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Ministry of Steel Government of India

UNDP/GEF Project: Removal of Barriers to Energy Efficiency in the Steel Re-Rolling Mill Sector in India (PIMS 1515)

Terminal Evaluation Report

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SYNOPSIS

Title of UNDP supported GEF financed project: Removal of Barriers to Energy Efficiency in the Steel Re-Rolling Mills Sector in India (SRRM)

UNDP Project ID: 1515

GEF Project ID: 1240

Evaluation time frame: September 2004 to June 2013

Date of evaluation report: July 8, 2013

Region and Countries included in the project: India

GEF Focal Area Objective: CCM-2: Renewable Energy: Promote market transformation for energy efficiency in industry and the building sector

Implementing partner and other strategic partners: Ministry of Steel, Government of India

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ABBREVIATIONS

Acronym	Meaning
AWP	Annual Work Plan
BEE	Bureau of Energy Efficiency
CTA	Chief Technical Adviser
CII	Confederation of Indian Industry
CCE	Cost of conserved energy
CDR	Combined Delivery Report
DEA	Department of Economic Affairs
DEM	Domestic Equipment Manufacturer
DST	Department of Science and Technology
DSIR	Department of Scientific and Industrial Research
DPR	Detailed Project Report
EL	EcoTech level
EMUs	EcoTech Model Units
EMC	Energy Management Center
ESCO	Energy Service Company
EMS	Environment Management System
FIs	Financial Institutions
FR	Financial Report
GEF	Global Environment Facility
GDP	Gross Domestic Product
IIM	Indian Institute of Metal
ICICI	ICICI Bank Ltd.
IDBI	Industrial Development Bank of India
IMWG	Inter-Ministerial Working Group
IREDA	Inter-Renewable Energy Development Agency
ISO	International Standards Organization
MTPY	Million Tonnes Per Year
MEPS	Minimum Energy Performance Standards
MTPY	Million Tonnes Per Year
MoEF	Ministry of Environment & Forests
MoS	Ministry of Steel
M&E	Monitoring and Evaluation
NIM	Nationally implemented
NISST	National Institute of Secondary Steel Technology
NPC	National Project Coordinator
NPD	National Project Director
NPP	National Project Personnel
NMCP	Netherlands Management Cooperation Programme
PAC	Project Advisory Committee
PCRA	Petroleum Conservation Research Association
PIT	Performance Improvement Training
PMC	Project Management Cell
PPM	Project planning matrix
PSC	Project Steering Committee
PSU	Public Sector Undertaking

Acronym	Meaning
PIR	Project Implementation Report
QPR	Quarterly Progress Report
RM	Resident manager
SDF	Steel Development Fund
SIDBI	Small Industries Development Bank of India
SME	Small and Medium Enterprises
SMP	Standard Maintenance Practices
SOP	Standard Operating Practices
SDF	Steel Development Fund
SRRM	Steel Re-rolling Mills
SRRMP	GEF-funded SRRM Project
S&L	Standards and Labelling
TA	Technical Assistance
TIRFAC	Technology Information Resource and Facilitation Center
TP	Technology Package
TPF	Third Party Financing
ToR	Terms of Reference
UNFCCC	UN Framework Convention on Climate Change

EXECUTIVE SUMMARY

Background

This report summarizes the findings of the Terminal Evaluation Mission conducted during June 14-27, 2013 for the Removal of Barriers to the Steel Re-Rolling Mill Sector in India (hereby referred to as SRRMP or the Project), that received a USD 6.75 million grant from the Global Environmental Facility (GEF). The Project was developed from between 2002 and 2003 under a PDF-B grant from GEF, and the Project implementation aspects managed by UNDP as a nationally executed (NEX) projects.

Context and Purpose of the Terminal Evaluation

The purpose of the Terminal Evaluation (TE) for this Project is to *evaluate the progress towards the attainment of global environmental objectives, project objectives and outcomes, capture lessons learned and suggest recommendations on major improvements*. The TE is to serve as an agent of change and play a critical role in supporting accountability. As such, the TE will serve to:

- promote accountability and transparency, and to assess and disclose levels of project accomplishments;
- synthesize lessons that may help improve the selection, design and implementation of future GEF activities;
- provide feedback on issues that are recurrent across the portfolio and need attention, and on improvements regarding previously identified issues; and,
- contribute to the GEF Evaluation Office databases for aggregation, analysis and reporting on effectiveness of GEF operations in achieving global environmental benefits and on the quality of monitoring and evaluation across the GEF system.

The Ministry of Steel (MoS) estimates that secondary steel production plants or steel re-rolling mills (SRRMs) account for more than 35% of all finished steel products in India. With India's large demand for finished steel products, there were an estimated 1,200 SRRMs in 1997¹³ which has grown to an estimated 1,890 SRRMs in 2013¹⁴, a growth rate of 2.6% annually¹⁵. Raw materials for most SRRMs are from steel products from induction furnaces that make billets, ingots and blooms from scrap steel from ship breaking in India, and imported scrap metals from old and retired automobiles. SRRMs then re-convert these billets, ingots and blooms into reinforcing bars for concrete, as well as channels, angles and plates used for various building and machinery applications.

The MoS indicate that the country produced over 76 million tonnes of finished steel products in 2012 of which more than 26 million tonnes of finished steel products (or 35%) came from steel re-rolling mills. Most of the 1,890 SRRMs in India are small to medium enterprises and produce on average between 50 to 100 tonnes of finished steel products per day. While growth has been generally unregulated, the SRRM sector does have a competitive advantage of being sufficiently flexible in producing low-tonnage steel products in various grades, shapes that meet local construction market demands. SRRM clusters are scattered throughout India to meet market demand for its products.

¹³ District Commissioner for Iron & Steel Survey Report, 1997, Ministry of Steel

¹⁴ "Study Report to Ascertain Extent of Replication of EE Technologies in SRRM Sector in India 2012-2013", 2013, SAILCON, pg 6.

¹⁵ The PMC reports that an estimated 10% of SRRM SMEs have closed within the last 2 years due to economic slowdown in India

SRRMs in India also consume coal, gas, furnace oil and electricity to operate outdated and low-investment technologies. One of the main concerns of the sector has been the rise of energy prices in 2007 along with intensive energy consuming production processes estimated to be in the order of 5,440 MJ/tonne of steel produced versus 2,200 MJ/tonne in developed countries¹⁶. In 2003, their direct energy costs were estimated to be in the order of 25 to 30% of overall production costs that have been exacerbated by rising energy costs since 2007. SRRM units in 2003 were characterised by:

- The use of outdated production technologies and operating practices;
- Low information and awareness levels of EcoTech options amongst owners, managers and operators;
- High investment costs of EE technologies;
- Lack of available and appropriate EE technologies on the Indian market;
- Lack of incentives to cater to small scale energy efficiency projects;
- Lack of experience to access external funds for EE technologies; and
- Lack of available and reliable technical assistance to engineer EcoTech options for SRRM plants.

The Project **objective** was to reduce greenhouse gas (GHG) emissions by providing technical assistance to the small and medium-sized steel-rolling mills in India to enable them to adopt more energy efficient and environmentally friendly technologies.

Assessment of Project Outcomes and Sustainability

Table A provides a summary of the terminal evaluation of SRRM.

Table A: Evaluation Ratings

1. Monitoring and Evaluation	Rating¹⁷	2. IA & EA Execution	Rating
M&E design at entry	4	Quality of UNDP Implementation	4
M&E Plan Implementation	4	Quality of Execution - Executing Agency	4
Overall quality of M&E	4	Overall quality of Implementation / Execution	4
3. Assessment of Outcomes		4. Sustainability	Rating¹⁸
Relevance	4.5	Financial resources	3
Effectiveness	5.0	Socio-political	4
Efficiency	4.4	Institutional framework and governance	3
Overall Project Outcome Rating	4.5	Environmental	4
		Overall likelihood of sustainability	3

¹⁶ ProDoc, Table 2, pg 6

¹⁷ 6=Highly Satisfactory (HS): The project has no shortcomings in the achievement of its objectives; 5=Satisfactory (S): The project has minor shortcomings in the achievement of its objectives; 4=Moderately Satisfactory (MS): The project has moderate shortcomings in the achievement of its objectives; 3=Moderately Unsatisfactory (MU): The project has significant shortcomings in the achievement of its objectives; 2=Unsatisfactory (U) The project has major shortcomings in the achievement of its objectives; 1=Highly Unsatisfactory (HU): The project has severe shortcomings in the achievement of its objectives.

¹⁸ Sustainability is rated as follows: 4 = Likely (L): negligible risks to sustainability; 3 = Moderately Likely (ML): moderate risks to sustainability; 2 = Moderately Unlikely (MU): significant risks to sustainability; and 1 = Unlikely (U): severe risks to sustainability. Overall rating is equivalent to the lowest sustainability ranking score of the 4 dimensions

The overall rating of the Project results is satisfactory (S). This is based on the following outcomes:

- The Project has had to overcome difficult baseline conditions in the SRRM sector that included initial apathy and communication barriers within the sector most notably when attempting to discuss operational issues. This took almost 3 years to resolve due to most SRRMs being informally managed and operated by personnel with no technical background or formal training. This lack of response from SRRMs was not identified in the PPM as a potential implementation risk. As a result, the Project team was ill equipped in the early stages of the Project to address this situation, lacking an approach and clearly defined steps to engage SRRMs throughout India;
- Project technical assistance activities that have provided significant contributions to the SRRM sector, and demonstrating the potential for the sector to become cost efficient and competitive through EcoTech options. Furthermore, the Project succeeded in bringing the SRRM sector to the attention of the Ministry of Steel. The sector is an important link within India's overall steel sector and is of vital importance to India's economy given its contribution in re-cycling of steel, providing value-added products and employment to nearly 1 million people;
- When the SRRM sector showed interest in this Project in late 2007, it coincided with rising energy costs to the SRRM sector. In 2007, the Project demonstrated its preparedness for assisting model SRRMs with EcoTech options. Much of the preparations had been conducted during the 2004 to 2007 period with the identification of low and high-end technologies with viability analyses that adequately responded to SRRM needs to reduce energy costs;
- There is an improved understanding of energy issues amongst personnel of the model SRRM units as well as NISST and other partner organizations. This was achieved through the benchmarking efforts of the Project, study tours to China to observe foreign steel re-rolling practices, the numerous discussions on how to standardize SRRM equipment, the numerous feasibility and post implementation reports on each of the model SRRM units, and the adoption of ISO9000 and ISO14000 practices within these model SRRMs;
- The setup of the www.undpgefsteel.gov.in website provides much of the information required by SRRMs to implement EcoTech options for their operations. The website also contains the Project's outputs that have raised SRRM awareness with papers, documents, and audio-visuals of Project success stories from the various consultants and equipment suppliers that serve as useful references and education tools for all Project stakeholders;
- The good response of the Project to support the use of the "Morgardshammar" roll pass design software and in general, technical assistance and training that was valued more by the SRRMs than the financial assistance;
- The lack of a thorough survey gauging SRRM opinions on the financial needs of the smaller SRRMs to implement EcoTech options that would determine if a capital subsidy program should be continued;
- Issues with the management of the Project that included:
 - A Project Steering Committee (PSC) with too many officials and representatives from as many as 10 ministries and agencies (many with no relevance to the steel sector) that likely hindered its ability to adaptively manage the Project;
 - A PMC that had excessive subject technical experts early in the Project when SRRMs were not interested in the Project and an insufficient number of qualified personnel after 2011, when SRRMs gained interest in the Project. The Project was

- extended thrice for short periods and as a result, neither the PMC personnel nor the SRRMs were sure of the Project's technical and financial support beyond the EOP. This reduced effectiveness in Project responsiveness to the SRRM stakeholder base;
- A number of model SRRM units did not have the energy audit baseline and post-commissioning reports that were prepared to assess the energy savings and serve as a basis for providing capital subsidy. This serves as an indicator and raises concerns that SRRMs are very focused on the fiscal savings from their EcoTech investments, and not full aware of the details of their energy savings;
 - The administrative delays and excessive efforts spent by the Project to disburse capital subsidy payments to SRRM owners; and
 - Late preparation of an exit strategy by the Project to determine and establish the institutions or government agencies responsible for providing technical and financial assistance to SRRMs after the EOP.

The overall Project sustainability rating is moderately likely (ML). This is primarily due to:

- Strong responses from SRRMs to adopt EE measures as a means of reducing their energy operational costs and to shield their businesses from sustained losses. These responses are coupled with a rapid increase in energy prices which shorten the pay-back period of many interventions and made them attractive to adopt;
- Setup of a SRRMP website (www.undpgefsteel.gov.in) that provides a wealth of easily accessible information on implementing EcoTech measures to reduce energy intensities of the SRRMs;
- Confirmed MoS co-financing after the EOP with plans to provide a financial incentive for remaining SRRMs after the completion of SRRMP;
- The lack of clarity on how available post-project resources from UNDP with co-financing from MoS will be used to build the capacity of NISST as the succeeding agency to manage the TIRFAC and continue TA support to SRRMs after post-project resources are exhausted. The UNDP resources of USD 1.575 million will be available for 12 to 18 months after the EOP. This may not be sufficient to fully build the capacity of NISST and the up-scaling the adoption of energy efficient technologies in 300 SRRM.

Conclusions

- There is justification for the Project needing 3 years (2004 to 2007) to change the SRRM mindset from business-as-usual practices. The main challenge for the Project during this period was to gain the trust of SRRM owners within a highly competitive business environment where almost no business information was shared amongst SRRM entrepreneurs. With no SRRMs interested in the bank interest subsidy financial incentive in place in 2004, it is possible that an earlier introduction of a capital subsidy would have accelerated SRRM acceptance of the Project prior to 2007;
- Project efforts were significant in building SRRM capacity to adopt EE measures and best practices, notably after 2007 during which energy costs were rising and the SDF-backed capital subsidy was in effect. The Project had successfully demonstrated and convinced SRRMs to invest in low end energy saving technologies: waste heat recuperators, use of pulverised coal, fuel switching, and the high end technology of hot charging. These activities facilitated increased SRRM production rates and significantly

reduced payback periods on EcoTech investments, thus, increasing the importance of technical support to the SRRMs;

- The PMC expended disproportionate efforts between 2008 and 2012 in the disbursements of the capital subsidy. This effort could have been reduced in favor of strengthening and sustaining the resident missions. By March 2011 or Year 6 of the Project, only five SRRMs received the capital subsidy out of 25 SRRMs where EE interventions were commissioned. At the same time, the PSC increased the Project targets for model SRRMs from 30 to 50 while closing 4 out of the 6 resident missions at the end of 2012 at a time when there was higher demand from SRRMs for technical assistance;
- The Project reaching 50% of its Gol co-financing target by the EOP is a reflection of the cumbersome process for SRRM subsidy claims and the Project falling short of its revised target of providing technical and financial assistance to 50 model SRRMs. The reduction in Gol co-financing share (on account of TIRFAC hardware center being dropped) has not been included in the AWP, which continues to reflect the original figure and has not been updated with revised Project plans;
- While technology solutions for SRRMs to reduce their energy consumption are simple in nature, their implementation is more complex. This is due to a large number of variables between each of the SRRMs that includes their layout, production capacity, primary energy supplies, grid power reliability, range of products produced and technical capacity of production personnel. This contributed to difficulties in meeting Project benchmarking targets;
- Similar to the conclusions drawn by the MTE, there is serious doubt if an ESCO model for SRRMs will work. To date, the SRRMs have expressed satisfaction with the assistance received by the Project from NISST, PCRA, SAILCON and other institutions. Since the initial 31 SRRMs have made EE improvements without ESCOs and with TA and capital subsidy from the Project (at no cost to the SRRMs), it will be very difficult if not impossible to convince smaller SRRMs with smaller profit margins to have ESCOs involved with implementation of EE measures at this stage. Furthermore, there will be significant resources required for capacity building efforts to develop an SRRM-ESCO, and to build the confidence of financial institutions to understand the risks of and fund an ESCO business to assist an informal industry. Further pursuit of building an ESCO business for SRRMs would not constitute proper use of limited resources available with UNDP;
- One of the expected Project outcomes was a succeeding agency is managing the TIRFAC and providing TA to the SRRMs by Year 2 of the Project. The Project, however, lost focus on building the capacity of the succeeding agency and commenced the formulation of an exit strategy in March 2013, the last year of the Project. While candidate succeeding agencies such as NISST, PCRA and SAILCON, performed various TA activities under contract with the Project, there was no assessment of their capacities to serve as the succeeding agency prior to 2013. As of September 2013, the PAC has made the recommendation (based on the PWC Exit Strategy Report) to have NISST to be the lead agency for the TIRFAC and TA to the SRRMs after the EOP. It is doubtful, however, that the exit strategy can be fully implemented prior to the current EOP date of December 31, 2013. While resources have been identified for 12 to 18 months after EOP to build the capacity of NISST, it is likely that additional resources will

be required to fully build the capacity of NISST to manage the TIRFAC and provide TA to the SRRMs;

- While the Project has achieved significant progress in catalyzing EE measures in the SRRMs after 2008, the Project could have achieved more market penetration with improved management. Factors that have hindered progress include:
 - A large representation of 10 ministries and agencies besides MoS and UNDP that would have the effect of constraining the PSC's ability to effectively and adaptively manage the Project;
 - Lack of steady staffing of the PMC leading to the PMC being less responsive to Project needs. This included the reduction of resident missions at the end of 2012 when there was high and increasing demand from SRRMs for technical assistance on EcoTech measures;
 - The continued use of a poorly designed Project planning matrix (from 2003) with a number of redundant indicators and outputs. The PPM had too many components with the achievement of each target demanding considerable effort coupled with unforeseen challenges from the initial lack of response from SRRMs. This led to inefficiencies in the use of resources and a loss of clear focus on attaining sustainability objectives (mainly related to the building of an agency for continuing SRRM TA after the EOP). This PPM may be a direct cause of PSC meetings not being fully focused on Project progress against clear Project outcomes.

Recommendations

Recommendation 1: Use remaining resources of the SRRMP (assumed to be available to December 31, 2013) towards enabling the nominated technological information resource and facilitation center (TIRFAC) to continue technical assistance and financial support to the SRRMs after the end of the Project. The 15th PAC meeting of September 3 recommended NISST as the best option for a TIRFAC. As such, the Project should focus its attention and remaining resources on the following:

- Providing technical assistance *in close collaboration with NISST* towards design and implementation of EE measures for the entire SRRM sector. This would include:
 - a technical consultancy focus towards measures that have been demonstrated by the 31 model units as well as those that have excellent benefit cost potential but have not been replicated on a large scale¹⁹;
 - implementation support for complex high-end Eco-Tech options²⁰;
- Setup of a program for the training of all SRRM staff levels notably shop-level personnel through an industry cluster mapping approach in which 30 to 40 units within a 100 km radius are covered;

¹⁹ This would include a) highly replicated options: high efficiency recuperator, use of pulverized coal as fuel, rolling mill technology packages; b) low replicated but establishes options: lump coal to producer gas, coal bed methane, biomass to producer gas, direct rolling and roll pass design; and c) potential options that need demonstration: oxy fuel combustion system and top and bottom firing system

²⁰ This would include the high efficiency recuperator, use of pulverized coal as fuel, rolling mill technology options, lump coal to producer gas, coal bed methane, automation, biomass as fuel, direct rolling and roll pass design, and oxy fuel combustion system

- Implementing building capacity activities of the TIRFAC with Performance Improvement Training (PIT) and 5S training with implementation support, and more workshops on SOP, SMP and electrical audits.

Recommendation 2: After completion of SRRMP and using post-project resources available from UNDP and co-financing from MoS, implement the training programme for all SRRM staff members and for building the capacity of NISST as the succeeding TIRFAC agency with the following considerations:

- The activities to build the capacity of NISST should be designed through consultations with experts and SRRM trainers;
- Capacity building activities should include analysis and identification of SRRM needs, identification of SRRMs willing to be industrial representatives, how the succeeding agency will build SRRM capacity through various modes (i.e. classroom, on-the-job training, training of trainers, etc.) and collecting feedback on capacity building activities for improvements;
- NISST TA activities should be de-centralized to more than 6 clusters making the TA accessible to all SRRMs throughout India. The current two resident missions in Nagpur and Mandi Gobindarh are clearly not sufficient to affect market transformation of the SRRMs;
- The Bureau of Energy Efficiency (BEE) needs to be included as one of the stakeholders in the post-SRRMP project. Their presence and experience will accelerate the advancement of S&L for the numerous SRRM equipment and appliances, and possibly provide assistance in its enforcement of the S&L initiative;
- Improve the MRV capacities of the MoS notwithstanding the difficulties of obtaining accurate data from SRRM enterprises. If energy and production data is monitored, verified and reported by 200 SRRMs, the sector can achieve a 90% confidence in its GHG reduction reporting that can be replicated in other industrial and commercial sectors in India. Thus far, the Project has managed to obtain this data for over 31 SRRMs with another 40 in the pipeline;
- With the assistance of UNDP, NISST should carefully evaluate its options on investing more efforts on ESCOs with SRRMs. There does not seem to be any indication from the SRRM stakeholder meetings of May 2013 that an ESCO would be successfully engaged to implement EE measures for SRRMs. Given the lack of ESCO operations in India, nature of SRRM's commercial operation, significant risks are involved in the use of UNDP resources to develop an ESCO implementation model even with the extension of Project activities to December 2014.

Many of these considerations are consistent with the PWC Exit Strategy. With the availability of USD 1.575 million from UNDP resources to the end of 2014 (an additional 12 to 18 months after EOP), NISST may develop sufficient capacity to undertake a nation-wide program to transform the SRRM sector into a viable energy efficient industry. However, if possible, additional resources should be secured to ensure appropriate capacity building activities for NISST.

Lessons Learned

- A concise Project planning matrix with identified risks and assumptions is essential for effective project implementation. The lack of a concise log-frame on SRRMP led to a number of problems including:

- A loss of focus on building the capacity of government institutions for the TIRFAC and resident missions that would provide TA for SRRMs after the end of the Project;
 - Lack of guidance to formulate strategies to engage stakeholders and soliciting stakeholder feedback to improve and respond to SRRM needs. Feedback from stakeholders would have included the difficulties of claiming capital subsidies, the decreased importance of the subsidy to the survival of the SRRMs, and the increased importance and convenience of the resident missions in providing TA to the SRRM clusters. The acceptance of the Project by stakeholders was not an assumption on the PPM;
 - Disproportionate efforts being placed on less important activities such as subsidy disbursement.
- UNDP Country Offices should exercise flexibility in resetting component outcomes and outputs. There is a common misconception that a PPM cannot be changed during the course of a project. However, during the course of many projects, circumstances change justifying the need to change a PPM, namely its outputs and targets. Changes to the PPM can be implemented with the guidance of mid-term evaluators or the Regional Technical Advisors. In the case of this Project, the CO was not encouraged to change the PPM notwithstanding the fact that the PPM did not meet certain standards for clarity. The lack of changes to the PPM for the SRRMP led the Project team (both the PSC and the PMC) to manage the Project under a PPM with issues detailed in the aforementioned bullet points;
 - A capital subsidy program needs to be efficiently administered so that the intended purpose of the subsidy which would be to catalyze investment into a particular technology. On SRRMP, the capital subsidy did catalyze investment. However, if the conditions for claiming the subsidy were less onerous, there likely would have been further EE investments by SRRMs, more utilization of the SDF funds, and a higher percentage of Gol co-financing.
 - Projects involving energy conservation with SMEs need to carefully design project interventions that will bring immediate benefits and reductions to their operational costs. SRRMP did not originally do this when they provided an interest rate subsidy without any consideration that most SRRMs seldom use bank financing services. This was later changed to a capital subsidy at the urging of the SRRM sector.
 - Partnerships between donor agencies and governments in developing countries with a large SME and informal industrial sector are extremely important if they are to become energy efficient. In the absence of the commercial financing sector who view loans to the informal sector as high risk, donor agencies fill a large assistance gap by playing an important financing support role to assist informal industry in a structured approach to implementing energy efficiency.

1. INTRODUCTION

This report summarizes the findings of the Terminal Evaluation Mission conducted during June 14-27, 2013 for the Project entitled “Removal of Barriers to Energy Efficiency in the Steel Re-Rolling Mill Sector in India (hereby referred to as SRRMP, the SRRM Project or the Project), that received a USD 6.75 million grant from the Global Environmental Facility (GEF). The project was developed between 2002 and 2003 from a PDF-B grant from GEF, and the implementation aspects managed by UNDP as a nationally executed (NEX) project.

More than 70% of India’s energy generation is from fossil fuels. Within this 70%, 40% is from coal, 24% from oil and 6% from natural gas. In 2009, fossil fuel imports of crude oil amounted to 160 ktoe that represents 80% of its total crude oil consumption of 200 ktoe⁹. Recent trends indicate that the proportion of oil consumption in India is growing, and with fossil fuels being so heavily subsidized in India, there is a considerable impetus to reduce these subsidies by increasing diesel and furnace oil prices to world market levels.

Estimates for Indian GHG emissions vary broadly. The EU’s Joint Research Commission (JRC) suggests that India’s GHG emissions between 2008 and 2010 have risen from 2,434 to 2,692 million tonnes CO_{2eq} (Mtons CO_{2eq}) between 2008 to 2010, a growth rate of 5.1%¹⁰. According to the Indian Network for Climate Change Assessment (INCCA), the total GHG emissions from India in 2007 was 1,728 million tonnes CO_{2eq} of which industrial GHG emissions were in the order of 413 tonnes CO_{2eq} or 22% of all GHG Indian emissions. The iron & steel industrial sector was responsible for 117 million tonnes CO_{2eq} in 2007 or 6.2% of all GHG emissions from India¹¹. An estimate from the IEA of GHG emissions from the steel manufacturing sector was in the order of 151 million tonnes CO_{2eq} in 2007¹².

Notwithstanding these variances in GHG emission estimates, the steel sector was and is still one of India’s largest industrial sectors¹³ that generate a significant proportion of India’s GHG emissions. Prior to the commencement of the SRRM Project in 2003, there were a large number of programs targeting energy efficiency in the steel sector through credit lines established by the World Bank, USAID and the Asian Development Bank with various Indian financial institutions. Unfortunately, these programs were limited to large-scale integrated steel plants leaving secondary or finished steel production plants without assistance to become more energy efficient.

1.1 Background

The Ministry of Steel (MoS) estimates that secondary steel production plants or steel re-rolling mills (SRRMs) account for more than 35% of all finished steel products in India. With India’s large demand for finished steel products, there were an estimated 1,200 SRRMs in 1997¹⁴ which has grown to an estimated 1,890 SRRMs in 2013¹⁵, a growth

⁹ http://www.iea.org/stats/balancetable.asp?COUNTRY_CODE=IN

¹⁰ <http://edgar.jrc.ec.europa.eu/overview.php>

¹¹ http://www.moef.nic.in/downloads/public-information/Report_INCCA.pdf

¹² http://www.iea.org/publications/freepublications/publication/india_industry_transition_28feb11.pdf

¹³ According to the World Steel Organization, India ranks fifth in the world in steel production with a production of 73.6 million tonnes of crude steel and 67.8 million tonnes of finished steel in 2011, roughly 5% of world’s steel output.

¹⁴ District Commissioner for Iron & Steel Survey Report, 1997, Ministry of Steel

rate of 2.6% annually¹⁶. Raw materials for most SRRMs are from steel products from induction furnaces that make billets, ingots and blooms from scrap steel from ship breaking in India, and imported scrap metals from old and retired automobiles. SRRMs then re-convert these billets, ingots and blooms into reinforcing bars for concrete, as well as channels, angles and plates used for various building and machinery applications.

The MoS indicate that the country produced over 76 million tonnes of finished steel products in 2012 of which more than 26 million tonnes of finished steel products (or 35%) came from steel re-rolling mills. Most of the 1,800 SRRMs in India are small to medium enterprises and produce on average between 50 to 100 tonnes of finished steel products per day. While growth has been generally unregulated, the SRRM sector does have a competitive advantage of being sufficiently flexible in producing low-tonnage steel products in various grades, shapes that meet local construction market demands. SRRM clusters are scattered throughout India to meet market demand for its products.

SRRMs in India also consume coal, gas, furnace oil and electricity to operate outdated and low-investment technologies. One of the main concerns of the sector has been the rise of energy prices in 2007 along with intensive energy consuming production processes estimated to be in the order of 5,440 MJ/tonne of steel produced versus 2,200 MJ/tonne in developed countries¹⁷. In 2003, their direct energy costs were estimated to be in the order of 25 to 30% of overall production costs that have been exacerbated by rising energy costs since 2007. SRRM units in 2003 were characterised by:

- The use of outdated production technologies and operating practices;
- Low information and awareness levels of EcoTech options amongst owners, managers and operators;
- High investment costs of EE technologies;
- Lack of available and appropriate EE technologies on the Indian market;
- Lack of incentives to cater to small scale energy efficiency projects;
- Lack of experience to access external funds for EE technologies; and
- Lack of available and reliable technical assistance to engineer EcoTech options for SRRM plants.

Since the 1980s, the Government has been intending to support energy efficiency in the SRRM sector through the Steel Development Fund (SDF), a fund that was derived from tax revenues¹⁸. Despite the finances available in the SDF, the funds were never utilized for the SRRM sector up to 2003, largely due to the resistance of SRRMs to change their business-as-usual practices, and a lack of incentives to reduce energy costs. With the Government's drive to reduce its energy intensities by 20% in line with the Energy Conservation Act of 2001, and the lack of progress in getting the SRRM sector to adopt EcoTech options, the Government welcomed the involvement of UNDP and GEF that aimed to catalyze EE initiatives in the SRRM.

¹⁵ "Study Report to Ascertain Extent of Replication of EE Technologies in SRRM Sector in India 2012-2013", 2013, SAILCON, pg 6.

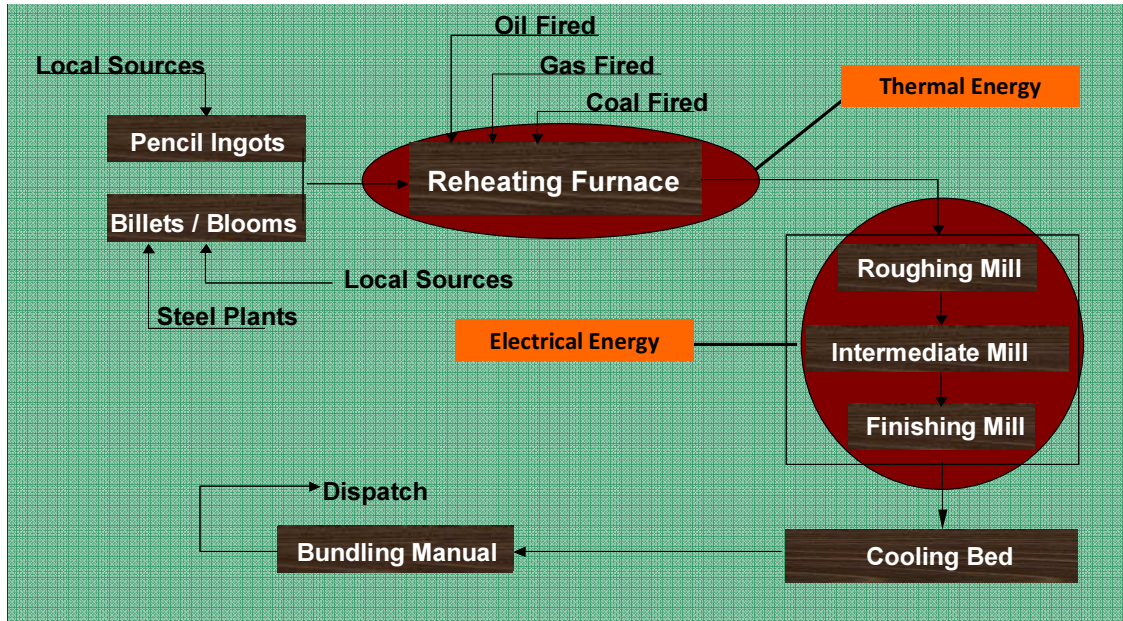
¹⁶ The PMC reports that an estimated 10% of SRRM SMEs have closed within the last 2 years due to economic slowdown in India

¹⁷ ProDoc, Table 2, pg 6

¹⁸ The Steel Development Fund was created in 1978 with the approval of the Cabinet for modernization, rehabilitation and development of the steel industry. The annual SDF investment into research and development in the steel sector has ranged from Rs. 7.27 crore to Rs. 20.65 (USD 2 to 5 million) between 2006 and 2012. The SDF also raises funds from interest bearing loans to various steel enterprises at a rate of 8%.

Figure 1 provides a schematic of the steel re-rolling process in India.

Figure 1: Process Flow Diagram of SRRMs



1.2 Terminal Evaluation

1.2.1 Purpose of the Evaluation

In accordance with UNDP and GEF M&E policies and procedures, all full and medium-sized UNDP support GEF financed projects are required to undergo a Terminal Evaluation (TE) upon completion of implementation of a project to provide a comprehensive and systematic account of the performance of the completed project by evaluating its design, process of implementation and achievements vis-à-vis GEF project objectives and any agreed changes during project implementation. As such, the TE for this Project will serve to:

- promote accountability and transparency, and to assess and disclose levels of project accomplishments;
- synthesize lessons that may help improve the selection, design and implementation of future GEF activities;
- provide feedback on recurrent issues across the portfolio, attention needed, and on improvements regarding previously identified issues;
- contribute to the GEF Evaluation Office databases for aggregation, analysis and reporting on effectiveness of GEF operations in achieving global environmental benefits and on the quality of monitoring and evaluation across the GEF system.

This TE was prepared to:

- ⇒ be undertaken independent of project management to ensure independent quality assurance;
- ⇒ apply UNDP-GEF norms and standards for evaluations;
- ⇒ assess achievements of outputs and outcomes, likelihood of the sustainability of outcomes; and if the project met the minimum M&E requirements;
- ⇒ report basic data of the evaluation and the project, as well as provide lessons from the Project on broader applicability.

TE mission was fielded to India in the cities of New Delhi, Chandigarh, Nagpur, Raipur, Chennai and Pondicherry between the 14th and 27th of June 2013. The Terms of Reference (ToRs) for the TE are contained in Appendix A.

Key issues addressed on this TE include:

- Assessing the impact of the entire Project duration from 2004 to the present accounting for the accelerated Project progress since 2009;
- Assessing the roles of the various Project partners including industrial associations and technical institutes;
- Providing recommendations for post-project support to the SRRM sector considering the actual number of SRRM entities that appear to be in need of EcoTech options.

Outputs from this TE will provide guidance in charting future directions on sustaining energy efficiency initiatives in the SRRM sector in India.

1.2.2 Evaluation Scope and Methodology

The methodology adopted for this evaluation includes:

- Review of project documentation (i.e. APR/PIRs, meeting minutes of Steering and Advisory Committees) and pertinent background information;
- Interviews with key project personnel including the Project Manager, technical advisors (domestic and international), demonstration project proponents, potential investors and relevant UNDP staff;
- Interview with relevant stakeholders from Government;
- Field visits to selected project sites and interviews with beneficiaries.

A detailed itinerary of the Mission is shown in Appendix B. A full list of people interviewed and documents reviewed is given in Appendices C and D. The Evaluation Mission for the UNDP-GEF project was comprised of one international expert and one national expert.

1.2.3 Structure of the Evaluation

This evaluation report is presented as follows:

- An overview of project achievements from the commencement of operations in September 2004
- An assessment of project results based on project objectives and outcomes through relevance, effectiveness and efficiency criteria;
- Assessment of sustainability of Project outcomes;
- Assessment of monitoring and evaluation systems;
- Assessment of progress that affected Project outcomes and sustainability; and
- Lessons learned and recommendations.

This evaluation report is designed to meet GEF's "Guidelines for GEF Agencies in Conducting Terminal Evaluations, Evaluation Document No. 3" of 2008:

<http://www.thegef.org/gef/sites/thegef.org/files/documents/Policies-TEguidelines7-31.pdf>

The Evaluation also meets conditions set by the UNDP Document entitled "UNDP GEF – Terminal Evaluation Guideline" (<http://erc.undp.org/resources/docs/UNDP-GEF-TE-Guide.pdf>) and the UNDP Document entitled "Handbook on Planning, Monitoring and Evaluating for Development Results", 2009:

(<http://www.undp.org/evaluation/handbook/documents/english/pme-handbook.pdf>)

and the "Addendum June 2011 Evaluation":

<http://www.undp.org/evaluation/documents/HandBook/addendum/Evaluation-Addendum-June-2011.pdf>

2. SRRM DESCRIPTION AND DEVELOPMENT CONTEXT

2.1 SRRM Start and Duration

The SRRM Project document (ProDoc) was signed on April 12, 2004 with formal Project operations commencing May 1, 2004. The ProDoc indicated that SRRMP was a 5-year project with a Project Terminal date of 30th April 2009. SRRM was extended thrice, once in 2009 for another 18 months until December 2010, again in 2010 for another 24 months to December 2012, and a third time in 2012 to the current terminal date of December 31, 2013.

2.2 Problems that the SRRM Project Sought to Address

The SRRM Project sought to accelerate adoption of energy efficient measures (also referred to as EcoTech options) in the SRRM sector in India, targeting the 1,200 SMEs in this sector in 2003. To accelerate the adoption of EcoTech options, the Project was designed to remove barriers to their adoption that included:

- A lack of financing approaches and mechanisms to SMEs in the SRRM sector;
- An absence of market transformation strategies specific to the SMEs in the SRRM sector;
- A lack of information to inform the SRRM sector on EcoTech options and financing mechanisms;
- Limited institutional and industrial capacity to support market transformative measures for SRRMs;
- Low priority of EE for SRRMs; and
- Lack of understanding of EcoTech options to be taken as well as unknown and hidden costs for adoption;
- Limited commercial experience of EcoTech options that could be applied to SRRM plants in India.

2.3 Objectives of SRRMP

The Project **objective** was to reduce greenhouse gas (GHG) emissions by providing technical assistance to the small and medium-sized steel-rolling mills in India to enable them to adopt more energy efficient and environmentally friendly technologies.

2.4 Main Stakeholders

The main stakeholders of the Indian SRRM Project are listed in an approximate order of ownership and involvement:

- The *Ministry of Steel (MoS)* as the Indian Executing Agency (implementing partner) with the responsibility to coordinate and plan the growth and development of the iron and steel industry. This includes amongst other responsibilities the growth and development of steel re-rolling mills in the public and private sector; the formulation of policies for production, distribution, pricing and the import and export of steel products; and development of input industries related to the supply of various ores and refractories required by the steel

industry. Two subsidiary MoS agencies that assist in these responsibilities includes:

- National Institute of Secondary Steel Technology (NISST) was set up as a registered society to provide technical training to the secondary steel sector, raise awareness of state-of-the-art technologies, provide consultancy services to improving efficiency and reducing pollution levels, and to provide a platform between the industry and research institutes. On SRRMP, NISST served as resident missions in 6 locations in India to service the SRRM clusters and providing baseline studies, electrical audits, cost-benefit studies and post implementation studies of model units;
- The Steel Authority of India Limited Consultancy Division (SAILCON) was setup to provide consultancy services based on their experience and knowledge base from India's leading public sector steel-making company, the Steel Authority of India Limited (SAIL). Consultancy services provided on SRRMP by SAILCON included life cycle assessments, performance improvement training, cost-benefit analysis, improvement of EE packages for SRRMs, preparation and provision of training manuals, general classroom training programs and replication studies;
- Metallurgical and Engineering Consultant (MECON) is an autonomous public sector company under MoS to provide consultancies for the full range of services required for setting up secondary steel plants from concept to commissioning including turnkey execution. On SRRMP, they provided services to develop standard O&M practices and implement ISO 9001 and 14001 for demonstration units;
- National Productivity Council was setup as a non-profit organization under Ministry of Industry (MoI) to disseminate knowledge on enhancement of industrial productivity including implementation of "5S Lean Manufacturing" and ISO-9001 and 14001 for model units and preparation of feasibility reports for various SRRMs to demonstrate improved productivity;
- APITCO (formerly Andhra Pradesh Industrial and Technical Consultancy Organization) was setup by several Indian financial institutions and industrial development corporations to provide consultancies to SMEs to assist in their modernization. On SRRMP, they provided baseline studies and post implementation studies of model SRRM units;
- The Petroleum Conservation Research Association (PCRA) was setup under the Ministry of Petroleum and Natural Gas (MoPNG) to promote energy efficiency in various sectors of the economy and to assist Government in proposing policies and strategies to reduce India's dependency on imported fossil fuels. On SRRMP, they provided services on SRRM cluster mapping, electrical audits, baseline and post-implementation studies of model SRRM units;
- Management consultancy firms to provide the SRRM sector and the MoS with the development of M&E manuals, SRRM benchmarking and Minimum Energy Performance Standards (MEPS) and recommendations for sustaining SRRM assistance during the post-SRRMP period;
- "Model" SRRM enterprises who agreed to accept Project assistance in exchange for sharing their operational data before and after implementation of EE, measures.

2.5 Expected Results

To achieve this overall goal and objective, the SRRM Project was designed for the removal of barriers with the following expected **Project outcomes**:

Outcome 1: *Benchmarks for EcoTech options & packages established through the following outputs:*

Output 1.1: Report review on techno-economic and commercial status of energy efficient clean technologies relevant to SRRM sector utilizing maximum bandwidth for future application and development of investment norms for all EE options and technology packages;

Output 1.2: Energy and environment labels, standards, and benchmarks that have been developed for equipment and devices used in the steel re-rolling industry, standard methods and tools that have been developed for design engineering and implementation of EcoTech solutions for the SRRM sector, and information modules for financing institutions, government and policy makers, and industry partners.

Outcome 2: *Strengthened institutional arrangements through the following outputs:*

Output 2.1: Network of associations of all stakeholders to provide technical, financial and market inputs to SRRM sector and for securing policy and administrative support;

Output 2.2: Network of multi-disciplinary national and international experts and successful innovative SRRM units for experience dissemination, problem diagnosis and development of solutions designs at local costs;

Output 2.3: Internationally linked institutional arrangement aimed at establishing global relations for two-way communication on current developments in technology and to facilitate technology transfer.

Outcome 3: *Effective information dissemination programme through the following outputs:*

Output 3.1: World-wide database that has been established on current and new developments in technology, their sources and investment requirements, projects in progress, market trends, and resource personnel, and communication channels that has been developed including web-based EE-Net for information dissemination on technology markets, funding schemes, etc

Outcome 4: *Enhanced stakeholder capacity through the following outputs:*

Output 4.1: Report on assessment of capacity building needs of major stakeholders to facilitate implementation and absorption of advanced EE technologies in the SRRM sector and mapping of clusters;

Output 4.2: Network strategy for capacity building;

Output 4.3: Methodologies and tools of energy management;

Outcome 5: *Feasibility of EcoTech options and technology packages established through the following outputs:*

Output 5.1: Study of 30 sample units;

Output 5.2: Energy and Environment Cluster study of non-sample units;

Output 5.3: Techno-economic modeling of Eco-Tech options to enhance financial participation; and

Output 5.4: Re-engineered and validated technology packages;

Outcome 6: *Innovative institutional mechanism established (ESCO and Third Party Financing) through the following outputs:*

Output 6.1: Performance contracting mechanism involving identified ESCOs and technology providers;

Output 6.2: Institutional linkages among exiting ESCOs, technology providers and industry;

Output 6.3: Market potential assessment through results of demonstration of ESCO concepts in 7 SRRM units.

Outcome 7: *Technology information resource and facilitation centre established through the following outputs:*

Output 7.1: Monitoring & evaluation system;

Output 7.2: Environment assessment and monitoring system;

Output 7.3: Study report for TIRFAC.

Output 7.4: A commissioned and installed TIRFAC;

Section 3 will provide details on the actual SRRM Project outcomes and outputs.

3. FINDINGS

3.1 Project Design and Formulation

3.1.1 Analysis of Project-Planning Matrix / Results Framework

The Project-planning matrix (PPM) that has been reviewed for this Project is contained in Appendix G. It was designed in 2003 with 7 outcomes that are associated with several indicators. The PPM for this Project, while understandable in its intent, was problematic in that there were too many outcomes that together seem to have a more technical focus rather than engaging the SRRM sector to adopt EE interventions. Other PPM issues included:

- Overlapping outcomes. The outcomes could have been consolidated into four components related to the removal of regulatory, knowledge/awareness and financial barriers as well as a technical component for pilot or demonstration project support. Examples include:
 - Parts of Outcomes 2 and 3 could have been combined into an outcome to remove awareness barriers by improving information flow on EE measures for SRRMs: this would have included improved business networking and the establishment of a database for emerging EE technologies;
 - Outcome 7 could have been subsumed under an outcome of removing knowledge and awareness barriers since one of the Outcome 7 outputs was TIRFAC that was designed to enhance stakeholder capacity and raise awareness of EcoTech options for the SRRM sector;
 - In Outcome 2, “Hardware facilities namely prototype development, technology testing and calibration along with software facilities put in operation by the end of 3rd year” is actually the preparatory work for Outcome 7: TIRFAC established;
 - Outcome 5 was not necessary as two outputs (establishment of the feasibility of the EcoTech packages and the multiplication strategy) could have been a part of a technical pilot or demonstration component and the output of documentation of lessons learned placed under a knowledge/awareness raising component.
- While most indicators meet SMART criteria¹⁹, there are indicators and outcomes that are not clear including:
 - Indicators for the overall project (impact) goal where there are “Progress ratio” measurement studies every two years (this is not specific in terms of what is being measured) and “EcoTech coverage increases to 25%” by the end of 5th year (this is not specific in terms of what constitutes “coverage” and may not be relevant given that each plant that has EcoTech “coverage” may not generate any substantial energy savings to the SRRM sector but is counted as having EcoTech coverage);
 - Indicators for the overall project (outcome) goal that include “share of EcoTech coverage increased to 25% or 3 million tons by EOP (this is not specific and it does leave the reader to speculate that this may refer to actual finished steel production by participating SRRMs);

¹⁹ Specific, Measurable, Attainable, Relevant and Time-bound

- Outcome 2 indicators, none of which are clearly linked to strengthened institutional arrangements. Hence, the actual activities to achieve this outcome need to be more relevant to institutional strengthening. This includes the indicator “Design, standards and implementation manuals put in practice during the same period” which is neither specific nor measurable, and is not relevant to the intended outcome of strengthened institutional arrangements; and
- Indicators for Outcome 7, none of which appear to have any relevance to the establishment of TIRFAC with the exception of the “setup of hardware and software centers in TIRFAC”. This indicator, however, is not specific in defining what is to be setup.

3.1.2 Assumptions and Risks

While most of the assumptions and risks provided in the PPM are reasonable in the realm of risk assessments of SRRMP, there are two additional assumptions that should have been included:

- “Continued rising energy costs” which has been the driving factor behind the recent success of the Project;
- “Cooperation with the Project by major stakeholders” which was not initially experienced by SRRMP contributing to an additional 3 years, 2004 to 2007, when the Project was trying to engage SRRMs into Project activities.

3.1.3 Lessons from Other Relevant Projects Incorporated into SRRMP Design

According to the ProDoc, the SRRM Project was the first project of its kind in India. There were no lessons from other relevant projects in India that were incorporated into the SRRMP design. While some experience from public sector companies in setting up SRRMs in India was being used on this Project, there have been no previous projects or programmes that address energy efficiency measures for SRRMs.

3.1.4 Planned Stakeholder Participation

MoS undertook design of SRRMP with UNDP with inputs from all stakeholders including the SRRM owners. The stakeholder participation approach of SRRMP was to involve stakeholders from government, private and public sector SRRMs and steel consultancy organizations with roles defined in the ProDoc, and to involve co-financing of the Government and other selected financial institutions that would finance EE measures for the SRRMs. Once these EE measures or EcoTech options are demonstrated to all relevant SRRM stakeholders, stakeholder participation would increase through acceptance of EcoTech options by SRRM owners and operators.

3.1.5 Replication Approach

Replication of the Project interventions would be enhanced through the de-centralization of EcoTech options in six geographically distinct regions of India. Each region was to host demonstrations of EcoTech options consisting of variations of furnace and other EE measures that could be applied in the SRRM sector. The geographic diversity of the demonstration locations would provide wider exposure of EE measures to the SRRM sector that would encourage replication of these measures. In addition, institutional arrangements with banking institutions would support financing of these measures, and

the flow of information on EE measures, “best practices” and financial rates of return for implemented projects would be shared by government agencies with local SRRM entities.

3.1.6 UNDP Comparative Advantage

As a GEF implementing agency, UNDP has a comparative advantage in its ability to support and facilitate the Government of India’s commitment to promote sustainable technological interventions such as those proposed under SRRM. This includes technical assistance for energy efficiency and renewable energy development in India and other developing countries with a focus on poverty alleviation and energy security. The SRRMP design is similar to other GEF-supported projects in India and is consistent with strategic areas of support identified in various CPAPs that are agreements between UNDP and Gol on developmental priorities²⁰.

UNDP India has implemented more than 16 GEF-funded projects for over the past 15 years and has developed a good relationship with the Gol with demonstrated effectiveness in developing local capacity and working with multiple stakeholders from public and private sectors, technical experts, civil society, and grassroots level organizations. In the context of energy efficiency and sustainable technology adoption, UNDP has demonstrated a unique multi-dimensional development perspective, and an ability to address cross-sectoral issues and inclusiveness in constituency building. The SRRMP addresses an assistance gap to the small-to-medium enterprises involved with steel re-rolling mills, an area where UNDP strengths can be fully utilized.

3.1.7 Linkages between the SRRM Project and Other Interventions within the Sector

The SRRMP design was conducted in 2003, a time when there were no comprehensive efforts for improving energy intensities in the SRRM sector operated by SMEs. PCRA had a program only focused on reducing furnace oil consumption of reheating furnaces. The main constraint of this effort, however, was the sole focus on the conservation of petroleum products which led to outcomes of marginal gains for the SRRM sector which mostly uses coal as its primary fuel.

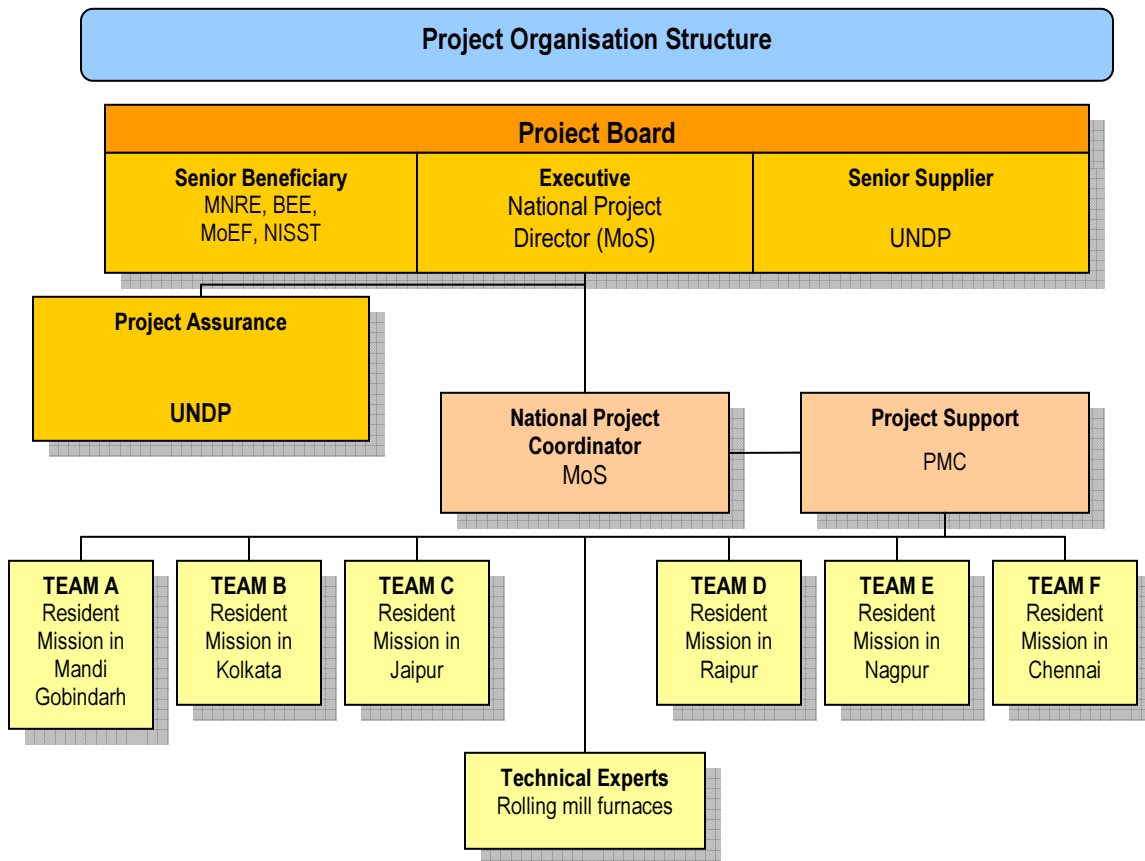
In addition, the Gol had initiated its own efforts to address the viability of energy efficiency through the 2001 Energy Conservation Act and the formation of the Bureau of Energy Efficiency (BEE). The SRRMP design in 2003, however, was not strongly linked to these efforts primarily due to lack of understanding as to what EE measures would have been implemented within the SRRM. To this extent, the BEE was designated as one of the members of the PSC for the SRRMP. BEE, however, in 2003 could not undertake a more prominent role on SRRMP as it had recently been formed and did not have sufficient capacity.

²⁰ This would include thematic area of Vulnerability Reduction and Environment Sustainability of the 2003-2007 UNDP Country Programme for India that envisages support to address national and regional concerns of climate change and demonstrate technologies including address linkages between global environment issues and national developmental challenges through innovative approaches and mobilizing resources from diverse sources including the Indian private sector.

3.1.8 Management Arrangements

The SRRM Project was a nationally implemented project (NIM) with MoS as an implementing partner where it has control over Project operations that were managed under a Project Management Cell (PMC) from its location in New Delhi. The Project’s National Project Director (NPD) was to be appointed by MoS, and assume overall responsibility for overall coordination, supervision, monitoring and clearance of the detailed work plan. An organogram of the current SRRM Project implementation arrangements is provided on Figure 2.

Figure 2: SRRM Project Implementation Arrangements²¹



A Project Steering Committee (PSC) was established for supervising and guiding Project implementation, facilitating inter-Ministerial co-ordination and cooperation with various government agencies, and identifying policy related issues in context of the Project that required review of rules, regulations to encourage adoption of EE technologies. Members of the PSC were from more than 10 ministries and organizations and included the MoS, BEE, Ministry of Environment and Forestry (MoEF), UNDP India as well as representatives of other institutions providing direct cost-sharing for the project activities.

²¹ The PMC has technical and administrative managers including Manager (Projects & Contracts), Manager (Furnace), Manager (Rolling mill), Manager (Implementation), Manager (IT), Manager (Documentation) and Manager (M&E). The Resident Managers report to the Manager (M&E).

A Project Advisory Committee (PAC), also chaired by the NPD, was also constituted to advise and facilitate timely implementation of all Project activities, and to serve as a formal vehicle for on-going stakeholder consultations and interaction with Project participants. The PAC had sub-committees to assist with technical, procurement and appointment issues on the Project.

The Project Management Cell (PMC) has been responsible for the day-to-day operations and monitoring of the Project, and headed by a National Project Coordinator (NPC) under the direction of the NPD. In 2004, the PMC was staffed with a Chief Technical Advisor (CTA), Manager of Administration and Finance, two administrative staff, and three technical experts in different disciplines and project management experts with expertise in project, finance, legal matters. Staffing of the PMC in 2012 is reflected on Figure 2.

3.2 Project Implementation

3.2.1 Adaptive Management

Examples of adaptive management on SRRMP includes:

- Project decisions as guided by the PAC and then the PSC to meet the technical needs of the SRRMs. This included dropping of the development of the hardware component of TIRFAC, and placing more emphasis on technical assistance at the PMC, and resident mission level for furnace and rolling pass designs for each SRRM;
- Formulation of the 2009, 2010, 2011 and 2012 AWP in an attempt to achieve objectives before the scheduled end of the Project. This included the outsourcing of most technical assistance services such as training for PIT, SOP, SMP and ISO; and
- Project responded to required changes to the original “interest rate subsidy” and its replacement with the capital subsidy. Further changes were made during 2012 and 2013 to make the claiming of the capital subsidy less onerous to the SRRMs.

The Project, however, could have improved its adaptive management to address issues including:

- the assessment of the importance of the capital subsidies with rising energy costs amongst model SRRMs as well as other smaller SRRMs who are likely less able to finance EcoTech options;
- increasing Project efforts towards direct technical assistance to the SRRMs;
- coming up with different approaches for benchmarking EcoTech options knowing that the standardization for SRRM energy consumption is complex with numerous variables including size of mill, daily production, type of products and different types of fuels used; and
- earlier preparation of an exit strategy that would have resulted in an operational TIRFAC with a succeeding agency.

Possible reasons for the Project’s inability to address the aforementioned issues may be related to:

- the constitution of the Project Steering Committee (PSC) that had too many officials and representatives (from as many as 10 ministries and agencies), many with no direct link with the SRRM sector. The size and diversity of PSC members may have restricted the ability of the PSC to make crucial and adaptive management decisions in the interest of the Project; and
- a poorly designed Project planning matrix that did not clearly outline the issues, intended outcomes and timelines of the Project (see Section 3.1.1).

3.2.2 Partnership Arrangements

The main partnership fostered by the Project appears to be the one between NISST and the SRRMs. Aside from the technical assistance from the PMC, NISST was singled out by the SRRMs as being a very helpful agency in the identification and implementation of EcoTech options. NISST during the 2008 to 2012 period was managing 4 out of the 6 Resident Missions (RMs) to disseminate and implement various EcoTech options to SRRM clusters; the number of RMs was subsequently reduced to 2 RMs at the end of 2012. The involvement of stakeholders listed in Section 2.4 was mainly through consultancies or professional time paid from Project resources. In conclusion, the only strong partnership from SRRMP efforts appears to be with NISST.

3.2.3 Feedback from M&E Activities Used for Adaptive Management

The Evaluation team had access to PSC meeting notes from 2002 to 2013 and PIRs and APRs from 2007 to 2012 to assess the M&E activities used for adaptively managing the Project. The PSC meeting minutes demonstrate how the MoS managed a number of Project issues ranging from work plan and staffing approvals to technical issues targeting SRRM energy efficiencies. The APRs/PIRs provide an indication of an adequate quality of M&E feedback that would have been used to adaptively manage the various Project issues. The Project did have strong M&E designs to manage the operation of each SRRM to provide accurate measurements and data of EcoTech measures adopted by each SRRM. M&E manuals were prepared by Ernst & Young for the purposes of providing consistent methods of calculating energy consumed and GHG emissions reduced.

However, there were some shortfalls in the PIR quality:

- The 2007 and 2008 PIRs focused mainly on GHG reductions and energy savings with little commentary on how to resolve the poor progress of the Project;
- The PIRs from 2009 and 2010 provided more details of Project progress but with few details on how the Project would meet its targets, and little or no feedback from the Project beneficiaries, the SRRM owners and operators on their opinions and needs. For example, on the 2009 PIR under the “Private Sector” worksheet, there is a “no” response to a question whether or not a private sector company has invested in the technologies being promoted by the Project. According to information collected by the Evaluators, this is not true and was a lost opportunity to collect information from the SRRMs on their needs on this Project;
- The 2011 and 2012 PIRs provide adequate details of the Project deliverables but do not address the broader strategic issues of the Project such as the exit strategy and discussion of possible institutions who would continue the work of

the Project after its completion. For example, on the 2012 PIR under the “Partnerships” worksheet, there is little detail on the “private sector” investment being made by the SRRMs on EcoTech options. Another example is the lack of reporting on the benchmarking of EcoTech options, the late start of this activity and the complexities of meeting the benchmarking ToRs.

3.2.4 Project Finance

A summary of the SRRM Project expenditures is provided on Table 1. The expenditures provided to the Evaluation Team were from UNDP’s “Combined Delivery Reports” (CDRs), some years of which were not broken down into component expenditures. As such, component-wise expenditures for this Project are not available. The Project expenditure as of December 31, 2009, the original Project terminal date, was only 44%; extensions were granted at that time to nurture the growing stakeholder acceptance of the Project.

GEF Project expenditure as of December 31, 2012 was USD 5,987,315 or 89% of the GEF allocation of USD 6.75 million.

Co-financing from the GoI amounted to USD 1.75 million, only 26% of the USD 7.28 million pledged by GoI in the ProDoc. These funds were mainly utilized for the capital subsidy program under the MoS that was used as incentive for SRRMs to adopt EcoTech options. While co-financing figure could have been higher, the onerous and stringent requirements of the PMC for claiming the subsidy was a primary cause of the GoI only meeting 26% of its co-financing commitment. While the TIRFAC hardware centre was dropped, the GoI’s contribution was not revised in subsequent AWP. Towards the end of project, the GoI’s cost share is expected to reach 50% of the original committed amount.

On the positive side, the combined resources of UNDP-GEF and GoI (USD 5.98 million + USD 1.88 million) for the provision of technical assistance, training and financial incentives have leveraged an investment of USD 6.827 million by 31 SRRMs, a ratio of 1: 0.87. Co-financing details can be found on Table 2.

Table 1: GEF Project Budget Expenditure for 2004-2013 (in USD as of December 31, 2012)

Outcome	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Total Disbursed	Total Planned for Project	Total Remaining
Outcome 1: Benchmark for ET options and Packages	n/a	n/a	n/a	n/a	n/a	n/a	18,527	15,918	78,787	n/a	113,233	701,064	587,831
Outcome 2: Strengthened Institutional Arrangements	n/a	n/a	n/a	n/a	n/a	n/a	70,700	109,440	121,794	n/a	301,933	949,362	647,429
Outcome 3: Benchmark for ET options and Packages	n/a	n/a	n/a	n/a	n/a	n/a	8,267	159,686	98,937	n/a	266,890	398,724	131,834
Outcome 4: Enhance Stakeholder Capacity	n/a	n/a	n/a	n/a	n/a	n/a	283,237	331,950	528,923	n/a	1,144,110	1,550,000	405,890
Outcome 5: Benchmark for ET options and Packages	n/a	n/a	n/a	n/a	n/a	n/a	96,295	57,331	307,232	n/a	460,858	949,999	489,141
Outcome 6: Strengthened Institutional Arrangements	n/a	n/a	n/a	n/a	n/a	n/a	12,701	13,801	27,547	n/a	54,049	847,617	793,568
Outcome 7: TIRFAC Established	n/a	n/a	n/a	n/a	n/a	n/a	156,825	149,238	243,277	n/a	549,340	667,173	117,833
Project Management; Monitoring and Evaluation	n/a	n/a	n/a	n/a	802,104	750,401	111,869	175,753	40,239	n/a	1,880,366	687,102	(1,193,264)
Total (Actual)	39,353	374,684	325,960	677,120	802,104	750,401	758,421	1,013,118	1,446,735	n/a	4,770,779	6,751,041	1,980,262
Total (Cumulate Actual)	39,353	414,037	739,997	1,417,117	2,219,221	2,969,622	3,728,043	4,741,161	6,187,896	-			
Annual Planned Disbursement	660,395	450,000	885,702	700,360	1,200,125	917,000	1,241,127	1,271,013	1,445,000	563,145			
% Expended of Planned Disbursement	6%	83%	37%	97%	67%	82%	61%	80%	100%				

**Table 2: Commitment, expenditure, balance by different donors for SRRM Project
(as of December 31, 2012)**

Donors Details	UNDP / GEF	GOI	Industries	FI and Others
Committed (in USD)	\$ 6,751,041	\$ 7,280,000	\$ 5,540,000	\$ 12,290,000
Committed (in INR)	₹ 324,049,968	₹ 349,440,000	₹ 277,000,000	₹ 614,500,000
Utilized (in USD)	\$ 6,187,896	\$ 2,551,850	\$ 2,322,373	0
Utilized (in INR)	₹ 297,019,021	₹ 122,488,810	₹ 111,473,890	0
Anticipated Utilization in 2013 (USD)	\$ 563,145	\$ 1,109,400	\$ 4,789,472	\$ -
Anticipated Utilization in 2013 (INR)	₹ 27,030,960	₹ 53,251,190	₹ 229,894,647	₹ -
EOP Anticipated Balance	\$ (0)	\$ 3,618,750	\$ (1,571,845)	\$ 12,290,000
EOP Anticipated Balance	₹ -13	₹ 173,700,000	₹ -78,592,226	

3.2.5 M&E Design at Entry and Implementation

Ratings of the Project's Monitoring and Evaluation system³⁴ are as follows:

- M&E design at entry – 4;
- M&E plan implementation – 4;
- Overall quality of M&E – 4.

The design of the Project's M&E activities was moderately satisfactory. The M&E design for evaluating EcoTech options was strong and focused on tracking energy and GHG reductions, reducing scale losses and improving productivity, replication of technology packages to SRRMs and implementation of the TA component. The weakness in this approach, however, was the focus on the delivery of technical outputs to the SRRMs, no activities on building the capacity of a succeeding agency after EOP and no regular feedback on the SRRM acceptance of EcoTech options demonstrated by the model units³⁵; this would have provided better indicators of the effectiveness of SRRMP activities, and a basis for adaptively managing the Project. For example, M&E design could have included periodic random surveys of SRRMs on their views of adopting, financing and implementing EcoTech measures.

Implementation of the M&E plan was moderately satisfactory with significant inputs coming from PSC and PAC meetings that resolved a number of outstanding Project implementation issues. There was, however, a disproportionate amount of M&E effort placed on the feedback on the progress of the subsidy programs for the SRRMs. The Evaluators received feedback from the model SRRMs that there was decreasing importance of the subsidies and increasing importance of the Project's technical assistance to SRRMs. They also expressed concerns over the onerous amount of

³⁴ 6 = HS or Highly Satisfactory: There were no shortcomings;
5 = S or Satisfactory: There were minor shortcomings,
4 = MS or Moderately Satisfactory: There were moderate shortcomings;
3 = MU or Moderately Unsatisfactory: There were significant shortcomings;
2 = U or Unsatisfactory: There were major shortcomings;
1 = HU or Highly Unsatisfactory.

³⁵ The only evidence of SRRM feedback on EcoTech options was provided in the "Study Report to Ascertain Extent of Replication of EE Technologies in SRRM Sector in India 2012-2013", 2013, SAILCON, pg xiii.

paperwork required for submission to claim their subsidies. This led to a disproportionate M&E effort on subsidy disbursement that took away some focus on the need for more SRRM technical assistance and the need to formulate an exit strategy on building the capacity of an institution in which these TA activities would be housed after the EOP.

3.2.6 UNDP and Executing Partner Performance

Ratings of UNDP (Implementing Agency) and the MoS (Executing Agency) performance³⁶ are as follows:

- Quality of UNDP Implementation – 4;
- Quality of Execution – MoS – 4;
- Overall Quality of Implementation/Execution – 4.

While the progress of SRRMP since 2009 can be attributed to the strong awareness raising and technical assistance work of the implementing and executing agencies coinciding with sharp energy cost increases, a moderately satisfactory rating is provided based on the following:

- Underreporting of key Project issues in the PIRs and PSC meeting minutes such as the exit strategy and increasing SRRM demand for TA;
- Inefficiencies in the reimbursement of the subsidies to model SRRM units caused by excessive amounts of paperwork required by the PMC for claiming of the subsidies placing the Project at risk of not meeting its targets. The delays caused by these inefficiencies was one of the main factors for extending the Project terminal date;
- Lack of oversight on the functions performed by the PMC;
- Lack of adaptive management to add detailed surveys to gauge the opinions of all SRRMs to implementing EcoTech options. These surveys would have provided sound justification for Project responses to the specific needs of SRRM sector to improve their adoption of EcoTech options, and rationale for the termination or continuation of subsidy support for SRRMs after the EOP. The Evaluators believe that smaller SRRMs may still be in need of capital subsidies for which such an SRRM survey would provide some rationale for this need;
- No reporting on actual capacity being built with partner organizations all of whom would have the potential to serve as the succeeding agency to the PMC and sustain Project activities after the EOP;
- Failure to revise the Project planning matrix to be consistent with the changes of the Project design and with updated formats on preparing PPMs for UNDP-GEF projects.

3.3 Project Results

Assessment of the SRRM Project achievements and shortcomings are provided in this section against the 2004 Project planning matrix. The outcomes and indicators of the 2004 log-frame were re-written as reflected in the subsequent PIRs; the outcomes and indicators from the 2011 PIR have been used in the assessment of actual SRRM outcomes. Each outcome was evaluated against individual criterion of:

³⁶ Ibid 33

- *Relevance* – the extent to which the outcome is suited to local and national development priorities and organizational policies, including changes over time;
- *Effectiveness* – the extent to which an objective was achieved or how likely it is to be achieved;
- *Efficiency* – the extent to which results were delivered with the least costly resources possible.

The Project outcomes were rated based on the following scale:

- *6: Highly Satisfactory (HS)*: The project has no shortcomings in the achievement of its objectives;
- *5: Satisfactory (S)*: The project has minor shortcomings in the achievement of its objectives;
- *4: Moderately Satisfactory (MS)*: The project has moderate shortcomings in the achievement of its objectives;
- *3: Moderately Unsatisfactory (MU)*: The project has significant shortcomings in the achievement of its objectives;
- *2: Unsatisfactory (U)*: The project has major shortcomings in the achievement of its objectives;
- *1: Highly Unsatisfactory (HU)*: The project has severe shortcomings in the achievement of its objectives.

3.3.1 Overall Results

Project Goal: To reduce GHG emissions in the steel rerolling mill (SRRM) sector in India.

Project Objective: To improve energy efficiency in the SRRM Sector by expanding private sector investments in 'win-win' nature of low GHG emitting technologies (EcoTechs).

Intended EOP Outcome:

- ⇒ Compliance with established energy & environment efficiency norms of EcoTech options & technology packages adopted beginning of first year. EcoTech coverage increases to 25% by end of fifth year;
- ⇒ Bi-annual cluster reports and Annual country reports (incl. model units)
- ⇒ 'Progress Ratio' measurement study after every 2 years
- ⇒ Beginning first year EcoTech coverage increases to 25% by end of fifth year
- ⇒ Share of EcoTech increased to 25% (3 million tons) by end of the project period resulting in cumulative energy saving of 9 PJ and 0.88 million tons of reduction in CO₂ emissions

Actual EOP Outcome:

- ⇒ A satisfactory outcome has been achieved with the adoption of EcoTech options and technology packages by more than 237 of the estimated 1,890 SRRMs in India³⁷. The Project has developed information on each EcoTech option, sufficient to induce investments of these EcoTech options from these SRRMs³⁸. Each EcoTech option,

³⁷ This would include the 31 model SRRMs, 40 pipeline units that have received energy audits and TA, and 166 SRRMs that were surveyed under the SAILCON Replication Study of 2013.

³⁸ PWC presentation on "Exit Strategy" on June 24, 2013

however, did not have established energy and environment efficiency norms due to the complexity of developing such norms³⁹; as an alternative, the Project developed minimum energy performance standards (MEPS);

- ⇒ A satisfactory outcome has been achieved in the reporting of the energy performance of each “model” unit, of which 15 SRRMs have multiple reports that they have been operating for more than 3 years during SRRMP;*
- ⇒ A satisfactory outcome has been achieved by increasing the EcoTech share in the SRRM sector to more than 12.5% (237 SRRMs out of an estimated 1,890 SRRMs) at the EOP, and resulting in a cumulative energy saving during the Project period of 2.4 PJ and a GHG reduction of 0.19 million tons of CO₂. While this is below the target set in the 2003 PPM, the number of SRRMs interested in adopting EcoTech options is strong, primarily due to the rapid increases in energy costs starting in 2007, and the work by the Project to provide good business proposals to the SRRMs for EcoTech adoption. The SAILCON Replication study (June 2013) describes their survey of 300 SRRMs of which 55% of the SRRMs had implemented EE measures (the confidence level of their survey would be more than 95%). As such, adoption of EE measures could be as high as 55% nationally; however, the extent of adoption of EcoTech measures by the smaller SRRMs is not known but could be more than 25%.*

Rating: relevance: 5
 effectiveness: 5
 efficiency: 4
 overall rating: 4.7

High energy prices coinciding with a cyclical downturn in the steel sector have resulted in the high interest amongst most if not all SRRMs in EcoTech options to reduce operational costs. While the Project has done well to catalyze SRRM investment into EcoTech options, the Evaluators have noted that the capital subsidy offered through the Gol co-financing expires on September 30, 2013. The justification for this end date does not seem to mesh with the needs of other SRRMs that may need this assistance⁴⁰, and Project delays in the development of an exit strategy involving the handover of the SRRM technical assistance functions to a succeeding agency. Overcoming these shortcomings would ensure the sustainability of the replication of Eco-Tech measures throughout the SRRM sector. MoS commitment towards the efficient and sustained implementation of EcoTech measures for the SRRM sector has been recently demonstrated in June 2013 through their co-financing commitment of USD 2.0 million to the extension of the SRRM project into 2014 entitled “Upscaling Cleaner Production in Small Scale Steel Industries in India”. This extension also includes USD 0.675 million funding from AusAID and 0.90 million from UNDP TRAC 2 funding.

Table 3 summarizes the GHG reduction estimates to June 30, 2013 that were generated during SRRMP using GEF guidelines⁴¹. Direct emission reductions were based on:

³⁹ These norms are complicated by the fact that the MJ/tonne production is affected by the size of the plant, the process being used and the calorific value of the fuel being used. For all these parameters, the variances between the different SRRMs are significant.

⁴⁰ This would include SRRMs that were chosen as “model” SRRMs and are likely smaller and less capable of financing EcoTech options. From the Evaluators perspective, there are likely many of these SRRMs where both TA and subsidy assistance are equally important.

⁴¹ “Manual for Calculating GHG Benefits of GEF Projects: Energy Efficiency and Renewable Energy Projects, April 16, 2008 (GEF/C.33/Inf.18)”

- Actual energy consumptive data reported from 31 SRRMs from the time of completion of installation of EcoTech options;
- Direct emission reductions were based on a grid emissions factor of 0.9 CO₂/MWh for the Indian electricity grid⁴²; and
- the GEF method for calculating GHG emission reductions.

Table 3: Summary of CO₂ Reductions from the Project

Total direct emission reduction, t CO₂	192,891
Total direct post-project emission reduction, t CO₂	0
Indirect emission reduction, t CO ₂	
Indirect bottom-up emission reductions, t CO₂	2,134,240
Indirect top-down emission reduction, t CO₂	13,364,714

No post-project direct emission reductions were calculated since there are no revolving funds. Indirect emission reductions consist of:

- Bottom up reductions based on:
 - a SAILCON Replication Report⁴³ conducted under the Project that established replication of EE technologies in 166 non-model units through SRRMP efforts leading to an annual emission reduction of 213,424 tCO₂ per year. This would represent the emission reductions based on SRRMs that would have known and observed Project activities on EcoTech measures and independently implemented them without consulting the Project directly; and
- Top-down reductions are based on:
 - the average annual emission reduction of each of the 166 non-model replicated SRRMs of 1,286 tonnes CO₂;
 - the assumption that the 55% of the SRRM sector has adopted EcoTech measures. Thus, top-down reductions were extrapolated over the 55% of the entire SRRM sector of 1,890 mills over a 10-year GEF influence period; and
 - a top-down emission reduction of 13,364,714 tCO₂.

3.3.2 Outcome 1: Benchmarks for EcoTech options & packages established

Intended Outcome 1:

- ⇒ Industry complies with energy- cum-environment performance bench marks set in respect of model units.
- ⇒ Techno-economic viability including cost recovery (CCE, IRR, Payback, BEP, etc.) is established.
- ⇒ Energy labels and standards developed by end of third year.
- ⇒ Minimum energy performance standards (MEPs), designs and manuals after successful implementation of model units and monitoring & evaluation of the EE

⁴² Grid emission factors were provided by the GoI's Central Electricity Authority under the Ministry of Power on January 2012: http://www.cea.nic.in/reports/planning/cdm_co2/user_guide_ver7.pdf

⁴³ "Study Report to Ascertain Extent of Replication of EE Technologies in SRRM Sector in India 2012-2013", 2013, SAILCON, pg xiii

<p>performance of 10 model units.</p> <p>⇒ Design standard and manual of EE equipment.</p> <p>⇒ Best practice EE norms based on 15 model units implemented by the 3rd year of the project.</p>
<p><i>Actual Outcome 1:</i></p> <p>⇒ A moderately satisfactory outcome has been achieved in working towards the benchmarking of EcoTech options. The benchmarks have not yet been finalized due to the complexities related to benchmarking EcoTech options which for the equipment being used for steel re-rolling results in a range of benchmark values; this range is dependent on production levels, types of steel products being produced, the operation and management of the furnace and rolling mills, and finally the calorific values of the fuels used. There have been a number of discussions with BEE to setup standards and labels for furnaces and other major appliances based on 8 model SRRMs. Amidst these complexities, the Project has made attempts to benchmark public sector SRRMs by focusing on specific appliances such as reheating furnaces and preparing life-cycle analyses for two SRRMs (one in Chennai and the other in Ludhiana). The main output from these efforts has been manuals on cases demonstrating best practices and practice norms;</p> <p>⇒ A highly satisfactory outcome has been achieved for the establishment of techno-economic viability of EcoTech measures. Post-implementation reports for 14 SRRM plants have been completed by NISST with all studies demonstrating substantial energy savings and rates of return for all these SRRMs. Concurrently, the published document on "Data Gathering and Analysis of Eco-Tech Options" has been updated by RDCIS (Research and Development Center for Iron and Steel) to include the latest identified technologies of hot charging, oxy-fuel burners, and biomass gasifiers;</p> <p>⇒ A moderately unsatisfactory outcome has been achieved in the development of standards and labelling. The Project had made attempts to establish standards and labelling for critical SRRM equipment such as furnaces through the floating of a public tender; there has been a poor response to this tender, and as a result, S&L establishment has not yet been completed on this Project. A proposal is in place to replace S&L with minimum energy performance standards (MEPS);</p> <p>⇒ A satisfactory outcome has been achieved in the development of minimum energy performance standard (MEPS) that has been considered as a benchmarking tool for 15 types of equipment used by SRRMs but has not yet been approved for adoption;</p> <p>⇒ A satisfactory outcome has been achieved on the development and dissemination of design standards and modules for SRRM equipment, and best practice norms for 15 model SRRM units. This includes 13 modules for reheating furnaces and 19 modules for re-rolling mills, and write-ups on best practice EE norms for more than 15 model SRRMs by 2013 (Year 10). This would also include the published document on "Data Gathering and Analysis of Eco-Tech Options", updated by RDCIS (Research and Development Center for Iron and Steel) to include the latest identified technologies of hot charging, oxy-fuel burners, and biomass gasifiers.</p>

Rating: relevance: 5
 effectiveness: 5
 efficiency: 4
 overall rating: 4.7

The activities of this component were delayed until 2008 when viable EcoTech options were identified, accepted and adopted by SRRM enterprises. The benchmarking of EcoTech measures, however, has been much more complex forcing the Project team to review their approaches to benchmarking. The overall outcome, however, has been an improved understanding of the energy consumptive patterns in various SRRMs where EcoTech measures have been implemented. An overall study summarizing the Project's benchmarking activities has been assigned to PWC who are in the process of simplifying these findings by focusing on product-based benchmarks. This marks at least the beginning to a long process to provide standards for equipment being used by SRRM enterprises throughout India.

The collection of more energy consumptive data for SRRM equipment, however, will be difficult given the inherent nature of several SRRM enterprises to not share this information for proprietary purposes. A possible regulatory change that could be implemented would be to obligate SRRMs to report their energy consumption and production figures to a central reporting agency within the Ministry of Steel. This, however, may be more difficult to implement since it will be difficult to independently verify the figures coming from the SRRMs.

3.3.3 Outcome 2: Strengthened institutional arrangements

Intended Outcome 2:

- ⇒ Development of business support network;
- ⇒ Internationally linked institutional capacity
- ⇒ TIRFAC Hardware and Software Centers at Mandi Gobindarh and Delhi respectively
- ⇒ Design, standards and implementation manuals put in practice

Actual Outcome 2:

- ⇒ *A moderately satisfactory outcome has been achieved with the establishment of a business network through the setup of resident missions in 6 geographical areas where SRRM clusters are located. The Project recruited a number of organisations to strengthen institutions responsible for delivering technical assistance to SRRMs. TA included the "5S & Lean Management system", ISO 9000 & 14000, electrical audits and performance improvement training. Organizations included on this component included the Steel Authority of India Ltd., Petroleum Conservation & Research Association, National Productivity Council, Research & Development Center for Iron and Steel, and the National Institute for Secondary Steel Technology (NISST). The resident missions were setup in 2008 to more effectively deliver TA to the SRRM clusters. While there were as many as 6 resident missions as of 2012, there were only two resident missions in operation during the Evaluation (one in Nagpur and the other in Mandi Gobindarh), both staffed by NISST who have emerged as a prominent organization to deliver TA to the SRRM clusters. Four resident missions were closed due to unsatisfactory performance. However, based on discussions with several of the model SRRMs, there is a strong demand for more assistance from resident missions to continue delivering TA to the remaining SRRMs. In June 2013, UNDP had secured additional funding from TRAC2 as well as AusAID and co-financing from MoS to continue the delivery of TA to the SRRMs for one more year ending in December 2014;*
- ⇒ *A satisfactory outcome has been achieved with the establishment of links to international institutes to assist in the building of SRRM capacity. This is related to the PMC work to involve Mogards Hammer, the Swedish company that owns the re-*

rolling software that is in high demand by the SRRM enterprises. The software is currently housed at the PMC;

⇒ The hardware facilities have been dropped as per recommendations from the MTE. A moderately unsatisfactory outcome has been achieved with regards to the determination of the location of the TIRFAC software center. The Project has only recently completed its Exit Strategy and during its 17th PAC meeting tentatively recommended NISST to serve as the succeeding agency to manage the TIRFAC software center (see Outcome 7);

⇒ A satisfactory outcome has been achieved in facilitating the use of designs and standards through the technical assistance of the resident missions and the setup of a website (www.undpgefsteel.gov.in). The website covers EcoTech equipment specifications, standard operating practices and standard maintenance practices. In addition, 36 training manuals were issued in 9 different languages covering basic and advanced issues in re-rolling and reheating furnace processes.

Rating: relevance: 4
 effectiveness: 5
 efficiency: 4
 overall rating: 4.3

The purpose of the strengthened institutional arrangements of this component was to provide the necessary regulatory outreach to SRRMs to assist their transition towards energy efficient operations. To a large extent, the Project after 2008 had made adequate progress on these arrangements until the end of 2012 when 4 out of the 6 resident missions were closed. The closure of these missions is of concern to the Evaluators since these closures coincide with high interest in EcoTech measures by SRRMs, and their demands for the growth of technical assistance from the Project. SRRMs interviewed had mentioned that the assistance provided by these missions was essential in the identification and implementation of EcoTech measures. With the completion of SRRMP by December 31, 2013, the Project appears to be short on resident missions and qualified personnel to continue TA to the SRRMs after the EOP.

The Project through the PMC did provide sufficient training and technical material to transfer knowledge on energy efficient practices for EcoTech options. The re-rolling software was the software in the highest demand by the SRRMs. A major issue with the PMC delivering training on the re-rolling software and other EE measures was the lack of close association with another institute who would continue as the succeeding agency with this TA after the EOP. According to the PMC, no other agency had emerged as a prime candidate for this role.

The setup of a research (hardware) facility was dropped due to a perceived lack of direct benefits to the SRRMs; most SRRMs have their own processes which they felt could not be replicated for research and development at a hardware facility. Efforts to determine where to house the TIRFAC software facility have started too late during the Project. As a result, the Project will not achieve its objectives for a fully operational TIRFAC by the EOP. The Project has managed to secure USD 1.575 million from AusAID and UNDP TRAC2 and USD 2.0 million co-financing from MoS to extend the TA work being done by the Project to December 31, 2014. However, it is not certain if these post-project resources would be sufficient to operationalize TIRFAC beyond the EOP and in a post-2014 period.

3.3.4 Outcome 3: Effective information dissemination programme

Intended Outcome 3:

- ⇒ Building with infrastructure setting up the knowledge center
- ⇒ Preparation of Detailed Project Plan (DPP)
- ⇒ System design, network alliances and mechanism
- ⇒ Information dissemination and knowledge center operationalized

Actual Outcome 3:

- ⇒ A satisfactory outcome has been achieved in setup of www.undpgefsteel.gov.in website to facilitate the use of designs and standards. The website covers a number of topics related to assisting SRRMs to adopt EcoTech measures including documentation of actual model units, audio-visual products of model units, EcoTech equipment specifications, standard operating practices and standard maintenance practices;
- ⇒ A satisfactory outcome has been achieved in the preparation and distribution of detailed Project Plans as an interim report assessing and reviewing the progress of the project up to 2005 and 2013 and providing recommendations for the roadmap ahead.
- ⇒ A moderately satisfactory outcome has been achieved with regards to the network alliances and systems design for disseminating knowledge. The Project has only recently completed its Exit Strategy and during its 15th PAC meeting tentatively recommended NISST to serve as the succeeding agency to manage the TIRFAC software center (see Outcome 7). The capacity of NISST, however, needs to be built if it is to become the succeeding agency;
- ⇒ A moderately satisfactory outcome has been achieved with the setup of the www.undpgefsteel.org website (that is updated periodically providing updates and programme schedule), and the lack of an operational TIRFAC after the EOP.

Rating: relevance: 4
 effectiveness: 5
 efficiency: 5
 overall rating: 4.7

The intended outcomes of Component 3 differ from the actual outcomes. This is an issue related to the log-frame design that is discussed in Section 3.1.1. Notwithstanding this issue, the outcome of an effective information dissemination programme for the SRRMs was achieved in a satisfactory manner with the www.undpgefsteel.gov.in website. The website is regularly updated, provides an excellent source of information regarding SRRM developments in India, and achieves the intended outcomes of sharing information on model units to a wide audience on the website. The key issue with the dissemination programme is the lack of a succeeding agency to undertake the role of the TIRFAC after the EOP.

3.3.5 Outcome 4: Stakeholder capacity enhanced

Intended Outcome 4:

- ⇒ Mapping of each cluster and assessment of technology resource and capacity building needs.
- ⇒ Master plan for capacity building activities is finalized and documented by 13th month.
- ⇒ 5 cluster workshops for units/DEMs/consultants on 'new' technologies and technology management each year

- ⇒ 10 Workshops for unit owners/managers on cooperative management practices and procurement processes in each of 5 clusters over 5 years.
- ⇒ Standard Operating Practices (SOP) and Standard Maintenance Practices (SMP) developed in third and fourth year
- ⇒ 'Best Practices' program developed in second year and workshops conducted in third and fourth year;
- ⇒ Three study tours for DEMs/local consultants organized to developed countries for providing exposure to similar industrial set up.

Actual Outcome 4:

- ⇒ A satisfactory outcome was achieved in cluster mapping and assessment of capacity building needs of SRRMs. This was accompanied by conducting a number of technical awareness raising workshops since 2009;
- ⇒ A satisfactory outcome was achieved in the completion of a master plan for capacity building of the SRRM sector in 2008;
- ⇒ A highly satisfactory outcome was achieved on the completion of more than 14 workshops for owners and consultants on new technologies and technology management;
- ⇒ A satisfactory outcome was achieved in the completion of 10 workshops for SRRM owners and managers on cooperative management practices and procurement processes;
- ⇒ A satisfactory outcome was achieved in the preparation and completion SOPs and SMPs for rolling mills and reheating furnaces that were implemented for 18 model SRRMs;
- ⇒ A satisfactory outcome has been achieved with the adoption of best practices including SOPs and SMPs that were implemented for 18 model SRRMs. In addition, workshops for ISO 9000 and ISO 14000 standards and 5-S (lean manufacturing practices), were delivered resulting in more than 16 SRRMs adopting such practices;
- ⇒ A satisfactory outcome was achieved with the involvement of a Swedish expert from Mogards Hammer who trained 15 trainers on their roll pass design software; subsequently, 4 workshops were held at various locations throughout India on the use of the Mogards Hammer software. This activity was adaptively managed to meet the specific needs of SRRM enterprises for technical assistance on roll pass design;
- ⇒ One workshop in Chennai was held specifically for the financial/banking sector; however, external financial assistance to the model SRRMs did not seem to be a priority during the Project⁴⁴. Due to lack of SRRM survey information, it is not clear if financial assistance is still required for the remaining SRRMs, many of which are small with less than 100 tpd production rates.

Rating: relevance: 5
 effectiveness: 5
 efficiency: 5
 overall rating: 5

SRRM stakeholder capacity (that does not include Government capacity) has been enhanced through the activities of this Project. Though the Project commenced its activities in 2004, stakeholder capacity building did not start in earnest until 2007 when SRRMs became increasingly affected by rising energy prices. Prior to 2007, the sharing

⁴⁴ Only one model SRRM had secured a loan from SIDBI

of any business information between SRRMs was almost absent due to business competitive reasons.

The setup of the first pilot projects with model SRRMs in 2007 represented a breakthrough for the Project as well as the SRRM sector. This allowed the Project to facilitate sharing of SRRM operational information with other SRRMs; this breakthrough facilitated the spread of knowledge on EE measures to SRRM entrepreneurs and managers, increasing their capacity to improve the energy performance of the industry. In addition, the Project was able to identify the SRRM clusters where:

- awareness raising activities would be focused and delivered;
- dialogue between SRRMs and the Project could be initiated to identify their specific needs;
- international expertise could be delivered to trainers on roll pass design software and other aspects of EcoTech options; and
- adoption of best practices (through ISO 9000 and 14000 standards and 5S and Lean Management) could be facilitated.

3.3.6 Outcome 5: Feasibility of ET options and technology packages established

Intended Outcome 5:

- ⇒ EcoTech Packages implemented and operationalized in 30 units⁴⁵: 3 units in 1st year, 4 in 2nd year, 9 in 3rd year, 8 in 4th year and 6 in 5th year.
- ⇒ Documentation of lessons learned in implementation of technology packages.
- ⇒ Multiplication strategy that included cluster wise mapping of energy efficiency issues concerns and targets, financial linkages and techno-economic modelling of EE options, energy and environment study of selected non-sample units, and development of investment pipeline project

Actual Outcome 5:

- ⇒ A highly satisfactory outcome has been achieved with the implementation and commissioning of 30 EcoTech packages;
- ⇒ A highly satisfactory outcome has been achieved in the completion of 14 post-implementation reports that document lessons learned from EcoTech options installed in model SRRM units;
- ⇒ A highly satisfactory outcome has been achieved with the completion of comprehensive feasibility studies for 39 additional SRRMs (10 by SAILCON, 20 by the NPC and another 9 by Parijat Consulting) leading to an investment pipeline for EcoTech measures for the SRRM sector.

Rating: relevance: 6
 effectiveness: 6
 efficiency: 6
 overall rating: 6

The feasibility of EcoTech options has been successfully completed. The detail to which these post-implementation studies of model SRRM units has been done has provided confidence to other SRRM enterprises that EcoTech options need to be considered and

⁴⁵ This was revised to 50 SRRMs as per PSC minute meeting notes from the 16th PSC meeting of 31st March 2011

implemented. The result of having 39 feasibility studies being completed by various agencies such as SAILCON and the NPC attests to the growing interest of SRRM enterprises to embrace and implement changes that improves the energy performance of the SRRM sector.

One issue of concern was the number of model SRRM units that received technical and financial assistance from Project did not have in their possession the energy audit baseline and post-commissioning reports which were prepared to assess the energy savings and serve as a basis for providing capital subsidy. While this may be an indicator that model SRRMs are focused on the fiscal impact of EcoTech investments, it is not clear if the model SRRMs have a full understanding of the details of their energy savings without access to these important reports. It is also not clear if this would affect their ability to sustain energy savings over the service life of the EcoTech technologies.

3.3.7 Outcome 6: *Innovative institutional mechanism established (ESCO and Third Party Financing)*

Intended Outcome 6:

⇒ Development of “performance contracting” mechanism.

Actual Outcome 6:

- ⇒ A moderately unsatisfactory outcome has been achieved with additional activities on ESCOs. The MTE made recommendations to drop all ESCO activities. Despite these clear directions, the Project has continued discussion on ESCOs to the extent of inviting ESCOs to implement EE measures in SRRMs in April 2013. The result of this tender has been responses from 3 ESCOs whose capabilities to operate as an effective ESCO for the SRRM sector were not clear;
- ⇒ A moderately satisfactory outcome has been achieved in the financial support mechanism that provided a 25% capital subsidy for 31 model SRRMs. The efficiencies of disbursement of these subsidies, however, have been an issue. This was primarily caused by the excessive paperwork required from the SRRMs to claim the subsidy. Moreover, at the time of this Evaluation, there were another 11 SRRMs implementing EcoTech measures that were eligible to claim subsidies. However, these SRRMs will not receive the MoS subsidies would be available after September 30, 2013.

Rating: relevance: 3
 effectiveness: 4
 efficiency: 3
 overall rating: 3.3

In the opinion of the Evaluators, the probabilities are low for the successful formation of ESCOs as a means to implement EE measures for SRRMs. Any ESCO entering this market with SRRMs will require substantial assistance from UNDP or another donor agency to absorb start-up costs that would include:

- marketing ESCO services to SRRM SMEs;
- employing and training engineers to design, implement and transfer the appropriate EcoTech packages to SRRMs;
- securing bank loans for an ESCO model despite the financial communities perceived risks of such a business model with a largely informal industrial sector;
- formulating agreements between ESCOs and SRRM enterprises; and

- employing energy auditors who can verify the actual energy savings of an SRRM.

There are high risks that bank loans for ESCOs may not be secured and that ESCO marketing efforts may not generate any interest amongst a critical mass of SRRMs. Unless these risks are mitigated, any further effort towards developing ESCO services to SRRMs will end in failure.

Since the 2012 PIR did not have any outcomes and indicators to gauge the performance of the MoS capital subsidy program, it has been added to this Outcome in this Evaluation. The purpose of the MoS capital subsidies was to provide additional incentives for SRRMs to adopt EcoTech options. When the MoS changed their subsidy scheme in 2007 from the interest rate subsidy to a capital subsidy, investment by the SRRMs into EcoTech options was catalysed. Two issues have emerged with the capital subsidy assistance from MoS:

- The irrelevance of the subsidies to the model SRRMs due to the fact that subsidies only cover less than 20% of the cost of the EcoTech measures, an insignificant amount to these SRRMs and onerous paperwork required to claim the subsidies. Model SRRM owners interviewed said that the MoS subsidy program was not their primary driver for adopting EcoTech measures. High energy costs were almost at the point of making their enterprises not viable, forcing them to implement EcoTech options as a matter of survival or as a hedge to withstand future business risks;
- The lack of a detailed survey to determine if capital subsidies are required by other smaller and less visible SRRMs⁴⁶. The Evaluators observed that model SRRMs were likely to be better managed and capable of managing the “risk” of sharing proprietary productivity information with other SRRMs. Given the informal nature of most SRRMs, it is probable that other SRRMs are not as well managed or as profitable as model SRRMs, and as a result, the impact of a capital subsidy for these SRRMs for EcoTech measures would be more significant. A detailed survey of other SRRMs on their dependence on a capital subsidy would clear this uncertainty and possibly justify the continuation of the capital subsidy program.

3.3.8 Outcome 7: Technology Information Resource and Facilitation Centre (TIRFAC) Established

Intended Outcome 7:

- ⇒ Monitoring and Evaluation Plan along with reporting procedures finalized.
- ⇒ Software and hardware centers of TIRFAC set up at the end of 2nd and 3rd year respectively

Actual Outcome 7:

- ⇒ A satisfactory outcome has been achieved in the setup of the M&E Plan for the SRRM energy performance and adoption of various monitoring reporting formats for model SRRM performance reviews;
- ⇒ A moderately satisfactory outcome has been achieved with the establishment of the TIRFAC software centre at the PMC at Jawahar Dhatu Bhawan with facilities for

⁴⁶ The survey of 300 SRRMs under the SAILCON replication study does not have sufficient information to determine the profile of other SRRMs that may be in need of financial assistance through capital subsidies

training and capacity building. The center contains the roll-pass design software from Morgards Hammer. As per MTE recommendation, the hardware center of TIRFAC has been dropped from the Project. In addition, most SRRM units commissioned under the Project were provided Performance Improvement Training through TIRFAC, and training workshops were conducted at several locations throughout India to raise awareness of EE measures for the SRRMs. The Project, however, has only recently decided that NISST would be the succeeding agency for software and training functions of TIRFAC after the EOP since its current location at the PMC is not sustainable. This is discussed in further detail in Section 3.3.11.

Rating: relevance: 4
 effectiveness: 5
 efficiency: 4
 overall rating: 4.3

As mentioned in Section 3.1.1, this Outcome was superfluous with indicators that lacked relevance and specificity. However, during the course of the Project, the main outcome that appears to have evolved has been the provision of technical assistance from the PMC as the TIRFAC on the use of software and training to create awareness amongst the privately owned SRRMs on measures to reduce energy consumption and increase productivity. The Project's contribution to the SRRMs was "Performance Improvement Training" which included training of staff on lean (5S) manufacturing, standard operating and management practices and use of roll-pass design. This was achieved through the organization and conducting of a number of workshops and training programs throughout the country through the TIRFAC software center. Towards the latter stages of SRRMP, this effort significantly raised the awareness of the secondary steel industry on the various EcoTech options to reduce energy consumption using success stories from the Project and instigating many SRRM units to replicate model SRRMs. The major issue with this component has been the late start of building the capacity of a succeeding institution to continue TIRFAC functions after the EOP.

3.3.9 Overall Evaluation of Project

The overall rating of the Project results is satisfactory (S). This is based on the following outcomes:

- The Project has had to overcome difficult baseline conditions in the SRRM sector that included initial apathy and communication barriers within the sector most notably when attempting to discuss operational issues. This took almost 3 years to resolve due to most SRRMs being informally managed and operated by personnel with no technical background or formal training. This lack of response from SRRMs was not identified in the PPM as a potential implementation risk. As a result, the Project team was ill equipped in the early stages of the Project to address this situation, lacking an approach and clearly defined steps to engage SRRMs throughout India;
- Project technical assistance activities that have provided significant contributions to the SRRM sector, and demonstrating the potential for the sector to become cost efficient and competitive through EcoTech options. Furthermore, the Project succeeded in bringing the SRRM sector to the attention of the Ministry of Steel. The sector is an important link within India's overall steel sector and is of vital importance to India's economy given its contribution in re-cycling of steel, providing value-added products and employment to nearly 1 million people;

- When the SRRM sector showed interest in this Project in late 2007, it coincided with rising energy costs to the SRRM sector. In 2007, the Project demonstrated its preparedness for assisting model SRRMs with EcoTech options. Much of the preparations had been conducted during the 2004 to 2007 period with the identification of low and high-end technologies with viability analyses that adequately responded to SRRM needs to reduce energy costs;
- There is an improved understanding of energy issues amongst personnel of the model SRRM units as well as NISST and other partner organizations. This was achieved through the benchmarking efforts of the Project, study tours to China to observe foreign steel re-rolling practices, the numerous discussions on how to standardize SRRM equipment, the numerous feasibility and post implementation reports on each of the model SRRM units, and the adoption of ISO9000 and ISO14000 practices within these model SRRMs;
- The setup of the www.undpgefsteel.gov.in website provides much of the information required by SRRMs to implement EcoTech options for their operations. The website also contains the Project's outputs that have raised SRRM awareness with papers, documents, and audio-visuals of Project success stories from the various consultants and equipment suppliers that serve as useful references and education tools for all Project stakeholders;
- The good response of the Project to support the use of the "Morgardshammar" roll pass design software and in general, technical assistance and training that was valued more by the SRRMs than the financial assistance;
- The lack of a thorough survey gauging SRRM opinions on the financial needs of the smaller SRRMs to implement EcoTech options that would determine if a capital subsidy program should be continued;
- Issues with the management of the Project that included:
 - A Project Steering Committee (PSC) with too many officials and representatives from as many as 10 ministries and agencies (many with no relevance to the steel sector) that likely hindered its ability to adaptively manage the Project;
 - A PMC that had excessive subject technical experts early in the Project when SRRMs were not interested in the Project and an insufficient number of qualified personnel after 2011, when SRRMs gained interest in the Project. The Project was extended thrice for short periods and as a result, neither the PMC personnel nor the SRRMs were sure of the Project's technical and financial support beyond the EOP. This reduced effectiveness in Project responsiveness to the SRRM stakeholder base;
 - A number of model SRRM units did not have the energy audit baseline and post-commissioning reports that were prepared to assess the energy savings and serve as a basis for providing capital subsidy. This serves as an indicator and raises concerns that SRRMs are very focused on the fiscal savings from their EcoTech investments, and not full aware of the details of their energy savings;
- The administrative delays and excessive efforts spent by the Project to disburse capital subsidy payments to SRRM owners; and
- Late preparation of an exit strategy by the Project to determine and establish the institutions or government agencies responsible for providing technical and financial assistance to SRRMs after the EOP.

Overall project ratings are provided on Table 5.

3.3.10 Country Ownership and Drivenness

The main driver for the SRRM Project has been the Government's intentions to support energy efficiency in the SRRM sector which has been through the SDF, a fund derived from tax revenues since the 1980s. The utilization of the SDF, however, has been poor up to 2007, largely due to the resistance of SRRMs to change their business-as-usual practices, a lack of incentives to reduce energy costs and an interest rate subsidy that was poorly subscribed by SRRMs who did not qualify for bank loans. The drivenness of the GoI has been augmented through its Energy Conservation Act of 2001 and its National Climate Change Action Plan of 2008 (NCCAP) with its targets to reduce its energy intensities by 20% by 2020.

Table 5: Ratings for Each Project Outcome⁴⁷

	Relevance	Effective-ness	Efficiency	Overall Rating
Monitoring and Evaluation:				
M&E design at entry	-	-	-	4
M&E plan implementation	-	-	-	4
<i>Overall quality of M&E:</i>	-	-	-	4
UNDP and Executing Partner Performance:				
Quality of UNDP implementation	-	-	-	4
Quality of Execution - MoS	-	-	-	4
<i>Overall quality of implementation/execution:</i>	-	-	-	4
Overall Results	5	5	4	4.7
Outcomes:				
Outcome 1: Benchmarks for EcoTech options & packages established	5	5	4	4.7
Outcome 2: Strengthened institutional arrangements	4	5	4	4.3
Outcome 3: Effective information dissemination programme	4	5	5	4.7
Outcome 4: Enhanced stakeholder capacity	5	5	5	5
Outcome 5: Feasibility of ET options and technology packages established	6	6	6	6
Outcome 6: Innovative institutional mechanism established (ESCO and Third Party Financing)	3	4	3	3.3
Outcome 7: Technology information resource and facilitation centre established	4	5	4	4.3
Overall Rating:	4.5	5.0	4.4	4.5

⁴⁷ 6 = HS or Highly Satisfactory: There were no shortcomings;
 5 = S or Satisfactory: There were minor shortcomings,
 4 = MS or Moderately Satisfactory: There were moderate shortcomings;
 3 = MU or Moderately Unsatisfactory: There were significant shortcomings;
 2 = U or Unsatisfactory: There were major shortcomings;
 1 = HU or Highly Unsatisfactory.

3.3.11 Sustainability of Project Outcomes

In assessing Project sustainability, the evaluators asked “how likely will the Project outcomes be sustained beyond Project termination?” Sustainability of these objectives was evaluated in the dimensions of financial resources, socio-political risks, institutional framework and governance, and environmental factors, using a simple ranking scheme:

- 4 = *Likely (L)*: negligible risks to sustainability;
- 3 = *Moderately Likely (ML)*: moderate risks to sustainability;
- 2 = *Moderately Unlikely (MU)*: significant risks to sustainability; and
- 1 = *Unlikely (U)*: severe risks to sustainability.
- *Overall rating is equivalent to the lowest sustainability ranking score of the 4 dimensions.*

The overall Project sustainability rating is moderately likely (ML). This is primarily due to:

- Strong responses from SRRMs to adopt EE measures as a means of reducing their energy operational costs and to shield their businesses from sustained losses. These responses are coupled with a rapid increase in energy prices which shorten the pay-back period of many interventions and made them attractive to adopt;
- Setup of a SRRMP website (www.undpgefsteel.gov.in) that provides a wealth of easily accessible information on implementing EcoTech measures to reduce energy intensities of the SRRMs;
- Confirmed MoS co-financing after the EOP with plans to provide a financial incentive for remaining SRRMs after the completion of SRRMP;
- The lack of clarity on how available post-project resources from UNDP with co-financing from MoS will be used to build the capacity of NISST as the succeeding agency to manage the TIRFAC and continue TA support to SRRMs after post-project resources are exhausted. The UNDP resources of USD 1.575 million will be available for 12 to 18 months after the EOP. This may not be sufficient to fully build the capacity of NISST and the up-scaling the adoption of energy efficient technologies in 300 SRRM.

Table 6: Assessment of Sustainability of Outcomes

Actual Outcomes (as of May 2013)	Assessment of Sustainability	Dimensions of Sustainability
<p>Actual Outcome 1: Benchmarks and energy performance standards are still being established for various equipment commonly used by SRRMs.</p>	<ul style="list-style-type: none"> • <i>Financial Resources:</i> Financial resources within the MoS are available through the SDF but have not yet been specifically allocated for benchmarking and setting MEPS; • <i>Socio-Political Risks:</i> The SRRMs seek guidance from MoS on issues related to standards and benchmarks. The setting of benchmarks for SRRM equipment has strong support within MoS; • <i>Institutional Framework and Governance:</i> The MoS have the network of experts and the committees to set these standards; • <i>Environmental Factors:</i> Efforts to benchmark equipment and setup MEPS will work towards reducing energy consumption and GHG emissions. <p style="text-align: right;"><i>Overall Rating</i></p>	<p style="text-align: center;">3</p> <p style="text-align: center;">4</p> <p style="text-align: center;">4</p> <p style="text-align: center;">4</p> <p style="text-align: center;">3</p>
<p>Actual Outcome 2: Institutional arrangements to assist SRRMs to adopt EE measures have been strengthened through the establishment of six resident missions near SRRM clusters which has now been reduced to two resident missions as of December 2012</p>	<ul style="list-style-type: none"> • <i>Financial Resources:</i> Post-project resources are available to assist NISST to assist 300 SRRMs through funding from MoS, AusAid and UNDP TRAC 2 funds. While the funds will utilize NISST to assist in this technology transfer after the EOP for a period of 12 to 18 months, the capacity of NISST may not be sufficiently built within this period to independently manage the SRRM technical transfers; • <i>Socio-Political Risks:</i> There is broad support within MoS for assistance to SRRMs to adopt EE measures to reduce their energy intensities; • <i>Institutional Framework and Governance:</i> NISST is the likely agency to continue the work of the resident missions. Their capacity to do continue assisting SRRMs, however, is still not sufficient until they are properly staffed; • <i>Environmental Factors:</i> Efforts related to the strengthening and continuation of institutional arrangements for assisting SRRMs will work towards reducing energy consumption and GHG emissions. <p style="text-align: right;"><i>Overall Rating</i></p>	<p style="text-align: center;">3</p> <p style="text-align: center;">4</p> <p style="text-align: center;">3</p> <p style="text-align: center;">4</p> <p style="text-align: center;">3</p>
<p>Actual Outcome 3: An effective information dissemination program has been established</p>	<ul style="list-style-type: none"> • <i>Financial Resources:</i> Financial resources have been allocated from MoS to continue updating and maintaining www.undpgefsteel.gov.in website; • <i>Socio-Political Risks:</i> The website has strong support from MoS; • <i>Institutional Framework and Governance:</i> The PSC in September 2013 has appointed NISST to be the succeeding agency as per the PWC 	<p style="text-align: center;">4</p> <p style="text-align: center;">4</p> <p style="text-align: center;">3</p>

Table 6: Assessment of Sustainability of Outcomes

Actual Outcomes (as of May 2013)	Assessment of Sustainability	Dimensions of Sustainability
	<p>report from the Project. Their role will be to provide TA to SRRMs after the EOP. However, their capacity to serve this role will need to be strengthened;</p> <ul style="list-style-type: none"> • <u>Environmental Factors</u>: Continuation of EE information dissemination to the SRRMs will result in shifting of practices by SRRMs to reduce energy consumption and subsequently reduced GHG emissions. <p style="text-align: right;">Overall Rating</p>	<p style="text-align: center;">4</p> <p style="text-align: center;">3</p>
<p>Actual Outcome 4: Capacity of the SRRMs to adopt EE measures and reduce energy costs has been enhanced.</p>	<ul style="list-style-type: none"> • <u>Financial Resources</u>: Most of the SRRMs have the financial resources to adopt EE measures to shield their businesses from sustained losses. SRRMs that cannot adopt EE measures will close down; • <u>Socio-Political Risks</u>: SRRMs will adopt EE measures as a means of business survival; • <u>Institutional Framework and Governance</u>: NISST will serve as the succeeding agency to continue the provision of TA to the SRRM sector. The capacity of NISST, however, will need strengthening in the long-term to sustain the provision of TA to the SRRMs; • <u>Environmental Factors</u>: The enhancement of the capacity of the SRRMs to adopt EE measures and to sustain their lower energy consumption levels and reduced GHG emissions will provide environmental benefits. <p style="text-align: right;">Overall Rating</p>	<p style="text-align: center;">4</p> <p style="text-align: center;">4</p> <p style="text-align: center;">3</p> <p style="text-align: center;">4</p> <p style="text-align: center;">4</p>
<p>Actual Outcome 5: The feasibility of ET options and various technology packages has been established to the extent that they are being adopted by the SRRMs.</p>	<ul style="list-style-type: none"> • <u>Financial Resources</u>: Post-project resources from MoS SDF funds and UNDP TRAC 2 funds are available to assist the SRRM sector for a period of 12 to 18 months after the EOP. There are some doubts that this would sustain the continuation of technology transfers to the SRRM after these post-project resources are exhausted after 12 to 18 months; • <u>Socio-Political Risks</u>: There is support from the MoS to continue technical support to the SRRMs for further EE improvements. The SRRMs have also demanded continued support from MoS for improved understanding of other ET options; • <u>Institutional Framework and Governance</u>: NISST will serve as the succeeding agency to continue the provision of TA to the SRRM sector. The capacity of NISST, however, will need strengthening in the 	<p style="text-align: center;">3</p> <p style="text-align: center;">4</p> <p style="text-align: center;">3</p>

4. CONCLUSIONS, RECOMMENDATIONS AND LESSONS

4.1 Conclusions

- There is some justification for the Project needing 3 years (2004 to 2007) to change the SRRM mindset from business-as-usual practices. The main challenge for the Project during this period was to gain the trust of SRRM owners within a highly competitive business environment where almost no business information was shared amongst SRRM entrepreneurs. With no SRRMs interested in the bank interest subsidy financial incentive in place in 2004, it is possible that an earlier introduction of a capital subsidy would have accelerated SRRM acceptance of the Project prior to 2007;
- Project efforts were significant in building SRRM capacity to adopt EE measures and best practices, notably after 2007 during which energy costs were rising and the SDF-backed capital subsidy was in effect. The Project had successfully demonstrated and convinced SRRMs to invest in low end energy saving technologies: waste heat recuperators, use of pulverised coal, fuel switching, and the high end technology of hot charging. These activities facilitated increased SRRM production rates and significantly reduced payback periods on EcoTech investments, thus, increasing the importance of technical support to the SRRMs;
- The PMC expended disproportionate efforts between 2008 and 2012 in the disbursements of the capital subsidy. This effort could have been reduced in favor of strengthening and sustaining the resident missions. By March 2011 or Year 6 of the Project, only five SRRMs received the capital subsidy out of 25 SRRMs where EE interventions were commissioned. At the same time, the PSC increased the Project targets for model SRRMs from 30 to 50 while closing 4 out of the 6 resident missions at the end of 2012 at a time when there was higher demand from SRRMs for technical assistance;
- The Project reaching 50% of its Gol co-financing target by the EOP is a reflection of the cumbersome process for SRRM subsidy claims and the Project falling short of its revised target of providing technical and financial assistance to 50 model SRRMs. The reduction in Gol co-financing share (on account of TIRFAC hardware center being dropped) has not been included in the AWP, which continues to reflect the original figure and has not been updated with revised Project plans;
- While technology solutions for SRRMs to reduce their energy consumption are simple in nature, their implementation is more complex. This is due to a large number of variables between each of the SRRMs that includes their layout, production capacity, primary energy supplies, grid power reliability, range of products produced and technical capacity of production personnel. This contributed to difficulties in meeting Project benchmarking targets;
- Similar to the conclusions drawn by the MTE, there is serious doubt if an ESCO model for SRRMs will work. To date, the SRRMs have expressed satisfaction with the assistance received by the Project from NISST, PCRA, SAILCON and other institutions. Since the initial 31 SRRMs have made EE improvements without ESCOs and with TA and capital subsidy from the Project (at no cost to the SRRMs),

it will be very difficult if not impossible to convince smaller SRRMs with smaller profit margins to have ESCOs involved with implementation of EE measures at this stage. Furthermore, there will be significant resources required for capacity building efforts to develop an SRRM-ESCO, and to build the confidence of financial institutions to understand the risks of and fund an ESCO business to assist an informal industry. Further pursuit of building an ESCO business for SRRMs would not constitute proper use of limited resources available with UNDP;

- One of the expected Project outcomes was a succeeding agency is managing the TIRFAC and providing TA to the SRRMs by Year 2 of the Project. The Project, however, lost focus on building the capacity of the succeeding agency and commenced the formulation of an exit strategy in March 2013, the last year of the Project. While candidate succeeding agencies such as NISST, PCRA and SAILCON, performed various TA activities under contract with the Project, there was no assessment of their capacities to serve as the succeeding agency prior to 2013. As of September 2013, the PAC has made the recommendation (based on the PWC Exit Strategy Report) to have NISST to be the lead agency for the TIRFAC and TA to the SRRMs after the EOP. It is doubtful, however, that the exit strategy can be fully implemented prior to the current EOP date of December 31, 2013. While resources have been identified for 12 to 18 months after EOP to build the capacity of NISST, it is likely that additional resources will be required to fully build the capacity of NISST to manage the TIRFAC and provide TA to the SRRMs;
- While the Project has achieved significant progress in catalyzing EE measures in the SRRMs after 2008, the Project could have achieved more market penetration with improved management. Factors that have hindered progress include:
 - A large representation of 10 ministries and agencies besides MoS and UNDP that would have the effect of constraining the PSC's ability to effectively and adaptively manage the Project;
 - Lack of steady staffing of the PMC leading to the PMC being less responsive to Project needs. This included the reduction of resident missions at the end of 2012 when there was high and increasing demand from SRRMs for technical assistance on EcoTech measures;
 - The continued use of a poorly designed Project planning matrix (from 2003) with a number of redundant indicators and outputs. The PPM had too many components with the achievement of each target demanding considerable effort coupled with unforeseen challenges from the initial lack of response from SRRMs. This led to inefficiencies in the use of resources and a loss of clear focus on attaining sustainability objectives (mainly related to the building of an agency for continuing SRRM TA after the EOP). This PPM may be a direct cause of PSC meetings not being fully focused on Project progress against clear Project outcomes.

4.2 Recommendations

Recommendation 1: Use remaining resources of the SRRMP (assumed to be available to December 31, 2013) towards enabling the nominated technological information resource and facilitation center (TIRFAC) to continue technical assistance and financial support to the SRRMs after the end of the Project. The 15th PAC meeting of September 3 recommended NISST as the best option for a

TIRFAC. As such, the Project should focus its attention and remaining resources on the following:

- Providing technical assistance *in close collaboration with NISST* towards design and implementation of EE measures for the entire SRRM sector. This would include:
 - a technical consultancy focus towards measures that have been demonstrated by the 31 model units as well as those that have excellent benefit cost potential but have not been replicated on a large scale³⁶;
 - implementation support for complex high-end Eco-Tech options³⁷.
- Setup of a program for the training of all SRRM staff levels notably shop-level personnel through an industry cluster mapping approach in which 30 to 40 units within a 100 km radius are covered;
- Implementing building capacity activities of the TIRFAC with Performance Improvement Training (PIT) and 5S training with implementation support, and more workshops on SOP, SMP and electrical audits.

Recommendation 2: After completion of SRRMP and using post-project resources available from UNDP and co-financing from MoS, implement the training programme for all SRRM staff members and for building the capacity of NISST as the succeeding TIRFAC agency with the following considerations:

- The activities to build the capacity of NISST should be designed through consultations with experts and SRRM trainers;
- Capacity building activities should include analysis and identification of SRRM needs, identification of SRRMs willing to be industrial representatives, how the succeeding agency will build SRRM capacity through various modes (i.e. classroom, on-the-job training, training of trainers, etc.) and collecting feedback on capacity building activities for improvements;
- NISST TA activities should be de-centralized to more than 6 clusters making the TA accessible to all SRRMs throughout India. The current two resident missions in Nagpur and Mandi Gobindarh are clearly not sufficient to affect market transformation of the SRRMs;
- The Bureau of Energy Efficiency (BEE) needs to be included as one of the stakeholders in the post-SRRMP project. Their presence and experience will accelerate the advancement of S&L for the numerous SRRM equipment and appliances, and possibly provide assistance in its enforcement of the S&L initiative;
- Improve the MRV capacities of the MoS notwithstanding the difficulties of obtaining accurate data from SRRM enterprises. If energy and production data is monitored, verified and reported by 200 SRRMs, the sector can achieve a 90% confidence in its GHG reduction reporting that can be replicated in other industrial and commercial sectors in India. Thus far, the Project has managed to obtain this data for over 31 SRRMs with another 40 in the pipeline;
- With the assistance of UNDP, NISST should carefully evaluate its options on investing more efforts on ESCOs with SRRMs. There does not seem to be any

³⁶ This would include a) highly replicated options: high efficiency recuperator, use of pulverized coal as fuel, rolling mill technology packages; b) low replicated but establishes options: lump coal to producer gas, coal bed methane, biomass to producer gas, direct rolling and roll pass design; and c) potential options that need demonstration: oxy fuel combustion system and top and bottom firing system

³⁷ This would include the high efficiency recuperator, use of pulverized coal as fuel, rolling mill technology options, lump coal to producer gas, coal bed methane, automation, biomass as fuel, direct rolling and roll pass design, and oxy fuel combustion system

indication from the SRRM stakeholder meetings of May 2013 that an ESCO would be successfully engaged to implement EE measures for SRRMs. Given the lack of ESCO operations in India, nature of SRRM's commercial operation, significant risks are involved in the use of UNDP resources to develop an ESCO implementation model even with the extension of Project activities to December 2014.

Many of these considerations are consistent with the PWC Exit Strategy. With the availability of USD 1.575 million from UNDP resources to the end of 2014 (an additional 12 to 18 months after EOP), NISST may develop sufficient capacity to undertake a nation-wide program to transform the SRRM sector into a viable energy efficient industry. However, if possible, additional resources should be secured to ensure appropriate capacity building activities for NISST.

4.3 Lessons Learned

- A concise Project planning matrix with identified risks and assumptions is essential for effective project implementation. The lack of a concise log-frame on SRRMP led to a number of problems including:
 - A loss of focus on building the capacity of government institutions for the TIRFAC and resident missions that would provide TA for SRRMs after the end of the Project;
 - Lack of guidance to formulate strategies to engage stakeholders and soliciting stakeholder feedback to improve and respond to SRRM needs. Feedback from stakeholders would have included the difficulties of claiming capital subsidies, the decreased importance of the subsidy to the survival of the SRRMs, and the increased importance and convenience of the resident missions in providing TA to the SRRM clusters. The acceptance of the Project by stakeholders was not an assumption on the PPM;
 - Disproportionate efforts being placed on less important activities such as subsidy disbursal.
- UNDP Country Offices should exercise flexibility in resetting component outcomes and outputs. There is a common misconception that a PPM cannot be changed during the course of a project. However, during the course of many projects, circumstances change justifying the need to change a PPM, namely its outputs and targets. Changes to the PPM can be implemented with the guidance of mid-term evaluators or the Regional Technical Advisors. In the case of this Project, the CO was not encouraged to change the PPM notwithstanding the fact that the PPM did not meet certain standards for clarity. The lack of changes to the PPM for the SRRMP led the Project team (both the PSC and the PMC) to manage the Project under a PPM with issues detailed in the aforementioned bullet points;
- A capital subsidy program needs to be efficiently administered so that the intended purpose of the subsidy which would be to catalyze investment into a particular technology. On SRRMP, the capital subsidy did catalyze investment. However, if the conditions for claiming the subsidy were less onerous, there likely would have been further EE investments by SRRMs, more utilization of the SDF funds, and a higher percentage of GoI co-financing.

- Projects involving energy conservation with SMEs need to carefully design project interventions that will bring immediate benefits and reductions to their operational costs. SRRMP did not originally do this when they provided an interest rate subsidy without any consideration that most SRRMs seldom use bank financing services. This was later changed to a capital subsidy at the urging of the SRRM sector.
- Partnerships between donor agencies and governments in developing countries with a large SME and informal industrial sector are extremely important if they are to become energy efficient. In the absence of the commercial financing sector who view loans to the informal sector as high risk, donor agencies fill a large assistance gap by playing an important financing support role to assist informal industry in a structured approach to implementing energy efficiency.

APPENDIX A – MISSION TERMS OF REFERENCE FOR PROJECT FINAL EVALUATION

TERMINAL EVALUATION TERMS OF REFERENCE FOR – INDIVIDUAL CONSULTANT

1. INTRODUCTION

In accordance with UNDP and GEF M&E policies and procedures, all full and medium-sized UNDP support GEF financed projects are required to undergo a terminal evaluation upon completion of implementation. These terms of reference (TOR) sets out the expectations for a Terminal Evaluation (TE) of the **Removal of barriers to Energy Efficiency Improvement in the Steel Rerolling mill sector in India (PIMS 1515)**. The essentials of the project to be evaluated are as follows:

2. PROJECT SUMMARY TABLE

Project Title:	Removal of barriers to Energy Efficiency Improvement in the Steel Rerolling Mill sector in India			
GEF Project ID:	1240		<i>at endorsement</i> <i>(Million US\$)</i>	<i>at completion</i> <i>(Million US\$)</i>
UNDP Project ID:	1515	GEF financing:	6,750,000	6,750,000
Country:	India	IA/EA own:		
Region:	Asia and Pacific	Government:	7,280,000	4,368,000
Focal Area:	Climate Change	Other (Financing Institutions & Promoters):	17,830,000	0
FA Objectives, (OP/SP):	CCM-2: Energy efficiency in the buildings and industry sectors	Total co-financing:	25,110,000	
Executing Agency:	UNDP	Total Project Cost:	31,860,000	
Other Partners involved:	N/A	ProDoc Signature (date project began):		th 12 April 2004
		(Operational) Closing Date:	Proposed: 30 th September 2008	Actual: 31 st December 2013

3. OBJECTIVE AND SCOPE

In order to achieve the project objective, the project key Components and Outcomes are as follows.

Component 1. Benchmarks for EcoTech Options & Packages Established

Outcome 1.01: Review report on techno - economic and commercial status of Energy Efficient clean technologies relevant to SRRM sector utilizing maximum bandwidth for future application and development of investment norms for all EE options and technology packages.

Outcome 1.02: Development of energy and environment labels, standards, and benchmarks for equipment and devices used

in steel re-rolling industry.

Development of standard methods and tools for design engineering and implementation of EcoTech solutions in SRRM sector.

Information modules for financing institutions, government and policy makers, and industry partners.

Component 2. Strengthened Institutional Arrangements

Outcome 2.01: Network of associations of all stakeholders to provide technical, financial and market inputs to SRRM sector and for securing policy and administrative support

Outcome 2.02: Network of multi-disciplinary national and international experts and successful innovative SRRM units for experience dissemination, problem diagnosis and development of solutions designs at local costs.

Outcome 2.03: Internationally linked institutional arrangement aimed at establishing global relations for two-way communication on current developments in technology and to facilitate technology transfer.

Component 3. Effective Information Dissemination Programme

Outcome 3.01: Establishment of worldwide database on current and new developments in technology, their sources and investment requirements, projects in progress, market trends, resource personnel etc. Development of communication channels including web based EE -Net for information dissemination on technology markets, funding schemes, etc.

Component 4. Enhanced Stakeholders Capacity

Outcome 4.01: Report on assessment of capacity building needs of major stakeholders to facilitate implementation and absorption of advanced EE technologies in the SRRM sector and Mapping of clusters.

Outcome 4.02: Network Strategy for Capacity Building

Outcome 4.03: Methodologies and Tools of Energy Management Developed

Component 5. Feasibility of ET Options and Technology Packages Established

Outcome 5.01: Study of 30 Sample Units

Outcome 5.02: Energy and Environment Cluster Study of Non-Sample Units

Outcome 5.03: Financial Linkages and TE Modeling of ET Options

Outcome 5.04: Re-Engineering and Validation of Technology Packages

Component 6. Innovative Institutional Mechanism Established [ESCO and Third Party Financing (TPF)]

Outcome 6.01: Development of performance contracting mechanism involving identified ESCOs and technology providers.

Outcome 6.02: Development of institutional linkages among exiting ESCOs, technology providers and industry.

Outcome 6.03: Assessment of market potential through results of demonstration of ESCO concepts in 7 SRRM units

Component 7. TIRFAC Established

Outcome 7.01: Establishment of Monitoring & Evaluation System

Outcome 7.02: Environment Assessment and Monitoring System

Outcome 7.03: Study Report for TIRFAC

Outcome 7.04: TIRFAC Installed and Commissioned

Component 8: Investment Projects in Sample Units Completed

Outcome 8.01: Project Reports/Detailed Engineering Reports for Investment Projects

Outcome 8.02: Implementation and Commissioning of Sample Units

The TE will be conducted according to the guidance, rules and procedures established by UNDP and GEF as reflected in the UNDP Evaluation Guidance for GEF Financed Projects.

The objectives of the evaluation are to assess the achievement of project results, and to draw lessons that can both improve the sustainability of benefits from this project, and aid in the overall enhancement of UNDP programming.

4. EVALUATION APPROACH AND METHOD

An overall approach and method¹ for conducting project terminal evaluations of UNDP supported GEF financed projects have developed over time. The evaluator(s) is(are) expected to frame the evaluation effort using the criteria of **relevance, effectiveness, efficiency, sustainability, and impact**, as defined and explained in the UNDP Guidance for Conducting Terminal Evaluations of UNDP-supported, GEF-financed Projects. The international consultant will be the team leader and coordinate the evaluation process to ensure quality of the report and its timely submission. The national consultant will provide supportive roles both in terms of professional back up, translation etc. The evaluation team is expected to become well versed as to the project objectives, historical developments, institutional and management mechanisms, activities and status of accomplishments. Information will be gathered through document review, group and individual interviews and site visits. A set of questions covering each of these criteria have been drafted and are included with this TOR ([Annex D](#)). The evaluator(s) is(are) expected to amend, complete and submit this matrix as part of an evaluation inception report, and shall include it as an annex to the final report.

The evaluation must provide evidence-based information that is credible, reliable and useful. The evaluator is expected to follow a participatory and consultative approach ensuring close engagement with government counterparts, in particular the GEF operational focal point, UNDP Country Office, Project Management Unit, and other key stakeholders. The evaluator is expected to conduct a field mission as indicated in section 4 of this Procurement Notice i.e. Financial Proposal (page 2). Interviews will be held with the following individuals and organizations at a minimum, but not limited to:

- Relevant personnel at UNDP Country Office in New Delhi, India and Program Officer in-charge of the Project
- National Project Director (NPD)
- National Project Coordinator (NPC)
- Project Management Unit (PMU)
- Relevant project stakeholders, and personnel, but not limited to:
 - a. SRRM units (model, pipeline, replication units), regional managers (RM) and clusters representatives
 - b. Consultants who design furnace, equipment suppliers
 - c. Consultancy firms who have supported the following
 1. Development of Standard Operating and Maintenance Practices (MECON)
 2. Implementation of 5 S and Lean Manufacturing Practices. (National Productivity Council - NPC)
 3. Implementation of ISO 9001 / ISO 14001. (NPC)
 4. Electrical Energy audits.(National Institute of Secondary Steel Technology - NISST)
 5. Performance Improvement Training Programmes for shop floor/management representatives (Steel Authority of India Limited - SAIL)

The evaluator will review all relevant sources of information, such as the project document, inception workshop report, annual work and financial plans, project reports – including Annual APR/PIR (until 2012), project budget revisions, quarterly reports, Minutes of Project Technical Committee/Project Steering Committee meetings, Back-to-Office Reports of UNDP staff (if any), Study reports/Conference proceedings/government guidelines, etc., midterm review, progress reports, GEF focal area tracking tools, project files, national strategic and legal documents, and any other materials that the evaluator considers useful for this evidence-based assessment such as terms of reference for past consultants' assignments and summary of the results; past audit reports (if any). A list of documents that the project team will provide to the evaluator for review is included

in [Annex C](#) of this Terms of Reference.

5. EVALUATION CRITERIA & RATINGS

An assessment of project performance will be carried out, based against expectations set out in the Project Logical Framework/Results Framework (see [Annex B](#)), which provides performance and impact indicators for project implementation along with their corresponding means of verification. The evaluation will at a minimum cover the criteria of: **relevance, effectiveness, efficiency, sustainability and impact**. Ratings must be provided on the following performance criteria. The completed table must be included in the evaluation executive summary. The obligatory rating scales are included in [Annex E](#).

Evaluation Ratings:			
1. Monitoring and Evaluation	rating	2. IA& EA Execution	rating
M&E design at entry		Quality of UNDP Implementation	
M&E Plan Implementation		Quality of Execution - Executing Agency	
Overall quality of M&E		Overall quality of Implementation / Execution	
3. Assessment of Outcomes	rating	4. Sustainability	rating
Relevance		Financial resources:	
Effectiveness		Socio-political:	
Efficiency		Institutional framework and governance:	
Overall Project Outcome Rating		Environmental :	
		Overall likelihood of sustainability:	

6. PROJECT FINANCE / COFINANCE

The Evaluation will assess the key financial aspects of the project, including the extent of co-financing planned and realized. Project cost and funding data will be required, including annual expenditures. Variances between planned and actual expenditures will need to be assessed and explained. Results from recent financial audits, as available, should be taken into consideration. The evaluator(s) will receive assistance from the Country Office (CO) and Project Team to obtain financial data in order to complete the co-financing table below, which will be included in the terminal evaluation report.

Co-financing (type/source)	UNDP own financing (mill. US\$)		Government (mill. US\$)		Partner Agency (mill. US\$)		Partner Agency (mill. US\$)		Total (mill. US\$)	
	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual	Actual	Actual
Grants										
Loans/Concessions										
□ In-kind support										

7. MAINSTREAMING

UNDP supported GEF financed projects are key components in UNDP country programming, as well as regional and global programmes. The evaluation will assess the extent to which the project was successfully mainstreamed with other UNDP priorities, including poverty alleviation, improved governance, the prevention and recovery from natural disasters, and gender.

8. IMPACT

The evaluators will assess the extent to which the project is achieving impacts or progressing towards the achievement of impacts. Key findings that should be brought out in the evaluations include whether the project has demonstrated: a) verifiable improvements in ecological status, b) verifiable reductions in stress on ecological systems, and/or c) demonstrated progress towards these impact achievements.²

9. CONCLUSIONS, RECOMMENDATIONS & LESSONS

The evaluation report must include a chapter providing a set of **conclusions, recommendations** and **lessons**.

10. IMPLEMENTATION ARRANGEMENTS

The principal responsibility for managing this evaluation resides with the UNDP CO in New Delhi, India. The UNDP CO will contract the evaluators and ensure the timely provision of per diems and travel arrangements within the country for the evaluation team. The Project Team will be responsible for liaising with the Evaluators team to set up stakeholder interviews, arrange field visits, coordinate with the Government etc.

Throughout the period of evaluation, the evaluation team will liaise closely with the UNDP Resident Representative/Deputy Resident Representative/Programme Analyst/Senior M&E Adviser/Project Manager, the concerned agencies of the Government, any members of the international team of experts under the project and the counterpart staff assigned to the project. The team can raise or discuss any issue or topic it deems necessary to fulfil its task, the team, however, is not authorized to make any commitments to any part on behalf of UNDP/GEF or the Government.

Logistics

The team will conduct a mission visit to New Delhi and selected project sites, to meet with relevant project stakeholders. This visit will also include meetings with the officials of UNDP, the Implementing Partner, stakeholders from other institutions and ministries related to the project.

After the initial briefing by UNDP CO, the review team will meet with the National Project Director (NPD), National Project Coordinator (NPC) and the GEF Operational Focal Point as required.

11. EVALUATION TIMEFRAME

The total duration of the evaluation will be 30 days according to the following plan:

Activity	Working Days	Completion Date
Preparation	7 days	15/04/2013
Evaluation Mission	12 days	22/04 to 3/05/2013
Draft Evaluation Report	7 days	13/05/2013
Final Report	4 days	27/05/2013

12. EVALUATION DELIVERABLES

The evaluation team is expected to deliver the following:

Deliverable	Content	Timing	Responsibilities
Inception Report	Evaluator provides clarifications on timing and method	No later than 2 weeks before the evaluation mission.	Evaluator submits to UNDP CO
Presentation	Initial Findings	End of evaluation mission	To project management, UNDP CO
Draft Final Report	Full report including TT sheet calculations, (per annexed template) with annexes	Within 3 weeks of the evaluation mission	Sent to CO, reviewed by RTA, PCU, GEF OFPs
Final Report*	Revised report	Within 1 week of receiving UNDP comments on draft	Sent to CO for uploading to UNDP ERC.

*When submitting the final evaluation report, the evaluator is required also to provide an 'audit trail', detailing how all received comments have (and have not) been addressed in the final evaluation report.

The evaluation team shall conduct debriefing for the UNDP Country Office, NPD, NPC, Project Management Unit, in India towards the end of the evaluation mission. The international consultant shall lead presentation of the draft review findings and recommendations. Lead drafting and finalization of the terminal evaluation report. The evaluation team shall review and prepare the tracking tool with the required information to complete the tracking tool as required for climate change mitigation projects.

13. EVALUATOR ETHICS

Evaluation consultants will be held to the highest ethical standards and are required to sign a Code of Conduct (Annex E) upon acceptance of the assignment. UNDP evaluations are conducted in accordance with the principles outlined in the [UNEP 'Ethical Guidelines for Evaluations'](#)

APPENDIX B – MISSION ITINERARY (FOR JUNE 14-26, 2013)

#	Activity	Stakeholder involved	Place
June 14, 2013 (Friday)			
	Arrival of Mr Roland Wong		New Delhi
June 14, 2013 (Friday)			
1	Briefing with Mr Srinivasan Iyer, Dr S N Srinivasan, Ms Manisha Sanghani, UNDP	UNDP India	New Delhi
2	Meeting with Mr. G.Misra, Ms. Nalini, Mr. B Ramakrishna Bhatta	Project Management Cell	New Delhi
June 15, 2013 (Saturday)			
	Travel to Chandigarh		
3	Meeting with Mr Raj Jindal.	Vivek Re-Rolling Mills Model Unit	Mandi Gobindgarh
4	Meeting with Mr. Vinod Vashisth, President, AISRA	All India Steel Re-rolling Association	Mandi Gobindgarh
June 17, 2013 (Monday)			
	Travel to Nagpur		
5	Mr M. L. Rathi, Mahalaxmi Dhatu Udyog Private Limited	Model Unit Steel re-rolling mill	Nagpur
6	Mr. Rajesh Sarda , CEO, Ramsons TMT Private Limited	Model Unit Steel re-rolling mill	Nagpur
7	Mr Paramjit Singh, National Institute of Secondary Steel Technology (NISST)	NISST, MoS	Nagpur
June 18, 2013 (Tuesday)			
	Travel to Raipur		
8	Skype discussions with Dr Butchaiah Gadde, UNDP Regional Technical Advisor (RTA)	UNDP Regional	Bangkok (by Skype)
9	Meeting at Bajrang Power and Ispat Ltd, Mr. Sandeep Goel and Bajrang Goel	Model Unit Steel re-rolling mill	Raipur
10	Meeting at A.C. Strips Private Limited, Mr. Viren Surana	Model Unit Steel re-rolling mill	Raipur
June 19, 2013 (Wednesday)			
	Travel to Chennai		

#	Activity	Stakeholder involved	Place
11	Meeting with Mr K P Eashwar, Academic and Development Communication Services, Chennai	UNDP	New Delhi
June 20, 2013 (Thursday)			
	Travel to Pondicherry		
June 21, 2013 (Friday)			
12	Mr. Rajesh Goel, Pulkit Steel Re-rolling Mills Private Limited)	Model Unit Steel re-rolling mill	Pondicherry
13	Mr Bharat Garg, Advait Steel Rolling Mills Private Limited	Model Unit Steel re-rolling mill	Pondicherry
June 22, 2013 (Saturday)			
	Return to New Delhi		
June 24, 2013 (Monday)			
14	Meeting with Mr. Rajiv Ralhan, Manager – Pricewaterhouse Coopers (PwC)	UNDP, PWC	New Delhi
15	Meeting with Mr. A C R Das, National Project Coordinator	MoS	New Delhi
16	Meeting with Mr. R.K. Bagchi, Director NISST	NISST, MoS	New Delhi
17	Meeting with Dr. S.K. Chakraborty, Deputy Director General and Mr Surya Prakash, National Productivity Council	Program Partner	New Delhi
June 25, 2013 (Tuesday)			
18	Meeting with Staff of Project Management Cell	PMC	New Delhi
19	De-briefing of preliminary findings to NPD, NPC, UNDP and PMC	MoS, UNDP, PMC	New Delhi
June 26, 2013 (Wednesday)			
20	Meeting with Mr. Shashi Sekhar (GEF-OFPP) and Dr. Nayanika Singh	MoEF	New Delhi
June 26, 2013 (Thursday)			
	Departure of Mr Roland Wong		

Total number of meetings conducted: **20**

APPENDIX C – LIST OF PERSONS INTERVIEWED

This is a listing of persons contacted in India (unless otherwise noted) during the Final Evaluation Period only. The Evaluators regret any omissions to this list.

- 1) Mr. Srinivasan Iyer, UNDP, New Delhi
- 2) Dr. S.N. Srinivas, UNDP, New Delhi
- 3) Ms Manisha Sanghani, UNDP, New Delhi
- 4) Dr Butchaiah Gadde, Regional Technical Advisor, UNDP, Bangkok
- 5) Mr. Shashi Sekhar, GEF Focal Point and Additional Secretary, MoEF, New Delhi
- 6) Dr. Nayanika Singh, MoEF, New Delhi
- 7) Mr Sayiddin Abbassi, Joint Secretary, Ministry of Steel (MoS), New Delhi
- 8) Ms. A C R Das, National Project Coordinator, MoS
- 9) Mr. Govind Misra, Technical Consultant, Project Management Cell (PMC), New Delhi
- 10) Ms. Nalini, Steel PMC, New Delhi
- 11) Arindam Mukherjee, Manager, PMC, New Delhi
- 12) Mr. Ramakrishna Bhatta, PMC, New Delhi
- 13) Mr Paramjeet Singh, Resident Manager – Centre, National Institute of Secondary Steel Technology (NISST)
- 14) Mr Raj Jindal, Vivek Re-rolling Mill, Mandi Gobindgarh, Punjab
- 15) Mr Vinod Vashishth, President, All India Steel Re-rolling mills Association
- 16) Mr. M L Rathi, Mahalaxmi Dhatu Udyog Pvt. Ltd, Nagpur
- 17) Mr Rajesh Sarada, Ramson Group, Nagpur
- 18) Mr Sandeep Goel and Mr Bajrang Goel, Shri Bajrang Power and Ispat Limited, Raipur
- 19) Mr. Viren Surana, A.C. Strips Private Limited, Raipur
- 20) Mr K P Eashwar, Academic and Development Communication Services, Chennai
- 21) Mr. Rajesh Goel, Pulkit Steel Re-rolling Mills Private Limited, Puducherry
- 22) Mr. Bharat Garg, Advait Steel Rolling Mills Private Limited, Puducherry
- 23) Mr Rajiv Ralhan, Manager Price Waterhouse Coopers, New Delhi
- 24) Mr R.K. Bagchi, Director, NISST, Mandi Gobindgarh
- 25) Dr. S.K. Chakraborty, Deputy Director General and Mr Surya Prakash, National Productivity Council, New Delhi

APPENDIX D – LIST OF DOCUMENTS REVIEWED

1. Project Document
2. Project Operation Manual
3. List of Project stakeholders
4. List of Model Units to be visited
5. List of Associations
6. List of PMC staffs including NPC/NPD
7. List of Resident Missions
8. PSC minutes
9. Workshop material and proceedings of:
 - a. Chennai workshop
 - b. Hyderabad workshop
 - c. Srinagar workshop
 - d. Goa workshop
10. Project Reports on:
 - i. Replication report
 - ii. 5 S Implementation Reports
 - iii. Bankable Feasibility Reports
 - iv. Baseline Reports
 - v. Cluster Mapping report
 - vi. Electrical Energy Audit report
 - vii. Feasibility Report by NPC
 - viii. Feasibility Reports by SAILCON
 - ix. ISO 9001 /14001 reports
 - x. Life Cycle Assessment Report
 - xi. Post Implementation Reports
 - xii. Technical and Financial Plans
 - xiii. PIT Reports
 - xiv. Steel Mid term evaluation report
 - xv. GHG calculation report
11. Knowledge products & documents
12. Process document – draft
13. Case studies – draft
14. Training Manuals
 - a. Manuals
 - b. M&E Manual
 - c. Standard Operating and Maintenance Practices Manual
 - d.
15. Audio visuals
16. Documentary (link sent through email)
17. UNDP reports
 - a. CDRs
 - b. AWP
 - c. PIRs

APPENDIX E – COMPLETED TRACKING TOOL



Tracking Tool for Climate Change Mitigation Projects (For Terminal Evaluation)

Special Notes: reporting on lifetime emissions avoided

Lifetime direct GHG emissions avoided: Lifetime direct GHG emissions avoided are the emissions reductions attributable to the investments made during the project's supervised implementation period, totaled over the respective lifetime of the investments.

Lifetime direct post-project emissions avoided: Lifetime direct post-project emissions avoided are the emissions reductions attributable to the investments made outside the project's supervised implementation period, but supported by financial facilities put in place by the GEF project, totaled over the respective lifetime of the investments. These financial facilities will still be operational after the project ends, such as partial credit guarantee facilities, risk mitigation facilities, or revolving funds.

Lifetime indirect GHG emissions avoided (top-down and bottom-up): indirect emissions reductions are those attributable to the long-term outcomes of the GEF activities that remove barriers, such as capacity building, innovation, catalytic action for replication.

Please refer to the Manual for Calculating GHG Benefits of GEF Projects.

[Manual for Energy Efficiency and Renewable Energy Projects](#)

[Manual for Transportation Projects](#)

For LULUCF projects, the definitions of "lifetime direct and indirect" apply. Lifetime length is defined to be 20 years, unless a different number of years is deemed appropriate. For emission or removal factors (tonnes of CO₂eq per hectare per year), use IPCC defaults or country specific factors.

General Data	Results	Notes
at Terminal Evaluation		
Project Title	Technological upgradation for sustainable development of Steel re-rolling sector in India meeting the	
GEF ID	1240	
Agency Project ID	1515	
Country	India	
Region	SAR	
GEF Agency	UNDP	
Date of Council/CEO Approval	September 1, 2004	Month DD, YYYY (e.g., May 12, 2010)
GEF Grant (US\$)	6,750,000	
Date of submission of the tracking tool	June 26, 2013	Month DD, YYYY (e.g., May 12, 2010)
Is the project consistent with the priorities identified in National Communications, Technology Needs Assessment, or other Enabling Activities under the UNFCCC?	1	Yes = 1, No = 0
Is the project linked to carbon finance?	0	Yes = 1, No = 0
Cumulative cofinancing realized (US\$)	8,574,318	
Cumulative additional resources mobilized (US\$)		additional resources means beyond the cofinancing committed at CEO endorsement

Objective 2: Energy Efficiency		
Please specify if the project targets any of the following areas		
Lighting		Yes = 1, No = 0
Appliances (white goods)		Yes = 1, No = 0
Equipment	1	Yes = 1, No = 0
Cook stoves		Yes = 1, No = 0
Existing building		Yes = 1, No = 0
New building		Yes = 1, No = 0
Industrial processes	1	Yes = 1, No = 0
Synergy with phase-out of ozone depleting substances		Yes = 1, No = 0
Other (please specify)		
Policy and regulatory framework	0	0: not an objective/component 1: no policy/regulation/strategy in place 2: policy/regulation/strategy discussed and proposed 3: policy/regulation/strategy proposed but not adopted 4: policy/regulation/strategy adopted but not enforced 5: policy/regulation/strategy enforced
Establishment of financial facilities (e.g., credit lines, risk guarantees, revolving funds)	0	0: not an objective/component 1: no facility in place 2: facilities discussed and proposed 3: facilities proposed but not operationalized/funded 4: facilities operationalized/funded but have no demand 5: facilities operationalized/funded and have sufficient demand
Capacity building	5	0: not an objective/component 1: no capacity built 2: information disseminated/awareness raised 3: training delivered 4: institutional/human capacity strengthened 5: institutional/human capacity utilized and sustained
Lifetime energy saved	7,775,712,930	MJ (Million Joule, IEA unit converter: http://www.iea.org/stats/unit.asp) Fuel savings should be converted to energy savings by using the net calorific value of the specific fuel. End-use electricity savings should be converted to energy savings by using the conversion factor for the specific supply and distribution system. These energy savings are then totaled over the respective lifetime of the investments
Lifetime direct GHG emissions avoided	642,630	tonnes CO2eq (see Special Notes above)
Lifetime direct post-project GHG emissions avoided	-	tonnes CO2eq (see Special Notes above)
Lifetime indirect GHG emissions avoided (bottom-up)	2,134,240	tonnes CO2eq (see Special Notes above)
Lifetime indirect GHG emissions avoided (top-down)	13,364,714	tonnes CO2eq (see Special Notes above)

APPENDIX F – EVALUATION QUESTION MATRIX

Evaluative Criteria	Questions	Indicators	Sources ⁵⁰	Methodology ⁵¹
Relevance: How does the project relate to the main objectives of the GEF focal area, and to the environment and development priorities at the local, regional and national levels?				
<ul style="list-style-type: none"> Is the project relevant to National priorities and commitment under international conventions? 	<ul style="list-style-type: none"> Is the project country-driven? <i>Yes, the project is driven by the Ministry of Steel which provided co-financing for the Project from their Steel Development Fund</i> 	•	<ul style="list-style-type: none"> Information shared by PMC and NPC 	<ul style="list-style-type: none"> Interviews and documents review
	<ul style="list-style-type: none"> Does the project adequately take into account the national realities, both in terms of institutional and policy framework in its design and its implementation? <i>While the Project correctly assumed the lack of awareness of energy efficiency, the design did not consider that the price of energy was and is still a critical factor in getting the owners and management of SRRM to pay attention to EE. The Project design also included a financial incentive in the form of “interest subsidy” without a full understanding that SRRMs do not use banks as a financing vehicle; this resulted in no SRRMs taking the interest subsidy.</i> 	•	<ul style="list-style-type: none"> Information shared by program partners, visits to model SRRM units 	<ul style="list-style-type: none"> Interviews and document review, GHG reduction calculations
	<ul style="list-style-type: none"> How effective is the project in terms of supporting and facilitating energy industry in moving towards low carbon pathways through energy efficiency initiatives specifically in SRRM sector? <i>Although the Project had a slow start in the initial 3 years, it was effective in being able to attract the attention of SRRMs in 2007 when the energy price started to increase. Over the past 3 years, the Project has made a significant impact by assisting SRRMs to reduce their specific energy consumption.</i> 	•	<ul style="list-style-type: none"> Information shared by program partners, visits to model SRRM units 	<ul style="list-style-type: none"> Interviews and document review, GHG reduction calculations
	<ul style="list-style-type: none"> What was the level of stakeholder participation in project design and ownership in project implementation? <i>Stakeholder participation was limited during the Project design phase. The Steering Committee constituted to oversee Project implementation had representatives from too many organizations indicating a weakness in ownership by the counterpart ministry.</i> 	•	<ul style="list-style-type: none"> Information shared by program partners 	<ul style="list-style-type: none"> Document review; interviews with project partners
<ul style="list-style-type: none"> Is the project internally coherent in 	<ul style="list-style-type: none"> Are there logical linkages between expected results of the project 	•	•	•

<p>its design?</p>	<p>(log frame) and the project design (in terms of project components, choice of partners, structure, delivery mechanism, scope, budget, use of resources etc.)? <u><i>There are logical linkages between targets of the various outputs. However, there is the lack of specificity of the targets and results, with few time bound indicators and some indicators not being measurable</i></u></p>			
	<ul style="list-style-type: none"> • Even after two extensions, does the project achieve its expected outcomes? If not, enumerate the reasons. <u><i>The Project has managed to achieve the expected outcomes in some components while other components have under achieved. The Gol co-financing is 55% of the planned commitment. The MoS reports that penetration of awareness of energy efficiency has reached to 55% of the 1,800 SRRM units with the anticipation that all units would have invested in various EE options within 10 years significantly reducing the sector's specific energy consumption.</i></u> 	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> • Information shared by PMC, interaction with SRRM units 	<ul style="list-style-type: none"> • Interviews with project stakeholders , document review
	<ul style="list-style-type: none"> • Did the project made satisfactory accomplishment in achieving project outputs vis-à-vis the targets and related delivery of inputs and activities? <u><i>The Project has towards the end, satisfactorily achieved the objective of removing the barrier on EE in SRRM, with hand-holding support for demonstration of technologies, installation of improved processes, and awareness raising on the benefits. The learning is being replicated in the SRRM sector through indirect means, since the Project is closing with no confirmed resources to reach out to industries.</i></u> 	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> • Information shared by PMC, interaction with SRRM units 	<ul style="list-style-type: none"> • Interviews with project stakeholders , document review
<ul style="list-style-type: none"> • Does the project provide relevant lessons and experiences for other similar projects in the future? 	<ul style="list-style-type: none"> • Has the experience of the project provided relevant lessons for other future projects targeted at similar objectives? State the lessons learnt. <u><i>The Project was designed with seven outcomes, which diluted project resources. With less intended outcomes, Project resources could have been more focused towards achieving outcomes that would have improved sustainability of technical assistance to the SRRMs.</i></u> 	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> • Information shared by PMC, interaction with project stakeholders 	<ul style="list-style-type: none"> • Interviews, document review
<p>Effectiveness: The extent to which an objective has been achieved or how likely it is to be achieved?</p>				
<ul style="list-style-type: none"> • Has the project been effective in achieving the expected outcomes and objectives? 	<ul style="list-style-type: none"> • Whether the performance measurement indicators and targets used in the project monitoring system are accomplished and able to achieve desired project outcomes within 31st December 2013? <u><i>The</i></u> 	<ul style="list-style-type: none"> • 	<p>See indicators in logframe listed in project</p>	<ul style="list-style-type: none"> •

	<p><u>performance indicators from the original log frame are not written as indicators but more as outcomes. These have been changed in the PIRs to suit the current needs of the Project. With these shortcomings, the Project does not have any hard targets probably due to the lack of knowledge when the Project was designed on what reasonable targets could be set. The Project outcomes, however, are good notably with the adoption of EcoTech measures by the SRRMs</u></p>		<p>document (or Annex B)</p>	
<ul style="list-style-type: none"> • How is risk and risk mitigation being managed? 	<ul style="list-style-type: none"> • How well are risks, assumptions and impact drivers being managed? <u>The main risk that has not been well managed on SRRMP has been the lack of institutional strengthening for a lead succeeding agency to carry on technical assistance to the SRRMs after the EOP.</u> 	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> •
	<ul style="list-style-type: none"> • What was the quality of risk mitigation strategies developed? Were these sufficient? <u>There have been no risk mitigation strategies developed for SRRMP until early 2013 when PWC was recruited to formulate a UNDP exit strategy. While the quality of PWCs exit strategy has been sound, the Project started the formulation of this exit strategy far too late in the Project, raising the risk that there would not be sufficient time to transfer the TA role from the PMC to another agency that could deliver TA to SRRMs after the EOP.</u> 	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> •
	<ul style="list-style-type: none"> • Are there clear strategies for risk mitigation related with long-term sustainability of the project? <u>There are clear strategies for the long term sustainability of the Project that were being developed in June 2013, 6 months before the end of the Project. It is fortuitous that UNDP has sourced funding in June 2013 for SRRM activities after the EOP which may provide sufficient resources to effectively build the capacity of the succeeding agency.</u> 	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> •
<ul style="list-style-type: none"> • Consideration of recommendations and reporting of information 	<ul style="list-style-type: none"> • Did the project consider Midterm Review recommendations conducted in August 2007 and reflected in the subsequent project activities <u>Yes, most of the recommendations were adopted by the team, namely dropping of the hardware component of TIRFAC. The Project, however, did not drop ESCO activities as it continued to develop ESCO strategies to work within SRRMs</u> 	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> •

	<ul style="list-style-type: none"> Reporting of the petroleum fuels and the power reduction in each of the model units from implementing eco- tech options and the corresponding carbon emission reductions. <u>Reporting of energy consumptive reductions has been satisfactory with reports on 31 model units having been completed.</u> 			
<ul style="list-style-type: none"> What lessons can be drawn regarding effectiveness for other similar projects in the future? 	<p>What lessons have been learned from the project regarding achievement of outcomes? <u>Projects involving energy conservation with SMEs need to carefully design project interventions that will bring immediate benefits and reductions to their operational costs. SRRMP did not originally do this when they provided an interest rate subsidy without any consideration that most SRRMs seldom use bank financing services but later changed to a capital subsidy at the urging of the SRRM sector.</u></p> <p><u>Another lesson is that partnerships between donor agencies and governments in developing countries are extremely important if there is a large SME and informal industrial sector needing to become energy efficient. Without this partnership, the informal industrial sector will not be able to achieve significant reductions in energy costs due to the lack of a structured approach that will provide regulations and standards that will boost the confidence and incentivize stakeholders.</u></p> <ul style="list-style-type: none"> What changes could have been made (if any) to the project design in order to improve the achievement of the project’s expected results? <u>There should have been less project components with each component responsible for removal of a particular barrier such as lack of knowledge of EE options, institutional regulatory barriers, financial and lack of an EE demonstration within the SRRM sector. Each component would then have SMART indicators that would have made the log-frame more useful in managing the Project.</u> 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none">
<p>Efficiency: Was the project implemented efficiently, in-line with international and national norms and standards and delivered results with the least costly resources possible?</p>				

<ul style="list-style-type: none"> Was project support provided in an efficient way? 	<ul style="list-style-type: none"> How do the project management systems, including progress reporting, administrative and financial systems and monitoring and evaluation system were operating as effective management tools, aid in effective implementation and provide sufficient basis for evaluating performance and decision making? <i><u>The Project management system was adequate for managing the outputs of SRRMP. However, the system did not address the broader strategic issues such as capacity building of an institution that would carry on TA after the EOP, and the decreasing importance of the capital subsidies for model SRRMs and possibly the SRRM sector in general.</u></i> 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none">
	<ul style="list-style-type: none"> How effective was the adaptive management practiced under the project and lessons learnt? <i><u>Adaptive management was practiced under the project in response to various situations that emerged from time to time starting with inclusion of financial incentive in the form of capital subsidy against the original plan of an "interest rate subsidy". Later, adaptive management was practiced by the PSC to make the process of approving the capital subsidies to the SRRM units less stringent. However, there was significant delay in adaptively managing these changes, which impacted Project implementation and GoI co-financing will only be 55% when the project ends in December 2013.</u></i> 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none">
	<ul style="list-style-type: none"> Did the project logical framework and work plans and any changes made to them used as management tools during implementation? <i><u>No changes were made to the Project logical framework during implementation</u></i> 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none">
	<ul style="list-style-type: none"> Utilization of resources (including human and financial) towards producing the outputs and adjustments made to the project strategies and scope. <i><u>As mentioned above</u></i> 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none">
	<ul style="list-style-type: none"> Details of co-funding provided (Ministry of Steel, GoI and Financing Units) and its impact on the activities (Refer to Table in section 6. Project Finance / Co-Finance). <i><u>Refer Section 3.2.4 of the report as well as GHG tracking tool</u></i> 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none">
	<ul style="list-style-type: none"> How does the APR/PIR process helped in monitoring and evaluating the project implementation and achievement of results? <i><u>The APRs and PIRs served as the main tool for M&E of the Project and</u></i> 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none">

	<i>achievement of results. There were some shortcomings of the APRs/PIRs as covered under Section 3.2.3 of the report.</i>			
<ul style="list-style-type: none"> How efficient are partnership arrangements for the project? 	<ul style="list-style-type: none"> Appropriateness of the institutional arrangement and whether there was adequate commitment to the project? <i>Adequate institutional support was available within the country and the select partners engaged were committed to the cause of project. NISST was one of the key implementing partner engaged in the project beside SAIL, PCRA and NPC which provided useful handholding support and training to the SRRM to improve productivity through adoption of Standard Operating Practices and Standard Management Practices in addition to technical support on reducing energy consumptions.</i> 	•	•	•
	<ul style="list-style-type: none"> Was there an effective collaboration between institutions responsible for implementing the project? <i>UNDP and Ministry of Steel were two institutions responsible for implementing the project that worked collaboratively to ensure the objectives of the project were met. In addition, the Project Management Cell had direct relationship through a contractual arrangement with various other institutions engaged for specific objective. No evidence was found of collaboration amongst institutions involved in project implementation.</i> 	•	•	•
	<ul style="list-style-type: none"> Is technical assistance and support received from project partners and stakeholders appropriate, adequate and timely specifically for project PMU? <i>Yes, the support provided by the Project partners in the form of non-technical training was appreciated by the industries as valuable insight in improving productivity and awareness raising. The results started coming from 4th year of the Project.</i> 	•	•	•
<p>Sustainability: To what extent are there financial, institutional, social-economic, and/or environmental risks to sustaining long-term project results?</p>				
<ul style="list-style-type: none"> Will the project be sustainable on its conclusion and stimulate replications and its potential? 	<ul style="list-style-type: none"> How effective is the project in terms of strengthening the SRRM units (model/pipeline/replication) in carrying out eco-tech options, and replication of these options on their own by other SRRM units once the project is closed. Does there exist a sound database of knowledge, and technical cell on the eco-tech options and implementation findings. <i>The project has been effective in providing technical hand-holding support to implement EE technologies and other standard operating practices which</i> 	•	•	•

	<p><i>have helped in reducing the energy consumption and increase productivity. Several reports and documentaries have been made on the energy saving technology options, which needs to be shared with industries even after the end of this project.</i></p> <ul style="list-style-type: none"> • How useful the formulation of technology information resource and facilitation center (TIRFAC) could have been under the project and what were the implications of not having such a Centre? <i>TIRFAC could have been made a part of existing institution which is working with the secondary steel industry. The software component of TIRFAC needs to continue to provide technical advice to the industries; however, the hardware component of TIRFAC would have had limited usefulness in the near term. As the technology and processes are evolving towards “direct charging” the TIRFAC hardware centre with its aim on improved furnace design would have outlived its usefulness in a short period of time.</i> • What would be the proposed alternative to fill this gap of not having a TIRFAC software Centre? <i>The TIRFAC software center with the roll pass design software acquired by the Project needs be continued in support of SRRM units that were not covered under the Project. The TIRFAC software center needs to be housed in an agency that is closely working with the SRRM units, and staffed by people trained on using the software.</i> 			
	<ul style="list-style-type: none"> • Comment on the exit strategy being implemented by the project and provide a commentary on the “Expected situation at the end of the Project” as envisioned at the time of terminal evaluation. <i>The exit strategy being prepared is a comprehensive study which reviews the activities of UNDP, PMC against the current needs of industries. Actions that need to be taken when the project ends in December 2013 would broadly cover (a) information dissemination; (b) implementation support to SRRM units; (c) selection of an implementing agency which is connected with the industry and (e) its mode of operation to provide support to industry. While the exit strategy preparation is addressing the gaps, it is being carried at a very late stage in the project, and gives insufficient time for UNDP and MoS to prepare for transition as the PMC will cease to exist and the products developed under the current project need to be passed on to a succeeding agency before the Project closes. Thus, the overall</i> 	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> • <i>Document review: interaction with project partners</i>

	<i>sustainability issue has not been adequately addressed.</i>			
	<ul style="list-style-type: none"> Appropriateness of the institutional arrangement and whether there was adequate commitment to the project. <i>The institutional arrangement was appropriate and there was adequate commitment by MoS to the Project.</i> 			
Impact: Are there indications that the project has contributed to, or enabled progress towards maximizing environmental benefits?				
<ul style="list-style-type: none"> What was the project impact under different components 	<ul style="list-style-type: none"> (a) Benchmarks for eco-tech Options & Packages Established (b) Institutional Arrangements Strengthened (c) Effective Information Dissemination Program Developed (d) Stakeholders capacity enhanced (e) Technical and financial feasibility of eco-tech options and technical packages established (f) Innovative institutional mechanisms established (g) Technology Information Resource and Facilitation Centre Established <p><i>Refer detailed description provided in Section 3.3 – Project Results on the impact of each project components</i></p>	<ul style="list-style-type: none"> Refer to details in Section 3.3 	Use key indicators in logframe listed in project document (or Annex B)	<ul style="list-style-type: none"> Document review and interview with Project stakeholders
	<ul style="list-style-type: none"> What was the additional co-financing amount that was leveraged by the project and mobilized investments in India? The co-financing given by Ministry of Steel and the investments made by individual model SRRM units. <i>Refer to Section 3.2.4 and Annexure E for co-financing details of MoS and model units</i> 		<ul style="list-style-type: none"> Information furnished by PMC, and CDR 	<ul style="list-style-type: none"> Document review, interviews
<ul style="list-style-type: none"> What are the indirect benefits that can be attributed to the project? 	<ul style="list-style-type: none"> Spinoffs created by the project, if any, as a result of the various workshops held nationwide, case studies of the model units and pipeline units where support was given for energy audits. Are these Energy Efficiency initiatives in the SRRM units influenced Small & Medium enterprises of other sectors to take similar initiatives for energy savings? <p><i>There has been widespread awareness created for measures that can be taken to reduce the specific energy consumption in SRRM: industries have come forward to invest in continuous casting process and make modifications in the plant to stop the use of re-heating furnaces. However, due to the ownership structure of these SRRMs, there are still a large number of SRRMs requiring hand holding support to improve efficiency and productivity. There is no evidence of information sharing between SMEs of</i></p>	<ul style="list-style-type: none"> Limited resource to hold workshops and training program in SRRM clusters 	<ul style="list-style-type: none"> Report entitled SAILCON and exit strategy by PWC 	<ul style="list-style-type: none"> Document review and discussions with project partners

	<p><i><u>SRRMs to take similar action.</u></i></p>			
<ul style="list-style-type: none"> Impacts due to information dissemination under the project 	<ul style="list-style-type: none"> Assess the use of electronic information and communication technologies in the implementation and management of the project. Documentary on the model units and the process documents produced. <i><u>The use of SRRM information on the www.undpgefsteel.gov.in website has been excellent. The information as well as various documentaries posted on the website has provided clear coverage of EE technologies, and practices such as 5S and those compliant to ISO standards for 9000 and 14000.</u></i> 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> Documentaries 	<ul style="list-style-type: none"> Document review

APPENDIX G – PROJECT PLANNING MATRIX

Strategy	Indicators	Means of Verification	Assumptions
Overall Project Goal (Impact)			
To reduce GHG emissions in the steel rerolling mill (SRRM) sector in India.	<ul style="list-style-type: none"> • Compliance with established energy & environment efficiency norms of EcoTech options & technology packages adopted. • Bi-annual cluster reports and Annual country reports (incl. model units) • 'Progress Ratio' measurement study after every 2 years. • Beginning first year EcoTech coverage increases to 25% by end of fifth year. 	<ul style="list-style-type: none"> • Annual statistical progress report of Ministry of Steel (Office of the DCI&S). • 'Green' Balance Sheets of SRRM Units (by TIRFAC) • Baseline & EcoTech study reports (by TIRFAC) 	Ministry of Steel (EA) sets up an internationally linked self-financing institutional capacity and maintains the required human and financial resources.
Project's Goal (Outcome)			
To improve energy efficiency in the SRRM Sector by expanding private sector investments in 'win-win' nature of low GHG emitting technologies (EcoTechs).	Share of EcoTech increased to 25% (3 million tons) by end of the project period resulting in cumulative energy saving of 9 PJ and 0.88 million tons of reduction in CO ₂ emissions.	<ul style="list-style-type: none"> • Bi-annual and annual study reports of TIRFAC based on regular field studies. • Collection of data from secondary sources 	<ul style="list-style-type: none"> • Market demand, Policy and regulatory framework sustained. • Adequate availability of semis • Required equity / credit is available.
Outputs/Components			
1. Benchmarks for ecotech options and technical packages established and validated			

Strategy	Indicators	Means of Verification	Assumptions
<ul style="list-style-type: none"> • Energy and environment labels, standards, and benchmarks including investment norms of EE options and technology packages developed; • Standardized methods and tools for design, engineering and implementation of ecotech solutions designed; • Information modules for financing institutions, government and policy makers, and industry partners developed. 	<ul style="list-style-type: none"> • Industry complies with energy-cum-environment performance norms benchmarked against 'best-practice' norms achieved in respect of similar technologies in India or abroad* and validated through actual performance of EMUs after one year of their stabilization; • Techno-economic viability including cost recovery (CCE, IRR, Payback, BEP etc.) is established; • Energy labels and standards developed by end of third year; • Information modules (1c) developed and disseminated by the end of 18 months of the start of the project. 	<ul style="list-style-type: none"> • Comparison with 'Best-practice' norms; • Verification by panel of experts; • Results documented for EMUs; • Week long continuous operation; • Standard design and implementation manuals prepared and distributed; • Feedback reports from FIs, Govt and policy planners and industry. 	<ul style="list-style-type: none"> • Technology sources are available; • Sources are keen to build up the market by tailoring technologies to match size and configuration the mills; • Local expertise for implementation is available.
2. Institutional Arrangements Strengthened			
<ul style="list-style-type: none"> • Networks of association of private and public institutions and companies, bilateral and multilateral organizations, financial institutions providing technical, financial and market inputs to the sector within the legal framework of the nation developed; • Business networks through self-financed association of multi-disciplinary experts including successful entrepreneurs; • Institutional capacity to facilitate technology transfer developed. 	<ul style="list-style-type: none"> • Job contracted to specialist agency/ organization, preferably, international with sufficient experience in the line. Completed successfully by the end of 3rd year. Job as includes establishment of business support networks and development of internationally linked institutional capacity; • Hardware facilities namely prototype development, technology testing and calibration along with software facilities put in operation by the end of 3rd year; • Design, standards and implementation manuals put in practice during the same period 	<ul style="list-style-type: none"> • Annual project implementation report by PMC. 	<ul style="list-style-type: none"> • Means of communication is available; • Willingness to participate and collaborate
3. Effective Information Dissemination Program Developed			

Strategy	Indicators	Means of Verification	Assumptions
<ul style="list-style-type: none"> • Establishing worldwide database on current and emerging EE technologies including sources of supply and investment costs, expert analysis, projects, markets, opportunities, and related stakeholders; • Disseminating information through newsletters, technical bulletins, website and expert presentation 	<ul style="list-style-type: none"> • Report identifying information needs, information sources, dissemination channels and MIS finalized by end of 1st year; • System design, data collection, alliances and mechanism established by end of 2nd year; • Information dissemination channels & access procedures operationalized by end of 3rd year. 	<ul style="list-style-type: none"> • Feedback from stakeholders based on responses; • National & regional workshops arranged in 5 years for information dissemination and awareness; • Publications 	<ul style="list-style-type: none"> • Competent task-specific expertise is locally available.
4. Stakeholders capacity enhanced			

Strategy	Indicators	Means of Verification	Assumptions
<ul style="list-style-type: none"> • Carrying out capacity needs assessment of the major stakeholders to implement and absorb advanced EE technologies in the sector; • Identifying specific capacity building needs for preparation and implementation of a time- bound action plan for capacity building of the major stakeholders; • Conducting training programs/workshops in EE Technologies and Technology Management including cooperative procurement of EE technologies in clusters, engineering and implementation support; • Developing Standard Operating Practices (SOP) and Standard Maintenance Practices (SMP); • Facilitating absorption and assimilation of 'Best Practices'; • Training of trainers' programme for developing industrial and institutional in- house capacity such as development of Energy-cum- Investment managers • Training local, state and central level banks, state financial institutions, manufacturers, and suppliers of services and local/regional consultant; • Institutional collaboration/tie- ups with clusters to facilitate new EE projects 	<ul style="list-style-type: none"> • Technology, resource and capacity building needs of each cluster mapped in first year time bound action plan; • Master plan for capacity building activities is finalized and documented by 13th month; • 5 cluster workshops for units/DEMs/ consultants on 'new' technologies and technology management each year; • 10 Workshops for unit owners/ managers on cooperative management practices and procurement processes in each of 5 clusters over 5 years; • Standard Operating Practices (SOP) and Standard Maintenance Practices (SMP) developed in third and fourth year; • 'Best Practices' program developed in second year and workshops conducted in third and fourth year; • Three exposure visits to developed countries for DEMs/local consultants; • 5 interaction and policy-oriented workshops for central/state govt. institutions on complex SME issues and constraints; • 3-week training program and curriculum developed by the end of first year for developing Energy-cum- Investment Managers, 5 programs, one in each cluster, conducted in 2nd, 3rd & 4th year; • Pilot programs for local govt., administrators, and planners focusing on energy efficiency and greening of environment conducted in each cluster beginning second year • Workshops on evaluating of EE technologies and projects for financing/ banking sector 	<ul style="list-style-type: none"> • Annual Project Implementation Reports and Reviews (Short, Mid & Long-term); • Formal participants' satisfaction survey conducted at conclusion of each capacity building activity (Level I); • Formal participants' skill evaluation at conclusion of every capacity building activity (Level II); • Independent Peer Reviews (IPRs) for capacity building efforts; • Action Taken Reports (ATRs) for capacity building activity plan 	<ul style="list-style-type: none"> • Policy and administrative support at all levels due to involvement of ministry of steel; • Competitive training/capacity building resources including modern software facilities are available

Strategy	Indicators	Means of Verification	Assumptions
5. Technical and financial feasibility of ecotech options and technical packages established			
<ul style="list-style-type: none"> Developing financial linkages and guidelines for support to pilot testing of packages in mills; Implementing 5 technology packages in 30 sample mills, 23 on one-to-one basis and 7 through ESCOs; Verifying techno-economic viability of packages including cost recovery, performance and impacts; Documenting implementation experience for developing model implementation practice; Disseminating the lessons learnt to wide range of stakeholders 	<ul style="list-style-type: none"> EcoTech Packages implemented and operationalized in 30 units: 3 units in 1st year, 4 in 2nd year, 9 in 3rd year, 8 in 4th year and 6 in 5th year; Documentation of lessons learned in successive years as above; Multiplication strategy package wise developed and recommended in successive years in accordance with successful implementation of packages as above. 	<ul style="list-style-type: none"> Progress report on implementation of demonstration units 'Best Practice' reports prepared by a Group of national and international experts based on demo units' operation 	<ul style="list-style-type: none"> Acceptance of the project by major stakeholders Executing agency ensures implementation at minimum cost
6. Innovative institutional mechanisms established			
<ul style="list-style-type: none"> Developing mechanisms of performance contracting involving identified ESCOs (Thermax EPS, INTESCO ASEA, ELPRO ENERGY CENTER, SEETECH INDIA, DCM. and 3EC) and technology providers; Strengthening capacity of the ESCOs for implementing identified technical packages for the mills; Developing institutional linkages among existing ESCOs, technology providers and industry Evaluating the market potential through demonstrating ESCO concept in 7 mills 	<ul style="list-style-type: none"> ESCOs identified. Performance capability of ESCOs specific to the needs of rerolling mills enhanced by the end of 2nd year; Market transformation strategy developed and implemented at end of the 2nd year; 5 ESCOs operationalised from third year; Demonstration of EcoTech packages in 7 units through ESCO route between 3rd and 5th year; A minimum of 90% of EE solutions (EcoTech options/tech. Packages proposed under the project) become locally available at conclusion of the project. 	<ul style="list-style-type: none"> Project completion reports by ESCOs as per agreement; Annual Market Survey Reports. 	<ul style="list-style-type: none"> Availability of national & international ESCOs and their willingness to participate

Strategy	Indicators	Means of Verification	Assumptions
7. Technology Information Resource and Facilitation Centre Established			
<ul style="list-style-type: none"> • Setting up of a project management and coordination unit for implementing project activities; • Developing a comprehensive work-cum-implementation and monitoring plan for activities in the TA component; • Reporting to funding agencies as per the pre-determined progress indicators for various activities in the project; • Documenting lessons learnt for all project activities and their objective vis-à-vis outputs; • Establishing technology information and Facilitation Centre. 	<ul style="list-style-type: none"> • PMC set up in 10 weeks after project approval by GEF Council; • Annual Work plan approved by PSC and job order issued which coincides with 'zero' date of the project; • Master plan for project activities is finalized and documented in first 10 weeks; • Monitoring and Evaluation Plan along with reporting procedures finalized and PMC staff appointed at the end of 6th month; • Monthly/quarterly/annual performance review formats prepared for adoption by all project constituents at the end of 6 months; • Software and hardware centers of TIRFAC set up at the end of 2nd and 3rd year respectively. 	<ul style="list-style-type: none"> • Job Order issued ; • Project Progress & Completion reports (PPR & PCR) plus mid-term Review and Action Taken Reports by Project Advisory Committee; • Annual Disbursement and Audit Reports. 	<ul style="list-style-type: none"> • Competent task-specific expertise is locally available; • Policy and administrative support at all levels is available; • Financial resources (GEF and non-GEF) are available in time; • EA exercises financial discipline to ensure implementation of project at minimum cost.

APPENDIX H– EVALUATION CONSULTANT AGREEMENT FORM

Evaluators:

1. Must present information that is complete and fair in its assessment of strengths and weaknesses so that decisions or actions taken are well founded.
2. Must disclose the full set of evaluation findings along with information on their limitations and have this accessible to all affected by the evaluation with expressed legal rights to receive results.
3. Should protect the anonymity and confidentiality of individual informants. They should provide maximum notice, minimize demands on time, and respect people’s right not to engage. Evaluators must respect people’s right to provide information in confidence, and must ensure that sensitive information cannot be traced to its source. Evaluators are not expected to evaluate individuals, and must balance an evaluation of management functions with this general principle.
4. Sometimes uncover evidence of wrongdoing while conducting evaluations. Such cases must be reported discreetly to the appropriate investigative body. Evaluators should consult with other relevant oversight entities when there is any doubt about if and how issues should be reported.
5. Should be sensitive to beliefs, manners and customs and act with integrity and honesty in their relations with all stakeholders. In line with the UN Universal Declaration of Human Rights, evaluators must be sensitive to and address issues of discrimination and gender equality. They should avoid offending the dignity and self-respect of those persons with whom they come in contact in the course of the evaluation. Knowing that evaluation might negatively affect the interests of some stakeholders, evaluators should conduct the evaluation and communicate its purpose and results in a way that clearly respects the stakeholders’ dignity and self-worth.

