

**Verification Report for Carbon Offset  
Units (CoUs) for Project  
(UCR ID Number: 052)**

**Title: “3.30 MW Small Scale Hydro Power  
project by Nanal Hydro Power  
Consultancy Pvt. Ltd.”**

**Project Owner details:**

**Nanal Hydro Power Consultancy Pvt. Ltd.,  
Vardaan Building, Below Gita Mandir, Tuti Kandi, Shimla,  
Himachal Pradesh-171004, India.**

**Submitted by:**

**Arjun K Vyas**

**Approved Verifier, UCR**

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# Executive Summary

Verifier has performed verification of the “3.30 MW Small Scale Hydro Power project by Nanal Hydro Power Consultancy Pvt. Ltd. located in Toss village of District Kangra, Himachal Pradesh, India” for generating clean energy from run-of-river based project, on the basis of UCR criteria. The generated electricity from hydro power project is sold to state electric utility namely Himachal Pradesh State Electricity Board (HPSEB).

Verification for the period : 12/10/2019 to 31/12/2021

In my opinion, the total GHG emission reductions over the crediting / verification period stated in the Monitoring Report (MR), submitted to me is found to be correct and in line with the UCR guidelines.

The GHG emission reductions were calculated on the basis of UCR Protocols which draws reference from, Standard Baseline, AMS. I. D – Grid connected renewable electricity generation (Version 18.0). Owing to the Covid pandemic, the verification was done remotely by way of video calls, phone calls and submission of documents for verification through emails.

I am able to certify that the emission reductions from the 3.3 MW small scale Hydro Power Project in Himachal Pradesh (UCR ID – 052) for the period 12/10/2019 to 31/12/2021 amounts to 18,053 CoUs (18,053 tCO<sub>2</sub>eq).

# Detailed Verification Report

## Scope of the verification

The scope of this verification includes, by way of suitable evidences, to establish that:

1. The project has been commissioned as per the documented & video evidence.
2. The details provided in the PCN and MR are correct.
3. The emission reductions from the project claimed are correct and in accordance with the requirements of the UCR Standard.

## Description of the Project

The project activity aims to harness kinetic energy of water (renewable source) to generate electricity. The net generated electricity from the project activity is sold to state electricity board i.e., Himachal Pradesh State Electricity Board (HPSEB) under the Power Purchase Agreement (PPA) signed between the Project Proponent (PP) and the utility.

The project replaces anthropogenic emissions of greenhouse gases (GHGs) estimated to be approximately 18,053 tCO<sub>2</sub>e for the said period under verification, there on displacing 20,059 MWh amount of electricity from the generation mix of power plants connected to the Indian electricity grid, which is mainly dominated by the fossil-fuel based power plant.

The project activity is the installation of a new grid connected renewable power plant. The scenario existing prior to the implementation of the project activity is 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. Baseline scenario and scenario existing prior to the implementation of the project activity are both same.

The project consists of Unit-I and Unit-II with an aggregated capacity of 3.3 MW which was implemented in a single phase and commissioned by Directorate of Energy, Government of Himachal Pradesh on 12/10/2019.

Total emission reductions achieved through the project activity during the monitoring period is summarised below:

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### **Summary of the Project Activity and ERs Generated for the Monitoring Period**

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Start date of this Monitoring Period	12/10/2019
Carbon credits claimed up to	31/12/2021
Total ERs generated (tCO <sub>2</sub> eq)	18,053 tCO <sub>2</sub> eq
Leakage	0

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### Level of Assurance

The verification report is based on the information collected through interviews conducted over video calls / phone calls, supporting documents provided during the verification, Project Concept Note (PCN) / Monitoring Report (MR), submitted by the project owner. The verification opinion is assured provided there exists credibility in the above mentioned.

### Verification Methodology

Review of the following documentation was done by Mr. Arjun K Vyas, who is experienced in such projects.

1. Project Concept Note (PCN)
2. Monitoring Report (MR)
3. Commissioning Certificate
4. Requested documents of the related project

### Persons Interviewed

1. Mr. R C Singh : Nanal Hydro Power Consultancy Pvt. Ltd.
2. Mr. Shailendra Singh Rao : Creduce Technologies Pvt Ltd

### Documentation Verified

1. Project Concept Note (PCN)
2. Monitoring Report (MR)
3. Joint Metering Reports
4. Energy Meter Calibration Reports
5. Commissioning Certificates
6. Power Purchase Agreement
7. Avoidance of double counting agreement

## Technical Details of the Project

The details provided in the MR and PCN regarding the technical details of the project are duly verified using appropriate verification methodology. It is confirmed that the project is located at the pin point location mentioned in the PCN/MR by the project proponent. The project activity involves 2 numbers of Hydro Turbine Generators of Pelton Wheel Horizontal type (1650 kW each). Below are the salient features of the power house:

1. Type : Surface Power house
2. Size : 30.0 m x 8.5 m x 13 m
3. Gross Head : 65.91 m
4. Net Head : 63.58 m
5. Capacity : 2 x 1650 kW

## Application of methodologies and standardized baseline

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

TYPE I – Renewable Energy Projects

CATEGORY – AMS. I.D. – Grid connected renewable electricity generation (Version 18.0)

<b>Applicability Criterion</b>	<b>Project Case</b>
<p>1. This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass:</p> <p>(a) Supplying electricity to a national or a regional grid; or</p> <p>(b) Supplying electricity to an identified consumer facility via national/regional grid through a contractual arrangement such as wheeling.</p>	<p>The project activity involves setting up of a 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"> <li>(a) Install a Greenfield plant;</li> <li>(b) Involve a capacity addition in (an) existing plant(s);</li> <li>(c) Involve a retrofit of (an) existing plant(s);</li> <li>(d) Involve a rehabilitation of (an) existing plant(s); or</li> <li>(e) Involve a replacement of (an) existing plant(s).</li> </ul>	<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"> <li>(a) The project activity is implemented in existing reservoir, with no change in the volume of the reservoir; or</li> <li>(b) 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/m<sup>2</sup></li> <li>(c) The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the project emissions section, is greater than 4 W/m<sup>2</sup></li> </ul>	<p>As the project activity is a run-off river type hydro power plant, this criterion is not relevant for the project activity.</p>
<p>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.</p>	<p>The rated capacity of the project activity is 3.3 MW with no provision of Co-firing fossil fuel. Hence, meeting with this criterion.</p>
<p>6. Combined heat and power (co-generation) systems are not eligible under this category</p>	<p>This is not relevant to the project activity as the project involves only hydro power generating units.</p>
<p>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 lower than 15 MW and should be physically distinct from the existing units.</p>	<p>There is no other existing renewable energy power generation facility at the project site. Therefore, this criterion is not applicable.</p>

<p>8. In the case of retrofit or replacement, to qualify as a small-scale project, the total output of the retrofitted or replacement power plant/unit shall not exceed the limit of 15 MW.</p>	<p>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.</p>
<p>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.</p>	<p>This is not relevant to the project activity as the project involves only hydro power generating units.</p>

Applicability of double counting emission reductions

As mentioned in the PCN and MR the project is not registered in any other GHG mechanism. Also, “Assurance to avoid double accounting by Project Owners” is duly signed and obtained for the verification purpose.

### Project boundary, sources and greenhouse gases (GHGs)

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."

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 <sub>2</sub>	Yes	<b>CO<sub>2</sub> emissions from electricity generation in fossil fuel fired power plants</b>
		CH <sub>4</sub>	No	Minor emission source
		N <sub>2</sub> O	No	Minor emission source
		Other	No	No other GHG emissions were emitted from the project
Project	Greenfield Hydro Power Project Activity	CO <sub>2</sub>	No	No CO <sub>2</sub> emissions are emitted from the project
		CH <sub>4</sub>	No	Project activity does not emit CH <sub>4</sub>
		N <sub>2</sub> O	No	Project activity does not emit N <sub>2</sub> O
		Other	No	No other emissions are emitted from the project

### Establishment and description of baseline scenario (UCR Protocol)

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 CO<sub>2</sub> emission factor (tCO<sub>2</sub>/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<sub>2</sub>/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**

$$ER_y = BE_y - PE_y - LE_y$$

Where:

$ER_y$  = Emission reductions in year  $y$  (tCO<sub>2</sub>/y)

$BE_y$  = Baseline Emissions in year  $y$  (t CO<sub>2</sub>/y)

$PE_y$  = Project emissions in year  $y$  (tCO<sub>2</sub>/y)

$LE_y$  = Leakage emissions in year  $y$  (tCO<sub>2</sub>/y)

### **Baseline Emissions**

Baseline emissions include only CO<sub>2</sub> 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:

$$BE_y = EGP_{J,y} \times EF_{grid,y}$$

Where:

$BE_y$  = Baseline emissions in year  $y$  (t CO<sub>2</sub>)

$EGP_{J,y}$  = 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<sub>2</sub>/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)

$$\text{Hence, } BE_y = 20,059 \times 0.9 = 18,053 \text{ tCO}_2\text{eq}$$

### **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.

$$\text{Hence, } PE_y = 0$$

## Leakage Emissions

As per paragraph 42 of AMS-I.D. version-18, all projects other than Biomass projects have zero leakage.

Hence, LE<sub>y</sub> = 0

Total Emission reduction by the project for the current monitoring period is calculated as below:

Hence, ER<sub>y</sub> = 18,053 – 0 – 0 = 18,053 CoUs

Annual Emission Reduction are as below:

Year	Emission Reductions (tCO <sub>2</sub> eq)
2019	1,219
2020	9,663
2021	7,170
Total	18,053

## Conclusion

Considering the above-mentioned verification conducted on the basis of UCR Protocol, which draws reference from UCR Protocol Standard Baseline, AMS. I. D – Grid connected renewable electricity generation (Version 18.0), the documents submitted during the verification including the data, Project Concept Note (PCN) / Monitoring Report (MR), I am able to certify that the emission reductions from the project - 3.30 MW Small Scale Hydro Power project by Nanal Hydro Power Consultancy Pvt. Ltd. (UCR ID – 052) for the period 12/10/2019 to 31/12/2021 amounts to 18,053 CoUs (18,053 tCO<sub>2</sub>eq).