



Monitoring report form for CDM project activity
(Version 07.0)

| MONITORING REPORT | | |
|---|--|--|
| Title of the project activity | 6.25 MW grid-connected Sattegala Mini Hydel Scheme at SLS Power Industries Ltd in Chamarajanagar District, Karnataka | |
| UNFCCC reference number of the project activity | 0923 | |
| Version number of the PDD applicable to this monitoring report | 3.3 | |
| Version number of this monitoring report | 01 | |
| Completion date of this monitoring report | 22/12/2020 | |
| Monitoring period number | 05 th in total and 1 st for 2 nd Crediting period | |
| Duration of this monitoring period | 24/03/2014 to 30/06/2020 (Inclusive of both the days) | |
| Monitoring report number for this monitoring period | Not Applicable | |
| Project participants | M/s Boruka Power Corporation Limited | |
| Host Party | India | |
| Applied methodologies and standardized baselines | AMS-I.D. ver. 18.0 - Grid connected renewable electricity generation Standardized baseline: Not Applicable | |
| Sectoral scopes | Sectoral Scope 1 : Energy industries (renewable/ non-renewable sources) | |
| Amount of GHG emission reductions or net anthropogenic GHG removals achieved by the project activity in this monitoring period | Amount achieved before 1 January 2013 | Amount achieved from 1 January 2013 |
| | 0 tCO ₂ e | 126,508 tCO ₂ e |
| Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD | 153,202 tCO ₂ e | |

SECTION A. Description of project activity

A.1. General description of project activity

The project activity is generation of electricity using hydro potential available in Cauvery River and exporting the generated electricity to the state owned power utility company Karnataka Power Transmission Corporation Ltd. (KPTCL). The details of the Mini Hydel Scheme are given below:

The project activity involves implementation and operation of a 6.25 MW (4 X 1.563) Small Hydroelectric grid connected renewable energy project on right bank of Cauvery river about 2 Km upstream of the Sattegala bridge in District Chamarajanagar of the state of Karnataka, India and exporting the generated electricity to the state owned power utility company Karnataka Power Transmission Corporation Ltd. (KPTCL).

The project design comprises an approach channel, diversion structure, scouring sluice, Intake Structure, powerhouse, Switchyard and tailrace canal.

The project scheme intercepts water flows of around 546 cum/sec (average) in Dhanagere anicut at 8 Km upstream of the proposed site and diverts it for power generation over a net head of 5m, in the power house located on the right bank of Cauvery river about 2 km upstream of the Sattegala bridge. Water after power generation will be led back into the parent stream by means of a tailrace channel emanating from the powerhouse. There is a diesel generator of 63 kVA capacity, which is used at the time of construction and the present use of the same is negligible (since the project is run of river and not canal based) compared to the amount of CO₂ displacement of the project activity. However, the diesel consumption is monitored during the whole crediting period.

The plant was commissioned on 17/06/2007. The plant was operational since 17/06/2007.

A.2. Location of project activity

- a) Host Country: India
- b) Region/State/Province: Region – Southern; State – Karnataka
- c) City/Town/Community: District – Chamarajanagar
- d) Physical/Geographical Location: Physical and Geographical Location of the project is as follows:

The site of the proposed project near Sattegala village is located about 140 km from Bangalore in Chamarajanagar district of Karnataka State. The nearest railhead is at Mandhya from the powerhouse site. Total area of land acquired for the project is 14.20 acres in which 5 Acres is owned by BPCL and the remaining land is leased from Government. The project is located between Dhanangere anicut on the upstream and Siva anicut on the downstream side. The Krishnaraja Sagar (KRS) dam across Cauvery river is about 110 km upstream of the proposed project. The project site can be reached by taking a deviation from state highway SH 58 near Maddur town towards Kollegala. The plant approximate coordinates are as follows 12°15' 8"N & 77°8'47"E

The physical location of the Karnataka state in India and project site in Karnataka state is shown in the maps given below



Map 1: Location of Karnataka state (Marked in Yellow) in India



Map 2: Physical location of the Project in Karnataka State

A.3. Parties and project participants

| Parties involved | Project participants | Indicate if the Party involved wishes to be considered as project participant (Yes/No) |
|------------------|--|--|
| India (host) | Bhoruka Power Corporation Limited (Private entity) | No |

A.4. References to applied methodologies and standardized baselines;

Sectoral Scope 1: Energy industries (renewable - / non-renewable sources)
AMS-I.D. ver. 18.0 - Grid connected renewable electricity generation¹ (EB 81, Annex 24)

The methodology draws upon following tools:

- Tool to calculate the emission factor for an electricity system, Version 07.0², EB 100, Annex 4
- Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion, Version 03.0³, EB 96, Annex 4 4

A.5. Crediting period type and duration

Crediting period: 24/03/2014 to 23/03/2021 (Second)

Duration – 7 years

Type of crediting period: Renewable

SECTION B. Implementation of project activity

B.1. Description of implemented project activity

¹ <https://cdm.unfccc.int/methodologies/DB/W3TINZ7KKWCK7L8WTXFQQOFQQH4SBK>

² <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf>

³ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-03-v3.pdf>

The Project has been completed as planned and the monitoring equipments were installed to monitor the parameters as described in the registered Project Design Document (PDD). The Plant is in operation continuously since 17/06/2007.

The details of major equipment of the project and suppliers are presented below:

Table 1 – Details of Major Equipment of the Project and Suppliers

| Sl. No. | Equipment details |
|---------|---|
| 1 | 4 x 1.563 MW, Vertical Full Kaplan type Turbine, Adjustable runner & guide vanes controlled by servomotors along with indicating and recording instruments, etc. Supplier: M/s HPP Energy (India) Pvt. Ltd. |
| 2 | Synchronous generator of 3 Phase, 3.3 kV, 50 c/s, 750 RPM, 0.85 PF and rated output 1.563 MW, 4 nos. Supplier: M/s Crompton Greaves, India |

B.2. Post-registration changes

B.2.1. Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents

There was no deviation from registered monitoring plan and or applied methodology during current monitoring period.

B.2.2. Corrections

There has not been any correction in the registered PDD.

B.2.3. Changes to the start date of the crediting period

There was no change in crediting period start date.

B.2.4. Inclusion of monitoring plan

Not applicable

B.2.5. Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents

There has not been any permanent change in registered monitoring plan or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents.

B.2.6. Changes to project design

There has not been any change in project design.

B.2.7. Changes specific to afforestation or reforestation project activity

As the project activity falls under Sectoral Scope 1: Energy industries (renewable - / non-renewable sources) this section is not applicable.

SECTION C. Description of monitoring system

A CDM team was formed in Boruka Power Corporation Limited (BPCL) for monitoring and verification of all the monitoring parameters as per the guidelines formulated by the management of BPCL. Qualified and trained people monitored the parameters and emission reduction calculations. In the complete implementation and monitoring Plan, BPCL is the sole agency responsible for implementation and monitoring of project activity. The details of monitoring team are detailed below:

1. Managing Director
2. General Manager (Operations)
3. Shift In-charge

Rules and responsibilities of Team Managing Director:

Managing Director was responsible for the total monitoring plan. The Managing Director examined the reports generated by General Manager (Operations) w.r.t, the monthly electricity exported to grid, electricity imported from grid and annual emission reduction calculations as per the monitoring plan. He also examined the internal audit reports prepared by internal auditor/General Manager (Operation) and in particular took note of any deviations in data over the norms and monitored that the corrective actions have resulted in adherence to standards.

General Manager (Operations):

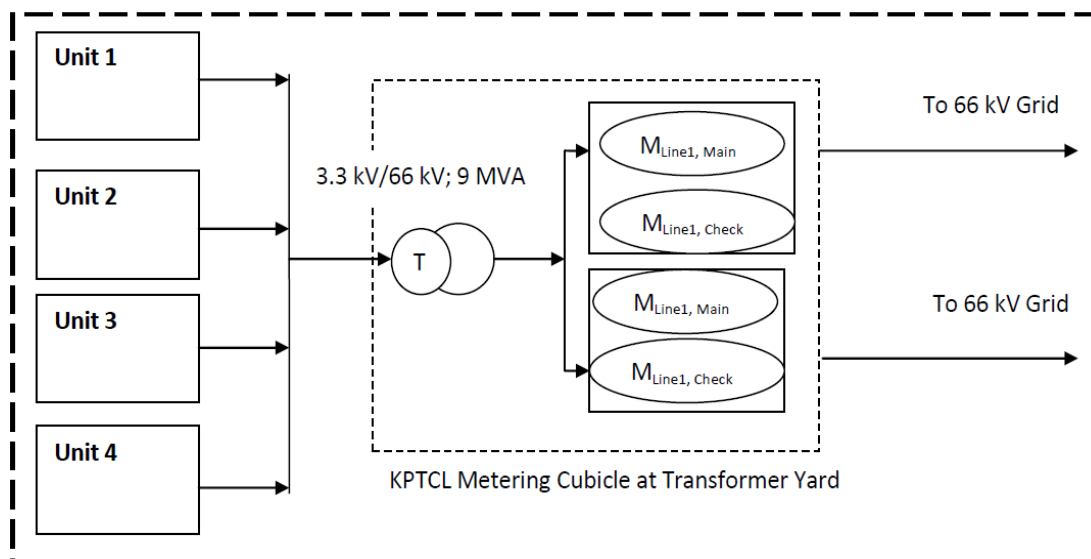
General Manager (Operations) assisted and reported to Managing Director for completing the task discussed above. The General Manager (Operation) was responsible for the electricity generations at their individual locations. He cross checked, signed the log book regularly and reported to Managing Director for any abnormality. The calibration of the meters installed were taken care by him as per the monitoring plan.

The responsibility of storage and archiving of information in good condition also lied with the General Manager. He also generated internal audit reports as per the monitoring plan and whenever necessary and submitted to Managing Director.

Shift In-charge:

Shift In-charge was responsible for recording the electricity meter readings at project site on daily basis. He took note of net export power to grid, plant shut down times, if any etc. The monthly Joint Meter Reading (JMR) of both main and check meters at line 1 and line 2 in KPTCL Metering Cubicle located in Transformer Yard was taken in the presence of KPTCL representative and the representative of PP. The monthly JMRs reports were submitted to the General Manager by the shift in-charge for verification and emission reduction calculations were done.

Schematic diagram of the metering arrangement of the project activity was as below.



SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante

| Data/Parameter | EF _{grid, CM,y} |
|----------------|--------------------------|
| Unit | tCO ₂ / MWh |

| | |
|--|--|
| Description | Combined Margin CO ₂ grid Emission factor for the INDIAN electricity grid |
| Source of data | Calculated from CEA database, Version 14, Dec 2018 ⁴ |
| Value(s) applied | 0.8885 |
| Choice of data or measurement methods and procedures | <p>The combined margin emissions factor is calculated as follows:</p> $EF_{grid,CM,y} = EF_{grid,OM,y} * W_{OM} + EF_{grid,BM,y} * W_{BM}$ <p>Where:</p> <p>$EF_{grid,BM,y}$ = Build margin CO₂ emission factor in year y (tCO₂/MWh)</p> <p>$EF_{grid,OM,y}$ = Operating margin CO₂ emission factor in year y (tCO₂/MWh)</p> <p>W_{OM} = Weighting of operating margin emissions factor (%) = 25%</p> <p>W_{BM} = Weighting of build margin emissions factor (%) = 75%</p> |
| Purpose of data/parameter | To calculate baseline emissions |
| Additional comments | The data will be archived 2 years after the end of the crediting period or the last issuance of CERs. |

| | |
|--|--|
| Data/Parameter | $EF_{grid,OM,y}$ |
| Unit | tCO ₂ / MWh |
| Description | Operating Margin CO ₂ emission factor for INDIAN electricity grid (weighted average of 3 years 2015-16, 2016-17 and 2017-18) |
| Source of data | Calculated from CEA database, Version 14, Dec 2018 ⁵ |
| Value(s) applied | 0.9610 |
| Choice of data or measurement methods and procedures | Calculated as per "Tool to calculate the emission factor for an electricity system, version 07" as 3-year generation weighted average using data for the years 2015-16, 2016-17 & 2017-18. The data are obtained from "CO ₂ Baseline Database for Indian Power Sector" version 14, December 2018, published by the Central Electricity Authority, Ministry of Power, Government of India. |
| Purpose of data/parameter | To calculate baseline emissions |
| Additional comments | The data will be archived 2 years after the end of the crediting period or the last issuance of CERs. |

| | |
|--|---|
| Data/Parameter | $EF_{grid,BM,y}$ |
| Unit | tCO ₂ / MWh |
| Description | Build Margin CO ₂ emission factor of the INDIAN electricity grid |
| Source of data | Calculated from CEA database, Version 14, Dec 2018 ⁶ |
| Value(s) applied | 0.8644 |
| Choice of data or measurement methods and procedures | Calculated as per "Tool to calculate the emission for an electricity system, version 07" as per the latest data available for the most recent year 2017-18. The data is obtained from "CO ₂ Baseline Database for Indian Power Sector" version 14, December 2018 published by the Central Electricity Authority, Ministry of Power, Government of India. |
| Purpose of data/parameter | To calculate baseline emissions |
| Additional comments | The data will be archived 2 years after the end of the crediting period or the last issuance of CERs. |

⁴ http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver14.pdf

⁵ http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver14.pdf

⁶ http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver14.pdf

D.2. Data and parameters monitored

| Data/Parameter | EG _{PJ,y} |
|---------------------------------------|--|
| Unit | MWh |
| Description | Net electricity supplied to grid by the project activity in year y |
| Measured/calculated/default | Measured and calculated |
| Source of data | Monthly Joint Meter Reading report (Form B) of main and check meters of both line 1 and line 2 located at Transformer Yard of the project site. |
| Value(s) of monitored parameter | 142,384.80 |
| Monitoring equipment | <p>One set of main and check meters at line 1 and one set of main and check meters at line 2 located at the Transformer Yard of the project site. Representative of KPTCL and representative of PP will take the monthly reading of both the main and check meters jointly. The monthly net energy export to the grid is calculated by deducting the total energy import from grid through line 1 and line 2 from total energy export to grid through line 1 and line 2. The net energy exported to grid is calculated by subtracting total energy import from total energy export and adjusting transmission losses as presented in the Joint Meter Reading report, which is used for baseline emission calculation.</p> $EG_{PJ,y} = EG_{\text{export}} - EG_{\text{import}}$ <p>Meter type : Bi-directional tri vector meters (both for main and check) Accuracy class 0.2s Calibration Frequency: Once in a year</p> |
| Measuring/reading/recording frequency | Continuous Monitoring - Hourly Measurement & Monthly Recording |
| Calculation method (if applicable) | <p>Net electricity supplied to grid is given by formula $EG_{PJ,y} = EG_{\text{export}} - EG_{\text{import}}$</p> <p>$EG_{\text{export}}$ = Electricity exported to grid by the project activity EG_{import} = Electricity imported from grid by the project activity</p> |
| QA/QC procedures | The energy meters are being periodically calibrated and the calibration certificates are being maintained. The project proponents also have the provision of check meters which are also regularly calibrated whenever the main meter becomes faulty the check meter is used as reference for arriving at the energy generated data. Sales bills/receipts may be compared as an alternative proof of the power exported to the grid. |
| Purpose of data/parameter | To calculate baseline emissions |
| Additional comments | The data monitored and required for verification and issuance be kept and archived electronically for two years after the end of the crediting period or the last issuance of CERs, whichever occurs later |

D.3. Implementation of sampling plan

Sampling is not applicable in this project activity

SECTION E. Calculation of emission reductions or net anthropogenic removals**E.1. Calculation of baseline emissions or baseline net removals**

As described in the section above, the total emission reduction achieved in a year would be

$$ER_y = BE_y - PE_y - LE_y$$

Where,

ER_y is the Emission reductions during the year y
 BE_y is the Baseline emissions during the year y
 PE_y is the Project emissions during the year y
 LE_y is the Leakage emissions during the year y

Baseline emissions:

The baseline emissions are calculated based on the given formula:

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

Where,

$EG_{PJ,y}$ is the net electricity supplied to grid by the project activity

$EF_{grid,y}$ is CO₂ emission factor of the grid

$$EF_{grid,y} = EF_{grid,CM,y} = 0.8885 \text{ tCO}_2/\text{MWh}$$

Net electricity supplied to the grid by the Project during current monitoring period = 142,384.80 MWh

Baseline emissions,

$$BE_y = 0.8885 \text{ tCO}_2\text{e/MWh} \times 142,384.80 \text{ MWh} = 126,508 \text{ tCO}_2\text{e (round-down value)}$$

Total Baseline Emissions (BE_y) = 126,508 tCO₂e (round-down value)

E.2. Calculation of project emissions or actual net removals

As per methodology AMS-I. D. version 18.0, no project emissions are considered for this project activity. Hence project emissions $PE_y = 0 \text{ tCO}_2\text{e}$

Therefore,

Project Emissions (PE_y) = 0 tCO₂e

E.3. Calculation of leakage emissions

No leakage is anticipated due to the project activity as the generating equipment is not transferred from another activity.

Hence

Leakage Emissions (LE_y) = 0 tCO₂e

E.4. Calculation of emission reductions or net anthropogenic removals

| | Baseline GHG emissions or baseline net GHG removals (t CO ₂ e) | Project GHG emissions or actual net GHG removals (t CO ₂ e) | Leakage GHG emissions (t CO ₂ e) | GHG emission reductions or net anthropogenic GHG removals (t CO ₂ e) | | |
|--------------|---|--|---|---|-----------------|--------------|
| | | | | Before 01/01/2013 | From 01/01/2013 | Total amount |
| Total | 126,508 | 0 | 0 | 0 | 126,508 | 126,508 |

E.5. Comparison of emission reductions or net anthropogenic removals achieved with estimates in the registered PDD

| Amount achieved during this monitoring period (t CO ₂ e) | Amount estimated ex ante for this monitoring period in the PDD (t CO ₂ e) |
|---|--|
| 126,508 | 153,202 |

E.5.1. Explanation of calculation of “amount estimated ex ante for this monitoring period in the PDD”

Considering the annual average emission reductions as per the registered PDD which is 24,408 tCO₂e per year, the number of days covered during the current monitoring period comes out to be 2,291 days, based upon which the estimated emission reductions attributed to this monitoring period comes out to be 153,202 tCO₂e. The detailed calculation can be referred from the emission reduction sheet.

E.6. Remarks on increase in achieved emission reductions

During this project activity, the actual emission reductions obtained is about 17% lower than the estimated value. The lower value is attributed to water flow level, grid availability and other factors those are beyond the control of project participant.

E.7. Remarks on scale of small-scale project activity

The project activity remain as a small scale project activity for the entire period.

Document information

| <i>Version</i> | <i>Date</i> | <i>Description</i> |
|----------------|-----------------|---|
| 07.0 | 31 May 2019 | Revision to: <ul style="list-style-type: none"> • Ensure consistency with version 02.0 of the “CDM project standard for project activities” (CDM-EB93-A04-STAN); • Add a section on remarks on the observance of the scale limit of small-scale project activity during the crediting period; • Add "changes specific to afforestation or reforestation project activity" as a possible post-registration changes; • Clarify the reporting of net anthropogenic GHG removals for A/R project activities between two commitment periods; • Make editorial improvements. |
| 06.0 | 7 June 2017 | Revision to: <ul style="list-style-type: none"> • Ensure consistency with version 01.0 of the “CDM project standard for project activities” (CDM-EB93-A04-STAN); • Make editorial improvements. |
| 05.1 | 4 May 2015 | Editorial revision to correct version numbering. |
| 05.0 | 1 April 2015 | Revisions to: <ul style="list-style-type: none"> • Include provisions related to delayed submission of a monitoring plan; • Provisions related to the Host Party; • Remove reference to programme of activities; • Overall editorial improvement. |
| 04.0 | 25 June 2014 | Revisions to: <ul style="list-style-type: none"> • Include the Attachment: Instructions for filling out the monitoring report form (these instructions supersede the "Guideline: Completing the monitoring report form" (Version 04.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for completing the CDM-MR-FORM in A.6 and Appendix 1; • Change the reference number from <i>F-CDM-MR</i> to <i>CDM-MR-FORM</i>; • Editorial improvement. |
| 03.2 | 5 November 2013 | Editorial revision to correct table in page 1. |
| 03.1 | 2 January 2013 | Editorial revision to correct table in section E.5. |
| 03.0 | 3 December 2012 | Revision required to introduce a provision on reporting actual emission reductions or net GHG removals by sinks for the period up to 31 December 2012 and the period from 1 January 2013 onwards (EB 70, Annex 11). |
| 02.0 | 13 March 2012 | Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20). |
| 01.0 | 28 May 2010 | EB 54, Annex 34. Initial adoption. |

| <i>Version</i> | <i>Date</i> | <i>Description</i> |
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