



PROJECT CONCEPT NOTE

CARBON OFFSET UNIT (CoU) PROJECT

Title: 24 MW Medium Scale Hydro Power Project by Devi Energies Pvt Ltd.

Version 1.0

Date 27-01-2022

First CoU Issuance Period: 02 years

Date: 19/09/2019 to 31/12/2021



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

BASIC INFORMATION

Title of the project activity	24 MW Hydro Power project by M/S Devi Energies Pvt Ltd.
Scale of the project activity	Medium Scale
Completion date of the PCN	28 / 01 / 2022
Project participants	Devi Energies Pvt Ltd
Host Party	India
Applied methodologies and standardized baselines	<p>Applied Baseline Methodology: AMS-I.D : “Grid connected renewable electricity generation”, version 18</p> <p>Standardized Methodology: Not Applicable.</p>
Sectoral scopes	01 Energy industries (Renewable)
Estimated amount of total GHG emission reductions	<p>To be estimated during verification</p> <p>[An ex-ante estimate is 77,454 CoUs from COD to till Dec 31, 2021.]</p>

SECTION A. Description of project activity

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

The proposed project activity with title under UCR “ 24 MW (3 X 8 MW) Medium Scale Hydro Power project by M/S Devi Energies Pvt Ltd.”, is a grid connected Hydro Electric Power project located in West Kameng district in the state of Arunachal Pradesh (India). The project is an operational activity with continuous reduction of GHG, currently being applied under “Universal Carbon Registry” (UCR).

Purpose of the project activity:

The proposed project activity is promoted by M/S Devi Energies Pvt Ltd. (herein after called as project proponent ‘PP’). The proposed project activity is installation and operation of 3 no’s of Horizontal Francis Type Turbine having individual capacity 8 MW with aggregated installed capacity of 24 MW in District – West Kameng, Arunachal Pradesh state of India. This project activity is also called as Dikshi Hydro Electric Project.

Dikshi Hydro Power Project is a run-of-river project located in West Kameng District in the state of Arunachal Pradesh. It utilizes flow of Phudung River, tributary of Kameng River. The project envisages a generation capacity of 24 MW of power by utilizing the available net head 113 m. The project activity aims to harness kinetic energy of water (renewable source) to generate electricity. The project comprises a Trench weir which diverts the water into an intake placed on the Right bank of the river. The diverted water passes through Desilting Tank. Desilted water enters into water conductor system, comprising of Head Race Tunnel & RCC Cut & Cover Channel, Forebay and the steel Penstock Pipe. A semi underground power house is suitably located on right bank of the river. Tail water from the power house is discharged back into the River. The project utilizes a net head of about 113 m. The project activity has been commissioned for commercial operation as on 19/09/2019.

The net generated electricity from the project activity is sold to Govt of Arunachal Pradesh under the Power Purchase Agreement (PPA) signed between the PP and the utility. In pre-project scenario, electricity delivered to the grid by the project activity would have otherwise been generated by the operation of fossil fuel-based grid-connected power plants and by the addition of new fossil fuel-based generation sources in the grid. As the nature of the hydro project, no fossil fuel is involved for power generation in the project activity. The electricity produced by the project is directly contributing to climate change mitigation by reducing the anthropogenic emissions of greenhouse gases into the atmosphere by displacing an equivalent amount of power at grid

Hence, project activity is displacing the estimated annual net electricity generation i.e., 77,454 MWh from the Indian grid system, which otherwise would have been generated by the operation of fossil fuel-based grid-connected power plants. The estimated annual CO₂e emission reductions by the project activity from COD till Dec 31, 2021 are expected to be 77,454 tCO₂e. 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 will generate 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

Indian economy is highly dependent on "Coal" as fuel to generate energy and for production processes. Thermal power plants are the major consumers of coal in India and yet the basic electricity needs of a large section of population are not being met. This results in excessive demands for electricity and places immense stress on the environment.

Changing coal consumption patterns will require a multi-pronged strategy focusing on demand, reducing wastage of energy and the optimum use of renewable energy (RE) sources. This project is a greenfield activity where grid power is the baseline. 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 ancillary units for manufacturing of the hydro turbine generator 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: Being a renewable resource, using hydro energy to generate electricity contributes to conservation precious natural resources. The project contributes to the economic sustainability through promotion of decentralization of economic power, leading to diversification of the national energy supply, which is dominated by conventional fuel based generating units. Locally, improvement in infrastructure will provide new opportunities for industries and economic activities to be setup in the area. Apart from getting better employment opportunities, the local people will get better prices for their land, thereby resulting in overall economic development.

Technological well-being: The project activity leads to the promotion of 24 MW hydro turbine generators into the region and will promote practice for small scale industries to reduce the dependence on carbon intensive grid supply to meet the captive requirement of electrical energy and also increasing energy availability and improving quality of power under the service area. Hence, the project leads to technological well-being.

Environmental well-being: 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. Also, it will contribute to reduction GHG emissions. Thus, the project causes no negative impact on the surrounding environment contributing to environmental well-being.

With regards to ESG credentials:

At present specific ESG credentials have not been evaluated, however, the project essentially contributes to various indicators which can be considered under ESG credentials. Some of the examples are as follows:

Under Environment:

The following environmental benefits are derived from the project activity:

- Produces renewable electricity without any GHG emissions.
- Run-of-river hydro power plant with little or no impact on the surrounding ecology.
- No increase in volume of reservoir and no land inundation, hence no disturbance to the natural habitat.

For the PP, energy sale 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. Hence, project contributes to ESG credentials.

Under Social:

The social well-being is assessed by contribution to improvement in living standards of the local community. The project activity is located in remote villages of industrially backward region in the state of Himachal Pradesh. The implementation of the project activity would provide job opportunities to the local community; contribute in poverty alleviation of the local community and development of basic amenities to community leading to improvement in living standards of the community.

Under Economics:

Economic well-being refers to additional investment consistent with the needs of the local community. The project activity is associated with a significant investment (nearly INR 4395 Million as on date of Mar 31, 2021). This investment is quite significant in a rural area. These activities would contribute to the economic well-being of the local community. The project activity has also provided direct and indirect job opportunities to the local community during construction and shall provide permanent job opportunities during operation. During operation of the project activity, many persons has been employed directly, apart from indirect employment, which would augur well for the economic well-being of the community

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

There was no harm identified from 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. Additionally, as per Indian Regulation, Environmental and Social Impact Assessment is not required for Hydro Projects.

Nevertheless, PP had conveyed about project activity before implementation at respective village of West Kameng district of Arunachal Pradesh, India to understand, discuss, record all possible concerns related to environment and socio-economic aspects of the project so that as per requirements mitigation measures can be taken. The feedback and inputs received from local stakeholders confirm that no negative impact is foreseen by them.

Additionally, there are social, environmental, economic and technological benefits which contribute to sustainable development. The key details have been discussed in the previous section.

Environmental and social issues management:

Issues like aquatic and terrestrial biodiversity, threatened species, critical habitats, ecosystem integrity and connectivity issues, water quality, erosion and sedimentation, project-affected communities, ethnic minorities, resettlement, cultural heritage and public health are either totally absent or properly managed, if at all required at the project conceptualization stage.

Environmental and social issues associated with the operating hydropower facility that extend beyond the jurisdictional boundaries in which the facility is located are absent as it is run-of-the-river model with no rehabilitation and no resettlement issues.

Ongoing issues are issues that have been of concern repeatedly for a given area over a longer period of time, and may relate to legacy issues. Legacy issue refers to impacts of previous projects that are unmitigated or not compensated with a similar good or service, or long-standing issues with a present (existing) project, or pre-existing issues in the present location of a new project.

This Project being ROR project of its kind in the area, no such legacy issues are faced.

Emerging issues may relate to on-site changes (e.g. riverbank erosion exposing cultural heritage artefacts or impacting on land-use or livelihood activities) or to broader circumstances (e.g. policy changes, changes in relevant legislation or standards, trends in emerging practice, changing community expectations, etc).

Such issues are handled aptly with suitable arrangements on ground like erosion control etc,

Project Benefits: Benefits that can be leveraged from the project; examples include: capacity building, training and local employment; infrastructure such as bridges, access roads, boat ramps; improved services such as for health and education; support for other water usages such as irrigation, navigation, flood/drought control, aquaculture, leisure; increased water availability for industrial and municipal water supply; etc.

This Project provided good no. of employment to the local. Provided about 100 nos of employment to local youth and about 20 nos post commissioning.

The Project provided road access facility to large no of people that can improve their social movement and augment their horti-agri trade opportunities.

The Project provided drinking water purification systems to the nearby schools that greatly helped school going kids and the teachers on account of their access to purified drinking water.

The Project brought mobile communication facilities which greatly transformed the lives of local people in the vicinity of the Project.

Project-Affected Communities and Livelihoods and Resettlement: Resettlement is the process of moving people to a different place to live, because due to the project they are no longer allowed to stay in the area where they used to live. Verifiers must identify the actions by project owner, that have been taken to address resettlement. It would typically include identification of those being resettled; the socioeconomic baseline for the resettles; the measures to be implemented as part of the resettlement process including those relating to resettlement assistance and livelihood support; monitoring, reporting and review provisions. Project affected communities are people in the area surrounding the hydropower project who have been affected either positively or negatively by the hydropower facility development and its associated infrastructure. Mitigation measures could be training and capacity building; education; health services; employment; transportation; contributions to provide for cultural traditions or events, etc. Livelihood refers to the activities required for a means of living. Scoring could be based on measures to address project affected communities, works to protect downstream riparian lands; downstream flow regime agreements to enable sustained livelihoods for downstream communities; access agreements to project lands to enable continued access to sacred sites, community forest, traditional medicinal plants; support for new industries; protection of sacred sites; etc.

No family is affected negatively by the Project as there are no rehabilitation & resettlement of the people. Infrastructure developed by the company for the project is very much useful to the local people and helps them to improve their living standards.

Biodiversity and Invasive Species: Measures to address biodiversity and potential impacts arising from pest and invasive species associated with the operating hydropower facility may include, for example: catchment protection, creation of reserves, habitat conservation and improvement, species management plans, translocations, habitat rehabilitation, new habitat creation, managed flow releases, etc. Measures to address passage of aquatic species may include, for example: fish ladders, fish elevators, catch and release programs, fish hatcheries, restocking programs, mechanisms for diversion away from turbines for downstream passage, assisted cues (water chemistry, operational conditions), etc. Measures to address invasive species may include, for example: physical barriers to pest species passage, pollution control, physical removal or containment, chemical treatment, reservoir water residence times, managed flow releases, etc.

As there is no reservoir and there by no inundation, bio diversity and invasive species are not at all affected.

A.3. Location of project activity >>

Country : India
State : Arunachal Pradesh
District : West Kameng
Village : Dikshi

The project site is located 30 km from district headquarter of West Kameng district in the state of Arunachal Pradesh. The project site can be approached through Rupa - Dikshi road. The nearest railway station to the project site is Balipara at a distance of about 110 kms & major Railway Station is Guwahati at a distance of about 320 kms. The geographic co-ordinate of the project locations is 27° 13' 20''N and 92° 20' 03 E .

The representative location map is included below:



(Courtesy: Google images and www.mapofindia.com)

A.4. Technologies/measures>>>

The project activity involves 3 numbers hydro turbine generators of Horizontal Francis type (8 MW each) connected 32 KM's Transmission Line with North East Grid . The generators generate power at 11 kV, which can further be stepped up to 132 kV. The project activity can operate in the frequency of 50 Hz and the voltage of 132 kV. The average life time of the generator is around 45 years as per the equipment supplier specification. The other salient features of the technology are:

Design Discharge	26 cumecs
Gross Head	124 m
Net Head	113 m
Diversion Weir	
Type	Trench weir
Size	20 m x 5 m x 3.2 m
Desilting Tank	
Type	Vortex
Size	35 x 7.50 x 6 m
Size particle to be removed	Down to 0.4 mm
Tunnel Power Channel	
Type	D Shape
Size	5.10 m X 4.6 m
Length	4950 m
Forebay Tank	
Type	Under Ground & D-shaped
Size	171 m x 6 m x 10 m
Penstock	
No.	One. 2.75 m diameter Steel pipe
Length	880 m
Anchor Blocks	11 nos.
Saddle	58 nos.
Power House	
Type	Semi underground Power house
Size	50 m x 21 m x 10.5 m
Capacity	3 x 8 MW
Gross head	121 m
Net head	113 m
Tail Race	
Shape	Rectangle, Tunnel & RCC Channel
Size	5 m x 4 m
Length	250 m

The hydro turbines have already been commissioned dated 19/09/2019.

In the absence of the project activity the equivalent amount of electricity would have otherwise been generated by the operation of fossil fuel-based grid-connected power plants and fed into unified India grid system, hence baseline scenario of the project activity is the grid-based electricity system, which is also the pre-project scenario as discussed in the previous section.

A.5. Parties and project participants >>

Party (Host)	Participants
India	<p>M/S Devi Energies Pvt Ltd. (Developer) Address: Site: H. No. E -351, Rupa, West Kamemg Dist - 790003, Arunachal Pradesh,India.</p> <p>Corp Office: H No: 8-2-268/1/A/1B&C, 1st Floor, 101, Tulasi Homes, Aurora Colony, Banjara Hills, Hyderabad – 500034, Telangana, India.</p>

A.6. Baseline Emissions>>

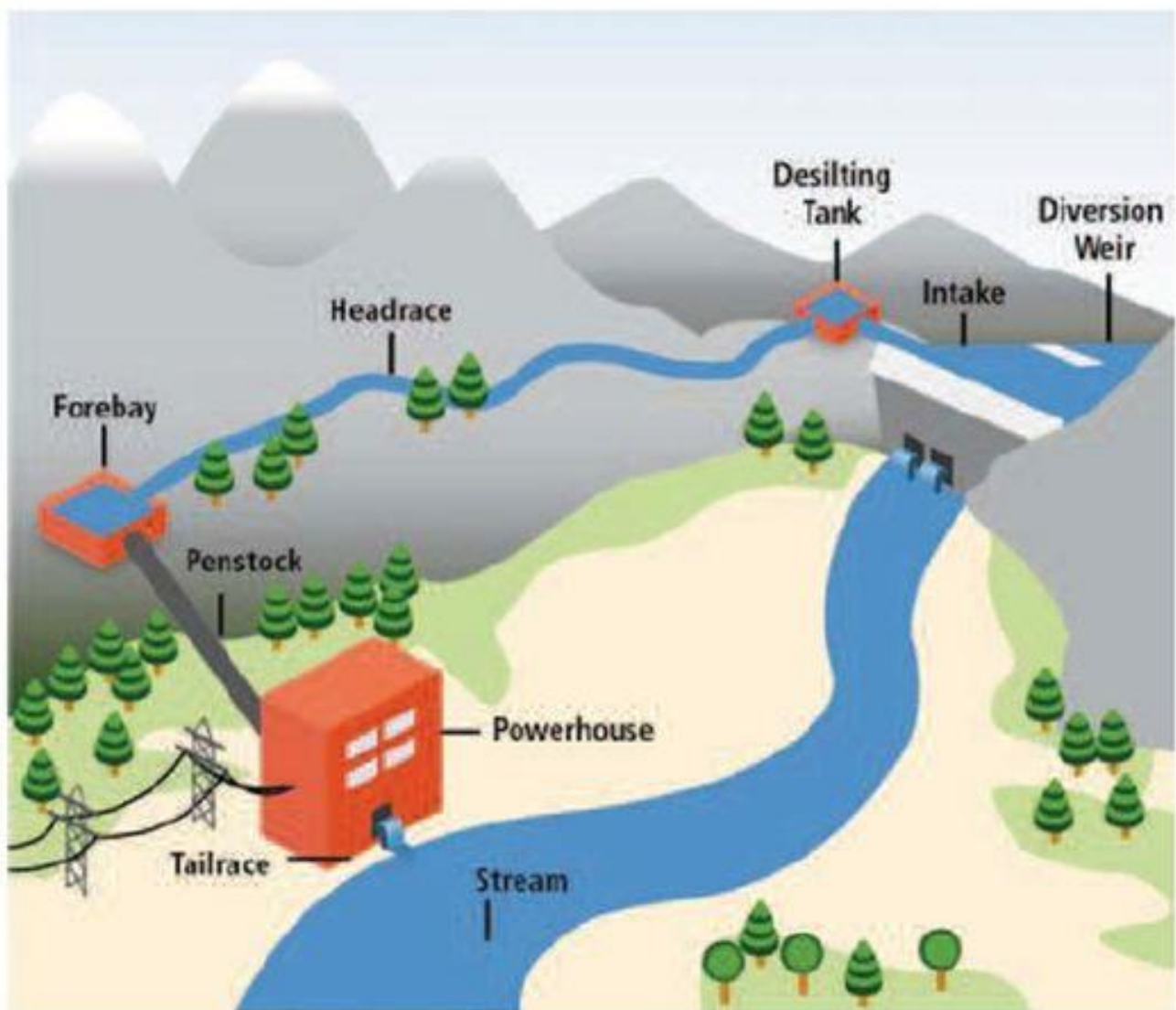
The baseline scenario identified at the PCN stage of the project activity is:

- Grid

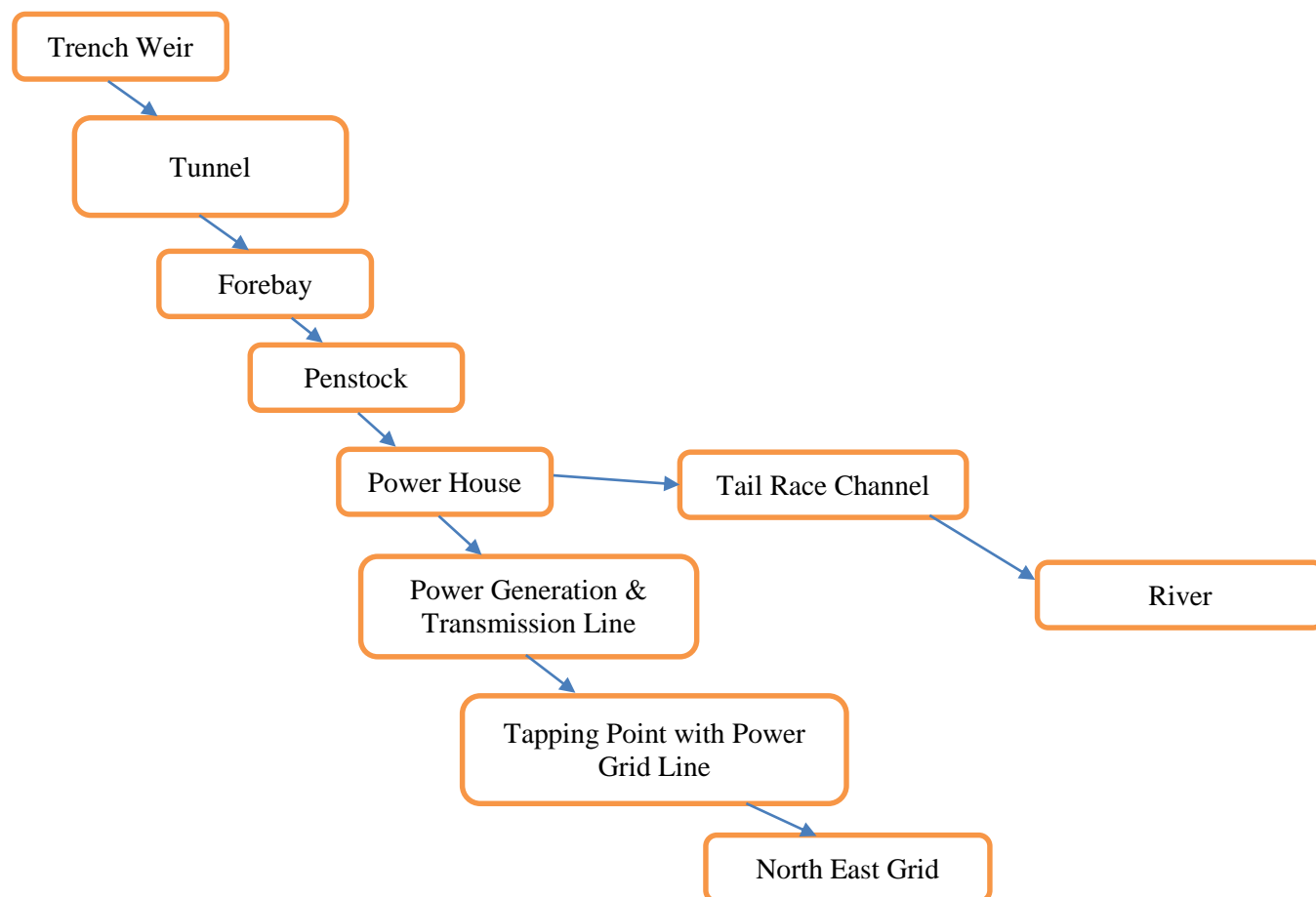
In the absence of the project activity, the equivalent amount of electricity would have been generated by the operation of fossil fuel-based grid-connected power plants and fed into North East grid, a part of unified Indian Grid, which is carbon intensive due to use of fossil fuels. Hence, baseline scenario of the project activity is the grid-based electricity system, which is also the pre-project scenario.

Schematic diagram showing the baseline scenario:

Project Scenario:



Project Model



North-East Grid, is a part of unified Indian Grid system.

Baseline Scenario:

As per the approved consolidated methodology AMS-I.D. Version 18, 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 MHEP (24 MW) plant to harness the green power from Hydro energy and to supply the produced power to the grid. 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. Hence, the baseline for the project activity is the equivalent amount of power produced at the Indian grid.

A.7. Debundling

This project is a standalone project & 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:

AMS. I.D. (Title: “Grid connected renewable electricity generation”, version 18)

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-based power project. The project activity has installed capacity of 24 MW which will qualify for a Large – scale project activity under “Methodologies for Large – scale project activities can be used, provided they are not part of the ineligible list as in Table 1 or 1.1 reproduced below

Table 1: Ineligible Methodologies for Project Types within the UCR Program	
Methodologies for industrial gases	Afforestation and reforestation Continuous Conservation Tillage REDD+
Projects that have received Annex 1 government or official development assistance (ODA) funding for their implementation	Nature Based Projects Sustainable Forest Management
Efficient transmission and distribution	Charcoal production
Soil Carbon Sequestration, Carbon Capture and Storage	Methane from mining activities
Methodologies for feedstock switch in industries.	Methodologies for gas flaring and gas leak reduction
Methodologies for fuel switch (Coal/oil to gas or Other low-carbon fuels).	Methodologies for efficient or less-carbon-intensive fossil-fuel-fired power plants. All old and new fossil fuel fired facilities.

Table 1.1 Ineligible Methodologies for Project Types within the UCR Program	
Fugitive emissions from fuels (solid, oil and gas)	Fugitive Emissions from production and consumption of halocarbons and sulfur hexafluoride
Solvents use	
Carbon Capture and Storage of CO2 in Geological Formations	Afforestation and Reforestation

The Applicability Criteria and Project case are as discussed below

Applicability Criterion	Project Case
<p>1. Must not be in ineligible methodology as per the Table 1 above, or in ineligible sectorial scope as per the Table 1.1 above</p>	<p>The project activity involves setting up of a 24 MW renewable energy (hydro) generation plant that exports electricity to the fossil fuel dominated electricity grid (Indian Grid system). Thus, the project activity meets this applicability conditions.</p>
<p>2. Illustration of respective situations under which each of the methodology (i.e., AMS-I.D: Grid connected renewable electricity generation”, AMS-I.F: Renewable electricity generation for captive use and mini-grid” and AMS-I.A: Electricity generation by the user) applies is included in Table 2</p>	<p>According to the point 1 of the Table 2 in the methodology – “Project supplies electricity to a national/regional grid” is applicable under AMS I.D. As the project activity supplies the electricity to Indian Grid system grid which is a regional grid, the methodology AMS-I.D. is applicable</p>
<p>3. This methodology is applicable to project activities that:</p> <ul style="list-style-type: none"> <i>a.</i> Install a Greenfield plant; <i>b.</i> Involve a capacity addition in (an) existing plant(s); <i>c.</i> Involve a retrofit of (an) existing plant(s); <i>d.</i> Involve a rehabilitation of (an) existing plant(s); or <i>e.</i> Involve a replacement of (an) existing plant(s). 	<p>The Project activity involves the installation of new power plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity. Thus, Project activity is a Greenfield plant and satisfies this applicability condition (a).</p>
<p>4. Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology:</p> <ul style="list-style-type: none"> <i>a.</i> The project activity is implemented in existing reservoir, with no change in the volume of the reservoir; or <i>b.</i> The project activity is implemented in existing reservoir, where the volume of the reservoir(s) is increased and the power density as per definitions given in the project emissions section, is greater than 4 W/m². <i>c.</i> The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the project emissions section, is greater than 4 W/m² 	<p>As the project activity is a run-off river type hydro power plant, this criterion is not relevant for the project activity</p>

Applicability Criterion	Project Case
5. If the new unit has both renewable and non-renewable components (e.g., a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable component. If the new unit co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15 MW..	The rated capacity of the project activity is 24 MW with no provision of Co-firing fossil fuel. Hence, meeting with this criterion.
6. Combined heat and power (co-generation) systems are not eligible under this category	This is not relevant to the project activity as the project involves only hydro power generating units.
7. In the case of project activities that involve the capacity addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be physically distinct from the existing units.	There is no other existing renewable energy power generation facility at the project site. Therefore, this criterion is not applicable
8. In the case of retrofit or replacement, to qualify as a medium-scale project, the total output of the retrofitted or replacement power plant/unit shall not exceed the required limit to the eligible medium scale project.	The project activity is a new installation, it does not involve any retrofit measures nor any replacement and hence is not applicable for the project activity
9. In the case of landfill gas, waste gas, wastewater treatment and agro-industries projects, recovered methane emissions are eligible under a relevant Type III category. If the recovered methane is used for electricity generation for supply to a grid then the baseline for the electricity component shall be in accordance with procedure prescribed under this methodology. If the recovered methane is used for heat generation or cogeneration other applicable Type-I methodologies such as “AMS I. C.: Thermal energy production with or without electricity” shall be explored.	This is not relevant to the project activity as the project involves only hydro power generating units
10. In case biomass is sourced from dedicated plantations, the applicability criteria in the tool “Project emissions from cultivation of biomass” shall apply.	This is not relevant to the project activity as the project involves only hydro power generating units

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(GHG)>>

As per applicable methodology AMS-I.D. Version 18, “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 Turbine Generators and the Indian grid system.

Source		Gas	Included?	Justification/Explanation
Baseline	Grid connected electricity generation	CO ₂	Yes	CO2 emissions from electricity generation in fossil fuel fired power plants
		CH ₄	No	Minor emission source
		N ₂ O	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 ₂ O	No	Project activity does not emit N ₂ O
		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 para 19 of the approved consolidated methodology AMS-I.D. Version 18, 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 sale to national grid i.e., India grid system through PPA arrangement. In the absence of the project activity, the equivalent amount of power would have been generated by the operation of grid-connected fossil fuel-based power plants and by the addition of new fossil fuel-based generation sources into the grid. 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 CO₂ emission factor (tCO₂/MWh) which will be associated with each unit of electricity provided by an electricity system. The UCR recommends an emission factor of 0.9 tCO₂/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 higher emission than the default value. Hence, the same emission factor has been considered to calculate the emission reduction under conservative approach.

Net GHG Emission Reductions and Removals

$$\text{Thus, } ER_y = BE_y - PE_y - LE_y$$

Where:

- ER_y = Emission reductions in year y (tCO₂/y)
- BE_y = Baseline Emissions in year y (t CO₂/y)
- PE_y = Project emissions in year y (tCO₂/y)
- LE_y = Leakage emissions in year y (tCO₂/y)

Baseline Emissions

Baseline emissions include only CO₂ 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:

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

Where:

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 this project activity in year y (MWh)
$EF_{grid,y}$	=	UCR recommended emission factor of 0.9 tCO ₂ /MWh has been considered, this is conservative as compared to the combined margin grid emission factor which can be derived from Database of Central Electricity Authority (CEA), India. (Reference: General Project Eligibility Criteria and Guidance, UCR Standard, page 4)

Project Emissions

As per paragraph 39 of AMS-I.D. (version 18, dated 28/11/2014), for most renewable energy project activities emission is zero.

As per applied methodology only emission associated with the fossil fuel combustion, emission from operation of DG Set, would be accounted for the project emission on actuals.

Diesel consumption:

The project also involves consumption of minor quantity of Diesel in standby DG Set. So, the formula used to calculate the project emissions due to diesel consumption is provided below:

$$PE_{\text{Diesel}} = \sum DC_y \times P \times NCV_{\text{Diesel}} \times EF_{\text{CO2Diesel}}$$

Where:

PE_{Diesel}	= Project Emission due to Diesel consumed during monitoring period in DG set
DC_y	= Diesel Consumption in Liters (L)
P	= Density of Diesel (0.86Kg/Lit)
NCV_{Diesel}	= Net Calorific Value of Diesel
$EF_{\text{CO2Diesel}}$	= IPCC 2006 Emission factor for Diesel

Hence, $PE_y = PE_{\text{Diesel}}$

Leakage

As per paragraph 22 of AMS-I.D. version-18, '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, $LE_y = 0$

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 (BE_y)

From COD (19/09/2009) to 31/12/ 2021 is 86060 MWh * 0.9 tCO₂/MWh
=77454 tCO₂/year (i.e., 77,454 CoUs/year)

From the year 2022 = 100,000 MWh/year × 0.9 tCO₂/MWh
= 90,000 tCO₂/year (i.e., 90,000 CoUs/year)

B.6. Prior History>>

The project activity is a medium - scale hydro project registered under the title “**Devi Energies Private Limited, 24 MW Hydro project**”

https://cdm.unfccc.int/Projects/PriorCDM/notifications/index_html

1/28/22, 1:37 PM

CDM: Prior Consideration of the CDM



Search Criteria

Date from: to:
Received * format DD/MM/YYYY

Host Party

Project Title

1

Displaying 1-1 of 1 notifications.

Project Title	Entity Name	Host Party	Date Received
Devi Energies Private Limited 24 MW Hydro project	Devi Energies Private Limited	India	07 Jul 2011

As the above is prior consideration of the CDM intimation to UNFCCC. As the validation of the project has not yet been conducted, there is no issuance of any CERs to the project and hence project will not cause double accounting of carbon credits (i.e., COUs).

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

There is no change in the start date of crediting period.

The start date of crediting under UCR is considered as 19/19/2019, which is the project commissioning date and no GHG emission reduction has been claimed so far.

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

Not applicable.

B.9. Monitoring period number and duration>>

First Monitoring Period: 02 years

19/19/2019 to 31/12/2021 (inclusive of both dates)

B.8. 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/UCRStandardNov2021updatedVer2_301121081557551620.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 conservative.

Data / Parameter	P
Data unit	kg/lit
Description	Density of diesel
Source of data	http://www.fast-tek.com/TM104.pdf http://www.iocl.com/Products/DieselSpecifications.pdf
Value applied	0.860
Measurement methods and procedures	Fixed Value has been taken from the publicly available data source.
Purpose of Data	Calculation of project emission
Comments	This parameter is fixed ex-ante for the entire crediting period.

Data / Parameter	NCV _{diesel,y}
Data unit	GJ/Ton
Description	Net calorific value of the Diesel in year y
Source of data	As options a, b & c are not available, the project proponent chooses option d i.e., IPCC default values at the upper limit of the uncertainty at

	a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories and is fixed Ex-ante. This is in accordance to the “Tool to calculate project or leakage CO2 emissions from fossil fuel combustion”, latest version applied.
Value applied	41.80
Measurement methods and procedures	IPCC Default Value is considered.
Purpose of Data	Calculation of project emission
Comments	This parameter is fixed ex-ante for the entire crediting period.

Data / Parameter	EF _{CO₂,diesel,y}
Data unit	tCO ₂ e/TJ
Description	CO2 emission factor of diesel in year y
Source of data	IPCC default value
Value applied	74.8
Measurement methods and procedures	As options a, b & c are not available, the project proponent chooses option d i.e., IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in Table 1.4 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories and is fixed Ex-ante. This is in accordance to the “Tool to calculate project or leakage CO2 emissions from fossil fuel combustion” latest version applied.
Purpose of Data	Calculation of project emission
Comments	This parameter is fixed ex-ante for the entire crediting period.

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

Data / Parameter	EG _{BL,y}
Data unit	MWh/year
Description	Quantity of net electricity supplied to the grid as a result of the implementation of the project activity in year y (MWh)
Source of data	Monthly Joint Meter Readings (JMRs)
Measurement procedures (if any):	<p>Data Type: Measured Monitoring equipment: Energy Meters are used for monitoring Recording Frequency: Continuous monitoring and Monthly recording from Energy Meters, Summarized Annually Archiving Policy: Paper & Electronic Calibration frequency: 5 years (as per CEA provision)</p> <p>Generally, the calculation is done by the Authority/Discom and the project proponent has no control over the authority for the calculation. Therefore, based on the joint meter reading certificates/credit notes, the project shall raise the invoice for monthly payments.</p>

	<p>In case the monthly JMR provides net export quantity, the same will be directly considered for calculation. However, if the JMR does not directly provide “net electricity” units, then quantity of net electricity supplied to the grid shall be calculated using the parameters reflected in the JMR.</p> <p>For example, the difference between the measured quantities of the grid export and the import will be considered as net export:</p> $EG_{PI,y} = EG_{Export} - EG_{Import}$
Measurement Frequency:	Monthly
Value applied:	To be applied as per actual data
QA/QC procedures applied:	<p>Calibration of the Main meters will be carried out once in five (5) years as per National Standards (as per the provision of CEA, India) and faulty meters will be duly replaced immediately as per the provision of power purchase agreement.</p> <p>Cross Checking: Quantity of net electricity supplied to the grid will be cross checked from the invoices raised by the project participant to the grid.</p>
Purpose of data:	The Data/Parameter is required to calculate the baseline emission.
Any comment:	All the data will be archived till a period of two years from the end of the crediting period.

Data / Parameter	DC _y
Data unit	Liters
Description	Diesel consumption by the standby DG set in year y
Source of data	Plant Records
Measurement methods and procedures	The diesel quantity available in the diesel storage tanks is recorded daily by PP in the plant log book. The diesel consumption has been recorded in the logbook in liters. However, based on the density of diesel of about 0.86 kg/liter, the diesel consumption in tons is calculated.
Frequency of monitoring/recording	Continuously and recorded monthly basis.
Value monitored	To be monitored as per actuals
Monitoring equipment	Calculated
QA/QC procedures to be applied	The measured data will be cross checked with total diesel procurement using payment receipts.
Purpose of the data	Calculation of project emissions.
Calculation method	Data Type: Measured & Calculated Data Archiving: Paper/ Electronic.
Comments	The data would be archived up to two years after the end of crediting period.