted to meetings or emanating from project activities, and communicate comments to consultants; • Represent the project at forums and meetings.
2	Project Manager, Traction (TR)	950	37	<ul style="list-style-type: none"> • Support the planning and monitoring of “rolling stock” and “Traction distribution” related railway operation activities; • Review and provide comments on outputs pertain to traction; • Assistance in the formulation of TORs and activity descriptions where appropriate; • Provision of substantive inputs on project activity implementation to the expert consultants and stakeholders.
3	Project Manager, Non Traction (NT) Services	950	37	<ul style="list-style-type: none"> • Support the planning and monitoring of non-traction related activities and services; • Review and provide comments on outputs pertain to non-traction; • Assistance in the formulation of TORs and activity descriptions where appropriate; • Provision of substantive inputs on project activity implementation to the expert consultants and stakeholders.
4	Project Manager Energy Efficiency (EE)	950	63	<ul style="list-style-type: none"> • Support for the planning, implementation, monitoring and reporting of energy efficiency related activities such as energy audits, awareness creation, training and capacity building; • Assistance in the formulation of TORs and activity descriptions where appropriate.
5	Office Manager(s), Administration and Finance	550	45	<ul style="list-style-type: none"> • Responsible for administrative and secretarial matters; • Perform project-related communication and liaison work: arrangement of logistics, including travel and organization of

				meetings/workshops; • Make annual budget and review its implementation, making adjustment correspondingly; • Carry out and manage the project contract payments; • Conduct annual financial audit of the project in line with the UNDP, produce the required statements as needed, keep checks and balances in place to ensure proper use of finances under various heads and report the financial progress; • Assist processing and reporting project incomes and expenditures.
	Total		275	

#	Position Titles	USD per person per week	Estimated person* weeks	TASKS TO BE PERFORMED
Technical Assistance – national consultants				
1	Railway Operation expert(s) on Rolling Stock (RS/TRD),	950	94.00	<ul style="list-style-type: none"> • Support PMU: <ul style="list-style-type: none"> ○ Capacity assessment, & technical Training-related EE measures and technologies. Capacity & Training gap analysis, identification of potential technology & measure related with RS &TRD operations (<i>Outcome 1</i>) ○ Implementation of RS-related EE measures and technologies. gap analysis, benchmarking, development of M&W specifications for potential technology & measure related with RS operations ○ Implementation of Traction & Distribution operations related EE measures and technologies. Gap analysis, benchmarking, development of M&W specifications for potential technology & measure related with Traction & Distribution operations (<i>Outcome 2</i>) ○ Implementation of EE pilot demonstration activities (<i>Outcome 3</i>) ○ Knowledge sharing of EE measures and technologies related with RS &TRD operations
2	Railway Operation expert(s), Buildings Services (BS),	950	93.50	<ul style="list-style-type: none"> • Support PMU: <ul style="list-style-type: none"> ○ Capacity assessment, & technical Training-related EE measures and technologies. Capacity & Training gap analysis, identification of potential technology & measure related with BS operations (<i>Outcome 1</i>) ○ Implementation of BS operations related EE measures and technologies; gap analysis, benchmarking, development of M&W specifications for potential technology & measure related with BS operations (<i>Outcome 2</i>) ○ Implementation of EE pilot demonstration activities (<i>Outcome 3</i>) ○ Knowledge sharing of EE measures and technologies related with BS operations (<i>Outcome 4</i>)
3	Energy Efficiency in Railways Operations, expert(s)	950	58.50	<ul style="list-style-type: none"> • Support to PMU: <ul style="list-style-type: none"> ○ Capacity assessment, & technical Training-related EE measures and technologies. Capacity & Training gap analysis, identification of potential technology & measure. Identification and evaluation of alternatives for the for sustainable EE program (<i>Outcome 1</i>) ○ Identification and evaluation of alternatives for the harmonization and mutual recognition of the Indian EE program and similar international programs (in particular in Asian countries); Support GOI in the implementation of harmonization activities; Collect and analyze Railways policies and regulations; consulting with local stakeholders; Gap analysis, benchmarking for Energy efficiency and performance criterion for M&W specifications for

#	Position Titles	USD per person per week	Estimated person* weeks	TASKS TO BE PERFORMED
				<p>potential technology & measure (<i>Outcome 2</i>);</p> <ul style="list-style-type: none"> o Implementation of EE pilot demonstration activities (<i>Outcome 3</i>) o Knowledge sharing of EE measures and technologies related with BS operations (<i>Outcome 4</i>)
4	Experts – RS,	550	195.00	<ul style="list-style-type: none"> • Evaluation of options & recommendation on EE; Collect and analyze Railways policies and regulations; consulting with local stakeholders; Gap analysis, identification of capacity development needs for energy efficiency and performance criterion for potential technology & measure; Identification of training need, Documentation & dissemination of Information (<i>Outcome 1</i>); • Evaluation of options & recommendation on incentives for EE; Collect and analyze Railways policies and regulations; consulting with local stakeholders; Gap analysis, benchmarking for energy efficiency and performance criterion for M&W specifications for potential technology & measure; Documentation & dissemination of Information (<i>Outcome 2</i>); • Implementation of EE pilot demonstration activities; Organizing, implementation of pilot projects and evaluation thereof related with Rolling stock operation (<i>Outcome 3</i>); • Identification of EE technologies, Learning, knowledge sharing and dissemination of Information on potential EE technology & measures with Railway personnel, Manufacturer & vendors for development and implementation on sustainable basis and setting a road map for post functioning for RS (<i>Outputs 4.1 and 4.2</i>)
5	Experts- TRD,	550	253.50	<ul style="list-style-type: none"> • Evaluation of options & recommendation on EE; Collect and analyze Railways policies and regulations; consulting with local stakeholders; Gap analysis, identification of capacity development & Training needs for energy efficiency and performance criterion for potential technology & measure; Identification of training need, Documentation & dissemination of Information (<i>Outcome 1</i>); • Evaluation of options & recommendation of incentives for EE; Collect and analyze Indian Railways policies and regulations; consulting with local stakeholders; Gap analysis, benchmarking for energy efficiency and performance criterion for M&W specifications for potential technology & measure • Implementation of EE pilot demonstration activities Organizing, implementation of pilot projects and evaluation thereof related with Traction & Distribution (<i>Output 3.1</i>) • Identification of EE technologies, Learning, knowledge sharing and dissemination of Information on potential EE technology & measures with Railway personnel, Manufacturer & vendors for development and implementation on sustainable basis and setting a road map for post functioning for TRD (<i>Outcome 4</i>)
6	Experts - BS,	550	195.00	<ul style="list-style-type: none"> • Evaluation of options & recommendation on EE; Collect and analyze Railways policies and regulations; consulting with local stakeholders; Gap analysis, identification of capacity development & Training needs for energy efficiency and performance criterion for potential technology & measure; Identification of training need, Documentation & dissemination of Information (<i>Outcome 1</i>); • Evaluation of options & recommendation of incentives for EE; Collect and analyze Railways policies and regulations; consulting with local stakeholders; Gap analysis, benchmarking for Energy efficiency and performance criterion for M&W specifications for potential technology & measure (<i>Outcome 2</i>);

#	Position Titles	USD per person per week	Estimated person* weeks	TASKS TO BE PERFORMED
				<ul style="list-style-type: none"> • Implementation of EE pilot demonstration activities Organizing, implementation of pilot projects and evaluation thereof related with Building services (<i>Outcome 3</i>); • Identification of EE technologies, Learning, knowledge sharing and dissemination of Information on potential EE technology & measures with Railway personnel, Manufacturer & vendors for development and implementation on sustainable basis and setting a road map for post functioning for BS (<i>Outcome 4</i>);
7	Experts, EE, Energy management and audits	550	214.50	<ul style="list-style-type: none"> • Evaluation of existing EE measures, options & recommendation on EE; Collect and analyze Railways policies and regulations; consulting with local stakeholders; d, Documentation & dissemination of Information (<i>Outcome 1</i>); • Preparation of audit procedures; Cost-benefit analysis and evaluation of options & recommendation of EE technologies and measures (<i>Outputs 2.1 and 2.2</i>); • Organization of audit support for pilot projects and evaluation thereof related (<i>Outputs 3.1</i>) • Identification of EE technologies, Learning, knowledge sharing and dissemination of Information on potential EE technology & measures with Railway personnel, (<i>Outcome 4</i>)
8	Expert, facilitation and capacity development	550	156.00	<ul style="list-style-type: none"> • Advice on financing and logistical arrangements for energy capacity development & Training needs for efficient technologies equipments as well as learning and knowledge activities (<i>Outcomes 1 and 4</i>); Support technology implementation and contact with equipment providers and financiers (<i>Outcome 2 and 3</i>)
9	Experts, finance and implementation	550	195.00	<ul style="list-style-type: none"> • Advice on financing arrangements for <i>efficient technologies</i> equipments; • Conduct of discussions with local financing institutions on financing arrangements for energy efficient equipments; • Technical advice to manufactures on negotiating financing arrangements for energy efficient equipments; as well as on preparing project proposals and business plans for the improvement of appliance designs and production processes; • Organize external financial support for implementation of Pilot project and evaluation thereof;
10	Expert, technology and documentation	550	49.50	<ul style="list-style-type: none"> • Documentation of proven technologies, successful demonstrated pilot projects; cost-benefits analysis; lessons learned; • Information on website and for TIRFAD dissemination
11	Experts, climate change and evaluation	550	13.00	<ul style="list-style-type: none"> • Review of EE potential, measures and technologies and organizing carbon & Energy profiling of project and evaluation thereof; Assessment on climate change mitigation due to EE initiatives and documentation thereof; (<i>Outcome 4; Outputs 1.1 and 2.1</i>)
12	Expert, human resources and institutional development	375	52.00	<ul style="list-style-type: none"> • Review the profile of the staff, evaluate the training needs, developing training module, and suggest / strengthen the incentive schemes for implementation of EE measures; Review the capacity and provide guidance on capacity development (<i>Outputs 1.2, 1.3, 2.4 and outcome 4</i>)
13	Training consultant	375	124.00	<ul style="list-style-type: none"> • Review and analyses the training needs, facilities available and needed as necessary for implementation of EE technologies and measures (<i>Outputs 1.1, 1.3, and 4.1</i>)
14	Quality Assurance, instrumentation, testing & calibration	375	78.00	<ul style="list-style-type: none"> • Conduct of survey on testing & calibration facilities; Collection of information on energy performance of existing products; Evaluation of existing designs and production processes, and identification of

#	Position Titles	USD per person per week	Estimated person* weeks	TASKS TO BE PERFORMED
	consultant			opportunities for improvements; Provision of technical guidance for the improvement of testing and calibration facilities (<i>Outputs 1.3 2.2, 2.3, 3.1</i>)
15	Procurement and implementation	375	52.00	<ul style="list-style-type: none"> Review of existing procurement policies and regulations. Identification and analysis of legal and financial issues regarding an eventual scheme for the procurement of energy efficient equipments by Railways ; Assistance to vendors and manufacturers
16	IT & infrastructure; web portal	375	104.00	<ul style="list-style-type: none"> Development of Information web portal for sharing of knowledge; Development of technology information resource and facilitation Desk(TIRFAD), Dissemination of information to the manufacturers and vendors (<i>Outputs 1.1, 1.3, 2.3, 4.1</i>)
17	Energy metering and auditing; energy and GHG estimation	375	65.00	<ul style="list-style-type: none"> Conduct of survey on metering & monitoring facilities; Provision of technical guidance for the improvement of metering & monitoring facilities
18	Other consultants	550	130.00	<ul style="list-style-type: none"> Provide complementary support for and/or actual implementation of the projects public outreach, workshops and seminars presenters, market monitoring and other related activities
19	Office assistants	275	392.73	<ul style="list-style-type: none"> Arrangement of logistics, including travel and organization of meetings/workshops on-site and in the various zones; translation services
	Total		2,515.23	

#	Position Titles	USD per person per week	Estimated person* weeks	TASKS TO BE PERFORMED
Technical Assistance – international consultants				
1	Senior technical advisor (STA), EE training & Institutional support COE	3,000	19.5	<ul style="list-style-type: none"> Review the training gap analysis, develop strategy and draw the training program to implement the EE measures; Assist at selected trainings
2	STA, Traction and EE	3,000	58.5	<ul style="list-style-type: none"> Guidance on EE implementation in Traction (TR) in general support for implementation of EE pilot demonstration activities related with Rolling stock & Traction power distribution
3	STA, Non-traction and EE	3,000	58.5	<ul style="list-style-type: none"> Guidance on EE implementation in Non-Traction (NT), in particular building services, and support for implementation of EE pilot demonstration activities
4	STA, EE implementation	3,000	58.5	<ul style="list-style-type: none"> Guidance on EE implementation, monitoring and verification of EE performance; Evaluation and assessment of technologies and measures implemented in Outcomes 2 and 3
5	Experts, communication and knowledge sharing	3,000	39.0	<ul style="list-style-type: none"> Preparing a knowledge sharing & learning module for imparting training to Railway staff, and for qualitative information on web info portal as well for TIRFAD related with activities of Traction, non-traction utilities and services, as well as for with energy efficiency, interaction with leading centers of Excellence of developed countries; Preparing a knowledge sharing & learning module for imparting training to Railway staff, and for qualitative information on web info portal as well for TIRFAD related
6	Experts, project evaluation and impact analysis	3,000	19.5	<ul style="list-style-type: none"> Mid-term and final evaluation Evaluation and assessment of project Climate change mitigation outcome and compilation of learning and project closure.
	Other consultants	3,000	52.0	<ul style="list-style-type: none"> Provide complementary support for and/or actual implementation of the projects public outreach, workshops and seminars presenters, market monitoring and other related activities
	Total	3,000	306.0	

ANNEX D: STATUS OF IMPLEMENTATION OF PROJECT PREPARATION ACTIVITIES AND THE USE OF FUNDS

A. EXPLAIN IF THE PPG OBJECTIVE HAS BEEN ACHIEVED THROUGH THE PPG ACTIVITIES UNDERTAKEN.

In January 2008, UNDP submitted the PIF and PPG request to the GEF Secretariat, which was cleared by the GEF CEO in October 2008. In 2009, the services of an international and national consultant were hired, supported by the PPG grant, to advise on the development of the project and elaborate the necessary documentation for GEF submission through UNDP.

As a main achievement of the PPG phase, the final versions of the Request for the CEO Endorsement/Approval and the UNDP/EF Project Document are submitted in July 2010 to the GEF Secretariat. Overall the PPG Exercise has achieved this objective.

B. DESCRIBE IF ANY FINDINGS THAT MIGHT AFFECT THE PROJECT DESIGN OR ANY CONCERNS ON PROJECT IMPLEMENTATION.

N/A

C. PROVIDE DETAILED FUNDING AMOUNT OF THE PPG ACTIVITIES AND THEIR IMPLEMENTATION STATUS IN THE TABLE BELOW:

<i>Project Preparation Activities Approved</i>	<i>Implementation Status</i>	<i>GEF Amount (\$)</i>				<i>Co-financing (\$)</i>
		<i>Amount Approved</i>	<i>Amount Spent To-date</i>	<i>Amount Committed</i>	<i>Uncommitted Amount*</i>	
Collection and analysis of information on the energy consumption within various operations in IR	Completed	25,000	35,500		-	40,000
Consultation with international experts on various aspects including best practices in energy conservation measures in railway operations	Completed	30,000	2,920	16,580	-	60,000
Discussion with railways staff at various levels on their training needs and trainers at COE	Completed	25,000	11,219	13,781	-	50,000
Developing project proposal	Completed	20,000		20,000	-	
Total		100,000	49,639	50,361	-	150,000

* Uncommitted amount should be returned to the GEF Trust Fund. Please indicate expected date of refund transaction to Trustee.