

ANNEX Q – LSC REPORT TEMPLATE

CONTENTS



A. Project Description

1. Title of the project activity
2. Project eligibility under Gold Standard
3. Current project status

B. Design of Stakeholder Consultation Process

1. Description of physical meeting(s)
 - i. Agenda
 - ii. Non-technical summary
 - iii. Invitation tracking table
 - iv. Text of individual invitations
 - v. Text of public invitations
2. Description of other consultation methods used

C. Consultation Process

1. Participants' in physical meeting(s)
 - i. List
 - ii. Evaluation forms
2. Pictures from physical meeting(s)
3. Outcome of consultation process
 - i. Minutes of physical meeting(s)
 - ii. Minutes of other consultations
 - iii. Assessment of all comments
 - iv. Revisit sustainable development assessment
 - v. Summary of changes to project design based on comments

D. Sustainable Development Assessment

1. Own sustainable development assessment
 - i. 'Do no harm' assessment
 - ii. Sustainable development matrix
2. Stakeholders blind sustainable development matrix
3. Consolidated sustainable development matrix

E. Sustainability Monitoring Plan

1. Discussion on Sustainability monitoring Plan
2. Discussion on continuous input / grievance mechanism

F. Description of Stakeholder Feedback Round

Annex 1. Original participants list

Annex 2. Original feedback forms

SECTION A. PROJECT DESCRIPTION

A. 1. Title of the project activity

Title: Energy Efficiency measures in DMRC Phase II stations

Date: 26 September 2012

Version no.: 2

A. 2. Project eligibility under the Gold Standard

[See Toolkit 1.2 and Annex C]

Eligibility condition GS VER Annex AD:

The project should be of end-use energy efficiency improvement category. Project activities must implement measures to reduce energy requirements as compared to the baseline without affecting the level and quality of the services provided (service equivalence). Furthermore, the following principle applies: efficiency measures implemented are considered 'end-use' energy efficiency measures when final end-users of products or services delivered can be clearly identified and therefore are within the project boundaries, and when physical intervention is required at the end-user side. Both emission reductions from direct and indirect energy savings are potentially eligible.

Justification

The project activity is an end-use energy efficiency improvement project that reduces the amount of energy required for delivering or producing non-energy physical goods or services such as air conditioning, lighting and station maintenance. The project activity involves the use of energy efficient lighting and VRV type air conditioners which reduce the amount of electrical energy consumed compared to the baseline scenario. The level and quality of services in the project scenario is the same as the baseline and does not affect the quality of air-conditioning and lighting in the stations of Phase II stations.

Additional GS applicability criteria/ requirements:

Emission reductions associated with end use energy efficiency improvements only shall be eligible for Gold Standard registration. Emission reductions associated with difference in carbon content between a non-renewable fuel and a less carbon intensive non-renewable fuel used for substitution measure shall NOT be eligible.

Justification

The project activity is an end use energy efficiency project. Emission reductions are associated with the reduction in electrical energy consumption and do not involve any substitution of non-renewable fuel.

A. 3. Current project status

The project is already operational and VERs are claimed for the project activity in retroactive mode. As such the pre feasibility assessment was conducted on 9th August 2012 given that the project is retroactive. After that Local Stakeholder Feedback round was also carried out on 26th September 2012. The details of Local Stakeholder Feedback round is provided in relevant sections of this document. The project will undergo validation henceforth

SECTION B. DESIGN OF STAKEHOLDER CONSULTATION PROCESS

B. 1. Design of physical meeting(s)

i. Agenda

Opening of the meeting

The opening of the Local stakeholder feedback round was done by CGM Delhi Metro.

Explanation of the project

A detailed power point presentation was given about the project and its impact on local stakeholders by Assistant Manager Environment, DMRC. The presentation consisted of an introduction to Delhi Metro, detailed description of the project and efficiency measures installed at stations, contribution of the project to sustainable development, a brief introduction to Gold standard and emission reduction calculation. The presentation content was presented in such a manner that it can be easily understood by laymen.

Discussion of continuous input /grievance mechanism

DMRC strives for the satisfaction of it's stakeholders. To ensure an easy and continuous mechanism for addressing the feedback from its stakeholders, DMRC has a Feedback/Complaint mechanism in its online portal <http://www.delhimetrorail.com/feedback.aspx>

The mechanism provides the options for the type of feedback under the headings as: Train frequency, Train timing, Station services, feeder bus services, Career and Other. The feedback/complaint is station specific and stakeholders can submit their responses regarding each station of Delhi Metro. Moreover there is also a 24 hour helpline available.

Questions for clarification about the project

After the presentation stakeholders were asked to clarify their queries if they have any. Stakeholders asked some questions and CGM gave the clarifications to those questions. Stakeholders also gave some valuable suggestions which were welcomed by the CGM.

This has been provided in Section C 1.

Blind SD exercise

Not required.

Discussion on monitoring SD

Not required.

After the presentation stakeholders were asked to clarify their queries if they have any. Stakeholders asked some questions and CGM gave the clarifications to those questions. Stakeholders also gave some valuable suggestions which were welcomed by the CGM.

Closure of the meeting

The closure of the meeting was done by CGM by thanking the stakeholders for their valuable time.

ii. Non-technical summary

Energy Efficiency measures at DMRC Phase II stations (hereafter referred to as the "Project") developed by Delhi Metro Rail Corporation Ltd. (DMRC) is located in state of Delhi, India. The project involves implementation of energy efficiency measures in selected stations of Phase II of Delhi Metro managed by DMRC. The energy efficiency measures have been undertaken primarily in the Heating, Venting and Air Conditioning (HVAC) system of station buildings. The measures adopted in the HVAC system result in reduction in electrical energy consumption, in comparison to that for a station building forming a part of Phase I of Delhi Metro with similar size (in terms of floor area) and architectural perspectives.

One of the main energy efficiency measures is the implementation of energy efficient VRV (Variable refrigerant volume) type Chillers under Phase II of DMRC. In Phase I the Split type chillers are used for cooling purposes, whereas in the Phase II more energy efficient VRV type chillers are being used for air-conditioning.

Conventional systems air condition a building as a whole, whereas the VRV system air conditions each room individually. Hence it is ideal for the constantly changing occupancy of a typical building. Even further, precise level control is possible that reacts to the exact conditions in each room.

Since the project is more energy efficient as compared to Phase I of Delhi Metro, it consumes less electricity and thus results in reduction of Carbon dioxide emissions (CO₂) emissions.

Apart from above mentioned measures, the project also involves other measures to improve energy efficiency through efficient lighting system and more efficient building architecture resulting in maximum utilization of daylight and reduction in cooling

requirement.

iii. Invitation tracking table

Category code	Organisation (if relevant)	Name of invitee	Way of invitation	Date of invitation	Confirmation received? Y/N
F	Carbon Watch	Deepak Mawandia	Invitation letter	04/09/2012	NA
F	Development Alternatives	Ashok Khosla	Invitation letter	04/09/2012	NA
F	EnerGHG India	Narendra Paruchuri	Invitation letter	04/09/2012	NA
F	Fair Climate Network	Dr. Sudha Padmanabha	Invitation letter	04/09/2012	NA
F	Non-Conventional Energy and Rural Development Society (NERD SOCIETY Coimbatore	Mrs. Sathiajothi Kamaraj	Invitation letter	04/09/2012	NA
F	Rural Education for Development Society-REDS	Mr. M. C. Raj and Mrs. Jyothi Raj	Invitation letter	04/09/2012	NA
F	SKG Sangha	Vidya Sagar Devabhaktuni	Invitation letter	04/09/2012	NA
F	Winrock International India	Debajit Das	Invitation letter	04/09/2012	NA
B	Central Road Research Institute, Delhi	Dr. Naseem Akhtar	Invitation letter	04/09/2012	Y
A	Kalindi College, Delhi University	Dr. Savita Roy	Invitation letter	04/09/2012	Y

Please explain how you decided that the above organisations/ individuals are relevant stakeholders to your project. Also, please discuss how your invitation methods seek to include a broad range of stakeholders (e.g. gender, age, ethnicity).

The NGOs/institutions were invited on the basis of the relevancy of their work with the project. NGOs invited were all listed by Gold Standard. These are major NGOs within the country. Other than NGOs stakeholders of varied identity were also invited which includes scientists, professors, students and local people who are also commuters of Delhi Metro.

iv. Text of individual invitations

To

Mr. _____

(Organization)

(Address)

Subject: Invitation for Local Stakeholder Feedback round for DMRC Gold Standard VER project *“Energy Efficiency measures in DMRC Phase II Stations”*

Dear Sir,

DMRC is pleased to announce a stakeholder feedback round on the project “Energy Efficiency measures in DMRC Phase II stations” on 18.09.12, 04.00 PM at Office of CPM-4. You are invited to attend this session in which you will be able to put forward your views on this project.

This project is about the energy efficiency measures undertaken by DMRC in all Phase II stations of Delhi metro. These energy efficiency measures have resulted in reduction in electrical energy consumption and thereby Greenhouse Gas Emissions in comparison to the stations of Phase I of Delhi Metro. The project involves measures to improve energy efficiency through efficient air conditioning, lighting and building architecture. Since the project is more energy efficient as compared to Phase I of Delhi Metro, it consumes less electricity and thus results in reduction of greenhouse gas emissions.

DMRC would appreciate your feedback on this project. We look forward to meet you at the meeting and apologize for any inconvenience that may have caused to your normal work programs.

Yours truly

Mr. S. A. Verma

AGM

Delhi Metro Rail Corporation

v. Text of public invitations

STAKEHOLDER CONSULTATION NOTIFICATION

Date: 26th

September 2012

Time: 04.00PM

Venue: Office of CPM-4, Seed Bed Park, Shakarpur, Delhi -110092

DMRC is pleased to announce a stakeholder feedback round on the project “Energy Efficiency measures in DMRC Phase II stations”. General public is invited to attend this session in which they will be able to put forward their views on this project. The primary purpose of this meeting is to speak with any stakeholders, including private citizens, Metro representatives, scientists and environmental and conservation NGOs, who wish to provide information regarding the energy efficiency of Delhi Metro.

Project Description: This project is about the energy efficiency measures undertaken by DMRC in all Phase II stations of Delhi metro. These energy efficiency measures have resulted in reduction in electrical energy consumption and thereby Greenhouse Gas Emissions in comparison to the stations of Phase I of Delhi Metro. The main efficiency measure is installation of energy efficient VRV (Variable refrigerant volume) type chillers in Phase II whereas in Phase I Split Chillers were installed. The project also involves other measures to improve energy efficiency through efficient lighting system and more efficient building architecture resulting in maximum utilization of daylight and reduction in cooling requirement. The project also contributes to sustainable development for the well being of the country in terms of environment, socio-economic benefits. Since the project is more energy efficient as compared to Phase I of Delhi Metro, it consumes less electricity and thus results in reduction of Carbon dioxide emissions (CO₂).

DMRC would appreciate your feedback on this project. We look forward to meet you at the meeting and apologize for any inconvenience that may have caused to your normal work programs.

A.K.Gupta CGM

(E&TI)

Delhi Metro Rail Corporation

B. 2. Description of other consultation methods used

If individuals and/ or entities (e.g. NGOs) are unable to attend the physical meeting, please discuss other methods that were used to solicit their feedback/ comments (e.g. questionnaires, phone calls, interviews).

Not Applicable.

SECTION C. CONSULTATION PROCESS

C. 1. Participants' in physical meeting(s)

i. List of participants

The list is provided in Annex 1.

Participants list is provided in Annex 1.

Date and time: 26th September 2012, 04.00PM

Location: Office of CPM-4, Seed Bed Park, Shakarpur, Delhi -110092

Comments accompanying Annex 1

Q.1 Passengers shifting from cars, buses, bikes etc to metro are also conserving energy indirectly (Modal Shift). Then why this aspect has not been included in the project?

Q.2 What about the gaseous emissions emitted by chillers? If VRV Chillers are more efficient than Split chillers, then why cannot we claim for the efficiency of VRV against split chillers? How much VRV chillers are more efficient than Split chillers?

Q.3 Roof tops of stations and trains can be coated with heat insulating/reflecting material to reduce the energy consumption for maintaining the temperature of the stations and trains?

Q.4 Wind turbines can be installed to exploit the wind velocity generated by the high speed train for the generation of electricity.

Q.5 Can we install Noise barrier system at escalators and station to conserve more electricity?

Q.6 Are there any energy efficiency measures taken for the lighting of the stations?

Q.7 There are two types of trains i.e. manufactured by Bombardier and Rotem. Which one of these is more energy efficient?

ii. Evaluation forms

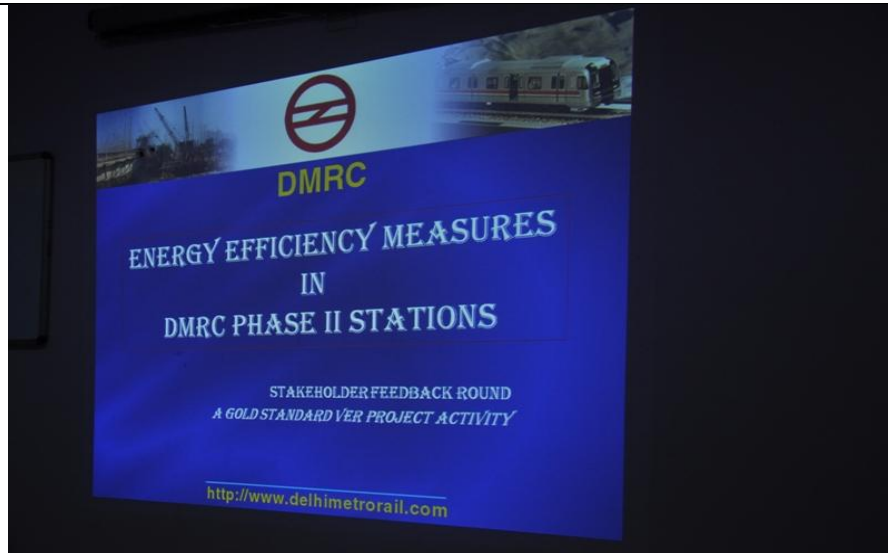
Evaluation forms has been Provided in Annex 2.

Comments accompanying Annex 2

The evaluation forms are attached as annex 2. There are no negative comments. All the stakeholders are impressed with the project activity and commended DMRC on their

initiative.

C. 2. Pictures from physical meeting(s)





C. 3. Outcome of consultation process

i. Minutes of physical meeting(s)

The detail description of the stakeholder feedback round for the project activity has been discussed in this document through relevant sections. Since the project is retroactive in nature, hence stakeholder feedback round was carried out. The description of.

The opening of the Local stakeholder feedback round was done by CGM Delhi Metro.

A brief introduction about the project was given by the CGM to the stakeholders. He explained the energy efficiency measures taken in stations of phase II of Delhi Metro in brief. A detailed power point presentation was given about the project and its impact on local stakeholders by Assistant Manager Environment, DMRC. The presentation consisted of an introduction to Delhi Metro, detailed description of the project and efficiency measures installed at stations, contribution of the project to sustainable development, a brief introduction to Gold standard and emission reduction calculation. The presentation content was presented in such a manner that it can be easily understood by laymen.

After the presentation stakeholders were asked to clarify their queries if they have any. Stakeholders asked some questions and CGM gave the clarifications to those questions. Stakeholders also gave some valuable suggestions which were welcomed by the CGM. This has been provided in Section C 1.

The closure of the meeting was done by CGM by thanking the stakeholders for their valuable time.

The attendance sheet and evaluation forms are provided in Annex 1 and Annex 2 respectively.

ii. Minutes of other consultations

Not Applicable

iii. Assessment of all comments

Stakeholder comment	Was comment taken into account (Yes/ No)?	Explanation (Why? How?)
Q.1 Passengers shifting from cars, buses, bikes etc to metro are also conserving energy indirectly (Modal Shift). Then why this aspect has not been included in the project?	No	Because it was about the energy conservation due to modal shift. It was informed that this aspect has been considered separately in another project.
Q.2 What about the gaseous emissions emitted by chillers? If VRV Chillers are more efficient than Split chillers, then why cannot we claim for the efficiency of VRV against split chillers? How much VRV chillers are more efficient than Split chillers?	No	Because it was concerned with air pollution. It was informed by the CGM that VRV chillers emit lesser gaseous emissions than Split chillers. And we cannot claim for technological efficiency of VRV chillers over split chillers.
Roof tops of stations and trains can be coated with heat insulating/reflecting material to reduce the energy consumption for maintaining the temperature of the stations	Yes	Because it was concerned with the architectural improvement which can lead to more energy efficiency. CGM appreciated the suggestion and said that they

and trains?		will consider it in future.
Wind turbines can be installed to exploit the wind velocity generated by the high speed train for the generation of electricity.	Yes	Because it was about innovation and technological improvement. CGM welcomed the suggestion.
Can we install Noise barrier system at escalators and station to conserve more electricity?	Yes	Because it was about the technological improvement at stations. CGM informed that DMRC already have installed this system at Metro Bhavan but not in stations. Instead of that they have controlled the speed of the escalators. On weekends the speed of the escalators is kept low while on week days the speed is higher to increase the rate of passenger's inflow and outflow.
Are there any energy efficiency measures taken for the lighting of the stations?	Yes	Because it was about energy efficiency at stations. It was informed that DMRC have installed CFL light at all the stations of Phase I and Phase II.
There are two types of trains i.e. manufactured by Bombardier and Rotem. Which one of these is more energy efficient?	Yes	Because it was about the energy efficiency of trains. CGM informed that both of these types of trains are energy efficient but trains manufactured by bombardier are technologically more advanced.

iv. Revisit sustainability assessment

Are you going to revisit the sustainable development assessment?	Yes	No
Please note that this is necessary when there are indicators scored 'negative' or if there are stakeholder comments that can't be mitigated	☐	☒

Give reasoning behind the decision

The stakeholders did not raise any negative comment regarding the project activity. They however suggested sufficient new innovative measures that can be implemented by DMRC in future. So, at present it is not required to revisit sustainable development assessment.

v. Summary of alterations based on comments

If stakeholder comments have been taken into account and any aspect of the project modified, then please discuss that here.

Not Applicable

SECTION D. SUSTAINABLE DEVELOPMENT ASSESSMENT

D. 1. Own sustainable development assessment

i. 'Do no harm' assessment

Safeguarding principles	Description of relevance to my project	Assessment of my project risks breaching it (low, medium, high)	Mitigation measure
The project respects internationally proclaimed human rights including dignity, cultural property and uniqueness of indigenous people. The project is not complicit in Human Rights abuses.	Yes, the project activity abides by human rights. Though the human right abuses are common in the host nation, but the project is not involved in any such act. The measures taken in the project supports the principle of respecting life and security by having positive impact on quality of air, water, soil and energy. The project participant is not a land mine or arms producer and distributor. The cultural property is protected by means of safeguarding the environment. The govt. of host nation has signed various Human rights treaties and has its legislation to consider violation of rights. The compliance to these laws is not very effective but all measures are being taken to improve the scenario.	There is no project risk against this safeguarding principle	Since the project activity is not causing human rights abuse in any form, there is no need for any mitigation measure.
The project does not involve and is not complicit in involuntary resettlement.	Though the host nation has not signed ILO 169 convention but the project activity does not involve any resettlement. In case of projects that involve resettlement, social impact analysis needs to be carried out by the project proponent. This is as per	There is no project risk against this safeguarding	Since the project activity does not involve any

	“National Rehabilitation and Resettlement policy 2007” by Ministry of Rural Development . Only those projects with proper rehabilitation and resettlement are provided clearance by the host country government.	principle	resettlement, there is no need for mitigation measure.
The project does not involve and is not complicit in the alteration, damage or removal of any critical cultural heritage	There is no damage caused by the project activity to the traditional culture, archaeological structures. However, the host nation is highly sensitive to issues relating to cultural and religious heritage and principles concerned are effectively complied with. The host country has proper acts and regulations which prevent implementation of project activities that complicit in alteration or degradation of critical cultural or national heritage.	There is no project risk against this safeguarding principle	The project activity is not causing any harm to cultural and religious heritage. So there is no need of any mitigation measure.
The project respects the employees’ freedom of association and their right to collective bargaining and is not complicit in restrictions of these freedoms and rights	The project activity complies with the principle.	There is no project risk against this safeguarding principle	Since it does not have any risk, hence this principle does not call for mitigation in the project scenario
The project does not involve and is not complicit in any form of forced or compulsory labour	The host nation has signed ILO convention 29 and 105 for abolition of forced labour. There is no forced labour involved in the project.	There is no project risk against this safeguarding principle	Since there is no forced labour involved in project activity, no need of

			mitigation measure.
The project does not employ and is not complicit in any form of child labour	The nation has not signed the child labour conventions. However the host nation has following laws: “The Child Labour (Prohibition and Regulation) Act of 1986”. This prohibits the employment of children below the age of 14 years in hazardous occupations identified in a list by the law. “The Juvenile Justice (Care and Protection) of Children Act of 2000” This law made it a crime, punishable with a prison term, for anyone to procure or employ a child in any hazardous employment or in bondage. All the DMRC work tenders specifically mention about works to be undertaken in accordance with all applicable legislation and Indian statutory requirements including Child Labour (Prohibitions & Regulations) Act, 1986 and Rules 1950 There is no hazardous work involved in the project and no child labour is involved in the project activity.	There is no project risk against this safeguarding principle	The project is free from child labour. So there is no need of mitigation measure.
The project does not involve and is not complicit in any form of discrimination based on gender, race, religion, sexual orientation or any other basis.	The host nation has ratified the conventions 100 and 111 to prevent any discrimination at work. The nation also has legislation to prohibit discrimination at workplaces. The project does not discriminate among people.	There is no project risk against this safeguarding principle	The project activity does not discriminate among people so mitigation measures not required.
The project provides workers with a safe and healthy work environment	The project activity complies with the principle. DMRC as an organization has committed towards Quality, Environmental,	There is no project risk against this	Not applicable

ronment and is not complicit in exposing workers to unsafe or unhealthy work environments.	Health and Safety Policy in all operation and maintenance activities. It ensures safe and healthy working environment to all its workers. During the construction as well as maintenance of the project activity, all quality health and safety protocols are adhered to. Contractors who executed construction and maintenance for the project activity had to submit detailed and comprehensive contract specific SHE (Safety, Health and Environment) policy and plan. Thus it is ensured that the project activity has not led to any unsafe work environment or hazard towards the workers.	safeguarding principle	
The project takes a precautionary approach in regard to environmental challenges and is not complicit in practices contrary to the precautionary principle.	The project activity complies with the principle. There is no agricultural activity for GMO, invasive species or large monoculture. Moreover the project activity does not produce any hazardous waste	There is no project risk against this safeguarding principle	Not applicable
The project does not involve and is not complicit in significant conversion or degradation of critical natural habitats, including those that are (a) legally protected, (b) officially proposed for protection, (c) identified by authoritative sources for their high conservation value, or (d) recognized as protected by traditional local communities.	There is no additional land required for the project activity as the required Energy Efficiency measures are taken in the already existing sites. Also there is no natural habitat existing in the project area. The project activity does not increase any stress on the site, rather this project is an effort to reduce load on the environment. Energy source in India is mainly fossil-fuel based. Energy efficient initiatives thus go a long way in conservation of natural resources	There is no project risk against this safeguarding principle	The project activity does not degrade any critical natural habitat. And project also does not require additional land. So there is no need of any mitigation measure to be taken.
The project does not involve and is not complicit in corruption.	The project activity complies with the principle. There is no corruption involved in the project activity. DMRC as an	There is no project risk against this	NA

	organization employs anti-corruption protocol to each of its activities. Apart from that regular vigilance awareness weeks are organized to check and reiterate commitment to curb and weed out corruption at all levels.	safeguarding principle	
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ii. Sustainable development matrix

The MDG (Millennium Development Goals) of host nation India are as follows:

Goal 1: Eradicate extreme poverty and hunger

Goal 2: Achieve universal primary education

Goal 3: Promote gender equality and empower women

Goal 4: Reduce child mortality

Goal 5: Improve maternal health

Goal 6: Combat HIV/AIDS, malaria and other diseases

Goal 7: Ensure environmental sustainability

Goal 8: Develop a global partnership for development

The major MDG met by the project activity is Goal 7 which states to ensure environmental sustainability. Each indicator below is described as to how it ensures environmental sustainability. The project activity to some extent also eradicates poverty by providing livelihood during construction. Moreover carbon revenue from the project activity will be used for betterment of livelihood of the poor and needy.

Indicator	Mitigation measure	Relevance to achieving MDG	Chosen parameter and explanation	Preliminary score
Gold Standard indicators of sustainable development	If relevant, copy mitigation measure from 'Do No Harm' assessment, and include mitigation measure	Check www.undp.org/mdg and www.mdgmonitor.org	Defined by project developer	<u>Negative impact:</u> score '-' in case negative impact is not fully mitigated, score '0' in case

	used to neutralise a score of '-'	Describe how your indicator is related to local MDG goals		impact is planned to be fully mitigated <u>No change in impact:</u> score '0' <u>Positive impact:</u> score '+'
Air quality		The project activity reduces air pollution. The major pollutant prevented by the project activity is mercury. Mercury can cause fatal poisoning when inhaled. It is also harmful in the event of transcutaneous absorption and has dangerous effects on pregnancy	- T-8 tube lights are made without mercury and hence will not leak into air as it evaporates readily and can remain for up to a year in the atmosphere. - Use of VRV chillers instead of split will help decrease the amount of heat (warm air) rejected to the environment as amount of refrigerant will vary according to cooling needs instead of a constant volume. thus thermal pollution of air will be prevented. - Daylight usage will allow minimal use of tube lights during day time and hence increasing period over which tube lights life can be used which converts to less lights being manufactured, thus prevention of pollution during manufacturing to some extent - Running chillers at maximum efficiency point will help prevent generation of waste heat due to running at full load and thus will not increase air temperature.	+
Water quality and quantity		The project activity reduces water	T8 tube lights without mercury will not pollute water bodies by leaching.	+

		pollution mainly thermal pollution of water	• Sun film usage to protect ECS will help decrease the cooling load on the system and therefore decrease in water quantity required for cooling. • Running chillers at maximum efficiency point will help prevent generation of waste heat due to running at full load and thus decrease cooling load. This will prevent thermal pollution of water.	
Soil condition		The project activity reduces soil pollution mainly pollution of soil from mercury of disposed tube-lights	• Use of T8 tube lights prevents accumulation of Mercury in sediments, where it is converted into methyl mercury, a more toxic organic derivative. Thus disposal of invalid tube-lights will not pose hazardous impact • Daylight usage will allow minimal use of tube lights during day time and hence increasing period over which tube lights life can be used and thus less number dumped in landfills.	+
Other pollutants		The project activity reduces noise and thermal pollution	• Use of variable voltage variable frequency drives will keep speed of lift in control reducing the noise pollution and vibrations. • Screw compressors have lesser moving parts and hence less noise and vibration. • Using waste heat during winters for heating will involve minimal use of heating devices and thus decrease any noise pollution caused by their working and their numbers manufactured as well as dumped. Thus less waste will be generated.	+
Biodiversity		There is no impact	There is no impact on biodiversity as the energy efficiency measures have been taken in already	0

		on biodiversity	existing buildings which does not falls in the area of any existing biodiversity in form of forest or water bodies.	
Quality of employment		The project activity ensures that occupational health and safety is maintained.	• The contractors involved in the construction and maintenance of the proeject activity had to submit a detailed SHE (safety, Health and Environment) protocol/policy before they are awarded work by DMRC. • Moreover the measures used in the project activity have no harmful effect during maintenance or construction • The measures used in phase two are safer like T8 tube lights if broken there is no danger of mercury vapor emission. Mercury can cause fatal poisoning when inhaled and has dangerous effect on pregnancy. • Also health problems can be lesser as T8 tube light can directly switch the alternating current into direct current, without causing any flickering, helpful to protect the eyes. • Similarly maintenance of screw compressors which have less moving parts will be easier. • Any failure in VRV chiller unit can be easily dealt with as it will not lead to entire system collapsing like in case of split chillers. • Maintenance of good daylight and ventilation conditions will also provide comfortable work environment.	+
Livelihood of the poor		The project activity will have impact on the improvement of the livelihood by	Carbon revenue from the project activity will be used for betterment of livelihood of the poor and needy. DMRC has fixed mandate to commit revenue for sustainable development	+

		utilizing the carbon revenue from the project activity for the measures discussed in the adjacent column. The measures involve providing homes, schools for homeless and poor, etc.	activities in Delhi NCR. Some of them are as follows: • Children dormitory, classroom and playground for homeless children in Tis Hazari, Delhi • Develop and implement schemes for easy movement of cycle rickshaws from and to metro stations • Old age home for helpless, homeless elders	
Access to affordable and clean energy services		The project contributes to sustainable energy resources. This is discussed in the adjacent column	The project activity entails higher investment into Phase II stations and results in improved energy services. These services are available to the stakeholders at the same prices as earlier. Moreover reduction in electrical units consumed due to project activity has an overall positive impact on the power situation of the city. Power is now available to other sectors and there is reduction in power cuts and fluctuations	+
Human and institutional capacity		Ensure environmental sustainability to increased awareness and participation. Generation of	The carbon revenue obtained from the project activity will be utilized for enhancing human and institutional capacity in dealing with sustainability issues. the following programs will be taken up: • Work with NGOs and conduct	+

		environment education and awareness.	environmental awareness program • Work with schools to raise awareness on conservation of resources • Raise awareness on female literacy and the role of female in mitigating environmental issues	
Quantitative employment and income generation		Ensures employment generation during the construction and maintenance of the project activity	Employment generation is during installation of the equipments. Moreover, operation and maintenance of the equipments lead to further employment generation. Moreover, the income generated is in form of income saved. Reduction in energy cost due to the project activity will result in cost saving by the project proponent.	+
Balance of payments and investment		Not applicable to the project activity	The Project activity is partially financed by the Government of Japan through JICA. Once carbon revenues are issued, the investment for the project activity will be alleviated.	0
Technology transfer and technological self-reliance		The successful implementation of the project activity will result in the use of similar and better energy efficient technologies in the future phases of Delhi metro as well as upcoming metros in India. Thus there will be	The energy efficient technologies of the project activity have been utilized for the first time in DMRC. The success of the Phase II will DMRC to be technologically self reliant. DMRC now aims to implement all the energy efficient measures of the project activity and more in Phase III as well. Thus the project activity demonstrates the viability of the technologies and will help in technology transfer to future phases of DMRC as well as other MRTS in India	+

		technology transfer within the nation.		
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Comments accompanying own sustainable development matrix

The project has an overall positive impact. It contributes to sustainable development indirectly. The main impact of the project activity is energy conservation.

D. 2. Stakeholders Blind sustainable development matrix

Not Required.

D. 3. Consolidated sustainable development matrix

Not Applicable

SECTION E. SUSTAINABILITY MONITORING PLAN

E. 1. Discussion on Sustainability monitoring Plan

According to GS toolkit, the sustainability monitoring plan is required for each non-neutral indicator according to GS Annex I. The indicators directly impacting sustainability are positive in nature and hence do not require mitigation measures. However the main parameter for the project activity which is energy conservation by the Phase II metro stations will be monitored during the entire crediting period. The energy conservation by Phase II stations will be calculated on the basis of energy consumption data by each station of the project activity. This parameter will be monitored throughout the crediting period. Since it is a neutral parameter, hence a mitigation measure is not applicable to this parameter.

Monitoring Plan for project activity and to ensure sustainability in each step

The project proponent (DMRC) will monitor the electricity consumed in all the station buildings forming the part of project activity. The data will be archived electronically and be stored for 2 years after the end of the crediting period.

To ensure that the data is reliable and transparent, the project entity will also establish Quality Assurance and Quality Control (QA&QC) measures to effectively control and manage data reading, recording, auditing as well as archiving data and all relevant documents. The data will be monitored on a monthly basis and will be submitted to Quality Assurance team of project proponent.

Chosen parameter		Energy Consumption for all the stations included in project activity
Current situation of parameter		The current situation shows that the project stations are more energy efficient than the baseline stations and hence reduces GHG emissions and contribute to sustainability of the project activity
Estimation of baseline situation of parameter		The baseline situation is the energy consumption by the Phase I stations of Delhi metro which are energy intensive.
Future target for parameter		The data will be measured continuously and will be recorded every month for all the station buildings using electricity meter
Way of monitoring	How	The data will be taken from site records (log books) maintained by DMRC on electricity consumption for all the stations covered by the project activity and are

		part of Phase II of Delhi Metro
	When	Monthly
	By who	Project proponent
Chosen parameter		SP8/Safe and Healthy work environment
Current situation of parameter		Positive
Estimation of baseline situation of parameter		DMRC is accredited to OHSAS 18001 standard. It has developed a QEHS policy (Quality Environment Health and Safety) policy which is followed strictly. All tenders for construction built-in clauses for maintaining safety health and environment.
Future target for parameter		Continued compliance to OHSAS standard
Way of monitoring	How	Checking compliance to health and safety management plan, training session, health and safety programmes
	When	Annual
	By who	Project proponent
Chosen parameter		SP9/ Safeguarding environment
Current situation of parameter		Positive
Estimation of baseline situation of parameter		DMRC has been awarded with ISO 14001 certificate and complies with its Environmental Policy
Future target for parameter		Continued compliance with ISO 14001 standard
Way of monitoring	How	Checking compliance to Environmental Management Plan
	When	Annual
	By who	Project proponent

Chosen parameter		SP11/Anti-corruption policy
Current situation of parameter		Positive
Estimation of baseline situation of parameter		DMRC has anti-corruption policy at place
Future target for parameter		Continued compliance to anti-corruption policy
Way of monitoring	How	Vigilance checks
	When	Annually
	By who	Project proponent
Chosen parameter		SI1/Air Quality
Current situation of parameter		Positive
Estimation of baseline situation of parameter		As discussed in the sustainable development criteria, the project activity includes energy efficient measures which do not have any adverse effect on air quality. However as a mitigation measure to control air pollution from other operational activities in DMRC stations, DMRC is carrying out air quality (particulate matter) monitoring inside its stations
Future target for parameter		Prevention of air pollution in stations
Way of monitoring	How	PM monitoring equipment
	When	Monthly
	By who	Project proponent
Chosen parameter		SI2/ Water Quality
Current situation of parameter		Positive
Estimation of baseline		DMRC has effluent treatment plants at its depot. No

situation of parameter		water from the depots is released into environment without prior treatment
Future target for parameter		The water quality released from should be within national standard
Way of monitoring	How	Water quality monitoring equipments
	When	Annually
	By who	Project proponent
Chosen parameter		SI4/Other pollutants; Noise Pollution
Current situation of parameter		Positive
Estimation of baseline situation of parameter		Noise monitoring has been done before construction of Phase II stations of DMRC
Future target for parameter		The noise generated by the equipments used in the project activity will be monitored at the periphery of the equipment. Point source of noise generation will be considered.
Way of monitoring	How	Noise
	When	Annually
	By who	Project proponent
Chosen parameter		SI6/Quality of employment
Current situation of parameter		Positive
Estimation of baseline situation of parameter		As discussed in Section F, sustainable development criteria, the project activity provides a good quality of employment. DMRC complies with OHSAS 18001 for occupational health and safety. DMRC also complies with its policy of Quality Environment, Health and Safety
Future target for parameter		Continue to provide quality employment in all operation and maintenance activity for the project
Way of monitoring	How	Environmental Health and Safety compliance report

	When	Annual
	By who	Project proponent

Chosen parameter	SI7/Livelihood of the poor	
Current situation of parameter	Positive	
Estimation of baseline situation of parameter	As discussed in section F sustainable Development indicator, revenue from the DMRC will be is utilized for betterment of the livelihood of poor	
Future target for parameter	• Children dormitory, classroom and playground for homeless children • Develop and implement schemes for easy movement of cycle rickshaws from and to metro stations • Old age home for helpless, homeless elders	
Way of monitoring	How	Annual Report of DMRC
	When	Annual
	By who	Project proponent

Chosen parameter	SI8/Access to affordable and clean energy services	
Current situation of parameter	Positive	
Estimation of baseline situation of parameter	As discussed in section F, stakeholders have access to better services at affordable price. Reduction in units of energy consumed contributes towards improvement in the power scenario of Delhi	
Future target for parameter	Replication of energy efficient technologies to all future lines of Delhi metro	
Way of monitoring	How	Annual report of DMRC: for technology transfer and innovation information
		Monthly logbooks: for information on reduction in

		electrical units consumed
	When	Annual
	By who	Project proponent
Chosen parameter		SI9/Human and institutional capacity
Current situation of parameter		Positive
Estimation of baseline situation of parameter		DMRC is already taking up activities to enhance human and institutional capacity. Similarly, the carbon revenue obtained from the project activity will be partly utilized for enhancing human and institutional capacity in dealing with sustainability issues.
Future target for parameter		• Work with NGOs and conduct environmental awareness program • Work with schools to raise awareness on conservation of resources • Raise awareness on female literacy and the role of female in mitigating environmental issues
Way of monitoring	How	Annual reports of DMRC
	When	Annually
	By who	Project Proponent
Chosen parameter		SI10/Quantitative employment and income generation
Current situation of parameter		Positive
Estimation of baseline situation of parameter		Employment generation is during installation of the equipments.
Future target for parameter		Operation and maintenance of the equipments leading to employment generation

Way of monitoring	How	Annual report
	When	Annual
	By who	Project proponent
Chosen parameter		SI12/Technology transfer and technological self-reliance
Current situation of parameter		Positive
Estimation of baseline situation of parameter		The energy efficient technologies of the project activity have been utilized for the first time in DMRC and found to be successful in reduction of energy consumed
Future target for parameter		The success of the Phase II has led DMRC to implement all the energy efficient measures of the project activity and more in Phase III as well
Way of monitoring	How	Information from operations department of DMRC
	When	Annual
	By who	Project Proponent

Quality Assurance and Quality Control

QA&QC procedures for recording, maintaining and archiving data shall be implemented as part of this Gold Standard project activity.

The project proponent will implement QA&QC measures to ensure the accuracy of metering and safety aspects of the project operation. The metering devices will be inspected properly and periodically, according to state electricity board's specifications and requirements to ensure accuracy in the readings.

Training and maintenance procedures: Carbon credit Quality Advisor would ensure training to on-site staff with respect to adherence to the Monitoring Plan of the project activity. Records of the training would be kept.

Internal audit of all the records of the plant will be carried out twice a year. During these audits all the data and parameters that need to be monitored as per the monitoring plan would be checked and shortcomings if any will be reported and addresses.

Data Storage and Archiving

All the data items monitored under the monitoring plan will be kept for 2 years after the end of crediting period or till the last issuance of VERs for this project activity, whichever occurs later. The data will be maintained in both electronic and paper formats. The data will be stored in following manner:

A copy of data will be maintained in electronic and paper format on-site for anytime reference and validation. The energy consumption per station data and calibration certificates of all stations will be maintained in the E&M Division of DMRC, Metro Bhawan. The operational area for each station will be stored in the Civil Division of DMRC, Metro Bhawan.

A copy of data will be stored in paper format by project operator in their branch office in safe storage.

E. 2. Discussion on continuous input / grievance mechanism

DMRC strives for the satisfaction of its stakeholders. To ensure an easy and continuous mechanism for addressing the feedback from its stakeholders, DMRC has a Feedback/Complaint mechanism in its online portal <http://www.delhimetrorail.com/feedback.aspx>

The mechanism provides the options for the type of feedback under the headings as: Train frequency, Train timing, Station services, feeder bus services, Career and Other. The feedback/complaint is station specific and stakeholders can submit their responses regarding each station of Delhi Metro. Moreover there is also a 24 hour helpline available.

	Method Chosen (include all known details e.g. location of book, phone, number, identity of mediator)	Justification
Continuous Input / Grievance Expression Process Book	Online portal where commuters and any other stakeholder can report their feedback and complaints. It is discussed in detail in the paragraph below.	Online interface is the easiest, fastest and transparent way to inform DMRC on stakeholder feedback and comments. It delivers the feedback directly to the nodal person within DMRC for taking up requisite action
Telephone access	24 hour helpline: 155370/011- 22561231	
Internet/email access	helpline@dmrc.org	
Nominated Independent Mediator (optional)		

All issues identified during the crediting period through any of the Methods shall have a mitigation measure in place. The identified issue should be discussed in the revised Passport and the corresponding mitigation measure should be added to sustainability monitoring plan

SECTION F.	DESCRIPTION OF THE DESIGN OF THE STAKEHOLDER FEEDBACK ROUND
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This template i.e. Annex Q has been used to describe in details of the stakeholder feedback round in all the sections of the document. Stakeholder consultation was conducted prior and during the construction of the project and also during the operation of the project. Since the project is retroactive a stakeholder feedback round was conducted on 26th September 2012. Description, design and details of Stakeholder feedback round has been described in each section of this template.

Sl. no.	Name of participant	Male/ Female	Signature	Contact details
1.	Dr. SAVITA ROY	F	Savita R.	KALINDI COLLEGE, UNIV OF DELHI, Ph: 9810629598.
2.	Dr. PUNITA VERMA	F	Punita V	" 9868617769
3.	RUCHIKA GUPTA	F	Ruchika	7428998482
4.	ABHA SHARMA	F	Abha	9868527186
5.	MADHURI GANGULY	F	Madhuri	9990480999.
6.	TULIKA SHARMA	F	Tulika	9650061617
7.	KANIKA TYAGI	F	Kanika	9560787728
8.	RASHMI	F	Rashmi	9015054539
9.	CHARUL GOEL	F	Charul	9211572828
10.	Dr. KIRTI BHANDARI	F	Kirti	9971331223
11.	Dr. NASEEM AKHTAR	M	Naseem	9540079993
12.	Vishal Saxena	M	Vishal	9810578585
13.	VIVEK RAJ BHAGWAN	M	Vivek	9891170871
14.	K.T. CHANDRAMOHAN	M	K.T. Chandramohan	9711737345
15.	Priyanshu R Singh	M	Priyanshu	9650023422
16.	Amit Kumar	M	Amit	9868060583
17.	Lokesh Shah	M	Lokesh	8130189059
18.	Gargi Sharma	F	Gargi	8010850286
19.	Suhrit Bera	M	Suhrit	9810832452
20.	Dr. Amita Singh	F	Amita Singh	844775385
21.	ANUJ DAHAL	M	Anuj	
22.	S.K. Kashyap	M	S.K.	9911334437
23.	Amit K. Srivastava	M	Amit K.	9650020228
23.	Amit K. Srivastava	M	Amit K.	9650020228

Evaluation Form

for

Stakeholder Feedback Round for Gold Standard VER project activity

"Energy Efficiency measures in DMRC Phase II Stations"

Date: 26 September 2012

What is your impression of the meeting?	The meeting gives us a positive step about how we (Innovative Project Students) can cooperate in saving energy, from our projects and make metro more efficient
What do you like about the project?	The savings done by the metro to DMRC, in phase II compared with phase I, which initiated to get more ideas to save energy for phase upcoming phase
What do you not like about the project?	According to me , the discussion

Name: Abha Sharma

Contact Detail: 9868527186

Abha
Signature:

Evaluation Form

for

Stakeholder Feedback Round for Gold Standard VER project activity

"Energy Efficiency measures in DMRC Phase II Stations"

Date: 26 September 2012

What is your impression of the meeting?	Quite informative. Then light on various aspects facts about the Delhi metro's implementation of energy efficient measures.
What do you like about the project?	The fact that the upcoming phases II, III and IV metro/rail plans are aiming towards more and more energy efficient / conserving measures is extremely agreeable.
What do you not like about the project?	

Name: Madhuri Ganguly.
Contact Detail: 9990480999

Signature: Madhuri

Evaluation Form
for
Stakeholder Feedback Round for Gold Standard VER project activity
"Energy Efficiency measures in DMRC Phase II Stations"

Date: 26 September 2012

What is your impression of the meeting?	The meeting was very efficient. It gave us the knowledge of new technology or new measures for consumption of energy. Such meeting must be frequently held for awareness as well as resulting with new ideas from the discussions.
What do you like about the project?	The special thing about the project was mainly that it concentrated on the VRV chillers in place of the split chillers and also the use of solar energy at the platforms.
What do you not like about the project?	—

Name:

Charul.

Signature:

Charul

Contact Detail:

9211572828

Evaluation Form

for

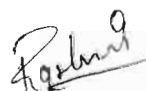
Stakeholder Feedback Round for Gold Standard VER project activity

"Energy Efficiency measures in DMRC Phase II Stations"

Date: 26 September 2012

What is your impression of the meeting?	The meeting was nice & is based on an innovative idea, that is use of VRF chillers in place of split chillers in phase II.
What do you like about the project?	This project is more efficient. As in the mentioned project 'Solar Energy' is used at the platforms. It will obviously going to decrease Green house Effect and also use of VRF in place of split chillers.
What do you not like about the project?	—

Name: RASHMI JHA

Signature: 

Contact Detail: 9015054539.

2/5/12

Evaluation Form

for

Stakeholder Feedback Round for Gold Standard VER project activity

"Energy Efficiency measures in DMRC Phase II Stations"

Date: 26 September 2012

What is your impression of the meeting?	A very well planned presentation, informative and clear in conceptualisation. The idea of Gold Standard VER is a good one. One can try to harness the solar energy available on top of alleviated stations and the wind energy generated due to high speeding metros also.
What do you like about the project?	1) Using day light to save energy on stations 2) Using variable chillers for cooling 3) reduction of green house emissions 4) well planned and focused 5) there are possibilities to make it even more efficient eg. lights to be switched on only as requirement
What do you not like about the project?	Nothing.

Name:

Dr. PUNITA VERMA

Signature:

Punita Verma

Contact Detail:

9868617769

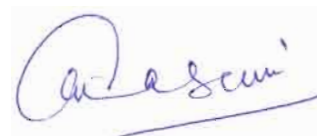
p.verma.du@gmail.com

Evaluation Form
for
Stakeholder Feedback Round for Gold Standard VER project activity
"Energy Efficiency measures in DMRC Phase II Stations"

Date: 26 September 2012

What is your impression of the meeting?	Outstanding presentation
What do you like about the project?	Energy saving is 23 kWh/sqm. Annually is very good & knowledgeable for everyone.
What do you not like about the project?	Nothing

Name: Dr. Naseem Akhtar
Contact Detail: Sr. Scientist
CRRI, New Delhi


Signature:

Evaluation Form
for
Stakeholder Feedback Round for Gold Standard VER project activity
“Energy Efficiency measures in DMRC Phase II Stations”

Date: 26 September 2012

What is your impression of the meeting?	This meeting gave us an insight into the energy efficiency measures undertaken by DMRC, which was very good.
What do you like about the project?	The larger amount of energy which could be saved by the different methods/ways incorporated by Delhi Metro.
What do you not like about the project?	—

Name: RUCHIKA G.

Signature: Ruchika

Contact Detail: 7428998482

Evaluation Form

for

Stakeholder Feedback Round for Gold Standard VER project activity

"Energy Efficiency measures in DMRC Phase II Stations"

Date: 26 September 2012

What is your impression of the meeting?	The meeting was nice and very much informative about what so far DMRC has done for environment i.e. by energy efficiency measures.
What do you like about the project?	• The reduced energy consumption by 23 KWh/m² (approx) which is very good. • Reduced emission of Greenhouse gases. • Installing VRF chillers and contribution to sustainable development.
What do you not like about the project?	

Name: Kanika Tyagi
Contact Detail: 9560787728

Signature: Kanika

Evaluation Form
for
Stakeholder Feedback Round for Gold Standard VER project activity
“Energy Efficiency measures in DMRC Phase II Stations”

Date: 26 September 2012

What is your impression of the meeting?	The meeting was good as it discussed about what so far has been done by DMRE to save this beautiful earth and what more can be done.
What do you like about the project?	The project is very nice, since the project has come up with more energy efficient metros which would lead to decrease in green house. The VRF chillers are the best to be installed
What do you not like about the project?	—

Name: Tulika Sharma

Signature: Tulika

Contact Detail: 9650081817

Evaluation Form
for
Stakeholder Feedback Round for Gold Standard VER project activity
"Energy Efficiency measures in DMRC Phase II Stations"

Date: 26 September 2012

What is your impression of the meeting?	meeting was good and it is a good practise and I suggest that it should be repeated.
What do you like about the project?	project is energy efficient and more eco-friendly. I suggest that most of the Lighting at station premise should be solar energy.
What do you not like about the project?	Everything is good.

Name: Vishal Saxena,

Contact Detail: 9810578585


Signature:

Evaluation Form
for
Stakeholder Feedback Round for Gold Standard VER project activity
"Energy Efficiency measures in DMRC Phase II Stations"

Date: 26 September 2012

What is your impression of the meeting?	It was very good
What do you like about the project?	Energy Savings concept organising by organisation
What do you not like about the project?	Every thing is good keep it up.

Name: Vivek Raj Bhargava
Contact Detail: 989470871


Signature:

Evaluation Form
for
Stakeholder Feedback Round for Gold Standard VER project activity
"Energy Efficiency measures in DMRC Phase II Stations"

Date: 26 September 2012

What is your impression of the meeting?	meeting was well organized and all the aspects of project boundary well. discussed and placed in front of to call stake holder.
What do you like about the project?	Delhi Metro is striving to make hard to introduce new innovative technologies to make the life of Delhi commuters simple and better.
What do you not like about the project?	

Name: Priyaranjan K. Singh
Contact Detail: 9650023422


Signature.

Evaluation Form
for
Stakeholder Feedback Round for Gold Standard VER project activity
“Energy Efficiency measures in DMRC Phase II Stations”

Date: 26 September 2012

What is your impression of the meeting?	Well represented
What do you like about the project?	good initiative for energy saving
What do you not like about the project?	Nothing

Name:

K. T. Chandramohan

Signature:

Chandramohan

Contact Detail:

9711737345

LSO Consultant

Evaluation Form

for

Stakeholder Feedback Round for Gold Standard VER project activity

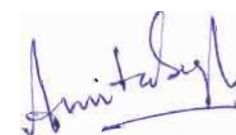
"Energy Efficiency measures in DMRC Phase II Stations"

Date: 26 September 2012

What is your impression of the meeting?	over all good & more effective & informative.
What do you like about the project?	yes! more effective for energy saving & Towards green economy.
What do you not like about the project?	

Name: AMITA SINGH

Contact Detail: 8447758383


Signature: