



Monitoring report form for CDM project activity
(Version 07.0)

MONITORING REPORT

Title of the project activity	Nimoo-Bazgo Hydroelectric Project	
UNFCCC reference number of the project activity	2023	
Version number of the PDD applicable to this monitoring report	11	
Version number of this monitoring report	02	
Completion date of this monitoring report	01/02/2020	
Monitoring period number	01	
Duration of this monitoring period	31/07/2011 to 30/06/2015	
Monitoring report number for this monitoring period	01	
Project participants	NHPC Ltd. (earlier known as National Hydroelectric Power Corporation Ltd.)	
Host Party	India	
Applied methodologies and standardized baselines	ACM0002 ver. 6 - Consolidated methodology for grid-connected electricity generation from renewable sources	
Sectoral scopes	01:Energy industries (renewable - / non-renewable sources)	
Amount of GHG emission reductions or net anthropogenic GHG removals achieved by the project activity in this monitoring period	Amount achieved before 1 January 2013	Amount achieved from 1 January 2013
	1487	142823
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	736643	

SECTION A. Description of project activity**A.1. General description of project activity**

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The project activity involved the construction of a hydroelectric run-of-river plant of 45 MW in India. Three turbines of 15 MW have been installed to generate clean and reliable electric power that will be sent to the Northern Grid. As power from the project will displace power generation using fossil fuels elsewhere on the grid, the project activity will lead to a reduction in greenhouse gas emissions.

NHPC Ltd. (earlier known as National Hydroelectric Power Corporation Ltd.) has developed the project activity. NHPC is a Government of India Enterprise that was incorporated in 1975. Its objective is to plan, promote and organise an integrated and efficient development of hydroelectric power in all aspects.

The implementation of the project activity will contribute to

1. The replacement of fossil fuel based power generation (from coal and diesel) elsewhere on the grid. This will reduce emissions from fossil fuels combustion.
2. The improvement of basic living conditions (due to availability of electricity) and educational standard (people working on the project will be educated and trained) in remote hilly areas.
3. The economic development of the region.

As a conclusion, the project activity will bring several environmental and socioeconomic benefits thus contributing to the sustainable development of the region.

A.2. Location of project activity

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Jammu & Kashmir State
Alchi Village in Leh District

Jammu and Kashmir State is the northern extremity of India, and is situated between 32.17 degree and 36.58 degree north latitude and 74.26 degree and 80.30 degree east longitude

A.3. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
India	NHPC Limited	Yes

A.4. References to applied methodologies and standardized baselines

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ACM0002 ver. 6 - Consolidated methodology for grid-connected electricity generation from renewable sources

A.5. Crediting period type and duration

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31/07/2011 – 30/07/2018 (Renewable)

SECTION B. Implementation of project activity**B.1. Description of implemented project activity**

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Nimoo Bazgo Hydroelectric Project would harness the hydropower potential of river Indus in Leh district of Jammu & Kashmir. The project utilizes a rated net head of 34 m to generate 239.33GWh

in a 90% dependable year with an installed capacity of 45 MW (three turbines of 15MW each). This is equivalent to a plant load factor (or capacity factor) of 60.7%. Each operating unit has been designed for a discharge of 48.7 cubic metres per second. The project will be connected to the Northern grid through a 220 kV transmission line from Leh to Srinagar (the line is scheduled for commissioning in due course).

The project has been fully commissioned in June 2013. Technical features of the hydroelectric power station are listed below:

- Concrete Gravity Dam 59 m high
- Three Penstock Intake
- Three Penstock of 3.3 m diameter
- Surface Power House
- Tail Pool
- Transformer Yard
- Switch Yard

The turbines are vertical shaft, Francis type with estimated machine availability of 95%². The generator is vertical shaft umbrella type, salient pole type, 50Hz and directly coupled to a turbine. It will be rated for an output of 15 MW at a power factor of 0.90 and rated voltage of 11 kV.

The project is a run-of-river hydro project. The dam diverts water from the river and involves a flooding of only 2.87km². Thus the power density³ is 45 MW per 2.87 km², i.e. 15.7W/m². The hydroelectric project has been provided with emergency D.G Sets (diesel) to be used when none of the units is operating. This condition is foreseen in case of tripping of the station on fault and not for any routine use. Even during winter season, the station shall run, but on reduced capacity. The following is the size of D.G. Sets provided at the project: 2X500kVA (one main and one standby).

B.2. Post-registration changes

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

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NA

B.2.2. Corrections

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NA

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

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Start date of the crediting period is postponed for one year i.e from 01/08/2010 to 31/07/2011

B.2.4. Inclusion of monitoring plan

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NA

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

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NA

B.2.6. Changes to project design

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NA

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

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NA

SECTION C. Description of monitoring system

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The monitoring of baseline emissions implies the application of an operational and management procedure that shall assure the correct and proper measurement and control of all variables involved in the calculation of emission reductions.

The necessary structure is characterised in the table given below.

Operational and management structure

Department	Responsibility	Monitoring	Methodology
Nimoo Bazgo H.E. Project	Head of the Project (HOP)	Net Electricity Generation (EGy)	<p>Energy meters are provided to measure Power Generation. These are:</p> <ol style="list-style-type: none"> 1. Main Meter for tariff – provided at line terminal. Accuracy of CT, PT, Energy meter 0.2% 2. Check Meter for tariff - provided at line terminal. Accuracy of CT, PT, Energy meter 0.2% 3. Stand-by meter for tariff – provided on HV side of Generator transformer Accuracy of CT, PT, Energy meter 0.2%. <p>The meters are integrated in nature and as per the latest technology and shall provide the following information stored in nonvolatile memory:</p> <ul style="list-style-type: none"> • Average frequency for each 15-minutes block (integrated for each 0.02 Hz in linear step). • Net active energy (Wh) for each 15-minutes block with sign (+/-). • Cumulative active energy (Wh) at each mid-night. • Cumulative reactive energy (VARh) each 15-minutes block for low voltage (below 97%) condition. • Meter data storing capacity is 10 days. <p>Meters for energy accounting & audit-provided at HV&LV sides of Unit auxiliary transformer & Station auxiliary transformer. Accuracy of CT, PT, Energy meter 0.2%.</p>
Env. & Diversity Management Division, NHPC Ltd.	Dy. General Manager (Env.)	Follow-up of CDM Project	There will be a person in charge of following the development of the project activity.

Monitoring activities that complement the Maintenance Plan:

Monitoring tests like Partial Discharge of generators, Dissolved Gas Analysis of Transformer oil, Insulation Resistance, capacitance, tan delta tests³, and many others are also done to complement the monitoring. Procedures for regular testing and calibration of gauges, panel relays, relays, meters and other instruments are also defined to ensure proper working. The frequency for calibration and other tests are defined as per need following national standards and rules.

Staff Training that complements the Monitoring Plan and Maintenance Plan:

Staff training for proficiency in use of the monitoring instruments is taken care of by the power station management. The HRD cell also conducts training regularly to enhance the skills of personnel attached with such equipment in the operating stations.

The EPC contract includes the supply of the operation and maintenance manuals by the contractor with drawings of the facilities as built. This shall be in such detail as to enable NHPC to operate, maintain, adjust and repair all parts of the facility.

SECTION D. Data and parameters**D.1. Data and parameters fixed ex ante**

Data/Parameter	EF
Unit	tCO ₂ /MWh
Description	Carbon dioxide emission factor of the Northern Region electricity grid
Source of data	Calculated from official data sources (CEA Database)
Value(s) applied	0.793 for <i>ex-ante</i> estimate of emission reductions
Choice of data or measurement methods and procedures	Calculated according to ACM0002, ver. 6.
Purpose of data/parameter	To calculate baseline emissions
Additional comments	

D.2. Data and parameters monitored

Data/Parameter	EGy
Unit	MWh
Description	Net electricity generation by the project activity and displaced from the grid.
Measured/calculated/default	Measured
Source of data	Joint Meter reading provided by NHPC
Value(s) of monitored parameter	181980
Monitoring equipment	<p>This value is measured by using energy meters. The monitored values are stored in non-volatile memory. These meters are integrated type with storage of data.</p> <p>For monitoring of the generation and transmission of power, a metering system using digital meters and recorders are provided for generators, for all lines and feeders of Switchyard, Unit transformers, Station Service Transformers, Step Down transformer etc. All parameters such as voltage, current, power, energy, etc., are measured. All the energy meters used for measurements are having an accuracy of 0.2%. All CT's and PT's shall be provided with a measuring core of accuracy class of 0.2. A system of main meter and check meters both for interface tariff and energy audit shall be provided.</p>
Measuring/reading/recording frequency	Recorded on monthly basis

Calculation method (if applicable)	Since the metering is done at a number of pf points, the method of measurement of power generation is free from errors as several points of check and counter check are available.
QA/QC procedures	The frequency for calibration are followed as per need following national standards rules.
Purpose of data/parameter	Baseline emissions and emissions reduction
Additional comments	The data shall be archived electronically for the entire crediting period + 2 years.

D.3. Implementation of sampling plan

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NA

SECTION E. Calculation of emission reductions or net anthropogenic removals

E.1. Calculation of baseline emissions or baseline net removals

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Net electricity exported from the project activity = 181980 MWh

Combined Margin Emission factor for Northern Grid, $EF_{CO_2,grid,y} = 0.793 \text{ tCO}_2\text{e/MWh}$

Formula for baseline emissions (BE_y):

$$BE_y = (EG_y * EF)$$

EG_y = Net electricity produced by the renewable generating unit in the project activity

$$BE_y = (181980) * 0.793$$

$$= 144310 \text{ tCO}_2\text{e}$$

$$ER_y = BE_y$$

$$ER_y = 144310 \text{ tCO}_2\text{e}$$

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

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According to ACM0002 neither project emissions nor leakage effects are to be considered in the emission reductions calculation. Therefore, baseline emissions are equal to emission reductions.

E.3. Calculation of leakage emissions

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According to ACM0002 neither project emissions nor leakage effects are to be considered in the emission reductions calculation. Therefore, baseline emissions are equal to emission reductions.

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

	Baseline GHG emissions or baseline net GHG removals (t CO ₂ e)	Project GHG emissions or actual net GHG removals (t CO ₂ e)	Leakage GHG emissions (t CO ₂ e)	GHG emission reductions or net anthropogenic GHG removals (t CO ₂ e)		
				Before 01/01/2013	From 01/01/2013	Total amount
Total	144310	0	0	1487	142823	144310

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

Amount achieved during this monitoring period (t CO ₂ e)	Amount estimated ex ante for this monitoring period in the PDD (t CO ₂ e)
144310 ¹	736643 ²

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

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PP is claiming emission reduction for 1431 days (31/07/2011 to 30/06/2015). As per the registered PDD 187893 tCO₂e are the estimated emission reduction for a period of 365 days. Thus for 1431 days the estimated ex ante emission reduction (as per registered PDD) would be 736643 tCO₂e.

1	Estimated Emission Reductions per year as per PDD, tCO ₂ e	187893
2	Start date of the monitoring	31-07-11
3	End date of the monitoring	30-06-15
4	Number of monitoring days	1431
5	Estimated ex ante Emission Reductions per monitoring days.	736643

E.6. Remarks on increase in achieved emission reductions

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PP is claiming emission reduction for 1431 days (31/07/2011 to 30/06/2015). As per the registered PDD 187893 tCO₂e are the estimated emission reduction for a period of 365 days. Thus for 1431 days the estimated emission reduction (as per registered PDD) would be 736643 tCO₂e. There is a decrease of 80.41% in the actual emission reduction as against stated in the registered PDD. Thus, there is no increase in achieved emission reductions.

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

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NA

¹ Emission reduction achieved for the period from (31/07/2011 to 30/06/2015)

² As per the registered PDD, the value of estimated emission reduction is 187893 tCO₂e for 365 days. However, the monitoring period is for 1431 days. Thus, the estimated emission reduction for 1431 days is 736643 tCO₂e.

Appendix 1. Contact information of project participants and responsible persons/entities

Project participant and/or responsible person/ entity	<input checked="" type="checkbox"/> Project participant <input type="checkbox"/> Responsible person/ entity for completing the CDM-MR-FORM
Organization:	M/s NHPC Ltd
Street/P.O.Box:	Sector -33
Building:	NHPC Office Complex
City:	Faridabad
State/Region:	Haryana
Postfix/ZIP:	121 003
Country:	India
Telephone:	0129-2588110
FAX:	0129- 2277941
E-Mail:	envdivnhpc@gmail.com
URL:	www.nhpcindia.com
Represented by:	-
Title:	Dy. General Manager (Environment)
Salutation:	Mr.
Last Name:	Bajpayee
Middle Name:	Kumar
First Name:	Sujit
Department:	Environment & Diversity Management Division
Mobile:	+ 91-9717494567
Direct FAX:	
Direct tel:	+91-129-2588667
Personal E-Mail:	envdivmgn-co@nhpc.nic.in

Project participant and/or responsible person/ entity	<input type="checkbox"/> Project participant <input checked="" type="checkbox"/> Responsible person/ entity for completing the CDM-MR-FORM
Organization name	Core CarbonX Sols Pvt Ltd
Street/P.O. Box	Punjagutta
Building	6-3-668/9, 5R, A-Block, KanthiShikhara Complex
City	Hyderabad
State/region	Telangana
Postcode	500082
Country	India
Telephone	+91-40-64102137
Fax	+91-40-23410367
E-mail	info@corecarbonx.com
Website	www.corecarbonx.com
Contact person	
Title	Managing Director
Salutation	Mr.
Last name	Mohanty
Middle name	Kumar
First name	Niroj
Department	
Mobile	+91-9908387772
Direct fax	+91-40-23410367
Direct tel.	+91-40-64102137
Personal e-mail	nmohanty@corecarbonx.com

Appendix 2. Details of Calibration of Energy Meter

Calibration of Meter

	Meter SI number Line 1	Class	Test date
Main Meter	XD566143	0.2	24/01/2019
			Satisfactory
Check Meter	XD566145	0.2	07/02/2019
			Satisfactory

Calibration of Meter

	Meter SI number Line 2	Class	Test date
Main Meter	XD566144	0.2	24/01/2019
			Satisfactory
Check Meter	XD566146	0.2	08/02/2019
			Satisfactory

Calibration of Meter

	Generator 1 Transformer HV Side	Class	Test date
Main Meter	KAV99557	0.2	27/03/2018
			Satisfactory

Calibration of Meter

	Generator 2 Transformer HV Side	Class	Test date
Main Meter	KAV99563	0.2	27/03/2018
			Satisfactory

Calibration of Meter

	Generator 3 Transformer HV Side	Class	Test date
Main Meter	KAV99556	0.2	27/03/2018
			Satisfactory

Document information

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

<i>Version</i>	<i>Date</i>	<i>Description</i>
Decision Class: Regulatory Document Type: Form Business Function: Issuance Keywords: monitoring report		