PROJECT CONCEPT NOTE

CARBON OFFSET UNIT (CoU) PROJECT

Title: 1500 MW Large Scale Nathpa Jhakri Hydroelectric Station by SJVN Limited (HCPL CREDUCE JV)

Version 2.0

Date 06/04/2022

First CoU Issuance Period: 8 years

Date: 01/01/2014 to 31/12/2021

Project Concept Note (PCN)
CARBON OFFSET UNIT (CoU) PROJECT

BASIC INFORMATION	
Title of the project activity	1500 MW Large Scale Nathpa Jhakri Hydroelectric Station by SJVN Limited (HCPL CREDUCE JV)
Scale of the project activity	Large Scale
Completion date of the PCN	06/04/2022
Project participants	Creduce Technologies Private Limited (Representator) SJVN Limited (Developer)
Host Party	India
Applied methodologies and standardized baselines	Applied Baseline Methodology: ACM0002: "Grid-connected electricity generation from renewable sources", Version 20.0 Standardized Methodology: Not Applicable.
Sectoral scopes	01 Energy industries (Renewable/Non-Renewable Sources)
Estimated amount of total GHG emission reductions	To be estimated during verification [An ex-ante estimate is 59,50,800 CoUs per year]

SECTION A. Description of project activity

A.1. Purpose and general description of Carbon offset Unit (CoU) project activity >>

The proposed project title under UCR is "1500 MW Large Scale Nathpa Jhakri Hydroelectric Station by SJVN Limited (HCPL CREDUCE JV)", which is a Hydro Power project located in Shimla district of Himachal Pradesh (India). The project is an operational activity with continuous reduction of GHG, currently being applied under "Universal Carbon Registry" (UCR). This is a run of the river project located on River Satluj (also known as Sutlej), a major tributary on the Indus basin, in Shimla district of Himachal Pradesh in North India.

Purpose of the project activity:
The project activity is a renewable power generation activity which incorporates installation and operation of 6 Vertical Axis Francis Turbines having individual capacity of 250 MW with aggregated installed capacity of 1500 MW. This project has been promoted by SJVN Limited. The Project will supply 1500 MW of the power to multiple states of India as mentioned in the below table, which are part of the Northern, Eastern, Western and North-Eastern (NEWNE) Electricity Grid of India.

Sr. No.	State	Allocation (In MW)	Percentage to the installed capacity
1.	Haryana	64	4.27
2.	Himachal Pradesh	547	36.47
3.	Jammu & Kashmir	105	7.00
4.	Punjab	114	7.60
5.	Rajasthan	112	7.47
6.	Uttar Pradesh	221	14.73
7.	Uttaranchal	38	2.53
8.	Chandigarh	08	0.53
9.	Delhi	142	9.47
10.	Unallocated quota at the disposal of the Central Govt.	149	9.93
	TOTAL	**1500**	**100**

Note: (Data from SJVN Website https://sjvn.nic.in/businessprojectdetails/28/5/7)

The commissioning date of each hydro turbine installed in this project is mentioned in the table below.

Turbine	Commissioning Date
UNIT-1	May 18, 2004
UNIT-2	May 06, 2004
UNIT-3	March 31, 2004
UNIT-4	March 30, 2004
UNIT-5	October 06, 2003
UNIT-6	January 02, 2004

As per the ex-ante estimate, the project will generate approximately 66,12,000 MWh of electricity per annum and supply it to the NEWNE grid. The renewable power generated by the project activity would be displacing equivalent quantum of grid electricity which is dominated by the fossil-fuel based power plants resulting in an estimated emission reduction of 59,50,800 tCO_2 per annum. The estimated annual average and the total CO_2e emission reduction by the project activity is expected to be 59,50,800 tCO_2e, whereas actual emission reduction achieved during the first CoU period shall be submitted as a part of first monitoring and verification.

Since the project activity generates electricity through Hydro energy, a clean renewable energy source it will not cause any negative impact on the environment and thereby contributes to climate change mitigation efforts.

Project's Contribution to Sustainable Development

This project is a greenfield activity where grid power is the baseline. Indian grid system has been predominantly dependent on power from fossil fuel powered plants. The renewable power generation is gradually contributing to the share of clean & green power in the grid; however, grid emission factor is still on higher side which defines grid as distinct baseline.

The Government of India has stipulated following indicators for sustainable development in the interim approval guidelines for such projects which are contributing to GHG mitigations. The Ministry of Environment, Forests & Climate Change, has stipulated economic, social, environment and technological well-being as the four indicators of sustainable development. It has been envisaged that the project shall contribute to sustainable development using the following ways: -

Social well-being: The project would help in generating direct and indirect employment benefits accruing out of construction of the Hydro Power Plant and for maintenance during operation of the project activity. It will lead to development of infrastructure around the project area in terms of improved road network etc. and will also directly contribute to the development of renewable infrastructure in the region.

Economic well-being: The project is a clean technology investment decided based on carbon revenue support, which signifies flows of clean energy investments into the host country. The project activity requires temporary and permanent, skilled and semi-skilled manpower at the project location; this will create additional employment opportunities in the region. The generated electricity will be supplied to the grid. Besides above, indirect benefits have also accrued to the region by way of increase in agriculture and industrial production. In addition, the project has provided gainful employment to a large number of skilled and unskilled workers and has also opened the landlocked hinterland by providing essential facilities such as schools, hospitals etc. for the people of the area. Thus, NJHEP has ushered in the social and economic upliftment of the persons living in the vicinity of the Project i.e., of society at large.

Technological well-being: The project activity employs state of art technology 6 x 250 MW vertical axis Francis turbines which has high power generation potential with optimized utilization of land. The successful operation of project activity would lead to promotion of this technology and would further push R&D efforts by technology providers to develop more efficient and better machinery in future. Hence, the project leads to technological well-being.

Environmental well-being: A prior approval and Environment Clearances have been taken by the project before the start of the construction activity. The project activity will generate power using zero emissions Hydro-based power generation facility which helps to reduce GHG emissions and specific pollutants like SOx, NOx, and SPM associated with the conventional thermal power generation facilities. The project utilizes Hydro energy for generating electricity which is a clean source of energy. The project activity will not generate any air pollution, water pollution or solid waste to the environment which otherwise would have been generated through fossil fuels. Thus, the project causes no negative impact on the surrounding environment contributing to environmental well-being.

With regards to ESG credentials:

The project essentially contributes to various indicators which can be considered under ESG credentials. Some of the examples are as follows:

Under Environment:
Environmental criteria may include a company's energy use, waste, pollution, natural resource conservation, and treatment of animals etc. For the project proponent, energy generation pattern is now based on renewable energy due to the project and it also contributes to GHG emission reduction and conservation of depleting energy sources associated with the project baseline. Also, the criteria can be further evaluated on the basis of any environmental risks which the company might face and how those risks are being managed by the company. Here, as the power generation will be based on Hydro power, the risk of environmental concerns associated with non-renewable power generation and risk related to increasing cost of power etc. are now mitigated. Hence, project contributes to ESG credentials.

Under Social:
Social criteria reflect on the company's business relationships, qualitative employment, working conditions with regard to its employees' health and safety, interests of other stakeholders' etc. With respect to this project, the Project Proponent has robust policies in place to ensure equitable employment, health & safety measures, local jobs creation etc. Also, the organizational CSR activities directly support local stakeholders to ensure social sustainability. Thus, the project contributes to ESG credentials.

Under Governance:
Governance criteria relates to overall operational practices and accounting procedure of the organization. With respect to this project, the Project Proponent practices a good governance practice with transparency, accountability and adherence to local and national rules & regulations etc. This can be further referred from the company's annual report. Also, the project activity is a Hydro power project owned and managed by the proponent for which all required NOCs and approvals are received. The electricity generated from the project can be accurately monitored, recorded and further verified under the existing management practice of the company. Thus, the project and the proponent ensure good credentials under ESG.

A.2 Do no harm or Impact test of the project activity>>

There was no harm identified form the project and hence no mitigations measures are applicable.

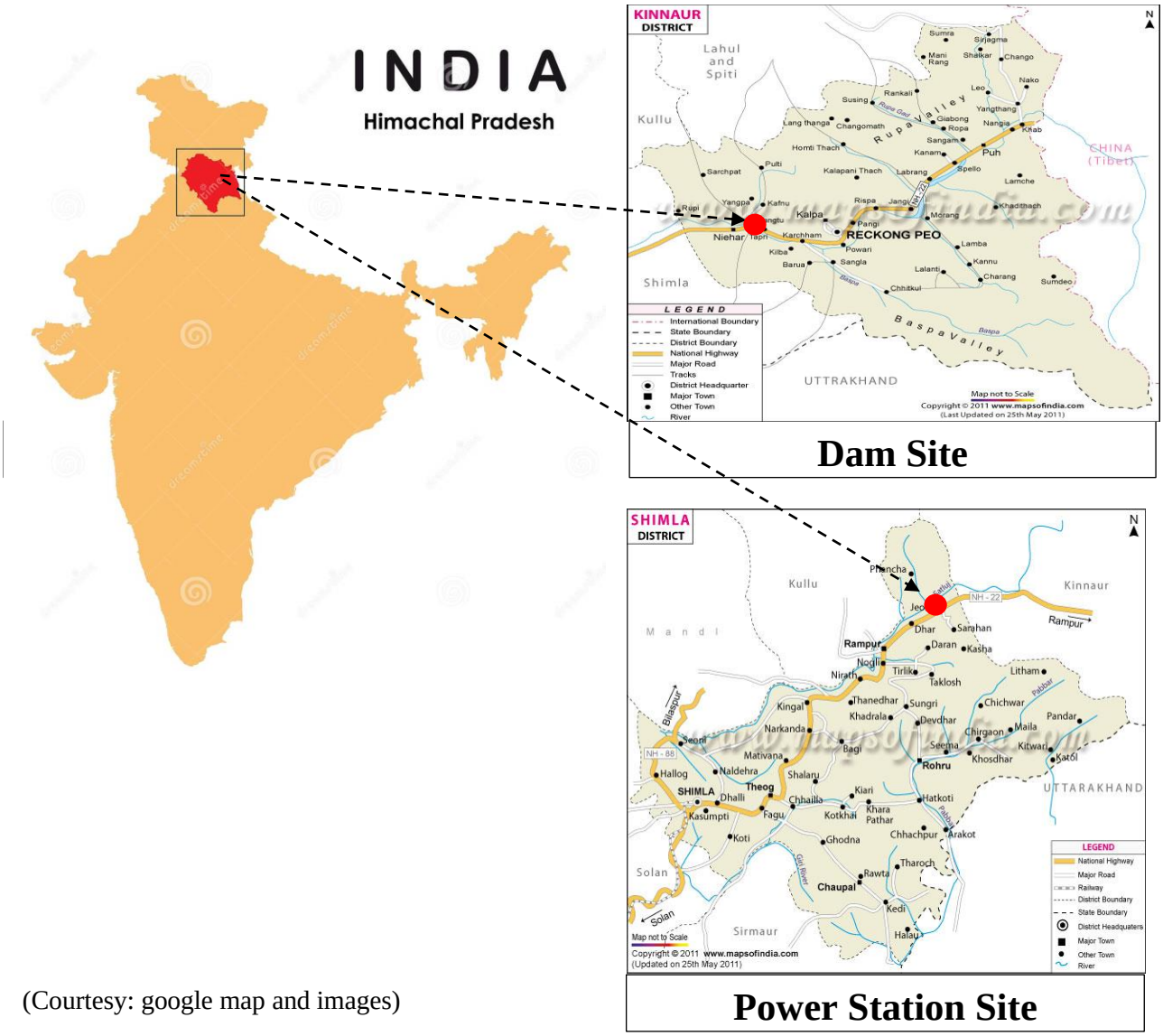
Rational: as per 'Central Pollution Control Board (Ministry of Environment & Forests, Govt. of India)', final document on revised classification of Industrial Sectors under Red, Orange, Green and White Categories (07/03/2016), it has been declared that Hydro project activity falls under the "White category". White Category projects/industries do not require any Environmental Clearance such as 'Consent to Operate' from PCB as such project does not lead to any negative environmental impacts. However, Environmental Clearance, Forest Clearance and PIB approval was taken before the start date of the project activity.

A.3. Location of project activity >>

The **Nathpa Dam** is located Near Nathpa Village of District Kinnaur in the state of Himachal Pradesh. The dam is constructed on the river of Satluj. It is 80 kilometres from Kinnaur city and 176 kilometres from the Shimla city. Project Coordinates of the dam is 31°33'51.8"N 77°58'48.1"E.

The **Nathpa Jhakri Power House** is located in the Village of Jhakri, District Shimla in the state of Himachal Pradesh. It is 47 kilometres from the Nathpa Dam and 135 kilometres from Shimla city. Location coordinates of the power house is 31°29'58.5"N, 77°42'22.2"E.

The representative location map of Naptha Dam and Jhakri Power Station is shown below:



(Courtesy: google map and images)

A.4. Technologies/measures >>

The proposed project activity is installation and operation of 6 Hydro Turbines having individual capacity 250 MW and with aggregated installed capacity of 1500 MW in the state of Himachal Pradesh in India.

Technical details for Hydro Power Plant are as below:

(1)	**Location:**	
	State	Himachal Pradesh
	District	Kinnaur / Shimla
	Vicinity	Dam down Stream of Wangtoo Bridge at Nathpa and Power House near Jhakri Village on left bank of River Satluj.
(2)	**Hydrology:**	
	Catchment area of Satluj at Dam site.	49,820 Sq.Km
	Dependable Year run-off	7689 million cubic meters
	Mean year run-of (Satluj)	9596 million cubic meters.
	Design discharge	405 cumecs
	Design flood	5660 cumecs
(3)	**Diversion Dam:**	
	Type of Dam	Concrete, Gravity.
	Maximum height above Foundation level	62.5 meters
	Length of dam at Road level	185.45 m
	Top of dam	EL.1498.50m
	Full Reservoir level	EL.1495.50m
	Minimum Draw Down level	EI.1474.00m
	Poundage Available (Gross)	343 Hect. Meters
(4)	**Under Sluices:**	
	Crest level	EI. 1458.00 M.
	Number	Five
	Gates	5 Radial Gates, each of size 7.5 M x 8.50m.
	Energy dissipation arrangement	Ski-jump.
(5)	**Spillway:**	
	Crest Level	EI. 1488.00m
	Gates	1 Counter weight Balanced Gate of size 2.5m x 7.5m.
	Energy Dissipation	Ski jump.
(6)	**Diversion Tunnel:**	
	Length	738m
	Diameter	8m D-shaped (on right bank)
(7)	**Intake Arrangement:**	
	No. of Intake tunnels	4
	Total discharge through Intake	486 cumecs
	Size and Shape of Intake tunnels	Rectangular opening of 6.0m x 5.25m suitably transitioned to 6.0m Horse shoe tunnel.

(8) Desilting Arrangements:

Type.	Underground.
Number and Size	Four parallel chambers, egg-shaped, each 525m (length) x 16.31m (max. width at center) x 27.5m(height)
Flow through velocity	31.0cm/Sec.
Particle size to be removed	Particles greater than 0.2 mm.

(9) Head Race Tunnel:

Shape & type	Circular, Concrete lined
Length	27.4 Km
Diameter,	10.15 M
Design discharge	405 cumecs
Velocity.	5.0 m/sec.

(10) Sholding Works:

(a) Weir

Location	Across Sholding Khad at EL. 1542.40 M.
Type	Trench weir.
Design discharge	8.0 cumecs (including 2.0 cumecs for flushing)
Length	16.0 M
Width.	3.0 m.
Depth.	1.63 m to 3.38 m.

(b) Inlet Tunnel

Size & Shape.	2m, D-Shaped.
Length	51.36 m

(c) Outlet Tunnel

Size & Shape.	2m, D-Shaped.
Length	126.73 m

(d) Silting Flushing Tunnel

Shape	D-Shaped.
Size	1.8m x 2.2 m
Length	276.44m

(e) Desilting Arrangement

Type	Underground
Size	53m x 10.15m x 10.81m (H)
Water depth, Flow throw Velocity	5.57m, 16cm/Sec.

(f) Drop Shaft

Diameter.	2.5 m.
Depth	102.63m, meeting HRT at RD 6407.04m
Discharge	6.0 cumecs

(g) Permanent Access Tunnel

Size & Shape	4.0m, D-Shaped
Length	471.39 m

(11) Crossing under Manglad-Khad:

No. of Steel lined Tunnels	1 No.
Diameter & length	8.5m, 710m
Thickness of High Tensile ASTM-A 517 Grade-F Steel Plates	30, 36 and 40mm

(12) Daj Steel Liner:

No. of Steel lined Tunnels	1 No.
Diameter & Length	8.5m, 376m
Thickness of High Tensile ASTM-A 517 Grade-F Steel Plates	30 and 36mm

(13) Surge Shaft:

Type	Restricted Orifice
Diameter	21.6 m circular for height of about 211m, connecting Shaft of 102 m dia., and about 85.0 m high and top pond with about 5 m water depth during maximum upsurge.
Total Height.	301 m.
Tunnel invert at Surge Shaft	EL 1272.61m
Max. Upsurge	EL 1583.95m
Min. Down Surge	EL 1373.19m
Lower Expansion Gallery	10.15 m diameter, 180m long

(14) Pressure Shaft:

Type	Circular steel lined with high tensile steel corresponding to ASTM – A517 Grade – F of thickness varying from 26mm to 38mm.
Number	3, each bifurcating to feed 2 units
Dia. & length:	4.9m and approx. 571m to 622m length
Branch Tunnels	3.45m dia. and 64.0m length

(15) Power House:

Type	Underground
Size	220mx20mx49m (height)
Type of Turbine	Vertical Axis Francis Turbine
Gross Head	486 m
Design Head	428 m
Number and capacity of generating units.	6 x 250 MW

(16) Tail Race Tunnel:

Size	10.15m Dia. Circular
Length.	982 m

(17) Power Potential:

Installed Capacity	1500MW
Annual Energy generation In a 50% mean year	7447 GWH
Annual Energy generation In a 90% dependable year	6612 GWH

A.5. Parties and project participants >>

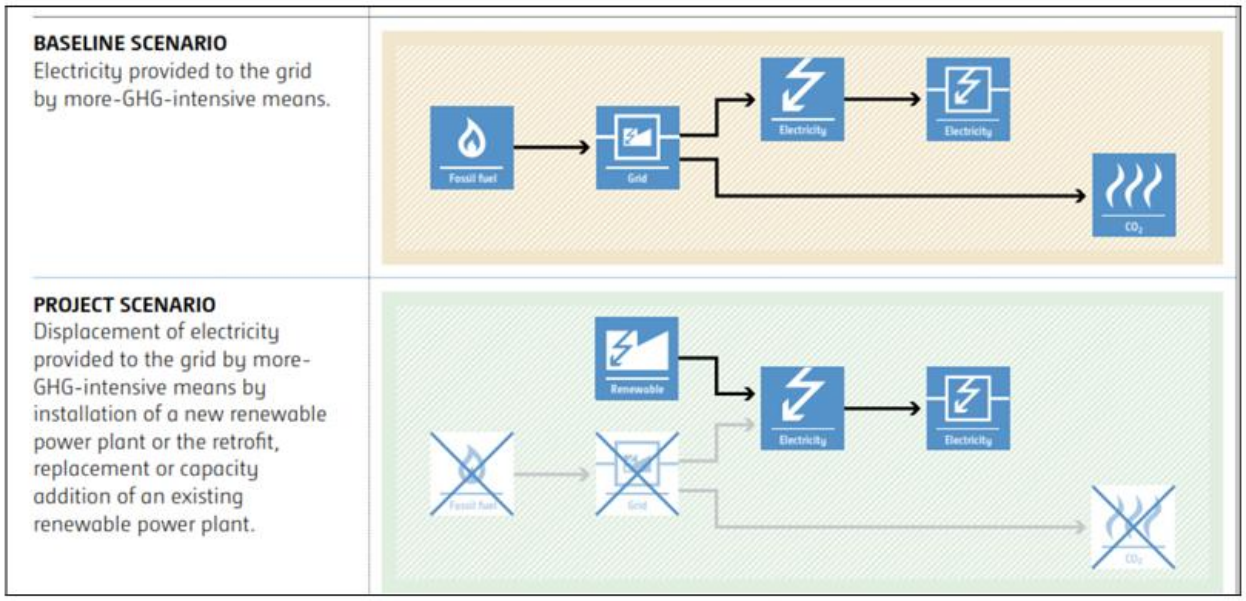
Party (Host)	Participants
India	**Creduce Technologies Private Limited (Representator)** Contact person: Shailendra Singh Rao Mobile: +91 9016850742, 9601378723 Address: 2-O-13,14 Housing Board Colony, Banswara, Himachal Pradesh - 327001, India **SJVN Limited (Developer)** Address: Shakti Sadan, Corporate Office Complex Shanan, Shimla-171006, Himachal Pradesh, India.

A.6. Baseline Emissions>>

The baseline scenario identified at the PCN stage of the project activity is:

- Grid

In the absence of the project activity, the equivalent amount of electricity would have been imported from the regional grid (which is connected to the unified Indian Grid system (NEWNE Grid)), which is carbon intensive due to predominantly sourced from fossil fuel-based power plants. Hence, baseline scenario of the project activity is the grid-based electricity system, which is also the pre- project scenario.



A.7. Debundling>>

This project activity is not a debundled component of a larger project activity.

SECTION B. Application of methodologies and standardized baselines

B.1. References to methodologies and standardized baselines >>

SECTORAL SCOPE:
01, Energy industries (Renewable/Non-renewable sources)

TYPE:
I - Renewable Energy Projects

CATEGORY:
ACM0002 (Title: "Grid-connected electricity generation from renewable sources", Version 20.0)

B.2. Applicability of methodologies and standardized baselines >>

The project activity involves generation of grid connected electricity from the construction and operation of a new Hydro Power Project. The project activity has installed capacity of 1500 MW which will qualify for a large-scale project activity of the Large-Scale methodology. The project status is corresponding to the methodology ACM0002, Version 20.0 and applicability of methodology is discussed below:

Applicability Criterion	Project Case
1. This methodology is applicable to grid-connected renewable energy power generation project activities that: (a) Install a Greenfield power plant; (b) Involve a capacity addition to (an) existing plant(s); (c) Involve a retrofit of (an) existing operating plants/units; (d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or (e) Involve a replacement of (an) existing plant(s)/unit(s).	The project activity consists of installation of Greenfield power plant at a site where no renewable power plant was in operation prior to the implementation of the project activity. Thus, it fulfills the point (a) of criteria 1.
2. The project activity may include renewable energy power plant/unit of one of the following types: hydro power plant/unit with or without reservoir, Hydro power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit;	The project activity is the installation of six Hydro turbine generators. Hence, meets this criterion.
3. In the case of capacity additions, retrofits, rehabilitations or replacements (except for Hydro, solar, wave or tidal power capacity addition projects) the existing plant/unit started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion, retrofit, or rehabilitation of the plant/unit has been undertaken between the start of this minimum historical reference period and the implementation of the project activity.	The project activity does not involve capacity additions, retrofits, rehabilitations or replacements. Hence this criterion is not applicable to the project activity.
4. In the case of retrofits, rehabilitations, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is "the continuation of the current situation, that is to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance".	The project is not a retrofit, rehabilitations, replacements or capacity addition; hence this applicability criterion is not relevant.

5. In case of hydro power plants, one of the following conditions shall apply: (a) The project activity is implemented in existing single or multiple reservoirs, with no change in the volume of any of the reservoirs; or (b) 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 (7), is greater than 4 W/m2; or (c) The project activity results in new single or multiple reservoirs and the power density, calculated using equation (7), is greater than 4 W/m2; or (d) The project activity is an integrated hydro power project involving multiple reservoirs, where the power density for any of the reservoirs, calculated using equation (7), is lower than or equal to 4 W/m2, all of the following conditions shall apply: (i) The power density calculated using the total installed capacity of the integrated project, as per equation (8), is greater than 4 W/m2; (ii) Water flow between reservoirs is not used by any other hydropower unit which is not a part of the project activity; (iii) Installed capacity of the power plant(s) with power density lower than or equal to 4 W/m2 shall be: (a) Lower than or equal to 15 MW; and (b) Less than 6 per cent of the total installed capacity of integrated hydro power project.	The project activity is a run of river project which results in new single reservoir named Nathpa Dam and the Power density is calculated using equation (7), is 6,290 W/m^2. Hence the condition (c) is applicable.
6. In the case of integrated hydro power projects, project proponent shall: (a) Demonstrate that water flow from upstream power plants/units spill directly to the downstream reservoir and that collectively constitute to the generation capacity of the integrated hydro power project; or (b) Provide an analysis of the water balance covering the water fed to power units, with all possible combinations of reservoirs and without the construction of reservoirs. The purpose of water balance is to demonstrate the requirement of specific combination of reservoirs constructed under CDM project activity for the optimization of power output. This demonstration has to be carried out in the specific scenario of water availability in different seasons to optimize the water flow at	This condition is not applicable since the project activity is not an integrated hydro project.

the inlet of power units. Therefore, this water balance will take into account seasonal flows from river, tributaries (if any), and rainfall for minimum of five years prior to the implementation of the CDM project activity.	
7. The methodology is not applicable to: (a) Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site; (b) Biomass fired power plants/units.	Project activity does not involve: (a) Switching from fossil fuels to renewable energy sources at the site of the project activity. (b) Biomass fired plants. Hence this criterion is not applicable.
8. In addition, the applicability conditions included in the tools referred to above apply.	Applicability conditions of the applied tool is justified.

From the above it is concluded that the project activity meets all the applicability conditions of the methodology ACM0002 Version 20.0 "Grid connected electricity generation from renewable sources".

B.3. Applicability of double counting emission reductions >>

There is no double accounting of emission reductions in the project activity due to the following reasons:

- Project is uniquely identifiable based on its location coordinates,
- Project has dedicated commissioning certificate and connection point,
- Project is associated with energy meters which are dedicated to the consumption point for project developer

B.4. Project boundary, sources and greenhouse gases (GHGs)>>

As per applicable methodology ACM0002 Version 20.0, The project boundary is as follow:

"The spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the project power plant is connected to."

Thus, the project boundary includes the Hydro Power Plant and the Indian grid system.

The greenhouse gases and emission sources included in or excluded from the project boundary are shown in the below table:

Source		Gas	Included?	Justification/Explanation
Baseline	Grid connected electricity generation	**CO_2**	**Yes**	**Main emission source**
		CH_4	No	Minor emission source
		N_2O	No	Minor emission source
		Other	No	No other GHG emissions were emitted from the project
Project	Greenfield Hydro Power Project Activity	CO_2	No	No CO_2 emissions are emitted from the project
		CH_4	No	Project activity does not emit CH_4
		N_2O	No	Project activity does not emit N_2O
		Other	No	No other emissions are emitted from the project

B.5. Establishment and description of baseline scenario >>

This section provides details of emission displacement rates/coefficients/factors established by the applicable methodology selected for the project.

As per the approved consolidated methodology ACM0002 Version 20.0, if the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following:

"The baseline scenario is that the electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources into the grid".

The project activity involves setting up of a new Hydro power plant to harness the green power from Hydro energy and to use for captive purpose via grid interface through wheeling arrangement. In the absence of the project activity, the equivalent amount of power would have been supplied by the Indian grid, which is fed mainly by fossil fuel fired plants. The power produced at grid from the other conventional sources which are predominantly fossil fuel based. Hence, the baseline for the project activity is the equivalent amount of power produced at the Indian grid.

A "grid emission factor" refers to a CO_2 emission factor (tCO_2/MWh) which will be associated with each unit of electricity provided by an electricity system. The UCR recommends an emission factor of 0.9 tCO_2/MWh for the 2014- 2020 years as a fairly conservative estimate for Indian projects not previously verified under any GHG program. Also, for the vintage 2021, the combined margin emission factor calculated from CEA database in India results into same emission factors as that of the default value. Hence, the same emission factor has been considered to calculate the emission reduction.

Net GHG Emission Reductions and Removals

Thus, $ER_y = BE_y – PE_y – LE_y$

Where:

ER_y = Emission reductions in year y (tCO_2/y)

BE_y = Baseline emissions in year y ($t\ CO_2/y$)

PE_y = Project emissions in year y (tCO_2/y)

LE_y = Leakage emissions in year y (tCO_2/y)

Baseline Emissions

Baseline emissions include only CO_2 emissions from electricity generation in power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants. The baseline emissions are to be calculated as follows:

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

BE_y	=	Baseline emissions in year y ($t\ CO_2$)
$EG_{PJ,y}$	=	Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh)
$EF_{grid,y}$	=	UCR recommended emission factor of 0.9 tCO_2/MWh has been considered. (Reference: General Project Eligibility Criteria and Guidance, UCR Standard, page 4)

Project Emissions

As per ACM0002 Version 20.0, only emission associated with the fossil fuel combustion, emission from operation of geo-thermal power plants due to release of non-condensable gases, emission from water reservoir of Hydro should be accounted for the project emission. Since the project activity is a Hydro power project.
Considering ACM0002 methodology paragraph 38 (c) equation 10. The project power density is higher than 10 W/m^2.

Hence, PEy = 0

Leakage

As per ACM0002 Version 20.0, 'If the energy generating equipment is transferred from another activity, leakage is to be considered.' In the project activity, there is no transfer of energy generating equipment and therefore the leakage from the project activity is considered as zero.

Hence, LEy = 0

The actual emission reduction achieved during the first CoU period shall be submitted as a part of first monitoring and verification. However, for the purpose of an ex-ante estimation, following calculation has been submitted:

Estimated annual baseline emission reductions (BEy).

BEy = 66,12,000 MWh/year X 0.9 tCO2/MWh

BEy = 59,50,800 tCO2/year (i.e., 59,50,800 CoUs/year)

B.6. Prior History>>

The project activity is not registered in any other GHG mechanism. Hence there will not be any double counting.

B.7. Changes to start date of crediting period >>

The crediting period under UCR has been considered from 01/01/2014

B.8. Permanent changes from PCN monitoring plan, applied methodology or applied standardized baseline >>

PCN version 2.0 should be considered for the latest information about the project activity.

B.9. Monitoring period number and duration>>

First Issuance Period: 8 years – 01/01/2014 to 31/12/2021 (inclusive of both dates).

B.10. Monitoring plan>>

Data and Parameters available at validation (ex-ante values):

Data / Parameter	UCR recommended emission factor
Data unit	tCO_2 /MWh
Description	A "grid emission factor" refers to a CO_2 emission factor (tCO_2/MWh) which will be associated with each unit of electricity provided by an electricity system. The UCR recommends an emission factor of 0.9 tCO_2/MWh for the 2014- 2020 years as a fairly conservative estimate for Indian projects not previously verified under any GHG program. Hence, the same emission factor has been considered to calculate the emission reduction under conservative approach.
Source of data	https://a23e347601d72166dcd6-16da518ed3035d35cf0439f1cdf449c9.ssl.cf2.rackcdn.com//Documents/UCRStandardJan2022updatedVer3_180222035328721166.pdf
Value applied	0.9
Measurement methods and procedures	-
Monitoring frequency	Ex-ante fixed parameter
Purpose of Data	For the calculation of Emission Factor of the grid

Additional Comment	The combined margin emission factor as per CEA database (current version 16, Year 2021) results into higher emission factor. Hence for 2021 vintage UCR default emission factor remains same.

Data and Parameters to be monitored (ex-post monitoring values):

Data / Parameter	$EG_{PJ,facility,y}$
Data unit	MWh
Description	Net electricity supplied to the NEWNE grid facility by the project activity
Source of data	Deviation settlement account (DSA) The Deviation Settlement Account are issued as per Central Electricity Regulatory Commission (Deviation Settlement Mechanism and related matters) Regulations, 2014 and amendments.
Measurement procedures (if any):	Data Type : Measured Monitoring equipment : Energy Meters are used for monitoring Archiving Policy : Electronic Calibration frequency : Once in 5 years (considered as per provision of CEA India).
Measurement Frequency:	Weekly
Value applied:	As per Deviation settlement account (DSA)
Purpose of data:	The Data/Parameter is required to calculate the baseline emission.

Data and Parameters to be monitored (ex-post monitoring values):

Data / Parameter	EG_y
Data unit	MWh
Description	Net electricity supplied (adjusted measured values) to the NEWNE grid facility by the project activity.
Source of data	Daily Generation Reports (DGR) Deviation settlement account (DSA) The Deviation Settlement Account are issued as per Central Electricity Regulatory Commission (Deviation Settlement Mechanism and related matters) Regulations, 2014 and amendments.
Measurement procedures (if any):	Data Type : Measured Monitoring equipment : Energy Meters are used for monitoring Archiving Policy : Electronic Calibration frequency : Once in 5 years (considered as per provision of CEA India).
Measurement Frequency:	Weekly
Value applied:	As per Deviation settlement account (DSA).
Purpose of data:	The Data/Parameter is required to calculate the baseline emission.

Data used for the calculation of the Project Emission

Data / Parameter	Cap
Data unit	W
Description	Installed capacity of the hydro power plant after the implementation of the project activity.
Source of data	Project Site
Measurement procedures (if any):	Determine the installed capacity based on manufacturer's specifications or commissioning data or recognized standards.

Monitoring Frequency:	Once at the beginning of each crediting period.
Value applied:	1,500,000,000 Watts (1500 MW)
Purpose of data:	The Data/Parameter is required to calculate the Power Density of the project activity used to determine the Project Emissions.

Data / Parameter	Ap
Data unit	m^2
Description	Area of the single or multiple reservoirs measured in the surface of the water, after the implementation of the project activity, when the reservoir is full.
Source of data	Project Site
Measurement procedures (if any):	Measured from topographical surveys, maps, satellite pictures, etc.
Monitoring Frequency:	Once at the beginning of each crediting period.
Value applied:	2,38,450 m^2 (23.845 ha.)
Purpose of data:	The Data/Parameter is required to calculate the Power Density of the project activity used to determine the Project Emissions.