



86 MW HYDRO PROJECT IN HIMACHAL PRADESH



Project title	86 MW Hydro Project in Himachal Pradesh
Project ID	VCS 93
Monitoring period	01-November-2022 to 31-December-2023
Original date of issue	04-March-2024
Most recent date of issue	05-FEB-2025
Version	1.4
VCS Standard Version	4.7
Prepared by	Atul Sanghal, Emergent Ventures India Private Limited

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PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

The Project activity is 86 MW hydro power project located at Jari village in Malana town of Kullu district, Himachal Pradesh, India. Project activity is based on the Run-of-the river (ROR) scheme and has been developed by Malana Power Company Limited, having registered office at Noida, India (herein after referred as MPCL). MPCL is a private organization, established with an objective of developing new hydro projects across the country. The generated electricity by the project activity is being exported to PTC (Power Trading Company).

The project plant has 2 units (2 x 43 MW). Unit-1 was commissioned on 09-July-2001 & Unit-2 was commissioned on 05-July-2001 and both are running satisfactorily.

The Project activity has generated 267,878 MWh of electricity thus reducing GHGs to the tune of 237,607 tCO₂e for the current monitoring period i.e., from 01-November-2022 to 31-December-2023 (First and last date included).

1.2 Audit History

Audit type	Period	Program	Validation/verification body name	Number of years
Validation 1	(05-July-2001 – 04-July-2011)	VCS	TÜV NORD CERT GmbH	10
Verification 1	(05-July-2001 to 31-March-2007)	VCS	TÜV NORD CERT GmbH	5.75
Verification 2	(01-April-2007 to 31-March-2008)	VCS	TÜV NORD CERT GmbH	1
Verification 3	(01-April-2008 to 31-March-2009)	VCS	TÜV NORD CERT GmbH	1
Verification 4	(01-April-2009 to 30-September-2009)	VCS	TÜV NORD CERT GmbH	0.50
Verification 5	(01-October-2009 to 31-March-2010)	VCS	TÜV NORD CERT GmbH	0.50

Verification 6	(01-April-2010 to 30-September-2010)	VCS	TÜV NORD CERT GmbH	0.50
Verification 7	(01-October-2010 to 30-June-2011)	VCS	TÜV NORD CERT GmbH	0.75
Validation 2 (crediting period renewal 1)	(05-July-2011 – 04-July-2021)	VCS	TÜV NORD CERT GmbH	10
Verification 8	(05-July-2011 to 31-August-2012)	VCS	SGS United Kingdom Limited	1.17
Verification 9	(01-September-2012 to 28-February-2015)	VCS	KBS Certification Services Pvt. Ltd.	2.5
Verification 10	(01-March-2015 to 31-December-2018 ¹)	VCS	LGAI Technological Center, S.A. (Applus+ Certification)	1.75
Verification 11	(01-November-2020 to 04-July-2021)	VCS	LGAI Technological Center, S.A. (Applus+ Certification)	0.67
Validation 3 (crediting period renewal 2)	(05-July-2021 to 04-July-2031)	VCS	LGAI Technological Center, S.A. (Applus+ Certification)	10
Verification 12	(05-July-2021 to 31-October-2021)	VCS	LGAI Technological Center, S.A. (Applus+ Certification)	0.33
Verification 13	(01-November-2021 to 31-October-2022)	VCS	VKU Certification Pvt. Ltd.	1
Verification 14	(01-November-2022 to 31-December-2023)	VCS	LGAI Technological Center, S.A. (Applus+ Certification)	1.17

¹ The 10th VCS monitoring period is from 01-March-2015 to 31-December-2018. During this monitoring period, the duration for which I-REC have been issued, is excluded for the VCU calculations. And VCUs were only issued from 01-March-2015 to 31-December-2015, 01-July-2017 to 30-September-2017, 01-December-2017 to 31-December-2017 and 01-June-2018 to 31-December-2018.

1.3 Sectoral Scope and Project Type

Sectoral scope	01- Energy Industries (renewable/ non-renewable sources)
Project activity type	Type I - Renewable Energy Projects

1.4 Project Proponent

Organization name	M/s. Malana Power Company Limited
Contact person	O.P. Ajmera
Title	Vice President Finance
Address	Bhilwara Towers, A -12, Sector 1, Noida -201301, Uttar Pradesh, India
Telephone	91-120-2541810, 91-120-2531648
Email	opajmera@lnjbhilwara.com ²

1.5 Other Entities Involved in the Project

Organization name	Emergent Ventures India Private Limited
Role in the project	Project Consultant
Contact person	Atul Sanghal
Title	Director
Address	1002, Magnum Tower-1, Sector -58, Gurgaon – 122018 (India)
Telephone	-
Email	atul.sanghal@emergent-ventures.com

² MPCL is a group company of LNJBhilwara. All the companies under the Bhilwara group use the domain name lnjbhilwara.com for emails. Link <https://www.lnjbhilwara.com/mpcl.html>

1.6 Project Start Date

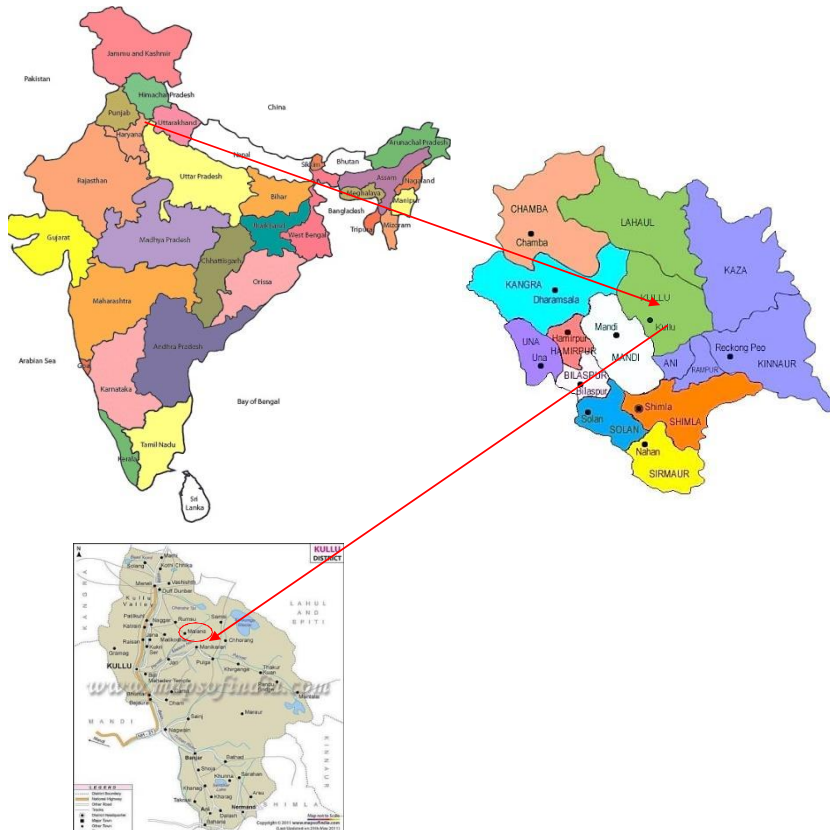
Project start date	05-July-2001
Justification	This is the commissioning date of the project activity.

1.7 Project Crediting Period

Crediting period	☐ Seven years, twice renewable ☐ Ten years, fixed ☒ Other (Ten years, twice renewable. This is as per the registered PD)
Start and end date of first crediting period	05-July-2001 to 04-July-2011 (first crediting period) 05-July-2011 to 04-July-2021 (second crediting period) 05-July-2021 to 04-July-2031 (third crediting period)

1.8 Project Location

The project is located at Jari village in district Kullu of Himachal Pradesh around 25 km from Bhunter. The Project activity is uniquely identified as Malana Hydro Project in the region. The nearest railway station from the project site is Kiratpur Sahib, about 198 km from Bhunter. Bhunter has airport and is well connected to Delhi.



For the project activity the project boundary is from the diversion site to the point of power supply to the nearest substation where the project proponent has full control.

Coordinates of the Barrage: Latitude: 32°02'15" N; Longitude - 77°15'23" E

Coordinates of Power House: Latitude - 32°00'15" N; Longitude - 77°14'55" E





1.9 Title and Reference of Methodology

Type (methodology, tool or module).	Reference ID, if applicable	Title	Version
Methodology	ACM0002	Grid-connected electricity generation from renewable sources	20.0 ³
Tool	TOOL11	Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period	03.0.1 ⁴
Tool	TOOL7	Tool to calculate the emission factor for an electricity system	07.0 ⁵

1.10 Double Counting and Participation under Other GHG Programs

1.10.1 No Double Issuance

Is the project receiving or seeking credit for reductions and removals from a project activity under another GHG program?

☐ Yes ☒ No

³ <https://cdm.unfccc.int/methodologies/DB/XP2LKUSA61DKUQC0PIWPGWDN8ED5PG>

⁴ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-11-v3.0.1.pdf>

⁵ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf>

The project is not receiving or seeking credit for reduction and removals under another GHG program for the current monitoring period from 01-November-2022 to 31-December-2023. The declaration claiming the same has been submitted.

1.10.2 Registration in Other GHG Programs

Is the project registered or seeking registration under any other GHG programs?

☒ Yes ☐ No

The project activity is registered under I-REC mechanism dated 01-March-2015⁶. The details for the periods, during which I-RECs have been claimed/issued, are provided in the table below.

Duration	Volume claimed /issued
01-January-2016 to 18-January-2016	3,100
19-January-2016 to 10-June-2016	80,000
11-June-2016 to 07-July-2016	48,385
08-July-2016 to 31-December-2016	184,082
Total 2016	315,567
01-January-2017 to 30-June-2017	119,495
01-October-2017 to 31-October-2017	21,092
01-November-2017 to 30-November-2017	11,526
Total 2017	152,113
01-January-2018 to 28-February-2018	11,068
01-March-2018 to 31-May-2018	38,219
Total 2018	49,287
01-January-2019 to 24-June-2019 ⁷	116,600
01-July-2019 to 30-August-2019 ⁸	148,466
01-September-2019 to 30-November-2019	81,715

⁶ <https://evident.app/I-REC/device-register/MALANAHY>

⁷ Although project was registered under both I-REC and VCS from 25 June 2019 to 30 June 2019, neither I-REC nor carbon credits were claimed for this period.

⁸ Although project was registered under both I-REC and VCS for 31 August 2019, neither I-REC nor carbon credits were claimed for this date.

01-December-2019 to 31-December-2019	9,088
Total 2019	355,869
01-January-2020 to 28-February-2020	14,514
01-March-2020 to 31-May-2020	51,215
01-June-2020 to 31-October-2020	256,320
Total 2020	322,049

The project activity is not claiming any REC and I-REC benefits for the current monitoring period.

1.11 Double Claiming, Other Forms of Credit, and Scope 3 Emissions

1.11.1 No Double Claiming with Emissions Trading Programs or Binding Emission Limits

Are project reductions and removals or project activities also included in an emissions trading program or binding emission limit? See the *VCS Program Definitions* for definitions of emissions trading program and binding emission limit.

☐ Yes ☒ No

1.11.2 No Double Claiming with Other Forms of Environmental Credit

Has the project activity sought, received, or is planning to receive credit from another GHG-related environmental credit system? See the *VCS Program Definitions* for definition of GHG-related environmental credit system.

☐ Yes ☒ No

1.11.3 Supply Chain (Scope 3) Emissions

Do the project activities affect the emissions footprint of any product(s) (goods or services) that are part of a supply chain?

☐ Yes ☒ No

If yes:

Has the project proponent(s) or authorized representative posted a public statement on their website saying, "Carbon credits may be issued through the Verified Carbon Standard project [project ID] for the greenhouse gas emission reductions or removals associated with [project proponent or authorized representative organization name(s)] [name of product(s) whose emissions footprint is changed by the project activities]."

☐ Yes ☐ No

If yes to all:

Provide evidence of the public statement. Evidence must be provided in this section or in an appendix.

1.12 Sustainable Development Contributions

The various contributions by the project activity towards the SDGs have been given below:

SDG 7: The project activity is a run-of-the-river hydroelectric power project which does not require additional dam for storing water. Also, it is harnessing kinetic energy of flowing water of river for the generation of electricity which otherwise would have been generated from fossil fuel-based power plant.

SDG 8: The project has generated a number of jobs during construction and operation phases.

SDG 13: The project mitigates GHG emissions compared to a baseline which is equivalent power generation from the stations supplying to the connected grid. Since grid is GHG intensive, any displacement from the project power shall effect GHG emission reductions.

Table 1: Sustainable Development Contributions

Row number	SDG target	SDG indicator	Net impact on SDG indicator	Current project contributions	Contributions over project lifetime
1)	7.2	Renewable energy generation	Implemented activities to increase	Generated and supplied 267,878 MWh of renewable energy during the current monitoring period.	Generated and supplied 6,001,777 MWh of renewable energy during 05-July-2001 to 31-December-2023
2)	8.5	Provide job opportunities by implementation of project	Implemented activities to increase	Provided 10 numbers of jobs during the current monitoring period.	Provided 10 numbers of jobs during 01-November-2022 to 31-December-2023. Job data was not reported prior to the current monitoring period.
3)	13.0	Tonnes of greenhouse gas emissions avoided	Implemented activities to increase	237,607 tCO ₂ e GHG emissions were avoided during the current monitoring period.	4,879,952 tCO ₂ e GHG emissions were avoided during 05-July-2001 to 31-December-2023

1.13 Commercially Sensitive Information

There is no such information which is deemed as commercially sensitive.

2 SAFEGUARDS AND STAKEHOLDER ENGAGEMENT

2.1 Stakeholder Engagement and Consultation

PP identified the people, groups and organizations that were interested or have got involved with this project implementation as stakeholder. PP sent a communication to all the identified stakeholders about the project activity. They conducted open consultation on 18-May-2004 where all the stakeholders were given an opportunity to present their views and opinions regarding the project.

The stakeholders were also requested to share their experiences and grievances on continuous basis. As a part of continual improvement process, feedback from the associated stakeholders was vital, therefore a dedicated Visitor register cum grievance register had been placed at the project site which was accessible to stakeholders to provide their feedback on the project. It was an appropriate publicly accessible location where local stakeholders could provide their feedback on the project. This location was also conducive to continuous and regular checks. Grievances raised during the current monitoring period are discussed in section 2.1.4 below.

2.1.1 Stakeholder Identification

Stakeholder Identification	Following are the identified stakeholders for the project activities at the time of validation:
	- Government Parties - HPSEB(Himachal Pradesh State Electricity Board) - Pollution Control Board of Himachal Pradesh - Environment Department of Himachal Pradesh - Ground Water Department - MNES (Ministry of Non Conventional Energy Sources) - Non Government Parties - Gram Panchayat of Jari Village - Land Owners - Non Government Organizations (NGOs) - Consultants

	Equipment Supplier
Legal or customary tenure/access rights	Project activity acquired land from few local land owners. Acquisition process has been done after taking consent of the land owners.
Stakeholder diversity and changes over time	Diverse groups including land owners, Panchayat members, NGOs, government officials, equipment supplier were identified as stakeholders in the project. They represent varied socio-economic backgrounds and cultural identities. Local people speak in Hindi and Kanashi (local language), while others have proficiency in English. Additionally stakeholders have diverse employment status. Government officials, NGOs, MPCL, local people interact with each other for the upliftment of the area. Various community service activities are undertaken around the project area by MPCL There is no change in the make-up of stakeholders over the time.
Expected changes in well-being	The project helped in generating employment opportunities during the construction and operation phases. The project activity also led to development in infrastructure in the region like development of roads.
Location of stakeholders	Local stakeholders comprises of the local people in and around the project area.
Location of resources	Not applicable. The project is installation of a new hydro power plant. It does not involve resources owned by the stakeholders.

2.1.2 Stakeholder Consultation and Ongoing Communication

Ongoing consultation	A dedicated suggestion cum grievance register has been appropriately placed at publicly accessible location and local stakeholders can provide their suggestions or grievances in the register. Suggestions and grievances can also be submitted at info@malanapower.com .
Date(s) of stakeholder consultation	18-May-2004 No separate stakeholder consultation was done during the

	current monitoring period. However, grievances received were addressed appropriately.
Communication of monitored results	MPCL regularly reviews the register and action is taken accordingly. Details of action taken are also mentioned in the register.
Consultation records	Suggestion/ grievance register
Stakeholder input	At two instances support for repairing retaining wall was asked for. Repair and cleaning of village drainages system was also requested. These jobs were completed and details of the action taken were entered in the register.

2.1.3 Free, Prior, and Informed Consent

Consent	No rehabilitation, relocation or resettlement of local people has taken place due the project activity. Project activity acquired small pieces of land for which adequate compensation was paid to the local villages. No ongoing or unresolved conflict took place due to the project activity.
Outcome of FPIC	No complaints were received regarding the compensation amount. PP assures that the project has not encroached on land, relocated people without consent, and forced physical or economic displacement.

2.1.4 Grievance Redress Procedure

A dedicated suggestion cum grievance register has been placed at the project site which is accessible to stakeholders to provide their suggestions and register their grievances. Suggestion and the grievance can also be submitted at info@malanapower.com.

Following grievances were raised during the current monitoring period. All of them were satisfactorily resolved.

Grievances received	Resolution and outcome
15-July-2023- Retaining wall	Wall was repaired by 11-December-2023.

along the road was damaged.	
20-Aug-2023- Retaining wall along the road was damaged.	Wall was repaired by 15-Jan-2024.
21-Aug-2023-Drains were damaged and blocked with garbage due to rains.	Drains were repaired and cleaned by 30-September-2023
23-Aug-2023- Retaining wall along road damaged.	Retaining wall repair work was given to contractor and was completed by 15-September-2023.

2.1.5 Public Comments

Summary of comments received	Actions taken
There was no public consultation conducted during the current monitoring period. Hence this does not apply. Grievances received from the community are already captured in section 2.1.4.	-

2.2 Risks to Stakeholders and the Environment

	Risk identified	Mitigation or preventative measure taken
Risks to stakeholder participation	No Risk Identified	Stakeholders can voice their concerns, grievances through stakeholder meetings, grievance register and email.
Working conditions	No Risk Identified	“Environment, Quality, Occupational Health, Safety & Social (EQHS&S) Policy” of MPCL maintains that the project is committed towards providing safe working conditions to all its employees, customers as well as the community at large. No incident regarding poor working conditions was reported during

		the current monitoring period.
Safety of women and girls	No Risk Identified	“Equal Opportunity Policy” of MPCL clearly mentions that project will not tolerate harassment, behavior that victimizes any individual or group. No incident regarding breach of safety of women was reported during the current monitoring period.
Safety of minority and marginalized groups, including children	No Risk Identified	“Equal Opportunity Policy” of MPCL maintains that project provides equal opportunity to all without any discrimination on grounds of religion, race etc. Child labour is prohibited. No incident regarding breach of safety of minorities and marginalized groups was reported during the current monitoring period.
Pollutants (air, noise, discharges to water, generation of waste, release of hazardous materials)	No risk identified.	Since it is hydro project so there is no issue regarding air pollution. On the other hand, power generation from the project will result in air quality improvement and emission reductions caused by burning of fossil fuels in the baseline power generation plants.

2.3 Respect for Human Rights and Equity

2.3.1 Labor and Work

Discrimination and sexual harassment	“MPCL Equal Opportunity Policy” clearly states company’s commitment to providing equal opportunity to all with no discrimination. No discrimination or sexual harassment was reported during the current monitoring period. No incident regarding discrimination and sexual harassment was reported during the current monitoring period.
Management experience	No new entity has been involved in project design or implantation.

Gender equity in labor and work	As per “MPCL Equal Opportunity Policy”, the company provides opportunity to all without any discrimination on the basis of gender. No incident regarding gender inequity was reported during the current monitoring period.
Human trafficking, forced labor, and child labor	The project does not use victims of human trafficking, forced labor, and child labor. No incident regarding Human trafficking, forced labor, and child labor was reported during the current monitoring period.

2.3.2 Human Rights

As per the “Environment, Quality, Occupational Health, Safety & Social Policy” MPCL is committed to engagement with community to understand, cooperate and interact for mutual benefit. During project development local villagers were consulted and kept informed about the activities. No villagers were displaced due to project activity. Land of few villagers was acquired for which they were adequately compensated. People can register their complaints in the suggestion cum grievances register kept at project site. The project also conforms to all applicable national/local laws and regulations pertaining to the installation and operation of a hydro power project. India is a signatory to 38 conventions of ILO including Minimum Age Convention, 1973 (No. 138, Indigenous and Tribal Peoples (No 169)) and companies operating in the country by default are required to run their operations in their compliance.

Source:

https://www.ilo.org/dyn/normlex/en/f?p=1000:11200:0::NO:11200:P11200_COUNTRY_ID:102691

2.3.3 Indigenous Peoples and Cultural Heritage

As per the “Environment, Quality, Occupational Health, Safety & Social Policy” MPCL is committed to protect the cultural heritage by preventing pollution at the workplace, surrounding areas and conserving natural resources and reduce the health, safety and environment (HSE) related risk for all personal including customers and community at large.

2.3.4 Property Rights

Disputes over rights to	Not applicable
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territories and resources	
Respect for property rights	No rehabilitation, relocation or resettlement of local people has taken place due the project activity. Project activity acquired small pieces of land for which adequate compensation was paid to the local villages.

2.3.5 Benefit Sharing

Summary of the benefit sharing plan	Some land parcels were acquired for the project activity from local villages for which they were adequately compensated. MPCL has been undertaking social welfare activities like construction of roads, footpaths, cremation ground, footbridge on a regular basis around the project area. Local educational institutes are also provided support. Health facilities are also made available to local people in MPCL plant dispensary. CSR policy of MPCL gives scope of community work undertaken by the company ⁹ .
Benefit sharing during the monitoring period	Activities undertaken for the welfare of local people for the current monitoring period are provided in the CSR Report separately.

2.4 Ecosystem Health

Risk identified		Mitigation or preventative measure taken during the monitoring period
Impacts on biodiversity and ecosystems	No risk identified	Project activity doesn't involve storage of large amount of river water hence there is no issue with regards to submergence of the forests, fertile land or of the inhabited areas. The structure of project (including reservoir, barrage and other facilities) is

⁹ https://www.malanapower.com/certificatepdf/csrMPCL_Corporate%20Social%20Responsibility%20Policy_r1_1.9.15.pdf

		not very big in size to cause any significant disturbance to the eco-system. Implementation of the scheme would help in conservation of forest by replacing the firewood for cooking and heating purposes with electricity.
Soil degradation and soil erosion	No risk identified	Project activity does not cause soil degradation and soil erosion.
Water consumption and stress	No risk identified	The project is a hydro power project and does not affect the quality and quantity of underground water.
Usage of fertilizers	No risk identified	Project does not use any fertilizers.

2.4.1 Rare, Threatened, and Endangered species

Project is not located in or adjacent to a habitat of any rare, threatened or endangered species.

Species or habitat	None
	...

2.4.2 Introduction of species

Species introduced	Classification	Justification for use	Adverse effects and mitigation
Not Applicable			

Existing invasive species	Mitigation measures to prevent spread or continued existence of invasive species
Not Applicable	

2.4.3 Ecosystem conversion

Not Applicable as the project area was not cleared of existing ecosystems or dominant land cover in last 10 years.

	Risks identified	Mitigation or preventative measure(s) taken
Ecosystem conversion	No risk identified	No ecosystem conversion took place during the current monitoring period.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The project is a Run-of-the-river Hydro Electric Power project, located in the Malana Nallah (a tributary of Parbati River), near Malana village of Kullu District, State of Himachal Pradesh, India. The project plant is of 86 MW (2 x 43 MW) and Unit-1 was commissioned on 09-July-2001 & Unit-2 was commissioned on 05-July-2001. The project is currently operational. No changes have occurred to project proponent or other entities during the current monitoring period.

Unit I remained closed in the month of December 2022 and Unit II in January 2023 for annual maintenance. In the month of July 2023 and August 2023 there was a loss of generation due to HPSEB 132 kV transmission line tower damaged by heavy rain/land slide at Thalout. Details are available in Appendix 3.

The technical specification of the project activity is given below:

Bharat Heavy Electricals Limited Power Sector – Northern Region Malana HEP	
Turbine Generators	
Turbine type	Pelton
Generators	2×43 MW TG sets
Head Regulator	
Width of Head Regulator	14.25 m
No. of bays	4
Width of each bay	2.50 m
Thickness of piers	0.85 m
Orientation with respect to Barrage axis	117°
Regulation gates	2.50 m × 1.90 m vertical lift
Design discharge	26.25 cum/sec
DE-Silting Arrangement	
No. and Size of desilting chamber	04 Nos, Each of 102 m × 8.5 m

Particle size to be excluded	All particles down to 0.20 mm size
Flow through velocity	0.19 sec
Flushing velocity	6.0 m/sec.
Storage Reservoir Gross Storage	249000 cm
Full supply reservoir level	1893.60 m
Minimum reservoir level	1879.00 m
Type and height of boundary wall	Concrete gravity dam with height of 23.8 m

3.2 Deviations

3.2.1 Methodology Deviations

There are no methodology deviations raised during previous and current monitoring period.

3.2.2 Project Description Deviations

No deviations were made during the current monitoring period.

Following deviation was however approved in the last monitoring period (01-November-2021 to 31-October-2022). This deviation is related to calibration frequency of the project. At the time of registration, calibration frequency of meters was established as once in three years. But at the time of project verification, it was observed that these meters were calibrated annually as per actual site practices. So, calibration frequency had been corrected. This deviation was of permanent nature and did not have any impact on the project applicability, scale, baseline scenario and additionality.

3.3 Grouped Projects

Project is not grouped project.

3.4 Baseline Reassessment

Did the project undergo baseline reassessment during the monitoring period?

☐ Yes ☒ No

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	EF _{BM,grid, y}
Data unit	tCO ₂ e/MWh
Description	Build margin CO ₂ emission factor for Unified Indian Grid in the year y
Source of data	CO ₂ Baseline Database for the Indian Power Sector, User Guide (Version 17) ¹⁰ & 'Tool to calculate the emission factor for an electricity system' version 7.
Value applied	0.8653
Justification of choice of data or description of measurement methods and procedures applied	The value is taken from the database developed by Central Electricity Authority (CO ₂ Baseline database for the Indian power sector, Version 17.0). The database is Government of India's official publication based on the 'Tool to calculate the emission factor for an electricity system' version 7.
Purpose of Data	For the calculation of grid emission factor
Comments	CEA CO ₂ Baseline Database for the year 2020-21

Data / Parameter	EF _{OM, grid, y}
Data unit	tCO ₂ e/MWh
Description	Operating margin CO ₂ emission factor for Unified Indian Grid in the year y
Source of data	CO ₂ Baseline Database for the Indian Power Sector, User Guide (Version 17) & 'Tool to calculate the emission factor for an electricity system' version 7.
Value applied	0.9522
Justification of choice of data or description of measurement methods and procedures applied	Calculated as 3-year generation weighted average using data for the years 2018-19, 2019-20 & 2020-21. The data is taken from the database developed by Central Electricity Authority (CO ₂ Baseline database for the Indian power sector, Version 17.0). The database is Government of India's official publication based

¹⁰ <https://cea.nic.in/cdm-co2-baseline-database/?lang=en>

	on the 'Tool to calculate the emission factor for an electricity system' version 7.
Purpose of Data	For the calculation of grid emission factor
Comments	CEA CO ₂ Baseline Database for year 2018-19, 2019-20, 2020-21

Data/ Parameter	EF _{CM, grid, y}
Data Unit	tCO ₂ e/MWh
Description	Combined margin CO ₂ emission factor for Unified Indian Grid in the year y
Source of data	Grid emission factor calculation: $EF_{grid,CM,y} = 0.25 \times EF_{grid,OM,y} + 0.75 \times EF_{grid,BM,y}$ $= 0.25 \times 0.9522 + 0.75 \times 0.8653$ $= 0.8870 \text{ tCO}_2\text{e/MWh}$ Values of OM and BM are taken from CEA User Guide, CO₂ Baseline Database for the Indian Power Sector, Version 17 & 'Tool to calculate the emission factor for an electricity system' version 7.
Value applied	0.8870
Justification of choice of data or description of measurement methods and procedures applied	The value is taken from the database developed by Central Electricity Authority (CO₂ Baseline database for the Indian power sector, Version 17.0). The database is Government of India's official publication based on the 'Tool to calculate the emission factor for an electricity system' Version 7.
Purpose of Data	For the calculation of grid emission factor
Comments	CEA CO ₂ Baseline Database for most recent three years

4.2 Data and Parameters Monitored

Data / Parameter	EG _{PJ,y}
Data unit	MWh
Description	Net Electricity supplied to the Unified Indian Grid by the project activity during the year y

Source of data	Meters installed at three locations, at generation point, plant sent out point and at Bajaura Substation, accurately monitors electricity supplied to the grid. Joint Meter readings taken at all three stations have been used to achieve the parameters $EG_{PJ,y}$.								
Description of measurement methods and procedures to be applied	This is calculated value and formula for the same is given below under section of calculation method.								
Frequency of monitoring/recording	Continuous Monitoring and Monthly Recording								
Value monitored	<table border="1"> <thead> <tr> <th>Vintage Period</th><th>$EG_{PJ,y}$ (MWh)</th></tr> </thead> <tbody> <tr> <td>01-November-2022 to 31-December-2022</td><td>19,866</td></tr> <tr> <td>01-January-2023 to 31-December-2023</td><td>248,012</td></tr> <tr> <td>Total</td><td>267,878</td></tr> </tbody> </table>	Vintage Period	$EG_{PJ,y}$ (MWh)	01-November-2022 to 31-December-2022	19,866	01-January-2023 to 31-December-2023	248,012	Total	267,878
Vintage Period	$EG_{PJ,y}$ (MWh)								
01-November-2022 to 31-December-2022	19,866								
01-January-2023 to 31-December-2023	248,012								
Total	267,878								
Monitoring equipment	Not applicable. It is a calculated value.								
QA/QC procedures to be applied	Not applicable. It is a calculated value.								
Purpose of the data	To calculate baseline emission								
Calculation method	$EG_y = [EG_{Malana} - EG_{Aux, Malana} - L_{Malana}]$								
Comments	Data will be archived in electronic form for two years after the end of crediting period or of the last issuance of CERs for this project activity, whichever occurs later.								

Data / Parameter	$EG_{Gen, Malana}$
Data unit	MWh
Description	Energy generated by 86 MW Hydro Project in Himachal Pradesh at the generation point
Source of data	Joint Meter Reading (JMR) by State Electricity Board (SEB)
Description of measurement methods and procedures to be applied	Meter installed at the generation point shall be used to record this parameter. SEB takes the reading on monthly basis and issue the JMR.

applied																		
Frequency of monitoring/recording	Monitoring Frequency: Continuous Recording Frequency: Monthly																	
Value monitored	<table><tr><td>Vintage Period</td><td colspan="2">EG_{Gen, Malana} (MWh)</td></tr><tr><td>01-November-2022 to 31-December-2022</td><td colspan="2">19,967</td></tr><tr><td>01-January-2023 to 31-December-2023</td><td colspan="2">249,739</td></tr><tr><td>Total</td><td colspan="2">269,706</td></tr></table>			Vintage Period	EG _{Gen, Malana} (MWh)		01-November-2022 to 31-December-2022	19,967		01-January-2023 to 31-December-2023	249,739		Total	269,706				
Vintage Period	EG _{Gen, Malana} (MWh)																	
01-November-2022 to 31-December-2022	19,967																	
01-January-2023 to 31-December-2023	249,739																	
Total	269,706																	
Monitoring equipment	Type: Electricity Meter Accuracy Class of meters: 0.2s <table><tr><td>Meter No</td><td>Make</td><td>Location</td></tr><tr><td>Q0333358</td><td>Secure</td><td>Malana G-1 Main Meter</td></tr><tr><td>18168106</td><td>L&T</td><td>Malana G-1 Check Meter</td></tr><tr><td>Q0333416</td><td>Secure</td><td>Malana G-2 Main Meter</td></tr><tr><td>18168111</td><td>L&T</td><td>Malana G-2 Check Meter</td></tr></table>			Meter No	Make	Location	Q0333358	Secure	Malana G-1 Main Meter	18168106	L&T	Malana G-1 Check Meter	Q0333416	Secure	Malana G-2 Main Meter	18168111	L&T	Malana G-2 Check Meter
Meter No	Make	Location																
Q0333358	Secure	Malana G-1 Main Meter																
18168106	L&T	Malana G-1 Check Meter																
Q0333416	Secure	Malana G-2 Main Meter																
18168111	L&T	Malana G-2 Check Meter																
QA/QC procedures to be applied	Meters are maintained by state electricity board. These meters are calibrated once in a year and the records maintained by state electricity department. The Calibration details of the Energy Meters have been mentioned in Appendix-2 of the Monitoring Report.																	
Purpose of the data	To calculate baseline emission.																	
Calculation method	-																	
Comments	-																	

Data / Parameter	EG _{Malana}
Data unit	MWh
Description	Energy supplied by 86 MW Hydro Project in Himachal Pradesh to the Malana transmission line at Malana Yard
Source of data	Calculated
Description of measurement methods and procedures to be applied	This is calculated value and formula for the same is given below under section of calculation method

Frequency of monitoring/recording	Monitoring Frequency: Continuous Recording Frequency: Monthly								
Value monitored	<table border="1"> <tr> <th>Vintage Period</th><th>EG_{Malana} (MWh)</th></tr> <tr> <td>01-November-2022 to 31-December-2022</td><td>19,901.863</td></tr> <tr> <td>01-January-2023 to 31-December-2023</td><td>248,941.336</td></tr> <tr> <td>Total</td><td>268,843.199</td></tr> </table>	Vintage Period	EG _{Malana} (MWh)	01-November-2022 to 31-December-2022	19,901.863	01-January-2023 to 31-December-2023	248,941.336	Total	268,843.199
Vintage Period	EG _{Malana} (MWh)								
01-November-2022 to 31-December-2022	19,901.863								
01-January-2023 to 31-December-2023	248,941.336								
Total	268,843.199								
Monitoring equipment	Not applicable								
QA/QC procedures to be applied	Not applicable								
Purpose of the data	To calculate baseline emission								
Calculation method	$EG_{Malana} = (EG_{Gen, Malana} - EG_{Aux, Malana})$								
Comments	-								

Data / Parameter	EG _{Toss}								
Data unit	MWh								
Description	The units/ Energy supplied by the Toss Hydro Power Project to the Malana transmission line at Malana Yard								
Source of data	Monthly meter readings issued by HPSEB								
Description of measurement methods and procedures to be applied	Meter installed at the Malana yard shall be used to record this parameter								
Frequency of monitoring/recording	Monitoring Frequency: Continuous Recording Frequency: Monthly								
Value monitored	<table border="1"> <tr> <th>Vintage Period</th><th>EG_{Toss} (MWh)</th></tr> <tr> <td>01-November-2022 to 31-December-2022</td><td>19,126.689</td></tr> <tr> <td>01-January-2023 to 31-December-2023</td><td>77,151.043</td></tr> <tr> <td>Total</td><td>96,277.732</td></tr> </table>	Vintage Period	EG _{Toss} (MWh)	01-November-2022 to 31-December-2022	19,126.689	01-January-2023 to 31-December-2023	77,151.043	Total	96,277.732
Vintage Period	EG _{Toss} (MWh)								
01-November-2022 to 31-December-2022	19,126.689								
01-January-2023 to 31-December-2023	77,151.043								
Total	96,277.732								

Monitoring equipment	Type: Electricity Meter		
	Accuracy Class of meters: 0.2s		
	Meter No	Make	Location
	Q0333437	Secure	Toss Incomer Main Meter
	Q0333467	Secure	Toss Incomer Check Meter
QA/QC procedures to be applied	Meters are maintained by state electricity board. These meters are calibrated annually and the records maintained by state electricity department. The Calibration details of the Energy Meters have been mentioned in Appendix-2 of the Monitoring Report.		
Purpose of the data	To calculate baseline emission.		
Calculation method	-		
Comments	The calibration was delayed by approx. 4 months but meters were found to be working within the permissible limit of error. To account for the delay, energy readings have been adjusted conservatively for the period Dec 2022-April 2023.		

Data / Parameter	EG _{M&T}								
Data unit	MWh								
Description	Total Energy sent out by both Malana and Toss hydro power project to the Malana transmission line at Malana yard.								
Source of data	Joint Meter Reading (JMR) by SEB								
Description of measurement methods and procedures to be applied	Meter installed at the Malana yard shall be used to record the parameter.								
Frequency of monitoring/recording	Monitoring Frequency: Continuous Recording Frequency: Monthly								
Value monitored	<table border="1"> <tr> <th>Vintage Period</th><th>EG_{M&T} (MWh)</th></tr> <tr> <td>01-November-2022 to 31-December-2022</td><td>39,028.552</td></tr> <tr> <td>01-January-2023 to 31-December-2023</td><td>326,092.379</td></tr> <tr> <td>Total</td><td>365,120.931</td></tr> </table>	Vintage Period	EG _{M&T} (MWh)	01-November-2022 to 31-December-2022	39,028.552	01-January-2023 to 31-December-2023	326,092.379	Total	365,120.931
Vintage Period	EG _{M&T} (MWh)								
01-November-2022 to 31-December-2022	39,028.552								
01-January-2023 to 31-December-2023	326,092.379								
Total	365,120.931								

Monitoring equipment	Type: Electricity Meter		
	Accuracy Class of meters: 0.2s		
	Meter No	Make	Location
	HPU05987	Secure	Malana Line-1 Main Meter
	HPU06607	Secure	Malana Line-1 Check Meter
	HPU05988	Secure	Malana Line-2 Main Meter
	HPU06608	Secure	Malana Line-2 Check Meter
	21009542	Schneider	Malana Line-1 Main Meter
	21009543	Schneider	Malana Line-1 Check Meter
	21009547	Schneider	Malana Line-2 Main Meter
	21009549	Schneider	Malana Line-2 Check Meter
QA/QC procedures to be applied	Meters are maintained by state electricity board. These meters are annually calibrated and the records maintained by state electricity department. The Calibration details of the Energy Meters have been mentioned in Appendix-2 of the Monitoring Report.		
Purpose of the data	To calculate baseline emission.		
Calculation method	-		
Comments	-		

Data / Parameter	EG _{Aux, Malana}
Data unit	MWh
Description	Auxiliary consumption by 86 MW Hydro Project in Himachal Pradesh
Source of data	Calculated
Description of measurement methods	This is calculated value and formula for the same is given below under section of calculation method.

and procedures to be applied									
Frequency of monitoring/recording	-								
Value monitored	<table border="1"> <tr> <th>Vintage Period</th><th>EG_{Aux, Malana} (MWh)</th></tr> <tr> <td>01-November-2022 to 31-December-2022</td><td>65.137</td></tr> <tr> <td>01-January-2023 to 31-December-2023</td><td>797.664</td></tr> <tr> <td>Total</td><td>862.801</td></tr> </table>	Vintage Period	EG _{Aux, Malana} (MWh)	01-November-2022 to 31-December-2022	65.137	01-January-2023 to 31-December-2023	797.664	Total	862.801
Vintage Period	EG _{Aux, Malana} (MWh)								
01-November-2022 to 31-December-2022	65.137								
01-January-2023 to 31-December-2023	797.664								
Total	862.801								
Monitoring equipment	Not applicable								
QA/QC procedures to be applied	Not applicable								
Purpose of the data	To calculate baseline emission								
Calculation method	$EG_{Aux, Malana} = [EG_{Gen, Malana} + EG_{Toss} - EG_{M\&T}]$								
Comments	-								

Data / Parameter	EG _{Bajoura, M&T}						
Data unit	MWh						
Description	Energy injected at Bajoura substation by both Malana and Toss hydro power project						
Source of data	Joint Meter Reading issued by SEB						
Description of measurement methods and procedures to be applied	Meter installed at the Bajaura Substation shall be used to record this parameter.						
Frequency of monitoring/recording	Monitoring Frequency: Continuous Recording Frequency: Monthly						
Value monitored	<table border="1"> <tr> <th>Vintage Period</th><th>EG_{Bajoura, M&T} (MWh)</th></tr> <tr> <td>01-November-2022 to 31-December-2022</td><td>38,960</td></tr> <tr> <td>01-January-2023 to</td><td>324,938</td></tr> </table>	Vintage Period	EG _{Bajoura, M&T} (MWh)	01-November-2022 to 31-December-2022	38,960	01-January-2023 to	324,938
Vintage Period	EG _{Bajoura, M&T} (MWh)						
01-November-2022 to 31-December-2022	38,960						
01-January-2023 to	324,938						

	31-December-2023	
	Total	363,898
Monitoring equipment	Type: Electricity Meter Accuracy Class of meters: 0.2s	
	Meter No	Make
	Q0333328	Secure
	Q0333343	Secure
	Q0333399	Secure
	Q0333519	Secure
QA/QC procedures to be applied	Meters are maintained by state electricity board. These meters are annually calibrated and the records maintained by state electricity department. The Calibration details of the Energy Meters have been mentioned in Appendix-2 of the Monitoring Report.	
Purpose of the data	To calculate baseline emission	
Calculation method	-	
Comments	-	

Data / Parameter	L _{Transmission}
Data unit	MWh
Description	Total transmission losses between Malana yard and Bajoura substation
Source of data	Calculated
Description of measurement methods and procedures to be applied	This is a calculated value and formula for the same is given below under section of calculation method.
Frequency of monitoring/recording	Not applicable
Value monitored	1,222.931
Monitoring equipment	Not applicable
QA/QC procedures to be applied	Not applicable
Purpose of the data	To calculate baseline emission

Calculation method	$L_{\text{Transmission}} = (EG_{\text{M\&T}} - EG_{\text{Bajaura, M\&T}})$
Comments	-

Data / Parameter	L_{Malana}
Data unit	MWh
Description	Share of losses of 86 MW Hydro Project in Himachal Pradesh
Source of data	Calculated
Description of measurement methods and procedures to be applied	This is calculated value.
Frequency of monitoring/recording	Not applicable
Value monitored	958.487
Monitoring equipment	Not applicable
QA/QC procedures to be applied	Not applicable
Purpose of the data	To calculate baseline emission
Calculation method	$L_{\text{MALANA}} = (L_{\text{TRANSMISSION}} \times EG_{\text{MALANA}}) / EG_{\text{M\&T}}$
Comments	-

Data / Parameter	L_{Toss}
Data unit	MWh
Description	Share of losses of Toss hydro power project
Source of data	Calculated
Description of measurement methods and procedures to be applied	This is calculated value.
Frequency of monitoring/recording	Not applicable
Value monitored	264.444

Monitoring equipment	Not applicable
QA/QC procedures to be applied	Not applicable
Purpose of the data	To calculate baseline emission
Calculation method	$L_{TOSS} = (L_{TRANSMISSION} \times EG_{TOSS}) / EG_{M\&T}$
Comments	-

Data / Parameter	A_{PJ}
Data unit	m^2
Description	Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full
Source of data	Project site
Description of measurement methods and procedures to be applied	Measured from topographical surveys, maps, satellite pictures, etc.
Frequency of monitoring/recording	Yearly
Value monitored	18,250
Monitoring equipment	Not applicable
QA/QC procedures to be applied	Not applicable
Purpose of the data	-
Calculation method	Not applicable
Comments	-

Data / Parameter	C_{apPJ}
Data unit	W (Watt)
Description	Installed capacity of the hydro power plant after the implementation of the project activity

Source of data	Project site
Description of measurement methods and procedures to be applied	Determine the installed capacity based on recognized standards
Frequency of monitoring/recording	Yearly
Value monitored	86,000,000
Monitoring equipment	Not applicable
QA/QC procedures to be applied	Not applicable
Purpose of the data	-
Calculation method	Not applicable
Comments	-

4.3 Monitoring Plan

Project Management Plan: A team is constituted with participation from relevant departments. People are trained on concept and monitoring plan. This team is responsible for data collection and archiving. This team meets periodically to review project activity check data collected; emissions reduced etc. On a weekly basis, the monitoring reports are checked and discussed by the seniors and team members/managers. In case of any irregularity observed, it will be informed to the concerned person for necessary actions. On monthly basis, these reports are forwarded to the management.

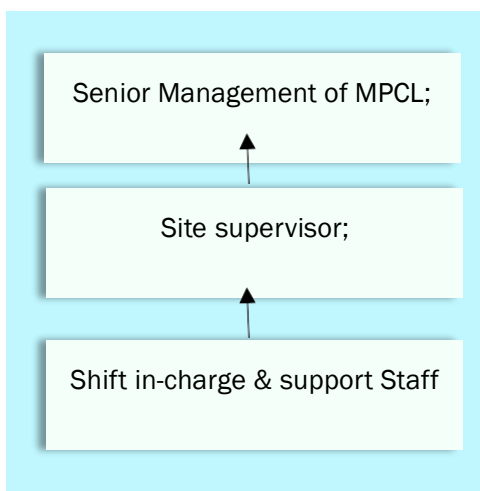


Figure 1 – Project Management Plan

Senior Management of MPCL/Technical Head: Overall responsibility of compliance with the monitoring plan.

Site Supervisor: Responsibility for completeness of data, reliability of data (calibration of meters) and monthly report generation.

Shift In-charge: Responsibility of daily report generationData.

Data Monitoring: The methodology requires monitoring of the following:

- Electricity generation from the project activity

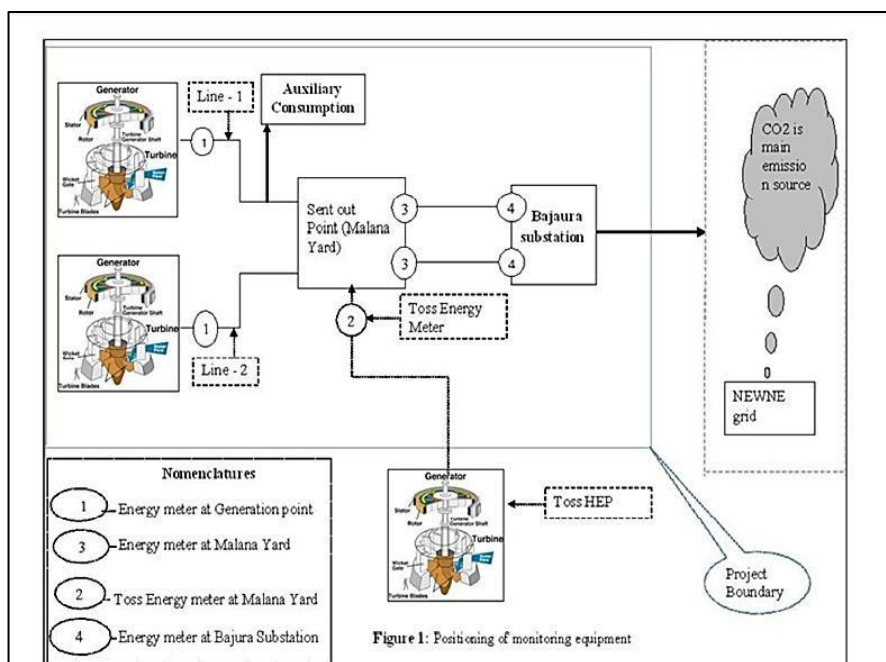
Energy supplied to the Grid: The energy supplied to grid is measured using electricity meters located at Bajaura substation. The net electricity supplied is measured as

$$EG_y = \text{Total Generation} - \text{Auxiliary Consumption} - \text{Transmission Losses}$$

In the current practice another hydroelectric power project (Toss) was allowed to utilize the Malana –Bus for sending out the generated electricity. A common meter is now being used to measure the electricity being sent out by Malana and Toss collectively at Malana Yard. Since there is a common meter for measuring the electricity sent out from Malana Bus Bar hence now the calculation of auxiliary consumption and transmission losses are based on combined energy sent out & combined energy injected at Bajaura Sub Station. The calculation for auxiliary consumption and transmission losses for Malana HEP is described in the section 4.2. Calculation is based on the authenticated Letter issued by HPSEB, 12-October-2009.

Gross generation at Malana is being measured by meter at generation point. The source of value taken for this parameter is the Joint Meter Reading (JMR). Energy sent out by Toss is measured by meter at the Toss incoming line. The meter readings are recorded and maintained by HPSEB.

The total energy sent out by Malana and Toss combined is measured by meter at Malana Bus. The source for these values is the JMR. The total energy injected at Bajaura substation by Malana and Toss combined is measured by meter at Bajaura substation. Auxiliary consumption and the share of transmission loss by Malana are calculated as per formula given in section 4.2. The total energy injected by Malana at Bajaura substation is calculated by subtracting the auxiliary consumption and Malana's share of transmission loss from the Gross generation by Malana.



Completeness - For electricity generation data: The project activity has installed the latest state-of-art monitoring and control equipment that measure, record, report, monitor and control various key parameters. Real time data has been collected using these control systems. An hourly log of data is also maintained by the shift in-charge. A daily report of aggregation of these data is also being prepared. Parameters monitored are the total power generated, power exported to the grid and auxiliary power consumed (other parameters like head availability, grid issues, frequency etc are being maintained hourly in the log).

Reliability - For electricity generation data: automatic control meters for power generation and exports are regularly maintained. The regular plant operating & maintenance procedures also include process of regular meter testing, calibration & maintenance. All these meters are calibrated & tested before installation and the calibration of meters is done once in a year at Government of India Lab. Actual power generation data are also metered using power output meter at the substation. The billing invoices for the power sold and meter readings are used to validate the data accuracy.

Frequency - The measurement is recorded and monitored on a continuous basis. An hourly log is prepared by the shift in-charge. At the end of the day, hourly data is aggregated in a daily report. The meters provided are of 0.2 accuracy class.

Training - Training needs have been identified in registered Joint PD&MR; however, the group is already operating a plant in Manikaran valley & experienced staff is available for plant O&M.

Internal audits of project compliance - Audits are carried out to check the correctness of procedures and data monitored by the internal auditing team entrusted for the work.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

Baseline Emissions: Baseline emissions due to the project activity are calculated as follow:

$$BE_y = EG_{PJ} \times EF_{grid,CM,y}$$

Where,

BE_y = Baseline emissions in year y (tCO₂e/yr)

$EG_{PJ,y}$ = Net Electricity supplied to the Unified Indian Grid by the project activity during the year y(MWh/yr)

$EF_{grid,CM,y}$ = Combined margin CO₂ emission factor for grid factor for grid connected power generation in year y calculated using TOOL 07 (tCO₂e/MWh)

$$= 267,878 * 0.8870 \text{ tCO}_2\text{e/MWh}$$

$$= 237,607 \text{ tCO}_2\text{e (Rounded Down Value)}$$

5.2 Project Emissions

According to sub-section (c) of para 38 of ACM0002, Version 20.0

The project activity is implemented in existing single or multiple reservoirs, where the volume of the reservoir(s) is increased and the power density, calculated using equation

$$PD = (Cap_{PJ} - Cap_{BL}) / (A_{PJ} - A_{BL}), \text{ is greater than } 10 \text{ W/m}^2$$

$$PD = 86,000,000 \text{ W} / 18,250 \text{ m}^2 = 4712.32 \text{ W/m}^2$$

As the calculated value from the given equation is 5,910.25 W/m² which is greater than 10 W/m², so as per applied methodology for the project activity, there would not be any project emission.

Hence, $PE_y = 0$

5.3 Leakage Emissions

No leakage emissions are considered for the proposed project activity since no energy

generating equipment is transferred from another activity and/or the existing equipment is transferred to another activity. Therefore, as specified in ACM0002, Version 20.0, project participants do not need to consider leakage.

Hence, $LE_y=0$.

5.4 GHG Emission Reductions and Carbon Dioxide Removals

Vintage period	Baseline emissions (tCO ₂ e)	Project emissions (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Reduction VCU (tCO ₂ e)	Removal VCU (tCO ₂ e)	Total VCUs (tCO ₂ e)
01-November-2022 to 31-December-2022	17,621	0	0	17,621	0	17,621
01-January-2023 to 31-December-2023	219,986	0	0	219,986	0	219,986
Total	237,607	0	0	237,607	0	237,607

Vintage period	Ex-ante estimated reductions/removals (tCO ₂ e)	Achieved reductions/removals (tCO ₂ e)	Percent difference (tCO ₂ e)	Explanation for the difference (tCO ₂ e)
01-November-2022 to 31-December-2022	47,608	17,621	-63.0%	Loss of generation due to planned shutdown at Unit 1 for annual maintenance in December-22.
01-January-2023 to 31-December-	284,869	219,986	-22.8%	Loss of generation due to planned shutdown at Unit 2 for annual maintenance in January-

2023				23. Loss of Generation due to damage to HPSEB 132 KV Transmission line tower by heavy rain/land slide at Thalout in the month of July & August.
Total	332,477	237,607	-28.5%	Less water flow in Malana Nallah during no rain period also contributed to lesser Generation.

APPENDIX 1: COMMERCIALLY SENSITIVE INFORMATION

There is no commercially sensitive information included in the monitoring report which needs to be excluded in the public version.

Section	Information	Justification
	Not applicable	

APPENDIX 2: METER CALIBRATION DETAILS

SN	Meter No	Make	Accuracy class	Main/ Check	Location	Purpose	Date of Calibration 1	Validity	Date of Calibration 2	Validity
1	Q0333358	Secure	0.2s	Main	Generating Point (Malana G-1 Main Meter)	EG _{Gen,Malana}	28-Apr-22	27-Apr-23	27-Apr-23	26-Apr-24
2	Q0333416	Secure	0.2s	Main	Generating Point (Malana G-2 Main Meter)	EG _{Gen,Malana}	28-Apr-22	27-Apr-23	27-Apr-23	26-Apr-24
3	18168106	L&T	0.2s	Check	Generating Point (Malana G-1 Check Meter)	EG _{Gen,Malana}	28-Apr-22	27-Apr-23	27-Apr-23	26-Apr-24
4	18168111	L&T	0.2s	Check	Generating Point (Malana G-2 Check Meter)	EG _{Gen,Malana}	28-Apr-22	27-Apr-23	27-Apr-23	26-Apr-24
5	HPU05987	Secure	0.2s	Main	Sarabai Transmission Line at Jari (Malana Line-1 Main Meter)	EG _{M&T}	28-Apr-22	27-Apr-23	Meter was replaced with Meter No 21009542 on 27-April-23	-
6	HPU05988	Secure	0.2s	Main	Sarabai Transmission Line at Jari (Malana Line-2 Main Meter)	EG _{M&T}	28-Apr-22	27-Apr-23	Meter was replaced with Meter No 21009547 on 27-April-23	-

7	HPU06607	Secure	0.2s	Check	Sarabai Transmission Line at Jari (Malana Line-1 Check Meter)	EG _{M&T}	28-Apr-22	27-Apr-23	Meter was replaced with Meter No 21009543 on 27-April-23	-
8	HPU06608	Secure	0.2s	Check	Sarabai Transmission Line at Jari (Malana Line-2 Check Meter)	EG _{M&T}	28-Apr-22	27-Apr-23	Meter was replaced with Meter No 21009549 on 27-April-23	-
9	21009542	Schneider	0.2s	Main	Sarabai Transmission Line at Jari (Malana Line-1 Main Meter)	EG _{M&T}	NA	NA	26-Apr-23	25-Apr-24
10	21009547	Schneider	0.2s	Main	Sarabai Transmission Line at Jari (Malana Line-2 Main Meter)	EG _{M&T}	NA	NA	26-Apr-23	25-Apr-24
11	21009543	Schneider	0.2s	Check	Sarabai Transmission Line at Jari (Malana Line-1 Check Meter)	EG _{M&T}	NA	NA	26-Apr-23	25-Apr-24
12	21009549	Schneider	0.2s	Check	Sarabai Transmission Line at Jari (Malana Line-2 Check Meter)	EG _{M&T}	NA	NA	26-Apr-23	25-Apr-24
13	*Q0333328	Secure	0.2s	Main	Sarabai Transmission Line at Sarabai (Bajaura Line-1 Main Meter)	EG _{Bajoura,M&T}	28-Apr-22	27-Apr-23	27-Apr-23	26-Apr-24
14	*Q0333399	Secure	0.2s	Main	Sarabai Transmission Line at Sarabai (Bajaura Line-2 Main	EG _{Bajoura,M&T}	28-Apr-22	27-Apr-23	27-Apr-23	26-Apr-24

					Meter)					
15	*Q0333343	Secure	0.2s	Check	Sarabai Transmission Line at Sarabai (Bajaura Line-1 Check Meter)	EG _{Bajoura,M&T}	28-Apr-22	27-Apr-23	27-Apr-23	26-Apr-24
16	*Q0333519	Secure	0.2s	Check	Sarabai Transmission Line at Sarabai (Bajaura Line-2 Check Meter)	EG _{Bajoura,M&T}	28-Apr-22	27-Apr-23	27-Apr-23	26-Apr-24
17	Q0333437	Secure	0.2s	Main	Toss	EG _{Toss}	21-Dec-21	20-Dec-22	**27-Apr-23	26-Apr-24
18	Q0333467	Secure	0.2s	Check	Toss	EG _{Toss}	21-Dec-21	20-Dec-22	**27-Apr-23	26-Apr-24

*All the four meters at Sarabai Transmission Line at Sarabai (Bajaura) were changed on 20-Dec-2021 during the last monitoring period (01-November-2021 to 31-October-2022). The details of the changed meters are as given below:

Location	Purpose	Old Meter	New Meter	Date of Installation of new meter
Sarabai Transmission Line at Sarabai (Bajaura Line-1 Main Meter)	EG _{Bajoura,M&T}	KRB09865	Q0333328	20-Dec-2021
Sarabai Transmission Line at Sarabai (Bajaura Line-2 Main Meter)	EG _{Bajoura,M&T}	HPU05989	Q0333399	20-Dec-2021
Sarabai Transmission Line at Sarabai (Bajaura Line-1 Check Meter)	EG _{Bajoura,M&T}	HPU06609	Q0333343	20-Dec-2021
Sarabai Transmission Line at Sarabai (Bajaura Line-2 Check Meter)	EG _{Bajoura,M&T}	HPU06610	Q0333519	20-Dec-2021

**The calibration was delayed by approx. 4 months but found to be working within the permissible limit of error. To account for the delay, EG_{Toss} energy readings have been adjusted conservatively for the period Dec 2022-April 2023.

APPENDIX 3: OUTAGE DETAILS

Month-Year	Unit 1 (Hours)	Unit 2 (Hours)	Reason
Nov-22	00:20	00:20	Planned shutdown for PPV Operation Check.
Dec-22	393:00	-	Planned shutdown for annual maintenance
Jan-23	-	00:56	Grid Failure
	-	373:20	Planned shutdown for annual maintenance
Feb-23	00:20	00:20	Planned shutdown for PPV Operation Check.
	00:14	-	Grid Failure
	-	17:00	Planned shutdown for annual maintenance
Mar-23	-	-	-
Apr-23	-	-	-
May-23	06:20	05:45	Planned shutdown for Runner replacement work
Jun-23	00:20	00:20	Planned shutdown for PPV Operation Check.
Jul-23	472:58	450:44	Loss of Generation due to HPSEB 132 KV Transmission line tower damaged by heavy rain/land slide at Thalout
Aug-23	112:48	127:14	Loss of Generation due to HPSEB 132 KV Transmission line tower damaged by heavy rain/land slide at Thalout
Sept-23	00:45	00:39	Grid Failure
	18:03	13:00	Malana-2 dam Silt Flushing
Oct-23	0:34	0:06	Grid Failure
Nov-23	00:20	00:20	Planned shutdown for PPV Operation Check.