**Project design document form for CDM project activities**

**(Version 08.0)**

*Complete this form in accordance with the Attachment "Instructions for filling out the project design document form for CDM project activities" at the end of this form.*

| PROJECT DESIGN DOCUMENT (PDD) | |
|---|---|
| **Title of the project activity** | Shri Bajrang RE Project |
| **Version number of the PDD** | 03 |
| **Completion date of the PDD** | 08/11/2016 |
| **Project participant(s)** | 1. Shri Bajrang Power and Ispat Ltd.(India)<br>2. Agrinergy Pte Ltd.(United Kingdom of Great Britain and Northern Ireland)<br>3. Swedish Energy Agency (Sweden) |
| **Host Party** | India |
| **Applied methodology(ies) and, where applicable, applied standardized baseline(s)** | AMS-I.D. ver. 18 - Grid connected renewable electricity generation |
| **Sectoral scope(s) linked to the applied methodology(ies)** | 01 Energy industries (renewable - / non-renewable sources) |
| **Estimated amount of annual average GHG emission reductions** | 36,647 $tCO_2$ |

## SECTION A. Description of project activity

### A.1. Purpose and general description of project activity

>>

The CDM project activity is undertaken by Shri Bajrang Power and Ispat Ltd at its sponge iron plant. The project activity is a biomass based power plant next to an existing power plant in Chhattisgarh, India. The power plant utilise rice husk a renewable biomass as the primary fuel for the generation of electricity for captive use and the surplus if any, is exported to the grid.

In India, the supply of electricity is primarily from their existing thermal and hydro based power plants. Where additional generation capacity is planned it will generally be thermal. The proposed CDM project – installation of biomass based power plant will therefore supplement current and planned electricity generation from traditional fossil fuel based power plants. As the project utilises mainly rice husk for the generation of electricity it will qualify as a renewable source of electricity.

The project involves the installation of a high pressure boiler (67 kg/cm$^2$, 490$^0$C, 60 tonnes per hour capacity) and condensing turbine generator of 8MW power generation capacity. The 8 MW turbine generator will only use 36 tonnes per hour of steam from the boiler. However, the analysis has been done considering the entire 60 tonnes per hour of steam. The project activity is expected to generate about 7.4MW of electrical power after considering auxiliary consumption. The power will be used on-site for captive purpose and surplus if any will be exported to the Chhattisgarh State Electricity Board ( NEWNE grid[1]) at 132 kV through the local substation. The existing plant has two (8MW and 10MW) condensing turbine generators, which were commissioned as part of a WHR based CDM project through which power is exported to the Chhattisgarh grid.

The plant will make a significant contribution to sustainable development not just directly through the provision of renewable electricity but also through the establishment of an industrial unit in a rural area. This will lead to the expansion of existing markets as well as the creation of new markets – new markets will mainly revolve around labour markets and the demand for skilled and semi-skilled labour whilst the rice husk market will be developed as will the infrastructure associated with the transport of rice husk. The on-going labour demand of the plant is estimated at 50 staff whilst the construction of the plant has involved more than 100 people.

The generation of renewable electricity will also reduce the dependence on existing and planned fossil fuel based generation. Chhattisgarh is heavily dependent on coal with less than 10% of generation sourced from non-fossil fuels (hydro). Thus, the project will have a positive impact not only through the reduction in emissions of greenhouse gases associated with such generation, which is predominantly coal based (see section on determination of the baseline), but also through a reduction in the emissions of other harmful gases (NOx and SOx) that arise from the combustion of coal.

The project activity commissioned (synchronized with grid) on 13/08/2008 and the commercial operation started on 01/09/2008. A total of 175,021 $tCO_2$ (16924 + 35294 + 32715 + 27087 + 29860 + 33141) CERs have been issued for the period 27$^{th}$ February 2009 to 31st August 2014.The project proponent intend to renew the crediting period in line with the procedure for renewal and the PDD has been accordingly updated

[1] August 2006 North and East grids were interconnected thereby 4 regional grids Northern, Eastern, Western and North Eastern grids are synchronously connected forming central grid operating at one frequency. On 31st December 2013, Southern Region was connected to Central Grid in Synchronous mode with the commissioning of 765kV Raichur-Solapur Transmission line thereby achieving 'ONE NATION'-'ONE GRID'-'ONE FREQUENCY'.

## A.2. Location of project activity

### A.2.1. Host Party

>>
India

### A.2.2. Region/State/Province etc.

>>
Chhattisgarh state

### A.2.3. City/Town/Community etc.

>>
Raipur District, Village Borjhara

### A.2.4. Physical/Geographical location

>>
Physical/ Geographical location: 21º18'30.8" N (21.3085) and 81º35'6.8"E (81.5852)

## A.3. Technologies and/or measures

>>
The project involves the installation of a 60 tph 67 kg/cm$^2$ 485$^o$C Cethar Vessels Ltd boiler and an 8MW condensing Triveni Engineering & Industries Ltd turbine generator. The turbine generator will produce electricity at 11 kV and after synchronization with the grid shall be used for captive consumption. However surplus if any will be stepped up to 132 kV and exported to the grid via the Urla substation, which is located at a distance of 2 kilometres from the plant.

The project will also entail investment in environmental technologies to mitigate the risks of ash, boiler flue gases and fugitive dust generated during the combustion of the fuel.

The project produces renewable energy from the combustion of rice husk and dolochar[2]/char will be used as a supplementary fuel. The project falls within the small scale rating as the total generation capacity of the new unit is 8MW, i.e. below the 15MW outlined in section ID of Appendix B of the simplified modalities and procedures for small-scale CDM project activities. The electricity generated in the project activity from renewable biomass would be expected to replace existing and planned generation from the grid, the majority of which is fossil fuel based. Any increase in the scale of power generation would require additional investment throughout the plant as the current equipments are scaled for 8MW, therefore any new capacity installed at the site would result in a new distinct project activity.

The technology employed is available in India and in the case of the project activity some of the technology is provided by local suppliers. The technologies employed are as per the industry norms and are in line with the consents from pollution control board and meet the local and national environmental and safety guidelines.

[2] A by product from the sponge iron plant.

### A.4. Parties and project participants

| Party involved (host) indicates host Party | Private and/or public entity(ies) project participants (as applicable) | Indicate if the Party involved wishes to be considered as project participant (Yes/No) |
|---|---|---|
| India (host) | Shri Bajrang Power and Ispat Ltd. | No |
| United Kingdom of Great Britain and Northern Ireland | Agrinergy Pte Ltd. | No |
| Sweden | Swedish Energy Agency | No |

### A.5. Public funding of project activity

>>
No public funds are invested in the project activity.

## SECTION B. Application of selected approved baseline and monitoring methodology and standardized baseline

### B.1. Reference of methodology and standardized baseline

>>
Type I – Renewable Energy Projects
Title - Grid connected renewable electricity generation
Reference – AMS I.D. - Version 18, valid from 28th November 2014
http://cdm.unfccc.int/methodologies/DB/W3TINZ7KKWCK7L8WTXFQQOFQQH4SBK

**Methodological Tool:**
Tool to calculate the emission factor for an electricity system (Version 04).
Tool to calculate project or leakage CO2 emissions from fossil fuel combustion (Version 02)
Project and leakage emissions from transportation of freight (Version 01.1.0)
Leakage in biomass small-scale project activities (Version 04.0)
Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period (Version 03.0.1)

### B.2. Applicability of methodology and standardized baseline

>>

| S. No. | Applicability criteria | Justification |
|---|---|---|
| 1. | *This methodology is applicable to project activities that: (a) Install a new power plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity (Greenfield plant); (b) Involve a capacity addition; (c) Involve a retrofit4 of (an) existing plant(s); or (d) Involve a replacement of (an) existing plant(s).* | The project activity installs a new power plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity. Hence the proposed project activity is a Greenfield plant and satisfies this condition. |
| 2. | *Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology:*<br>*a) The project activity is implemented in an existing reservoir with no change in the volume of reservoir;*<br>*b) The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the project* | This criterion is not applicable to the project activity as the proposed project is a biomass project. |

| S. No. | Applicability criteria | Justification |
|---|---|---|
| | *emissions section, is greater than 4 W/m2;*<br>*c) The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the project emissions section, is greater than 4 W/m2.* | |
| 3. | *If the new unit has both renewable and non-renewable components (e.g. a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable component. If the new unit co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15MW.* | The project activity uses only renewable energy component with the total capacity of 8 MW which is below the 15 MW, thus this condition is not applicable. |
| 4. | *Combined heat and power (co generation) systems are not eligible under this category.* | The project activity is not a cogeneration activity. Hence the criterion is not applicable. |
| 5. | *In the case of project activities that involve the addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct from the existing units.* | The project activity is a new project of 8 MW capacity and there was no power generation at the proposed site historically. Hence the criterion is not applicable. |
| 6. | *In the case of retrofit or replacement, to qualify as a small-scale project, the total output of the retrofitted or replacement unit shall not exceed the limit of 15 MW.* | The proposed biomass project activity is not a retrofit or modification of any existing facility. Hence, this criterion is not applicable. |
| 7. | *In the case of landfill gas, waste gas, wastewater treatment and agro-industries projects, recovered methane emissions are eligible under a relevant Type III category. If the recovered methane is used for electricity generation for supply to a grid then the baseline for the electricity component shall be in accordance with procedure prescribed under this methodology. If the recovered methane is used for heat generation or cogeneration other applicable Type-I methodologies such as "AMS-I.C.: Thermal energy production with or without electricity" shall be explored.* | This criterion is not applicable to the project activity as the proposed project is a biomass project. |
| 8. | *In case biomass is sourced from dedicated plantations, the applicability criteria in the tool "Project emissions from cultivation of biomass" shall apply.* | In the proposed biomass project activity biomass is not sourced from dedicated plantations |

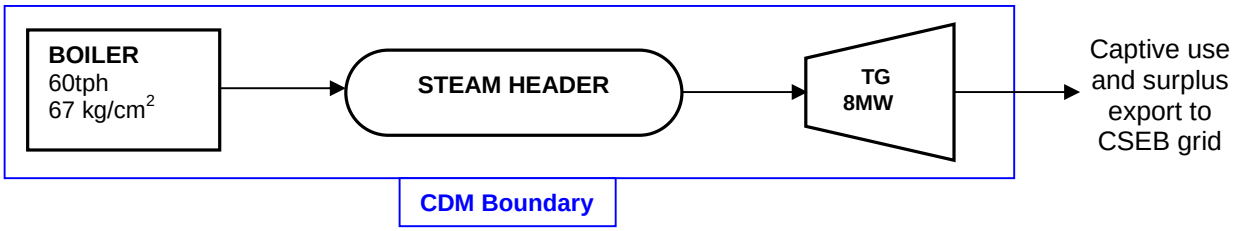
The project activity will produce renewable energy from the combustion of rice husk. The plant will be connected to the 132kV grid and the electricity generated in the project activity would be expected to displace existing and planned electricity generation from the grid, the majority of which is fossil fuel based. The project activity may co-fire some fossil fuel but this is likely to be restricted to periods of seasonal shortage of rice husk and during the monsoon. The project activity therefore satisfies the applicability condition relating to renewable biomass and supply/displacement of electricity to/from a distribution system that is currently operating on fossil fuel.

The project activity has the capacity to produce 8 MW of renewable energy and therefore meets the eligibility limit of 15 MW for a small scale project activity. The initial estimate on the fuel ratio is 80% rice husk and 20% Dolochar/Char and this may vary depending on the availability of rice husk. The project activity is not a co-generating system and no emission reductions are being claimed for heat.

The project activity does not seek to retrofit or modify an existing renewable energy facility.

## B.3. Project boundary

In line with the guidance in "Appendix B of the simplified modalities and procedures for small-scale CDM project activities" the boundary for category I.D. projects "encompasses the physical, geographical site of the renewable generation source".




We do not consider the disposal of fly ash in the boundary. This arises as a greater quantity of fly ash would arise in the baseline (Indian coal has a much higher ash percentage than rice husk) and this would have to be transported to disposal sites.

Under AMS I-D there is no specific requirement to measure leakage as there is no transfer of equipment to/from the project activity.

In line with the general guidance on leakage in biomass project activities (attachment C to Appendix B[3]) we have to consider the possibility of leakage in the case of the project activity as it utilizes biomass residues (rice husk) from external sources. The guidance states that emissions from transportation of biomass can be neglected if they are smaller than 10% of emission reductions. This is outlined in section B.6.3. Leakage may occur through diversion of biomass resources resulting in increased combustion of fossil fuels outside the boundary. However, there are ample supplies of rice husk from existing rice mills in the state of Chhattisgarh, which is known as the "Rice Bowl" of India. Further the project proponent has carried out a survey on the availability of biomass in the region and this clearly demonstrates the surplus availability. However, an annual survey will be undertaken in order to confirm that the biomass purchased by the project activity did not lead to increased use of fossil fuels or other GHG emissions elsewhere.

For the purposes of the project activity the relevant grid is defined by the power generating units serving the same grid as the project activity. In the case of India there are regional grids which facilitate the transfer of electricity between states and which are supplied by central sector power stations operating in the region. Chhattisgarh is part of the Western Region (along with Gujarat, Madhya Pradesh, Maharashtra and Goa) as per the grid definitions outlined by the CEA and we have therefore utilized the analysis of the NEWNE grid undertaken by the CEA in order to determine our baseline emission factor for electricity generation. This provides a complete analysis of the power plants that the project will affect. We do not believe that the national grid is appropriate given the limited interconnectivity of the regional grids and the size of the project relative to national power generation capacity.

[3] http://cdm.unfccc.int/methodologies/SSCmethodologies/AppB_SSC_AttachmentC.pdf

| Source | | GHGs | Included? | Justification/Explanation |
|---|---|---|---|---|
| Baseline scenario | CO2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity | $CO_2$ | Yes | Main emission source |
| | | $CH_4$ | No | Excluded for simplification. As this is conservative |
| | | $N_2O$ | No | Excluded for simplification. As this is conservative |
| Project scenario | Project emissions due to the project activity(transport of biomass) | $CO_2$ | Yes | Main emission source |
| | | $CH_4$ | No | Excluded for simplification. As this is conservative |
| | | $N_2O$ | No | Excluded for simplification. As this is conservative |

## B.4. Establishment and description of baseline scenario

>>

Referring to Appendix B of the Simplified Baseline and Monitoring Methodologies the baseline for the project activity is the MWh produced by the renewable generating unit multiplied by the grid emission coefficient ($tCO_2$/MWh) obtained from Central Electricity Authority. The additionality of the project activity has been demonstrated in section B.5 through analysis of:

1. Project financials, the project activity is non-viable without the revenue from emission reductions;
2. Other barriers to the project which include lower tariff for export and variation in the price of rice husk.

The project activity will generate electricity from the combustion of biomass and this electricity would be expected to supplement existing and planned electricity generation from the grid, the majority of which is fossil fuel based. The electricity generated will be monitored along with auxiliary consumption. The electricity generated from biomass will qualify for emission reductions as explained in section B.6.1 in line with the approved methodology.

**Data used to determine the baseline scenario**

| Baseline data | Key information | Source |
|---|---|---|
| Grid generation | Generation data of grid based generating units | Central Electricity Authority |
| Grid emissions | Fossil fuel consumption of grid based generating units | Central Electricity Authority |
| Capacity expansions | Timing of expansions to determine build margin | State electricity boards and generating companies |

For the second crediting period, the continued validity of the original baseline should be assessed. According to the Methodological Tool “Assessment of the validity of the original/current baseline and update the baseline at the renewal of the crediting period” (version03.0.1), the stepwise procedure as follows should be adopted to assess the continued validity of the baseline and to update the baseline:

**Step 1: Assess the validity of the current baseline for the next crediting period**

**Step 1.1: Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies**

There are no new national and/or sectoral policies that could affect the baseline scenario during the renewal of the crediting period[4]. Hence in the absence of the project activity, electricity would still have been generated from the grid, the majority of which is fossil fuel based[5].

**Step 1.2: Assess the impact of circumstances**

The baseline scenario identified at the validation of the project activity was the continuation of the current practice without any investment;

Secondly, the mainly investment environment or market characteristics especially the tariff, the policy in terms of market access permit have no significant change which would impacts the current baseline.

The current practice for the baseline emissions is still the GHG emitted by grid: the equivalent electricity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources into the grid;

But the conditions used to determine the baseline emissions in the previous crediting period are not valid: the emission factor calculation of grid in the first crediting period is based on the data of 2007-2008. For better management of power grid system, India is geographically divided into five regions namely, Northern, Eastern, Western North Eastern and Southern grids. Since August 2006, the Indian electricity system is divided into two grids, the Integrated Northern, Eastern, Western, and North-Eastern regional grids (NEWNE) and the Southern Grid. All the states and union territories in India fall in either of these regions. The first four (NEWNE) out of five regional grids are operating in a synchronous mode, which implies that the power across these regions can flow seamlessly as per the relative load generation balance hence these four regional grids have been integrated together into NEWNE. On 31st December 2013, Southern Region was connected to Central Grid in Synchronous mode with the commissioning of 765kV Raichur-Solapur Transmission line thereby achieving 'ONE NATION'-'ONE GRID'-'ONE FREQUENCY'. From the above it is clear that the change in the grid system do not have any impact on the validity of the current baseline for the nect crediting period.

Before the time of requesting renewal of the crediting period, the Central Electricity Authority (CEA) have published the latest "CO2 baseline database for the financial year 2013-14 in December 2014, so the emission factor of grid and all values is need to be updated for the second crediting period.

**Step 1.3: Assess whether the continuation of the use of current baseline equipment(s) or an investment is the most likely scenario for the crediting period for which the renewal is requested**

The current baseline scenario is the continuation of the current practice. In the absence of the project, the electricity would have been supplied by grid, and it will not request an investment by the project proponent or third party. So this step is not applicable.

**Step 1.4: Assessment of the validity of the data and parameters**

[4] National Electricity Plan (In fulfilment of CEA's obligation under section 3(4) of the Electricity Act 2003) – http://climateobserver.org/wp-content/uploads/2015/01/National-Electricity-Plan.pdf
National Electricity Policy, 2005 - http://pib.nic.in/archieve/others/2005/nep20050209.pdf
National Electricity Act 2003 – http://elearn.teriuniversity.ac.in/file.php?file=%2F1%2FAPGDRE%2Fmodule9%2FNational_electricity_act_elctricity_policy_etc.pdf

[5] http://powermin.nic.in/power-sector-glance-all-india

Since there are some parameters, which were determined at the start of the first crediting period and not monitored during the first crediting period, are not valid anymore, therefore, the current baseline emissions needs to be updated for the second crediting period according to this tool.

Before the time of requesting renewal of the crediting period, the Central Electricity Authority (CEA) have published the latest "CO2 baseline database for the financial year 2013-14 in December 2014, so the emission factor of grid and all values are updated for the second crediting period

**Application of Steps 1.1, 1.2, 1.3 and 1.4 confirmed that the current baseline is valid for the second crediting period but data and parameters needs to be updated. Therefore step 2 is used**

**Step 2: Update the current baseline and the data and parameters**

**Step 2.1: Update the current baseline**

The baseline emissions for the second crediting period have been updated, without reassessing the baseline scenario, based on the latest approved version of the methodology AMS.I.D. More details for the updated baseline emissions for the second crediting period can be seen in section B.6.

**Step 2.2: Update the data and parameters**

As mentioned in step 1.4 above, all parameters regarding the grid emission factor calculation have been updated for this second crediting period. More details can be seen in section B.6.

## B.5. Demonstration of additionality

>>

The table below is only applicable if the proposed project activity is a type of project activity which is deemed automatically additional, as defined by the applied approved methodology or standardized baseline.

| | |
|---|---|
| Specify the methodology or standardized baseline that establish automatic additionality for the proposed project activity (including the version number and the specific paragraph, if applicable). | **NA** |
| Describe how the proposed project activity meets the criteria for automatic additionality in the relevant methodology or standardized baselines. | NA |

In line with attachment A to appendix B of the simplified M&P for small-scale CDM project activities, demonstration of additionality focuses on the barriers facing the project - investment barriers and an analysis of prevailing practice in the state. In showing that the project is additional we demonstrate that it is not part of the baseline scenario, which in the case of the project activity is that the grid continues to operate and expand based on predominantly fossil fuel generation.

The main barrier to the project activity is the return on investment and the following highlights the result of the financial analysis of the project. All assumptions inherent in the financial analysis will be made available to the DOE but the following is a summary of the main points and results which demonstrate the importance of CER revenue.

The price of electricity is taken from the power purchase agreement (PPA) which was issued by the Chhattisgarh State Electricity Regulatory Commission (CSERC) to the project activity. This has been the main barrier in the project activity as the project proponents requested a tariff of Rs 3.20/kWh with an annual escalation of 5% but a tariff of Rs 2.79/kWh for the first year of operation (with 2% escalation in each subsequent year) was initially granted through the state electricity regulatory commission[6]. The financial analysis undertaken was based on the above price of electricity. However, the price of electricity from biomass based power plants is dependent on the year of commissioning and whilst the project was expected to be commissioned in 2007/08 financial year this has slipped to 2008/09 and therefore a revised tariff rate of Rs 2.85/kWh is likely to be applicable but has not yet been confirmed by the CSEB[7]. However, as demonstrated below, the project IRR still does not improve substantially based on this new electricity tariff and the project IRR without CDM revenues continues to remain below the chosen benchmark.

The revenue streams associated with the project are only the sale of electricity to the grid and the CERs resulting from registering the project as a CDM. In calculating the electricity revenues we have included the increase in generation of the existing turbine generators due to the steam that will be fed to these from the newly installed boiler, this will allow for a further increase in exports of 4MW and hence the revenues from these units have been included (the price for this electricity will not however be the preferential renewable energy tariff as the CSEB has only granted 8MW of power under the preferential tariff order and also no CERs are claimed for the electricity generated by these units).

The price of rice husk is another barrier as this price varies significantly due to variation in the transportation and collection costs and the seasonal nature of the product. The project activity has incorporated a cost of rice husk of Rs 1,200/tonne which is escalated by 5% each year until year 7 and then remains constant (this matches the period of escalation in the tariff).

The other costs have been included under O&M charges and interest on working capital. The interest on the working capital is based on a working capital requirement of Rs 8.8m in the first year, Rs 10m in the second year and Rs 10.5m thereafter. The O&M costs are detailed in the following table and set out in the spreadsheet, to these we apply an annual escalation of 5% which is below the current rates of inflation and hence conservative.

| O&M costs | | |
|---|---|---|
| | Rate | Rs 1000 |
| O&M cost on plant, machinery, erection and instruments | 4% | 13,504 |
| Maintenance on buildings | 1% | 200 |
| Miscellaneous fixed assets | 2.5% | 278 |
| Insurance on fixed assets | 0.5% | 1,962 |
| Total | | 15,944 |

In line with the accepted guidance we have adopted a period of the analysis of 20 years. Analysing the project IRR in the light of these revenues and costs we initially arrived at a project IRR of 9.42% without CER revenues and 14.94% when the expected CER revenues were included. However, the new tariff structure for electricity (Rs 2.85/kWh) results in a project IRR of 10.36% without CER revenues. The details are available in the spreadsheets submitted to the DOE.

The project IRR can be compared with the cost of financing which has been taken from the prime lending rate (PLR) in India (the rate at which banks are willing to lend at). PLRs are published in

[6] As per CSERC tariff order date 11/11/2005. In line with the same, a board resolution was passed in October 2005 indicating that the project required CDM funding in order to be financially viable.

[7] However it should be recognized that it was always the intention of the plant to commission in the 2007/08 financial year and this is evidenced from the boiler and turbine orders which detail commissioning dates for the suppliers (clause 4 and clause 5 respectively) and the penalties that will come into force if these are not met.

India on the Reserve Bank of India website and the range quoted at the time of financial closure[8] was 12.25% to 12.50%[9]. To remain conservative the project proponents have not applied a country risk premium over the PLR which was quoted at 3% as per OECD guidelines[10]. The benchmark is thus derived as 12.25% for the project activity. This shows that the project IRR without CDM is not financially attractive (in either of the two tariff scenarios) and the returns of the project are favourable only after considering the revenues obtained from CDM.

To provide an idea of prevailing practice in the state, there are eighteen biomass based projects of a similar scale as the project activity which have been commissioned within the state. The complete list is as follows:

| Sr no | Name of project | Capacity | Commissioned | CDM |
|---|---|---|---|---|
| 1 | M/s Kalindi Power & Steel Ltd | 8 MW | Y | Y (registered) |
| 2 | M/s Ind Power Ltd | 10 MW | Y | Y (registered) |
| 3 | M/s Rukmani Power and Steel Limited | 10 MW | Y | Y (registered) |
| 4 | M/s Agrawal Oil Extractions Limited | 8.5 MW | Y | Y (registered) |
| 5 | M/s Shivalik Power and Steel Limited | 8.5 MW | Y | Y (registered) |
| 6 | M/s Lahari Power and Steel Limited | 9.8 MW | Y | Y (registered) |
| 7 | M/s RR Energy Pvt Limited | 14 MW | Y | Y (registered) |
| 8 | M/s Vandana Vidhyut Limited | 7.7 MW | Y | Y (registered) |
| 9 | M/s South India Agro Industries Limited | 9.8 MW | Y | Y (under validation) |
| 10 | M/s Hanuman Agro Industries Limited | 2.5 MW | Y | Y (under validation) |
| 11 | M/s Raypati Power Generation Pvt Limited | 7.5 MW | Y | Y (under validation) |
| 12 | M/s Neeraj Power Pvt Limited | 7.5 MW | Y | Y (under validation) |
| 13 | M/s. Sudha Agro Oil & Chemical Industries Pvt Limited | 9.99 MW | Y | Y (under validation) |
| 14 | M/s Mahavir Energy and Coal Bebenification Ltd | 12 MW | Y | Y (under validation) |
| 15 | M/s. Maa Usha Urja Ltd | 7.5 MW | Y | Y(registered) |
| 16 | M/s NRI Power & Steel Pvt. Ltd | 7.5 MW | Y | Y(Host country approval obtained) |
| 17 | M/s. ISA Power Pvt Ltd | 8 MW | Y | Y(registered) |
| 18 | M/s. Ecofren Power & Projects Limited | 8 MW | Y | Y(registered) |

.

Furthermore, there are two more biomass based power plants commissioned within the state i.e. M/s Indo Lahri Bio Power Project and M/s Rajaram Maize Products project. The Indo Lahri plant started in the 1990s and therefore does not qualify as a CDM whilst the Rajaram Maize project has a capacity of 1.5 MW and hence cannot be considered similar to the project activity.

It is therefore clear that CDM has played an important role in the successful commissioning of all the biomass based power projects in the state.

## B.6. Emission reductions

### B.6.1. Explanation of methodological choices

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**Emission Reductions**

[8] Referring back to response to request for review, the PLR prevailing during the start date was 10.75%-11.25% which is still higher than the project IRR of 9.42%

http://rbidocs.rbi.org.in/rdocs/Bulletin/PDFs/72490.pdf

[9] http://rbidocs.rbi.org.in/rdocs/Bulletin/PDFs/76703.pdf

[10] http://www.oecd.org/dataoecd/9/12/35483246.pdf

The emission reductions from the project activity are calculated by the application of the following equation:

$$ER_y = BE_y - PE_y - L_y \quad \text{Equation 1}$$

Where:

| | |
|---|---|
| $ER_y$ | Emission reductions in year t $CO_2$ |
| $BE_y$ | Baseline emissions in year t $CO_2$ |
| $PE_y$ | Project emissions in year y t $CO_2$ |
| $L_y$ | Leakage emissions in year y t $CO_2$ |

The guidance indicates that the formula to calculate baseline emission is the kWh produced by the renewable generating unit multiplied by an emission coefficient. The equation used for calculation of baseline emissions is as follows:

$$BE_y = EG_{PJ,y}.EF_{grid,y} \quad \text{Equation 2}$$

Where:

| | |
|---|---|
| $BE_y$ | Baseline emissions in year y $tCO_2$ |
| $EG_{PJ,y}$ | Quantity of net electricity generation as a result of the implementation of the CDM project activity year y, MWh |
| $EF_{grid,y}$ | Combined margin$CO_2$ emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system", $tCO_2$/MWh |

**I. Calculation of the baseline emissions**

The monitoring methodology consists of metering the electricity generated by the renewable technology. With this information, a reliable estimate of the amount of emission reductions can be made.

The baseline emissions are calculated based on the projected net energy provided to the grid (in MWh/year), and an emission factor for the displaced grid electricity (in $tCO_2$/MWh). The data required to calculate the emission factor is based on historic data (ex-ante approach). The grid emission factor has been calculated in line with AMS I.D, version 18, paragraph 23, which represents the baseline grid emission factor as:

(a) A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the "Tool to calculate the emission factor for an electricity system";

This combined margin emission factor has been calculated according to the latest version of the "Tool to calculate the emission factor for an electricity system."

As per the "Tool to calculate the emission factor for an electricity system", version 04.0, the combined margin emission factor is calculated as per following six steps:

Step 1: Identify the relevant electricity systems;
Step 2: Choose whether to include off-grid power plants in the project electricity system (optional);
Step 3: Select a method to determine the operating margin (OM);
Step 4: Calculate the operating margin emission factor according to the selected method;
Step 5: Calculate the build margin (BM) emission factor;
Step 6: Calculate the combined margin (CM) emission factor.

The following section details the steps mentioned above in order to calculate the combined margin emission factor

**Step 1**: Identify the relevant electricity systems Here the relevant project electricity system should be identified. If the DNA of the host country has published a delineation of the project electricity system and connected electricity systems, these delineations should be used. The following delineation is provided by the Central Electricity Authority (CEA) of the Government of India:

| NEWNE Grid | | | | Southern Grid |
|---|---|---|---|---|
| **Northern** | **Eastern** | **Western** | **North-Eastern** | |
| Chandigarh<br>Delhi<br>Haryana<br>Himachal Pradesh<br>Jammu & Kashmir<br>Punjab<br>Rajasthan<br>Uttar Pradesh<br>Uttarakhand | Bihar<br>Jharkhand<br>Orissa<br>West Bengal<br>Sikkim<br>Andaman-Nicobar | Chhattisgarh<br>Gujarat<br>Daman & Diu<br>Dadar & Nagar Haveli<br>Madhya Pradesh<br>Maharashtra<br>Goa | Arunachal Pradesh<br>Assam<br>Manipur<br>Meghalaya<br>Mizoram<br>Nagaland<br>Tripura | Andhra Pradesh<br>Karnataka<br>Kerala<br>Tamil Nadu<br>Puducherry<br>Lakshadweep |

The project is located in Chhattisgarh, which belongs to Integrated Northern, Eastern, Western, and North-Eastern regional grids (NEWNE) hence NEWNE grid has been chosen as the relevant electric power system.

**Step 2**: Choose whether to include off-grid power plants in the project electricity system (optional)

Project proponents have chosen Option I: Only grid power plants are included in the calculation.

**Step 3**: Select a method to determine the operating margin (OM) As per the tool the calculation of the operating margin emission factor is based on one of the following methods, which are described in Step 4:

a) Simple OM
b) Simple adjusted OM
c) Dispatch data analysis OM
d) Average OM

The tool allows the use of any of the above mentioned methods to calculate the operating margin emission factor; however, in order to use the simple OM method, it must be ensured that lowcost/must-run resources constitute less than 50% of the total grid generation in:
1) Average of the five most recent years
2) Based on long term averages for hydroelectricity production

Here the approach of average of the five most recent years for calculating the share of low cost must-run sources was adopted. Since the low-cost/must-run resources constitute less than 50% of the total grid generation the simple OM method has been chosen. As per the Central Electricity Authority CO2 baseline database, in India, hydro and nuclear stations qualify as low-cost/ must run sources and are excluded.

According to the tool, the emission factor can be calculated using either of the two following data vintages:

Ex ante option: A 3-year generation-weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation, without requirement to monitor and recalculate the emissions factor during the crediting period,

Or

Ex post option: If the ex post option is chosen, the emission factor is determined for the year in which the project activity displaces grid electricity, requiring the emissions factor to be updated annually during monitoring. If the data required to calculate the emission factor for year y is usually only available later than six months after the end of year y, alternatively the emission factor of the previous year (y-1) may be used. If the data is usually only available 18 months after the end of year y, the emission factor of the year proceeding the previous year (y-2) may be used. The same data vintage (y, y-1, or y-2) should be used throughout all crediting periods.

"Ex ante option: A 3-year generation - weighted average" has been selected for the purpose of emission reductions calculation for this project.

**Step 4**: Calculate the operating margin emission factor according to the selected method

Simple Operating Margin, Option A has been selected for determination of Operating Margin. The operating margin emission factor is calculated as the generation-weighted average CO2 emissions per unit net electricity generation (tCO2/MWh) of all generating power plants serving the system, not including low cost/must run power plant/units. The operating margin emission factor is defined as the weighted average emissions per electricity unit (tCO2/MWh) of all generating sources serving the system, excluding zero or low-cost/must-run power sources based on the average of the latest three years of data available (2011-12, 2012-13, 2013-14). The OM has been calculated as per the equation 1 of the tool:

$$EF_{grid,OMsimple,y} = \frac{\sum_m EG_{m,y} * EF_{EL,m,y}}{\sum_m EG_{m,y}} \qquad (1)$$

Where:

$EF_{grid,OMsimple,y}$ = Simple operating margin $CO_2$ emission factor in year $y$ ($tCO_2/MWh$)
$EG_{m,y}$ = Net quantity of electricity generated and delivered to the grid by power unit $m$ in year $y$ (MWh)
$EF_{EL,m,y}$ = $CO_2$ emission factor of power unit $m$ in year $y$ ($tCO_2/MWh$)
$m$ = All power units serving the grid in year $y$ except low-cost / must-run power units
$y$ = The relevant year as per the data vintage chosen in Step 3

Determination of $EF_{EL,m,y}$
The emission factor of each power unit $m$ has been determined by Option A1, equation 2 of the tool as follows:

$$EF_{EL,m,y} = \frac{\sum_i FC_{i,m,y} * NCV_{i,y} * EF_{CO2,i,y}}{EG_{m,y}} \qquad (2)$$

Where:

$EF_{EL,m,y}$ = $CO_2$ emission factor of power unit $m$ in year $y$ (tCO2/MWh)
$FC_{i,m,y}$ = Amount of fossil fuel type $i$ consumed by power unit $m$ in year $y$ (Mass or volume unit)
$NCV_{i,y}$ = Net calorific value (energy content) of fossil fuel type $i$ in year $y$ (GJ/mass or volume unit)
$EF_{CO2,i,y}$ = $CO_2$ emission factor of fossil fuel type $i$ in year $y$ ($tCO_2/GJ$)
$EG_{m,y}$ = Net quantity of electricity generated and delivered to the grid by power unit $m$ in year $y$ (MWh)
$m$ = All power units serving the grid in year $y$ except low-cost/must-run power units

$i$ = All fossil fuel types combusted in power unit $m$ in year $y$
$y$ = The relevant year as per the data vintage chosen in Step 3

| Simple Operating Margin (tCO2/MWh) (incl. Imports) | | | |
|---|---|---|---|
| | **2011-12** | **2012-13** | **2013-14** |
| **NEWNE** | 0.970 | 0.992 | 0.995 |

As per the database provided by the Central Electricity Authority the Simple generation OM is calculated to be 0.986 $tCO_2$/MWh.

**Step 5**: Calculate the build margin (BM) emission factor

The tool to calculate the emission factor requires the project proponent to choose between the following two options for the vintage of data,

**Option 1**: *For the first crediting period, the build margin emission factor should be calculated ex-ante based on the most recent information available on units already built for sample group m at the time of CDM-PDD submission to the DOE for validation. For the second crediting period, the build margin emission factor should be updated based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period to the DOE. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used. This option does not require monitoring the emission factor during the crediting period.*

**Option 2**: *For the first crediting period, the build margin emission factor shall be updated annually, ex-post, including those units built up to the year of registration of the project activity or, if information up to the year of registration is not yet available, including those units built up to the latest year for which information is available. For the second crediting period, the build margin emissions factor shall be calculated ex-ante, as described in option 1 above. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used.*

Option 1 has been chosen from the above mentioned options and the build margin has been calculated ex-ante based on the most recent information available on the plants already built for a sample group $m$ at the time of PDD submission. There will not be any monitoring of the emission factor during the crediting period.

As per the tool equation 13 the $EF_{grid,BM,y}$ is calculated as below:

$$EF_{grid,BM,y} = \frac{\sum_m EG_{m,y} * EF_{EL,m,y}}{\sum_m EG_{m,y}} \qquad (3)$$

$EF_{BM,y}$ = Build margin $CO_2$ emission factor in year $y$ ($tCO_2$/MWh)
$EG_{m,y}$ = Net quantity of electricity generated and delivered to the grid by power unit $m$ in year $y$ (MWh)
$EF_{EL,m,y}$ = $CO_2$ emission factor of power unit $m$ in year $y$ (tCO2/MWh)
$m$ = Power units included in the build margin
$y$ = Most recent historical year for which electricity generation is available

| Build Margin ($tCO_2$/MWh) (not adjusted for imports) | |
|---|---|
| | 2013-14 |
| NEWNE | 0.950 |

As per the database provided by the Central Electricity Authority the BM (not adjusted for imports) is calculated to be 0.950 $tCO_2$/MWh

**Step 6**: Calculate the combined margin (CM) emission factor.

The calculation of the combined margin (CM) emission factor ($EF_{grid,CM,y}$) should be based on one of the following methods:

(a) Weighted average CM; or
(b) Simplified CM.

The weighted average CM method (option A) should be used as the preferred option.

The simplified CM method (option B) can only be used if:
- The project activity is located in a Least Developed Country (LDC) or in a country with less than 10 registered projects at the starting date of validation; and
- The data requirements for the application of step 5 above cannot be met.

Option A (Weighted average CM) has been chosen for the calculation of combined margin emission factor for the project activity.

The combined margin emission factor is calculated as follows:

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM} \qquad (4)$$

Where:
$EF_{grid,CM,y}$ = Combined margin $CO_2$ emission factor in year $y$ ($tCO_2$/MWh)
$EF_{grid,BM,y}$ = Build margin $CO_2$ emission factor in year $y$ ($tCO_2$/MWh)
$EF_{grid,OM,y}$ = Operating margin $CO_2$ emission factor in year $y$ ($tCO_2$/MWh)
$w_{BM}$ = Weighting of build margin emissions factor (%)
$w_{OM}$ = Weighting of operating margin emissions factor (%)

The following default values should be used for $w_{OM}$ and $w_{BM}$ for all projects beside wind and solar power generation:
$w_{OM}$ = 0.5 and $w_{BM}$= 0.5 for the first crediting period, and $w_{OM}$ = 0.25 and $w_{BM}$= 0.75 for the second and third crediting period. As this project is no solar or wind power generation project and the calculation refers to the 2nd crediting period, $w_{OM}$= 0.25 and $w_{BM}$=0.75 is used.

Therefore, the combined margin emission factor could be calculated as shown in the following table:

| Combined Operation Margin ($tCO_2$/MWh) (incl. Imports) | | | |
|---|---|---|---|
| | OM | BM | CM |
| NEWNE | 0.986 | 0.950 | 0.959 |

In line with the methodology, $EG_{PJ,y}$ may be given as:

$$EG_{PJ,y} = EG_{Gen} - EG_{Aux} \qquad \text{Equation 5}$$

$$EG_{Gen} = MIN\left[\left(M_{biomass,y} / SC_{biomass}\right) and \left(EG_{total,y} - \left(M_{Dolochar,y} / SC_{Dolochar}\right)\right)\right] \qquad \text{Equation 6}$$

Where:

| | |
|---|---|
| $EG_{Gen}$ | Gross electricity generation from rice husk, MWh |
| $EG_{total,y}$ | Gross electricity generation from the use of biomass (rice husk) + dolochar, MWh |
| $EG_{Aux}$ | Auxiliary electricity consumption[11], MWh |
| $M_{biomass,y}$ | Amount of biomass used during the year y, tonnes per year |
| $SC_{biomass}$ | Specific fuel consumption for biomass, tonnes/MWh |
| $M_{Dolochar,y}$ | Amount of Dolochar used during the year y, tonnes per year |
| $SC_{Dolochar}$ | Specific fuel consumption of Dolochar, tonnes/MWh |

As mentioned earlier in section A.2 we are analysing the entire 60 tonnes per hour of steam generated within the boiler and therefore we calculate the fuel that would be required to generate this much of steam.

*Project Emissions ($PE_y$)*

Project emissions will arise from the road transportation of freight. As per methodology procedure it can be done by monitoring fuel consumption (Option A) or using conservative default values (Option B). ($PE_{TR,m}$) of biomass residues and we use the following equation to determine these:

Option A: Monitoring fuel consumption: This option requires monitoring the fuel consumption of the vehicles used for the transportation of freight under the project activity. The monitored fuel consumption shall include fuel consumed by the vehicles on both outbound and return trips, even if the vehicles also transport freight not associated with the project activity.

Option B: Using conservative default values: This option relies on conservative default emission factors to estimate project or leakage emissions from road transportation of freight. These default values are established for two vehicle classes: light vehicles and heavy vehicles.

We opt for option B for project emission calculations. Under this option, the following data shall be monitored separately for each freight transportation activity f to estimate the emissions:
(a) The quantity of freight transported ($FR_{f,m}$);
(b) The origin and destination of the freight transported and the road (or rail line) distance between the origin and the destination ($D_{f,m}$); and
(c) The vehicle class used, if the freight is transported by road.

$$PE_{TR,m} = \sum_{f} D_{f,m} X\, FR_{f,m} X\, EF_{CO2,f} X\, 10^{-6}$$

Equation 7

$PE_{TR,m}$ = Project emissions from transportation of freight monitoring period m (t CO2)
$D_{f,m}$ = Return trip distance between the origin and destination of freight transportation activity f in monitoring period m (km)
$FR_{f,m}$ =Total mass of freight transported in freight transportation activity f in monitoring period m (t)
$EF_{CO2,f}$ = Default CO2 emission factor for freight transportation activity f (g $CO_2$/t km)
*f* = Freight transportation activities conducted in the project activity in monitoring period m

*Leakage emissions*
As per the methodological tool "Leakage in biomass small-scale project activities", version 04.0, for competitive uses of biomass, the project participant shall evaluate ex ante if there is a surplus of the biomass in the region of the project activity, which is not utilised. If it is demonstrated (e.g., using published literature, official reports, surveys etc.) at the beginning of each crediting period

[11]To be conservative the auxiliary consumption has not been apportioned for rice husk and dolochar. The total auxiliary consumption would be used to calculate the qualifying electricity thereby giving a conservative value to the volume of CERs.

that the quantity of available biomass in the region (e.g., 50 km radius), is at least 25% larger than the quantity of biomass that is utilised including the project activity, then this source of leakage can be neglected otherwise this leakage shall be estimated and deducted from the emission reductions.

### B.6.2. Data and parameters fixed ex ante

*(Copy this table for each piece of data and parameter.)*

| | |
|---|---|
| Data/Parameter | **$EF_{CO2,f}$** |
| Unit | g $CO_2$/t km |
| Description | Default CO2 emission factor for freight transportation activity *f* |
| Source of data | - Project and leakage emissions from transportation of freight (Version 01.1.0) EB 70, Annex 23 |
| Value(s) applied | **Vehicle class** / **Emission factor (g $CO_2$/ t km)**: Light vehicles / 245; Heavy vehicles / 129 |
| Choice of data or Measurement methods and procedures | - |
| Purpose of data | Project Emission calculations |
| Additional comment | Applicable to Option B. The default CO2 emission factors take into account emissions generated by loaded outbound trips and empty return trips. The default emission factors have been obtained from two sources. For light vehicles, the emission factor was obtained from empirical data from European vehicles[12] For heavy vehicles, the emission factor has been derived based on custom design transient speed-time-gradient drive cycle (adapted from the international FIGE cycle), vehicle dimensional data, mathematical analysis of loading scenarios, and dynamic modelling based on engine power profiles, which, in turn, are a function of gross vehicle mass (GVM), load factor, speed/acceleration profiles and road gradient. The following assumptions on key parameters have been made: an average driving speed of 30 km/h, an average gradient of 1%, and a load factor attained when biomass[13] is transported were assumed |

| | |
|---|---|
| Data/Parameter | **$SC_{biomass}$** |
| Unit | tonnes/MWh |
| Description | Specific fuel consumption of biomass |
| Source of data | Plant records and specification from manufacturers |
| Value(s) applied | 2.00 |
| Choice of dataorMeasurement methods and procedures | The specific fuel consumption is calculated based on specifications from the manufacturers and the proposed fuel mix in the project activity. |
| Purpose of data | Baseline Emission calculations |
| Additional comment | Specified *ex-ante* |

[12] CO2 emissions from heavy weight French between 1996 and 2006 increased more slowly that the volumes transported . ' General Commission on Sustainable Development. # 25 , 2009 .

[13] Biomass is the most commonly transported material in existing CDM projects where transportation is not the main project activity. Due to a low bulk density of biomass, volumetric loading was used to derive the emission factor assuming that project proponents will extent the height of side panels to the height of 2.4 m to maximize their trip efficiency.

| Data/Parameter | **$SC_{Dolochar}$** |
|---|---|
| Unit | tonnes/MWh |
| Description | Specific fuel consumption of Dolochar/char |
| Source of data | Plant records and specification from manufacturers |
| Value(s) applied | 4.14 |
| Choice of dataorMeasurement methods and procedures | The specific fuel consumption is calculated based on specifications from the manufacturers and the proposed fuel mix in the project activity |
| Purpose of data | Baseline Emission calculations |
| Additional comment | Specified *ex-ante* |

| Data/Parameter | **$EF_{grid,y}$** |
|---|---|
| Unit | $tCO_2$/MWh |
| Description | Emission factor |
| Source of data | Source: Central Electricity Authority - Baseline Carbon Dioxide Emissions from Power Sector Version 10.0. http://www.indiaenvironmentportal.org.in/content/404156/co2-baseline-database-for-the-indian-power-sector/ |
| Value(s) applied | 0.959 |
| Choice of data or Measurement methods and procedures | The value used has been fixed *ex-ante* and will be used throughout the second crediting period of the project activity<br>$EF_{grid,y} = EF_{OM,y} \times w_{OM} + EF_{BM,y} \times w_{BM}$<br>As per Methodological tool: Tool to calculate the emission factor for an electricity system Version 04.0, $w_{OM}$ = 0.25 and $w_{BM}$ = 0.75 for the second crediting period |
| Purpose of data | Baseline Emission calculations |
| Additional comment | - |

| Data/Parameter | **$EF_{OM,y}$** |
|---|---|
| Unit | $tCO_2$/MWh |
| Description | Simple Operating Margin |
| Source of data | Source: Central Electricity Authority - Baseline Carbon Dioxide Emissions from Power Sector Version 10.0. http://www.indiaenvironmentportal.org.in/content/404156/co2-baseline-database-for-the-indian-power-sector/ |
| Value(s) applied | 0.986 |
| Choice of dataorMeasurement methods and procedures | The value used has been fixed *ex-ante* and will be used throughout the second crediting period of the project activity |
| Purpose of data | Baseline Emission calculations |
| Additional comment | The value utilized above is available at the following link: http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm |

| Data/Parameter | **$EF_{BM,y}$** |
|---|---|
| Unit | $tCO_2$/MWh |
| Description | Build Margin |
| Source of data | Source: Central Electricity Authority - Baseline Carbon Dioxide Emissions from Power Sector Version 10.0. http://www.indiaenvironmentportal.org.in/content/404156/co2-baseline-database-for-the-indian-power-sector/ |
| Value(s) applied | 0.950 |

| | |
|---|---|
| Choice of dataorMeasurement methods and procedures | The value used has been fixed *ex-ante* and will be used throughout the second crediting period of the project activity |
| Purpose of data | Baseline Emission calculations |
| Additional comment | The value utilized above is available at the following link: http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm |

### B.6.3. Ex ante calculation of emission reductions

>>

From section B.6.1 the emission reductions are given as:

$$ER_y = BE_y - PE_y - L_y$$

$$BE_y = EG_{PJ,y}.EF_{grid,y}$$

Where:

$BE_y$ Baseline emissions in year y $tCO_2$

$EG_{PJ,y}$ Quantity of net electricity generation as a result of the implementation of the CDM project activity year y, MWh

$EF_{grid,y}$ Combined margin $CO_2$ emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system", $tCO_2$/MWh

And $EG_{PJ,y}$ is given as,

$$EG_{PJ,y} = EG_{Gen} - EG_{Aux}$$

$$EG_{Gen} = MIN\left[\left(M_{biomass,y} / SC_{biomass}\right) and \left(EG_{total,y} - \left(M_{Dolochar,y} / SC_{Dolochar}\right)\right)\right]$$

Where:

$EG_{Gen}$ Gross electricity generation from rice husk, MWh

$EG_{total,y}$ Gross electricity generation from the use of biomass (rice husk) + dolochar, MWh

$EG_{Aux}$ Auxiliary electricity consumption, MWh

$M_{biomass,y}$ Amount of biomass used during the year y, tonnes per year

$SC_{biomass}$ Specific fuel consumption for biomass, tonnes/MWh

$M_{Dolochar,y}$ Amount of Dolochar used during the year y, tonnes per year

$SC_{Dolochar}$ Specific fuel consumption of Dolochar, tonnes/MWh

The fuel for the 60tph boiler has been estimated annually at $M_{biomass, total, y}$ = 113,234 tonnes and $M_{Dolochar, total, y}$ = 28,309 tonnes. Up to now, six verifications were successfully carried out between 27th February 2009 and 31st August 2014.For monitoring period 01st September 2014 to 26th February 2016 is currently under verification. For each corresponding monitoring period, the Plant load factor (PLF) was calculated:

| Electricity Generation-Actual Data for first crediting period | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Verifn 1 | Verifn 2 | Verifn 3 | Verifn 4 | Verifn 5 | Verifn 6 | Verifn 7 | | |
| M biomass | tonnes | 55,289 | 109,993 | 106,666 | 87,819 | 94,340 | 102,848 | 118849.88 | | |
| SC biomass | tonnes/MWh | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | | |
| M dolochar | tonnes | 2,844 | 10,211 | 12,274 | 13,788 | 14,377 | 16,851 | 19,827 | | |
| SC dolochar | tonnes/MWh | 4.14 | 4.14 | 4.14 | 4.14 | 4.14 | 4.14 | 4.14 | | |
| PLF | | 81% | 90% | 85% | 94% | 86% | 88% | 68% | **Average** | **85%** |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Auxiliary | | 4714.60 | 10215.32 | 11400.56 | 9620.84 | 9372.62 | 9270.02 | 10894.24 | | |
| TG capacity | MW | 8 | 8 | 8 | 8 | 8 | 8 | 8 | | |
| EGtotal | MWh | 28,990 | 62,739 | 64,722 | 60,854 | 60,482 | 61,512 | 70,989 | | |
| EGbiomass | MWh | 27,644 | 54,997 | 53,333 | 43,909 | 47,170 | 51,424 | 59,425 | | |
| EGdolochar | MWh | 687 | 2,466 | 2,965 | 3,330 | 3,473 | 4,070 | 4,789 | | |
| EGtotal - EGdolochar | MWh | 28,303 | 60,272 | 61,758 | 57,523 | 57,009 | 57,441 | 66,200 | | |
| EGGen | MWh | 26,138 | 54,892 | 52,813 | 43,909 | 47,170 | 51,222 | 59,010 | | |
| $EG_{PJ,y}$ | MWh | 21,423 | 44,677 | 41,412 | 34,288 | 37,798 | 41,951 | 48,116 | | |
| Auxiliary % | | 16% | 16% | 18% | 16% | 15% | 15% | 15% | Average | 16% |

Therefore based on the above formulae, we have:

$M_{biomass,y}$ 113,234 tonnes
$M_{Dolochar,\ y}$ 28,309 tonnes
$SC_{ricehusk}$ = 2.0 tonnes/MWh
$SC_{Dolochar}$ = 4.14 tonnes/MWh

$$EG_{Gen} = MIN\left[\left(113{,}234/2.0\right) and \left(45{,}052 - \left(28{,}309/4.14\right)\right)\right]$$

$$EG_{Gen} = MIN\left[(56{,}523) and (38{,}214)\right]$$

$EG_{total,\ y}$ is estimated at 45,052 MWh. Based on these figures the above equation for qualifying generations gives $EG_{PJ,y}$ = 38,214 MWh. $EF_{grid,y}$ has been taken as 0.959 $tCO_2/MWh$[14]

| Emission Factor | Value (tCO2/MWh) |
|---|---|
| ***EF**OM,2011-12* - Operating margin 2011-12 | 0.970 |
| ***EF**OM,2012-13* - Operating margin 2012-13 | 0.992 |
| ***EF**OM,2013-14* - Operating margin 2013-14 | 0.995 |
| ***EF**OM* - Average Operating margin | 0.986 |
| ***EF**BM,2013-14* - Build Margin | 0.950 |
| ***EF**CM* - **Combined Margin** | **0.959** |

Thus, $BE_y$ = 38,214*0.959
= 36,647 $tCO_2e$

Emissions due to transport of the rice husk to the project plant are estimated as:

$$PE_y = PE_{TR,m}$$

$$PE_{TR,m} = \sum_f D_{f,m} X\ FR_{f,m} X\ EF_{CO2,f} X\ 10^{-6}$$

Where
$PE_{TR,m}$ = Project emissions from transportation of freight monitoring period m (t $CO_2$)
$D_{f,m}$ = Return trip distance between the origin and destination of freight transportation activity f in monitoring period m (km)
$FR_{f,m}$ =Total mass of freight transported in freight transportation activity f in monitoring period m (t)
$EF_{CO2,f}$ = Default CO2 emission factor for freight transportation activity f (g $CO_2$/t km)
*f* = Freight transportation activities conducted in the project activity in monitoring period m

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http://www.indiaenvironmentportal.org.in/content/404156/co2-baseline-database-for-the-indian-power-sector/

$D_{f,m}$ 100
$F_{Rf,m}$ 113,234 tonnes
$EF_{co2,f}$ 245 g $CO_2$/ t km (light vehicles)
129 g $CO_2$/ t km (heavy vehicles)
For calculation purpose we have considered light vehicle which is more conservative. The vehicle class will be monitored separately during the crediting period for the calculation of project emissions. Based on the above figures, the emissions due to transportation per year are given as:

$PE_y$ = 2,774 $tCO_2$

It can be seen that $PET_y$ < 10% of $BE_y$ and therefore we do not need to consider project emissions due to transportation as indicated in the attachment C to appendix B for small scale project activities[15].

The surplus availability of the biomass (25% larger than the quantity of biomass that is utilized including the project activity) has been established with the biomass survey conducted for the year 2014-15 by M/s MCJ Enegy Engineers (P) Ltd covering the 100 km radius from the project activity. The biomass assessment survey shows the 36.88% surplus availability of biomass. Hence the leakage emissions from the project activity for the crediting period are taken as zero.
Biomass generation (MT/year): 1660,867
Biomass consumption (MT/year): 1213,368
Surplus available biomass (MT/year): 447,499

i.e. $L_y$ = 0 $tCO_2$

Therefore, the emission reductions are estimated as:

$$ER_y = BE_y - PE_y - L_y$$

$ER_y$ = 36,647 $tCO_2e$

### B.6.4. Summary of ex ante estimates of emission reductions

| Year | Baseline emissions (t $CO_2e$) | Project emissions (t $CO_2e$) | Leakage (t $CO_2e$) | Emission reductions (t $CO_2e$) |
|---|---|---|---|---|
| Year 2016-2017 | 36,647 | 0 | 0 | 36,647 |
| Year 2017-2018 | 36,647 | 0 | 0 | 36,647 |
| Year 2018-2019 | 36,647 | 0 | 0 | 36,647 |
| Year 2019-2020 | 36,647 | 0 | 0 | 36,647 |
| Year 2020-2021 | 36,647 | 0 | 0 | 39,724 |
| Year 2021-2022 | 36,647 | 0 | 0 | 39,724 |
| Year 2022-2023 | 36,647 | 0 | 0 | 39,724 |
| Total | 256,532 | 0 | 0 | 256,532 |
| Total number of crediting years | 7 years x 3 | | | |
| **Annual average over the crediting period** | **36,647** | **0** | **0** | **36,647** |

[15] http://cdm.unfccc.int/methodologies/SSCmethodologies/AppB_SSC_AttachmentC.pdf

## B.7. Monitoring plan

### B.7.1. Data and parameters to be monitored

*(Copy this table for each piece of data and parameter.)*

| Data/Parameter | $EG_{total,y}$ |
|---|---|
| Unit | MWh |
| Description | Gross electricity generation from the use of biomass (rice husk) + dolochar |
| Source of data | Plant records maintained by the power plant manager. |
| Value(s) applied | 45,052 |
| Measurement methods and procedures | Electricity generated from the turbine generator will be continuously recorded by the energy meter with accuracy class of 1.0. This will be collated at the end of each day and reported to the head of power plant. This will form the basis for calculations. The energy meter will be calibrated annually. |
| Monitoring frequency | Continuously monitored, recorded hourly and collated on daily / monthly basis. |
| QA/QC procedures | This can be cross checked from the amount of fuel fired using specific energy consumption data. Total electricity generation by the project activity has been compared with the estimated electricity generation based on *ex-ante* fixed specific fuel consumption and found comparable. |
| Purpose of data | Baseline emissions calculations |
| Additional comment | Data will be kept for the crediting period and two years thereafter. |

| Data/Parameter | $E_{aux,y}$ |
|---|---|
| Unit | MWh |
| Description | Auxiliary electricity consumption |
| Source of data | Plant records maintained by the power plant manager. |
| Value(s) applied | 16% |
| Measurement methods and procedures | Energy meter with accuracy class of 0.5 will monitor this data continuously and the values will be recorded daily in the records kept in the power plant. The energy meter will be calibrated annually. |
| Monitoring frequency | Continuously monitored, recorded hourly and collated on daily / monthly basis |
| QA/QC procedures | Not Applicable |
| Purpose of data | Baseline emissions calculations |
| Additional comment | Data will be kept for the crediting period and two years thereafter. |

| Data/Parameter | $M_{biomass, total ,y}$ |
|---|---|
| Unit | Tonnes |
| Description | Amount of biomass (rice husk) used in the project activity annually |
| Source of data | Plant records |
| Value(s) applied | 113,234 |
| Measurement methods and procedures | The total fuel (rice husk + dolochar) fed to the boiler will be continuously measured by a belt weigher. The dolochar will be measured across the weigh bridge which is located prior to the storage yard . The amount of rice husk used in the project activity will be calculated from the difference between the total fuel from belt weigher and the dolochar from weigh bridge[16]. The data will be collated at the end of each day. The belt weigher will be calibrated annually. |
| Monitoring frequency | Daily |

[16] This is a conservative approach since the stocks of dolochar will not be accounted for. This would ensure that the maximum quantity of dolochar is deducted from total fuel combusted thereby giving a lower electricity generation value from biomass and hence lower CERs.

| | |
|---|---|
| QA/QC procedures | Purchase Records can be used to cross check this data as all the biomass delivered to the storage yard is also weighed across the weighbridge . |
| Purpose of data | Baseline emissions calculations |
| Additional comment | Data will be kept for the crediting period and two years thereafter. |

| | |
|---|---|
| Data/Parameter | $\mathbf{M_{Dolochar, total , y}}$ |
| Unit | tonnes |
| Description | Amount of Dolochar/char used in the project activity annually |
| Source of data | Plant records (stores) |
| Value(s) applied | 28,309 |
| Measurement methods and procedures | The parameter will be measured daily by the weigh bridge installed within the plant premises prior to the storage yard. The data will be collated at the end of each day. |
| Monitoring frequency | Daily |
| QA/QC procedures | The weigh bridge will be calibrated, annually which will act as QA/QC for this parameter. |
| Purpose of data | Baseline emissions calculations |
| Additional comment | Data will be kept for the crediting period and two years thereafter. |

| | |
|---|---|
| Data/Parameter | $\mathbf{FR_{f,m}}$ |
| Unit | Tonnes |
| Description | Total mass of freight transported in freight transportation activity *f* in monitoring period *m* |
| Source of data | Records by project participants |
| Value(s) applied | 113,234 |
| Measurement methods and procedures | - |
| Monitoring frequency | Continuously |
| QA/QC procedures | - |
| Purpose of data | Project emissions calculations |
| Additional comment | Applicable to Option B |

| | |
|---|---|
| Data/Parameter | $\mathbf{D_{f,m}}$ |
| Unit | Kilometre |
| Description | Return trip distance between the origin and destination of freight transportation activity *f* in monitoring period *m* |
| Source of data | Records by project participants |
| Value(s) applied | 100 |
| Measurement methods and procedures | Determined once for each freight transportation activity *f* for a reference trip using the vehicle odometer or any other appropriate sources (e.g. on-line sources) |
| Monitoring frequency | To be updated whenever the distance changes |
| QA/QC procedures | - |
| Purpose of data | Project emissions calculations |
| Additional comment | Applicable to Option B |

### B.7.2. Sampling plan

>>
Not Applicable

### B.7.3. Other elements of monitoring plan

>>
The CDM data will be collected monthly and this will permit the monitoring and reporting of emission reductions on a monthly basis.

A detailed monitoring report will be produced by the plant and this will form the basis of the roles and responsibilities and collection frequency of the data required to monitor the project activity.

More generally the generation data from the turbine and auxiliary consumption will however be continuously recorded by the energy meters and a manual hourly record will be made by the turbine operator. This data will be collated at the end of each day and reported in the daily operating report to the factory management, the responsibility for which will be with the Head Electrical.

The amount of biomass (rice husk) brought in by the plant will be monitored through purchase records duly supported with weighment slip for each truck that delivers biomass . The total quantity of fuel (rice husk + dolochar) used in the project activity will be monitored by belt weigher. The amount of dolochar /char used in the project activity will also be monitored using the weigh bridge. The amount of rice husk used in the project activity will be calculated from the difference between the total fuel monitored form the belt weigher and the dolochar monitored on the weigh bridge. This data will be collected continuously. The overall responsibility for this data will be with the Manager Purchase (Power). The calculations of transport emissions is undertaken through monitoring of the total mass of freight transported in freight transportation activity and return trip distance between the origin and destination of freight transportation activity.

The organization will train the staff to ensure that the monitoring process is appropriate and effective.

### B.8. Date of completion of application of methodology and standardized baseline and contact information of responsible persons/ entities

>>
081/11/2016
Mr. S. K. Goyal
M/s Shri Bajrang Power and Ispat Ltd
commercial.bjr@goelgroup.co.in
The entity is a project participant. The details of project participant are given in Appendix 1.

## SECTION C. Duration and crediting period

### C.1. Duration of project activity

### C.1.1. Start date of project activity

>>
27/06/2006 - Date of board resolution considering CDM revenues at the development stage of the project.

### C.1.2. Expected operational lifetime of project activity

>>
20 years-00 months

## C.2. Crediting period of project activity

### C.2.1. Type of crediting period

>>
Renewable crediting period (7 years x 3)

### C.2.2. Start date of crediting period

>>
27/02/2009 - 26/02/2016 - first crediting period
27/02/2016 – 26/02/2023 renewal of crediting period

### C.2.3. Length of crediting period

07 years 00 months

## SECTION D. Environmental impacts

### D.1. Analysis of environmental impacts

>>
As per the Ministry of Environment & Forest (MoEF), Government of India, Environmental Impact Assessment (EIA) studies are exempted for power plant up to 15 MW, based on biomass (Environment Impact Assessment Notification S.O. 3067 (E), dated 01/12/2009). Since the project comes under the small-scale category of CDM projects as per UNFCCC guidelines, doesn't call for EIA study. However, the statutory approvals and authorization are obtained for the project activity. .

In relation to the baseline scenario no negative environmental impacts will arise as a result of the project activity.

The positive environmental impacts arising from the project activity are:

- A reduction in carbon dioxide emissions from the replacement of fossil fuels which would be generated under the baseline scenario
- A reduction in the emissions of other harmful gases (NOx and SOx) that arise from the combustion of coal in power generation
- A reduction in the production of ash as rice husk has a lower ash content[17] than that of Indian coal which typically has an ash content of 30 to 40%

The factory will meet all environmental legislations as set out by the state Chhattisgarh Environment Conservation Board (the State Pollution Control Board) and Ministry of Environment and Forest, Government of India as per applicable rules/act and there will be on-going monitoring of the plant by this state body. A "Consent to Establish" has been issued and a "Consent to operate" will be provided annually and this will form part of the monitoring procedures.

The plant will install an electrostatic precipitator at the exit of the boiler to limit suspended particulate matter in the flue gases to less than 150 mg/$Nm^3$. There will also investment in waste water systems to treat the water de-mineralisation plant effluent and also the blow down water from the cooling tower and steam generator.

Monitoring of air and water quality will be undertaken on a regular basis as per PCB guidelines after the plant is commissioned.

[17] The ash content on rice husk is normally 15%.

### D.2. Environmental impact assessment

>>
Not applicable, as no negative environmental impacts are anticipated due to the proposed project activity.

## SECTION E. Local stakeholder consultation

### E.1. Solicitation of comments from local stakeholders

>>
The stakeholder review has been conducted at the following levels:

- A local stakeholder review
- A national stakeholder review which will be undertaken through the approval by the Ministry of Environment and Forests (the Indian DNA) and consent to operate from the Chhattisgarh Pollution Control Board.

The institutions are already in place for the national and international stakeholder review and any comments arising from these processes will be incorporated prior to registration. The project will be submitted to the Indian designated national authority (the Ministry of Environment and Forests) for the approval.

The *"Municipal Corporation Birgaon, Raipur"* (a locally elected representative) has been approached and informed of the project, the necessary permissions have been issued. A notice was published in the local daily "Samvet Shikhar" on 16/6/2007 informing local stakeholders in the region about the project activity.

Other stakeholders that have been notified of the project, through consents and approvals required for the investment, are the Chhattisgarh State Electricity Board, the Chhattisgarh Renewable Energy Development Authority, the Ministry of Commerce and Industry, the State Boiler and State Electrical Inspectorate. These parties have approved the project and provided the necessary approvals required to date.

### E.2. Summary of comments received

>>
No comments were received.

### E.3. Report on consideration of comments received

>>
As no comments were received, no action has been taken in this regard.

## SECTION F. Approval and authorization

>>

| Sr. No. | Approval and Authorization Details | Reference | Date of Approval and Authorization |
|---|---|---|---|
| 1 | Host Country Approval from Ministry of Environment and Forests, Government of India | 4/24/2007-CCC | 15/02/2008 |
| 2 | Consent to establish from Chhattisgarh Environment Conservation Board, Raipur for installation of 8 MW Biomass power plant | 4017/TS/CECB/ 2007 | 19/07/2007 |
| 3 | Environmental Clearance from Ministry of Environment & Forests, Govt of India | J-11011/531/2007 – 1A.II (I) | 17/01/2008 |
| 4 | No-objection certificate from Chhattisgarh State Renewal Energy Development Agency for establishment of biomass based power plant of capacity 8 MW | 10339 / CREDA /BM/RSB/2004 | 10/09/2004 |

# Appendix 1. Contact information of project participants and responsible persons/ entities

| | |
|---|---|
| **Project participant and/or responsible person/ entity** | ☒ Project participant<br>☐ Responsible person/ entity for application of the selected methodology (ies) and, where applicable, the selected standardized baselines to the project activity |
| **Organization name** | M/s Shri Bajrang Power and Ispat Ltd. |
| **Street/P.O. Box** | Urla Industrial Area, 522/C |
| **Building** | |
| **City** | Raipur |
| **State/Region** | Chhattisgarh |
| **Postcode** | 493221 |
| **Country** | India |
| **Telephone** | +91-771 4288019 |
| **Fax** | +91-771 4288123 |
| **E-mail** | commercial.bjr@goelgroup.co.in |
| **Website** | |
| **Contact person** | |
| **Title** | Director |
| **Salutation** | Mr. |
| **Last name** | Goyal |
| **Middle name** | |
| **First name** | Shravan Kumar |
| **Department** | |
| **Mobile** | +91-9826422320 |
| **Direct fax** | +91-771 4288123 |
| **Direct tel.** | |
| **Personal e-mail** | skgoyal@goelgroup.co.in |

| | |
|---|---|
| **Project participant and/or responsible person/ entity** | ☒ Project participant<br>☐ Responsible person/ entity for completing the CDM-MR-FORM |
| **Organization name** | Agrinergy Pte Ltd. |
| **Street/P.O. Box** | Eagle Tower |
| **Building** | Montpellier Drive |
| **City** | GL50 1TA Cheltenham |
| **State/Region** | |
| **Postcode** | |
| **Country** | United Kingdom of Great Britain and Northern Ireland |
| **Telephone** | +44 1242 506315 |
| **Fax** | |
| **E-mail** | ben.atkinson@agrinergy.com |
| **Website** | www.agrinergy.com |
| **Contact person** | |
| **Title** | Director |
| **Salutation** | Mr |

| | |
|---|---|
| **Last name** | Atkinson |
| **Middle name** | |
| **First name** | Ben |
| **Department** | |
| **Mobile** | |
| **Direct fax** | |
| **Direct tel.** | +44 1242 506315 |
| **Personal e-mail** | ben.atkinson@agrinergy.com |

| | |
|---|---|
| **Project participant and/or responsible person/ entity** | ☒ Project participant<br>☐ Responsible person/ entity for completing the CDM-MR-FORM |
| **Organization name** | Swedish Energy Agency |
| **Street/P.O. Box** | Kungsgatan, 43 P O Box 310, SE- 63104 |
| **Building** | |
| **City** | Eskilstuna |
| **State/Region** | Södermanland County |
| **Postcode** | |
| **Country** | Sweden |
| **Telephone** | +46 165442000 |
| **Fax** | +46 165442099 |
| **E-mail** | Nils.Henoch@swedishenergyagency.se |
| **Website** | https://www.energimyndigheten.se/en/ |
| **Contact person** | |
| **Title** | |
| **Salutation** | Mr. |
| **Last name** | Henoch |
| **Middle name** | |
| **First name** | Nils |
| **Department** | |
| **Mobile** | |
| **Direct fax** | +46 165442099 |
| **Direct tel.** | +46 165442000 |
| **Personal e-mail** | Nils.Henoch@swedishenergyagency.se |

# Appendix 2. Affirmation regarding public funding

The project has not received any public funding.

# Appendix 3. Applicability of methodology and standardized baseline

The applicability of selected methodology (AMS I.D) has already been mentioned in section B.2 of the PDD.

# Appendix 4. Further background information on ex ante calculation of emission reductions

The background information on ex ante calculation of emission reductions has already been mentioned in section B.6.1 of the PDD.

# Appendix 5. Further background information on monitoring plan

The roles and responsibility to monitor the project activity as per procedures are given below,

| Designation | Responsibility |
|---|---|
| Director | Overall responsibility of CDM Project |
| General Manager | Co-ordination of day to day CDM activities |
| General Manager (Inst & Control) | Monitoring of Process Data through DCS |
| General Manager (Electrical) | Monitoring of Electricity Generation & Auxiliary Consumption Data |
| Manager, Purchase | Monitoring Data for Fuel (Rice Husk+Dolochar) Purchase and its consumption in Boiler |

In addition to the measures for monitoring, following systems will be put in place to monitor the project activity.

In terms of the storage and archiving of data, logbooks will be kept for the generation of power. Purchase records duly supported with weighment slip will also be held for each truck that delivers biomass (rice husk) to the site. This data will however be collated into a daily format and held in an electronic format at the plant.

As outlined the environmental monitoring will be undertaken by qualified independent third party agencies and records of these reports will be kept on site along with the necessary consents from the Chhattisgarh Pollution Control Board.

The meters will be calibrated annually by an accredited independent third party. The calibration records will be maintained on site.

The Power Plant Manager will be responsible for the collection and storage of the electrical data, supported by the shift engineers and the switchboard attendants. The Head of Purchase will be responsible for the collection and storage of the biomass and fossil fuel consumption data.

The monitoring of the project activity will be the responsibility of Mr Shravan Kumar Goyal. If the project is not performing as expected or if there are any negative impacts on the volume of

emission reductions obtained, on the basis of the monthly data being monitored, a report will be prepared by Shri Bajrang Power and Ispat Ltd outlining where the project is deviating in its generation of emission reductions and the immediate measures which need to be undertaken to maintain the expected generation of emission reductions from the operation of this project. Should there be significant changes to the set-up or operation of the plant, amendments to the PDD will be requested through a DOE.

At the end of each year of operation Shri Bajrang Power and Ispat Ltd will prepare a monitoring report that will be submitted to a DOE for verification. All data will be kept for a minimum of 2 years following issuance of certified emission reductions or the end of the crediting period, whichever is later, and the storage of this data will be the responsibility of the project proponents.

**Training**

Complete training for the operation of the boiler and turbine and their auxiliaries will be provided at the time of commissioning by the manufacturers. Additional training will be provided to the operators and it is expected that they will gain additional recognised technical qualifications through this training.

# Appendix 6. Summary of post registration changes

Not Applicable

- - - - -

## Document information

| *Version* | *Date* | *Description* |
|---|---|---|
| 08.0 | 22 July 2016 | EB 90, Annex 1<br>Revision to include provisions related to automatically additional project activities. |
| 07.0 | 15 April 2016 | Revision to ensure consistency with the “Standard: Applicability of sectoral scopes” (CDM-EB88-A04-STAN) (version 01.0). |
| 06.0 | 9 March 2015 | Revisions to:<br>• Include provisions related to statement on erroneous inclusion of a CPA;<br>• Include provisions related to delayed submission of a monitoring plan;<br>• Provisions related to local stakeholder consultation;<br>• Provisions related to the Host Party;<br>Editorial improvement. |
| 05.0 | 25 June 2014 | Revisions to:<br>• Include the Attachment: Instructions for filling out the project design document form for CDM project activities (these instructions supersede the "Guidelines for completing the project design document form" (Version 01.0));<br>• Include provisions related to standardized baselines;<br>• Add contact information on a responsible person(s)/ entity(ies) for the application of the methodology (ies) to the project activity in B.7.4 and Appendix 1;<br>• Change the reference number from *F-CDM-PDD* to *CDM-PDD-FORM;*<br>• Editorial improvement. |
| 04.1 | 11 April 2012 | • Editorial revision to change version 02 line in history box from Annex 06 to Annex 06b |
| 04.0 | 13 March 2012 | Revision required to ensure consistency with the “Guidelines for completing the project design document form for CDM project activities” (EB 66, Annex 8). |
| 03.0 | 26 July 2006 | EB 25, Annex 15 |
| 02.0 | 14 June 2004 | EB 14, Annex 06b |
| 01.0 | 03 August 2002 | EB 05, Paragraph 12<br>Initial adoption. |

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