Monitoring Report

CARBON OFFSET UNIT (CoU) PROJECT

Title: 109MW LARGE SCALE BUNDLE NEPAL HYDROELECTRIC STATION BY NABIL BANK LIMITED

Version 1.0

Date: 30/07/2025

First CoU Issuance Period: 2 years, 3 months

Monitoring Period: **01/10/2022 to 31/12/2024**

Monitoring Report (MR)
CARBON OFFSET UNIT (CoU) PROJECT

Monitoring Report	
Title of the project activity	**109MW Large Scale Bundle Nepal Hydroelectric Station By Nabil Bank Limited**
UCR Project Registration Number	567
Version	1.0
Completion date of the MR	30/07/2025
Monitoring period number and duration of this monitoring period	Monitoring Period Number: 2 years, 3 months Duration of this monitoring Period: (first and last days included (01/10/2022 to 31/12/2024)
Project participants	**Project Proponent**: Nabil Bank Limited **Authorised Representative**: AIROI
Host Party	NEPAL
Applied methodologies and standardized baselines	Applied Baseline Methodology : **ACM0002:** Grid-connected electricity generation from renewable sources --- Version 22.0
Sectoral scopes	01 Energy industries (Renewable/Non-Renewable Sources)
Estimated amount of GHG emission reductions for this monitoring period in the registered PCN	**2022**: 14596 CoUs (14596 tCO2eq)
	2023: 428269CoUs (428269 tCO2eq)
	2024: 425596CoUs (425596 tCO2eq)
Total:	**868461 CoUs (868461 tCO2eq)**

SECTION A. Description of project activity

A.1. Purpose and general description of project activity >>

a) Purpose of the project activity and the measures taken for GHG emission reductions >>

The proposed project under UCR is titled "**109MW Large Scale Bundle Nepal Hydroelectric Station by Nabil Bank Limited**., here in after refer as "**HYDRONABIL**" It is a bundle of hydropower projects located in Nepal. The proposed project activity involves **TWO HYDROELECTRIC PROJECTS** located in different regions of Nepal. The details are as follows:

1. **27MW Dordi Khola Hydropower Project - (PROJECT -1)**: A Run-of-River (RoR) type hydroelectric project with a generating capacity of 27 MW. The project is being developed by **Himalayan Power Partner Ltd. (HPPL)**, Kathmandu, Nepal. The entire project area lies in Chiti, Dhodeni, and Bansar VDCs in the Lamjung district, western Nepal. It is connected to Kathmandu by a 170 km road.

2. **86MW Solu Khola (Dudhkoshi) Hydroelectric Project (SKDKHEP) (PROJECT -2)**: Also a Run-of-River (RoR) type hydroelectric project with a generating capacity of 86 MW. The project is being developed by **Sahas Urja Ltd.**, Kathmandu, Nepal. It is located in Solududhkunda Municipality & Thulung Dudh Koshi Gaupalika (formerly Tingla, Kangel, and Panchan VDCs) of Solukhumbu District, Sagarmatha Zone, Nepal. The project area is about 130 km east of Kathmandu (aerial distance).

This project is an ongoing operational activity aimed at continuous reduction of greenhouse gas (GHG) emissions and is currently being applied under the "Universal Carbon Registry" (UCR).

b) Brief description of the installed technology and equipment>>

The purpose of this project activity is to harness Nepal's vast hydropower potential for the generation of renewable energy, contributing to the region's sustainable energy future. The project involves the development and operation of two hydroelectric power plants, using advanced turbine technologies to efficiently convert the natural river flow into clean electricity without contributing to greenhouse gas emissions.

The first component of the project is the Dordi Khola Hydropower Project, which utilizes **Horizontal axis Francis- type turbines**, each with **a capacity of 9.3 MW, resulting in a total installed capacity of 27 MW.** Developed by Himalayan Power Partner Ltd. (HPPL), this project leverages the natural flow of rivers in the Lamjung district to generate renewable electricity. The power generated will be transmitted to several states in India, all part of the Northern, Eastern, Western, and North-Eastern (NEWNE) Electricity Grid, thereby supporting India's growing demand for clean energy and aligning with regional goals to reduce dependence on fossil fuels.

Similarly, the Solu Khola (Dudhkoshi) Hydroelectric Project incorporates **Vertical Axis Pelton turbines**, each with a **capacity of 30.32 MW, providing a total installed capacity of 86 MW**, including a 10% continuous overload (COL) capacity. Developed by Sahas Urja Ltd., this project will also supply renewable energy to multiple states in India connected to the NEWNE Electricity Grid. By utilizing these renewable energy resources, both projects significantly reduce carbon emissions and enhance regional energy security, supporting the transition to a more sustainable energy infrastructure for both Nepal and its neighbouring countries.

The document (Annexure) does detail the approved power import transactions from Nepal to Haryana Discoms, through NTPC Vidyut Vyapar Nigam Limited (NVVN), for specific hydropower projects.

Table 1: Power Distribution and Project Details

Sr.No	State	Allocation (in MW)	%to the installed capacity
1	Haryana	109.61	Not specified

Details:

- **State:** Haryana (the allocation is directed only to Haryana Discoms)
- **Approved Allocation:** 109.61MW (comprising 83.42MW from Solu Khola (Dudhkoshi) Hydropower Project and 26.19MW from Dordi Khola Hydropower Project; other proposed projects were not approved in this document)

PROJECT 1: Dordi Khola Hydropower Project

For the Dordi Khola Hydropower Project (27MW), the available official wet commissioning/loss rejection tests for all three units were witnessed by NEA and company representatives and completed on the same date:

Turbine Unit	Commissioning (Load Rejection Test) Date
Unit I	10/09/2022
Unit II	10/09/2022
Unit III	10/09/2022

This indicates the turbines were commissioned (at least wet-testing and load rejection) on 10th September 2022, which fits with industry practice for such documentation.

PROJECT 2: Solu Khola (Dudhkoshi) Hydropower Project

There are three generating units in this project, each with an individual commission (synchronization) date as per the official commissioning test reports:

Turbine Unit	Commissioning (Synchronization) Date
Unit 1	10/02/2023
Unit 2	11/02/2023
Unit 3	12/02/2023

All three units underwent their synchronization tests in February 2023, which is the official commissioning activity before commercial operation begins.

As per the ex-ante estimate, the project will generate approximately **1054288.69** 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 8,68,461 tCO2 per annum. The estimated annual average and the total CO2e emission reduction by the project activity is expected to be 8, 68,461 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 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.

c) Relevant dates for the project activity (e.g. construction, commissioning, continued operation periods, etc.)>>

UCR Project ID or Date of Authorization: 567
Start Date of Crediting Period: 01/10/2022
Project Commissioned: 10/09/2022

d) Total GHG emission reductions achieved or net anthropogenic GHG removals by sinks achieved in this monitoring period>>

The total GHG emission reductions achieved in this monitoring period is as follows:

Summary of the Project Activity and ERs Generated for the Monitoring Period	
Start date of this Monitoring Period	01/10/2022
Carbon credits claimed up to	31/12/2024
Total ERs generated (tCO2eq)	8,68,461 tCO2eq
Leakage	0

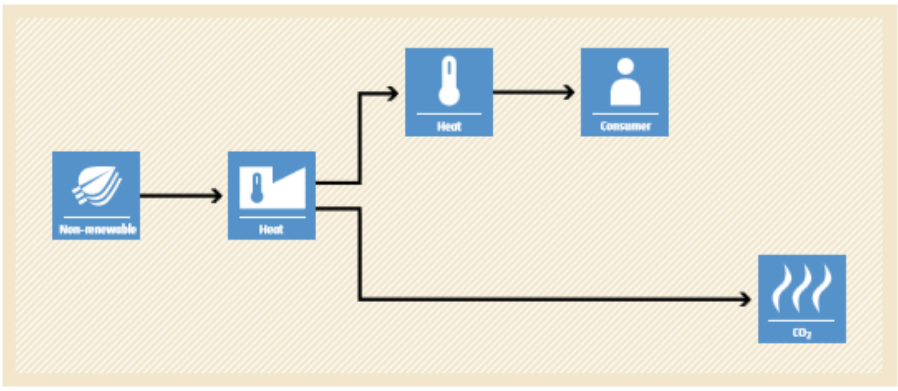
e) Baseline Scenario>>

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.

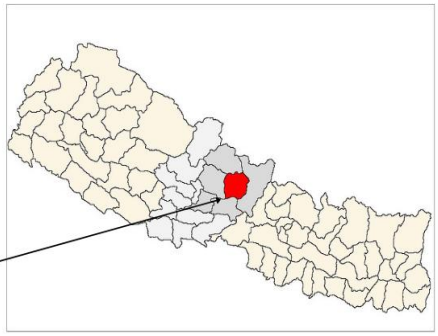
A.2. Location of project activity>>

BASELINE SCENARIO
Thermal energy would be produced by more-GHG-intensive means based on the use of non-renewable biomass.



PROJECT -1

Country: NEPAL (western)
District: Lamjung
Village: Chiti, Dhodeni, Bansar
Tehsil: N/A (Nepal generally doesn't have the Tehsil administrative division)
State: Gandaki Province
Code: N/A (Nepal doesn't use postal codes in the same format as other countries)
Geographical Co-ordinates of Project Area
Longitude: 84° 26'E to 84° 28'30"E
Latitude: 28°10' N to 28°13' 32"N

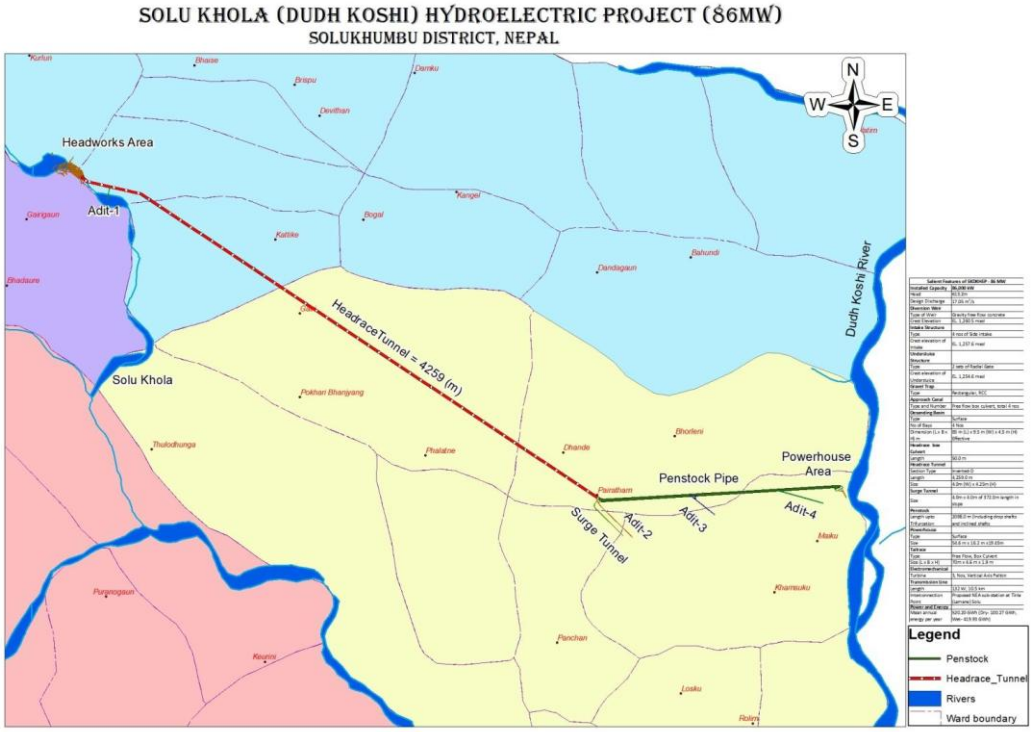


PROJECT 1
27MW Dordi Khola Hydropower Project - (PROJECT -1)

PROJECT 2
86MW Solu Khola (Dudhkoshi) Hydroelectric Project (SKDKHEP)

PROJECT -2

Country: NEPAL
District: Solukhumbu
Village: Tingla, Kangel, Panchan
Tehsil: N/A (Nepal generally doesn't use Tehsil divisions)
State: Koshi Province
Code: N/A (Nepal does not use standard postal codes like other countries)
Geographical Co-ordinates of Project Area
Latitude 27°21’53”N to 27°25’15”N
Longitude 86°37’35”E to 86°41’15”E




1. Access from Biratnagar
Biratnagar-Itahari-Rupani-Mirchaiya-Katari-Okhaldhunga-Salleri = 315km
24 78 52 28 86 47
2. Access from Kathmandu via Kulekhani
Kath.-Kulekhani-Hetauda-Pathlaiya-Dhalkebar-Mirchaiya-Katari-Okhal.-Salleri = 421km
47 40 29 110 34 28 86 47
3. Access from Kathmandu via Dhulikhel-Khurkot Road
Kath.-Dhulikhel-Khurkot-Ghurmi-Okhaldhunga-Salleri = 264km
30 82 61 44 47
4. Access from Kathmandu via Narayanghat
Kath-Naubise-Mugling-Narayanghat-Hetauda-Dhalkebar-Mirchaiya-Katari-Salleri = 560km
30 83 36 77 139 34 28 133
Salleri to Ramite = 17km, Ramite to HW = 10km
CHINA
INDIA
Scale
20 km 20 km
Kathmandu
Naubise
Dhulikhel
Hetauda
Pathlaiya
Birgunj
Kamalamai
Bardibas
Dhalkebar
Khurkot
Okhaldhunga
Salleri
Kangel
SKDKHEP
Project Area
Mirchaiya
Janakpur
Biratnagar
Jogbani


Solu River
Solu River
Solu River
Solu Khola (Dudhkoshi)
Hydroelectric Project
Lower Solu Hydro
Power House- 82 MW

A.3. Parties and project participants >>

Party (Host)	Participants
NEPAL	Project Proponent: Nabil Bank Limited Authorised Representative: AIROI

A.4. 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 22.0)

A.5. Crediting period of project activity >>

Duration of crediting period: -01/10/2022 to 31/12/2024 (both dates inclusive)
Length of the crediting period corresponding to this monitoring period: 02years & 3months.

A.6. Contact information of responsible persons/entities >>

Particular	Details
Name	Manisha Vasudevan
Designation	Executive
Company	AIROI Inc.
Address	228 Hamilton Avenue, 3rd Floor, Palo Alto, CA 94301 USA
Email	**manisha@airoi.com**

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity >>

a) Provide information on the implementation status of the project activity during this monitoring period in accordance with UCR PCN>>

HHPL Dordi Khola Hydropower Project - (PROJECT -1)

The project comprises a surface powerhouse equipped with 3 horizontal-axis Francis turbines, each rated at 9.3 MW, and corresponding synchronous generators rated at 10.59 MVA with an operating voltage of 11 kV and power factor of 0.85 lagging. The powerhouse is supported by an electro-hydraulic governing system, brushless/static excitation systems, generator step-up transformers (11/132 kV), and a 132 kV switchyard for power evacuation.

Water is diverted from the Dordi Khola through a side-type intake structure and passes through a desilting basin with two hopper-type chambers before entering a concrete-lined headrace tunnel. The tunnel is 3.3 meters in diameter and approximately 2.6 kilometers long. A surge shaft with a restricted orifice configuration (7 meters diameter, 45 meters high) is installed upstream of the penstock to regulate hydraulic transients. The steel penstock bifurcates into three branch pipes leading to individual turbines. Post-generation, water is discharged back to the river through a reinforced concrete tailrace channel.

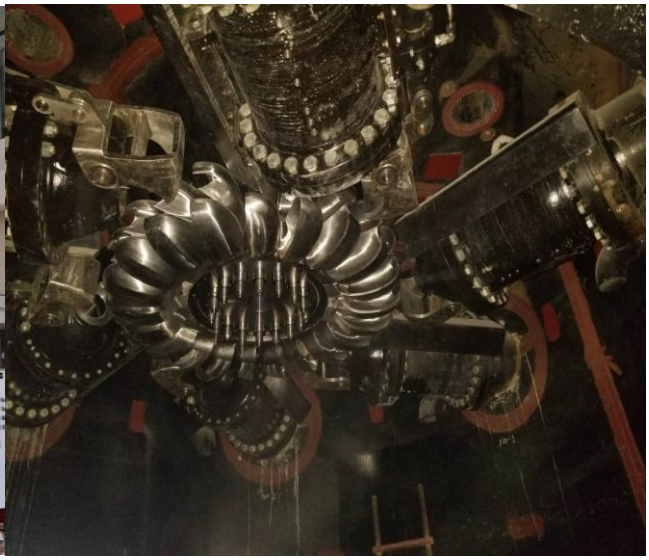
Auxiliary systems such as cooling water circuits, oil pressure systems, fire protection (CO_2-based), drainage and dewatering, compressed air systems, and SCADA-based automation and control have been installed in accordance with industry standards. The project also includes a diesel generator for emergency power supply and a dedicated 132 kV transmission line for grid interconnection.

Construction of the project was completed within the anticipated timeline of 42 months. The first full-scale turbine load rejection and wet commissioning tests were conducted on **10 September 2022**, in the presence of representatives from the Nepal Electricity Authority (NEA), marking the start of commercial operations.
Since commissioning, the project has operated as a single-site, single-phase facility with all three generating units synchronized and feeding electricity into the national grid. There are no additional sites or phased implementations associated with this project.

The implementation of the Dordi Khola Hydropower Project is thus fully aligned with the registered design documents and applicable standards under the relevant GCC framework.

Solu Khola (Dudhkoshi) Hydroelectric Project (SKDKHEP) - (PROJECT -2)

The Sahas Urja Limited Solu Khola (Dudhkoshi) Hydroelectric Project is an 86 MW run-of-river plant comprising a surface powerhouse equipped with three vertical-axis, six-jet Pelton turbines. Each turbine is rated at 28.67 MW and is directly coupled with a synchronous generator rated at 34.8 MVA, 11 kV output voltage, with a power factor of 0.85 lagging. Power from the generators is stepped up via three 11/132 kV, 35.5 MVA generator transformers, and evacuated to the grid through a 132 kV air-insulated switchyard equipped with SF6 circuit breakers and full grid protection and metering.



Water is diverted from the Solu Khola by a gravity-type weir through a side intake structure and delivered to a four-bay settling basin capable of removing silt down to 0.15 mm. From there, water flows via a 4,259 meter-long, concrete-lined, inverted D-shaped headrace tunnel to a surge tunnel (372 meters, 4 x 4 meters), and then to the powerhouse via a trifurcated steel penstock of approximately 2,098 meters in total length, with internal diameters ranging from 2.5 to 2.1 meters. The used water is returned to the Dudh Koshi river through a reinforced concrete tailrace channel.

The powerhouse and turbines are supported by auxiliary systems including digital governor controls, SCADA-based automation, fire-fighting and cooling circuits, DC/AC auxiliary power, station batteries, and a diesel generator for emergency supply. Electricity is evacuated through a dedicated 132 kV transmission line to the NEA Tingla substation for grid interconnection.

Construction of the Solu Khola (Dudhkoshi) project commenced in late 2016 to early 2017 and involved extensive civil, hydromechanical, and electromechanical works. All major works were completed over a period of roughly five years. The three turbine-generator units were synchronized to the grid in rapid succession: Unit 1 on 10 February 2023, Unit 2 on 11 February 2023, and Unit 3 on 12 February 2023, as confirmed by Voith Hydro commissioning reports. All units underwent successful commissioning tests, including mechanical spinning, vibration, heat run, protection simulation, over-speed, and synchronization checks as per technical and regulatory requirements.

Following completion of 72-hour trial runs, the project commenced full commercial operation in February 2023, with all three units operating and exporting power to the Nepal grid in accordance with the Nepal

Electricity Authority's standards. The facility was commissioned as a single-site, single-phase implementation; there are no additional sites or phases pending.

The Solu Khola (Dudhkoshi) Hydroelectric Project is thus fully aligned with the registered design and technical documentation, and is in continuous commercial operation with all required systems, protections, and auxiliaries in place.

b) For the description of the installed technology(ies), technical process and equipment, include diagrams, where appropriate>>

The two proposed project activity is installation and operation of 3 x 9 MW Horizontal Axis Francis-type turbines for PROJECT-1 which has the capacity of 27MW and 3 x 30.32 MW Vertical Axis Pelton turbines for PROJECT-2 which has the capacity of 86MW and with this the bundle Hydro Power Plant aggregated installed capacity of **109MW** in the state of Kathmandu in Nepal.

Technical details for Hydro Power Plants are as below:

PROJECT -1	
State	Gandaki Porvince
District	Lamjung
Vicinity	Located near Chiti, Dhodeni, and Bansar Village Development Committees (VDCs).
Specific Location	Approximately 170 km northwest of Kathmandu in the Lamjung district.

HYDROLOGY

River/Stream	Dordi-Khola
Catchment area at Diversion site	277 km2
Design Discharge	15.28 m3/s
Design Flood at diversion site (100 year return period)	614 m3/s
Design Flood at Powerhouse site (1000 year return period)	3251 m3/s
River Diversion Arrangement	
1 in 20 years dry season design flood	27.24 m3/s
Top of coffer dam at upstream	El. 762.0 m
Top of coffer dam at downstream	El. 756.0 m

DIVERSION STRUCTURE

Type	Ogee Type weir, free over flow with under sluice bays
Average river bed level	El. 758.0 m
Bridge deck level	El. 768.0 m
Width of diversion structure	55 m
Highest flood level	El. 767.75 m
Full supply level	El. 764.50 m
Weir Crest elevation of overflow weir Width of weir	El. 764.25 m 70 m

UNDER SLUICE BAY

No. of under sluice bays	2
Width of each bay	5 m
Thickness of pier	1.5 m
Crest level of under sluice bay	El. 756.0 m
Clear width of under sluice bays	11.5 m
Type and height of gate	Vertical gates, 3 m high.
Energy Dissipation System	Hydraulic Jump Type Stilling Basin
Length of stilling basin from toe of sloping glacis	25 m
Total width of basin	83 m
Cistern level	El. 753.0 m
End Sill Level	El. 754.0 m
Intake Structure	Side Intake
Type	Side Intake
Track rack size	4.75 m (W) x 4.0 m (H)
Numbers of trash rack	2
Intake diversion flow (including 20% flushing discharge)	18.33 m^3/s
Intake size	Two bays; each 2.25 m (W) x 2.7 m (H)
Invert level of Intake	El. 760.0 m
Intake stop log	1 no. Vertical lift gate (2.25 m x 2.7 m)
Intake service gate	2 nos. Vertical lift gate (2.25 m x 2.7 m)

FEEDER CHANNEL

Type	Rectangular
Numbers	2
Size	2.25 m wide, height varies from 3.45 m to 3.6 m
Length	34.68 m & 30.78 m

DESILTING BASIN

Type	Hopper Type
Numbers of chambers	2 nos
Size of particles to be removed	0.2 mm and above
Dimension (L x B x H)	60 m x 8.5 m x 8.0 m
Design discharge	18.33 m3/s

Flow through velocity	0.26 m/s

SILT FLUSHING PIPE

Type	Circular
Diameter	0.9 m
Total length	100 m

WATER CONDUCTOR PIPE

Type	Steel Pipe
Size	2.65 m diameter
Total length	3237.47 m

HEAD RACE TUNNEL (CONCRETE LINED)

Type & shape	Underground, D-shaped
Diameter	3.3 m
Total Length	2661.67 m

STEEL LINED TUNNEL

Type & shape	Underground, circular
Diameter	2.65 m u/s of HRT, 2.3 m d/s of HRT
Total length	25 m, 82 m respectively

SURGE SHAFT

Type	Restricted orifice type
Height	45 m
Diameter	7 m
Orifice size	1.3 m diameter, circular
Top of surge shaft	El. 780.0 m
Maximum upsurge level	El. 778.06 m
Minimum down surge level	El. 746.39 m

VALVE HOUSE

Type	Surface
Number	1
Size (L x W x H)	10 m x 8 m x 12 m
Type of valve	Buttery valve
Diameter of valve	2.3 m

PENSTOCK

Type	Surface and Buried Penstock
Nos.	One no. starting from outlet portal and trifurcating before Power House.
Diameter	2.3 m, circular shaped
Liner thickness	10 mm to 20 mm
Length	830.5 m
Length of penstock after trifurcation	163.8 m
Branch penstock	Circular, 1.3 m diameter each

POWER HOUSE

Type	Surface
Gross Head	214 m
Rated Head	203.32 m
Design discharge	15.28 m3/s
Normal Tail water Level	El. 550.0 m
Center line of penstock	El. 549.95 m
Size of Powerhouse at machine floor	52.2 m (L) x 17.0 m (W) x 35.1 m (H)

TAIL RACE CHANNEL

Type	RCC Box culvert
Length	333.66 m
Size	3.5 m x 2.5 m
Normal tail water level	El. 550 m

SWITCHYARD

Size	30 m x 40 m
Voltage level	132 kVA

TURBINE

Turbine Type	Horizontal axis Francis
Number	3
Rated Capacity of each turbine	9.3 MW

GENERATOR

Generator Type	Synchronous three phase
Number	3
Rated Capacity	3 x 10590 kVA
Power Factor	0.85
Voltage	11 kV
Frequency	50 Hz
Excitation system	Brushless/ static

TRANSFORMER

Rated capacity	Bank of 3 x 10.67 MVA, 11/132/√3, single phase
Voltage ratio	11 kV/ 132 kV

TRANSMISSION LINE

Voltage level	132 kV Single Circuit
Length	3.2 km

POWER GENERATION

Installed capacity	27 MW
Net annual energy after transmission & outage losses	142.75 GWh

Technical details for Hydro Power Plants are as below:

PROJECT -2	
State	Koshi Province (Province 1, Nepal)
District	Solukhumbu
Vicinity	The intake site is at Gairigaun village, about 600 m downstream of the suspension bridge over Solu Khola at Sanghutar.
Specific Location	Details indicate the project lies in the eastern region of Nepal, about 130 km (aerial distance) east of Kathmandu, and is situated near the confluence of Solu Khola and Dudh Koshi Rivers.

PROJECT LOCATION

Solukhumbu District, Province 1

Intake Site	Solududhkunda Municipality
Powerhouse Area	Thulung Dudhkoshi Gaupalika
Latitude	27°21’53”N to 27°25’15”N
Longitude	86°37’35”E to 86°41’15”E

GENERAL

Name of River	Solu Khola
Type of Scheme	Run-of-River
Gross Head	613.20 m
Net Head	598.09 m
Installed Capacity	86,000 kW

HYDROLOGY

Catchment Area	454 km^2
Design Discharge	17.05 m^3/s
Design Flood Discharge	475 m^3/s (100 Yr. Flood)

DIVERSION WEIR

Type of Weir	Gravity free flow concrete
Length of Weir	34.8 m
Max. Height of Weir	13.50 m from foundation level
Crest Elevation	EL. 1,262.00 masl

INTAKE STRUCTURE

Type	3 no.s of Side intake
Size (W x H)	4.00 m (W) x 2.00 m (H)
Crest elevation of Intake	EL. 1,258.00 masl

UNDERSLUICE STRUCTURE

Type and number	3 nos with Gate
Size (W x H)	1.50 m (W) x 1.00 m (H)
Crest elevation of Undersluice	EL. 1,256.00 masl

GRAVEL TRAP

Type	Rectangular, RCC
Size	5.00m (W) x 5.00 m (L)
Bed load size to trap	5 mm

APPROACH CANAL

Type and Number	Free flow box culvert, total 3 nos
Size	2.6 m x 2.6 m

DESANDING BASIN

Type	Surface
No of Bays	3 Nos
Dimension (L x B x H) m	85 m (L) x 9.00 m (W) x 5.00 m (H)
Particle Size to be Settled	0.15 mm (90% trapping efficiency)
Outlet Water Level	EL. 1,259.30 m

HEADRACE BOX CULVERT

Length	34.50 m
Size	4.5m (W) x 4.5m (H)
Numbers	1 (One)

HEADRACE TUNNEL

Section Type	Inverted-D
Length	4469.61m
Size	4.0m (W) x 4.25m (H)
Support	Shotcrete, Ribs, Rock bolt

SURGE TUNNEL

Size	4.0m x 4.0m of 375.0m length in slope

PENSTOCK TUNNEL

Length up to Bifurcation	1867.17 m
Horizontal section before Drop Shaft 1	220.0 m

Drop Shaft-1	187.0 m
Inclined Section 2	536.0 m
Drop Shaft-2	251.7 m
Inclined Section 3	672.47 m
Internal Diameter and length	2.50 m for 1st 1198 m length, 2.25m for next 268 m length and 2.1m for 396 m length (last portion)
Thickness of steel penstock	12 mm ~ 46 mm with yield strength 350 to 460 MPA

POWERHOUSE

Type	Surface
Size	49.6 m x 15.2 m x 32.96 m

TAILRACE

Type	Free Flow, Box Culvert
Length	70 m
Size (B x H)	4.6 m x 1.9 m

TURBINE

Type	3 no. Vertical Axis Pelton
Speed of Turbine	750 RPM
Rated Output Capacity per Unit	3 x 30.32 MW with 10% COL
Efficiency	91%

GOVERNOR

Type	Digital/Hydraulic with PID Control
Adjustment for Speed Drop	Between 0 to 5 %

GENERATOR

Type	Synchronous 3 Phase
Rated Output Capacity per Unit	34.6 MVA
Voltage	11 kV
Efficiency	97%

TRANSFORMER

Type	Out Door, Oil Immersed
Rated Capacity per Unit	Three Phase 35 MVA total Nos 3
Frequency	50 Hz

TRANSMISSION LINE

Length	12.0 km
Voltage	132 KV
Interconnection Point	NEA sub-station at Lammane, Tingla, Solukhumbu.

POWER AND ENERGY GENERATION

Mean annual energy per year	520.20 GWh (Dry- 100.27 GWh, Wet- 419.93 GWh)

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

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, **HYDRONABIL** project has ushered in the social and economic upliftment of the persons living in the vicinity of the Project i.e., of society at large.

Environmental Well-being:

Prior to commencing construction, the project obtained all necessary environmental approvals and clearances. It will generate power using a hydro-based facility that produces zero emissions, significantly reducing GHG emissions and specific pollutants such as sulfur oxides (SOx), nitrogen oxides (NOx), and suspended particulate matter (SPM) commonly associated with thermal power generation. The project utilizes hydro energy as a clean source for electricity generation, ensuring that it does not contribute to air pollution, water contamination, or solid waste production. Consequently, the project has a neutral impact on the surrounding environment, contributing positively to environmental well-being.

SDG	Description – How the Project Contributes
 SDG 7Affordable and Clean Energy	The project activity has generated **1054288.69 MWh** of clean energy per year, which with increased shared will increase the affordability at a cheaper rate to end user. • The project activity will utilize Hydro energy (renewal resource) to generate power. The project activity will increase the share of renewable resource-based electricity in global mix of energy consumption.
 SDG 8Decent Work and Economic Growth	•Decent work and economic growth. The project activity generates additional employment for skilled and unskilled, also the project situated in a remote area will provide employment opportunities to unskilled people from villages. • Training on various aspects including safety, operational issues, and developing skill sets will also be provided to employees.
 SDG 13Climate Action	• This Hydro power project meets the SDG 13 goal by saving fossil fuel and producing clean energy. • This project has avoided 8,68,461 tons of CO2 emissions so far up to Dec'24 during this monitoring period. In a Greenfield project, electricity delivered to the grid by the project would reduce the dependence on fossil fuel-based generation units and as there are no associated emissions with this project it contributes to the reduction of greenhouse gases (GHG) emissions.

B.3. Baseline Emissions>>

In the absence of the Dordi Khola (27 MW) and Solu Khola (Dudhkoshi, 86 MW) hydropower projects, the baseline electricity supply for Nepal would have relied on the existing grid mix, which is constrained by limited hydropower output during dry seasons and peak demand periods. The Nepal Electricity Authority (NEA) typically addresses this gap through:

- Imports of grid electricity from India, where a significant share is generated from fossil fuel-based thermal power plants, mainly coal and gas,
- Supplemental domestic generation, including diesel-based peaking plants during shortages,
- Load-shedding and extensive use of backup diesel generators for commercial and institutional consumers, particularly in the hilly regions where reliable supply is challenging.

Without these new clean energy projects, growing demand in Kathmandu, Lamjung district, and regions served by these plants would continue to be met through this carbon-intensive mix. This situation sustains high grid emission factors, especially given the emissions profile of Indian grid electricity and the inefficiencies and pollution associated with diesel backup generation.

The baseline scenario is characterized by:

- Continued dependence on high-emission energy imports from India and on fossil-based local generation,
- Ongoing use of backup diesel generators during outages or peak demand,
- Delay of renewable energy deployment due to infrastructure and investment hurdles in challenging, underdeveloped areas.

Socio-economic and environmental benefits, including job creation, local grid stability, and clean power injection, would not materialize in the absence of these projects.

Both the Solu Khola (Dudhkoshi) and Dordi Khola projects are voluntary private sector initiatives, not mandated by government policy or required under any regulatory framework at the time of investment. They reflect independent commitments by project proponents to Nepal's energy security and cross-border decarbonization, as well as to participation in international carbon markets through measurable greenhouse gas (GHG) reductions.

This scenario is further substantiated by official correspondence from India's Central Electricity Authority, which, in its letter dated 5 September 2023, approved the import of up to 83.42 MW from Solu Khola (Dudhkoshi) and up to 26.19 MW from Dordi Khola to Haryana DISCOMs during the monsoon months from August 2023 to October 2027. This confirmation underscores that the clean hydropower generated is directly replacing grid electricity in India's system, which would otherwise be sourced primarily from fossil fuel plants.

B.4. Debundling>>

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

SECTION C. Application of methodologies and standardized baselines

C.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 22.0)

C.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 109 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 22.0 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 fulfils 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	The project is not a retrofit, rehabilitations, replacements or capacity addition; hence this applicability criterion is not relevant.

equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance".	
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.	For Solu Khola (Dudhkoshi) and Dordi Khola Hydropower Projects, unless there is creation or expansion of a reservoir with a calculated power density greater than 4W/m², or they are integrated projects as defined, typically condition (a) applies (project activity in existing river/reservoir with no change in volume). However, to conclusively determine which condition (a–d) applies, the project's reservoir and power density data must be confirmed.
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 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.	No, this requirement is not applicable for Solu Khola (Dudhkoshi) and Dordi Khola Hydropower Projects, as they are not integrated, multi-reservoir projects according to the available documentation and commissioning reports

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 22.0 "Grid connected electricity generation from renewable sources".

C.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

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

As per applicable methodology ACM0002 Version 22.0, 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		GHG	Included?	Justification/Explanation
Baseline	Grid connected electricity generation	CO2	Yes	Main emission source
		CH4	No	Minor emission source
		N2O	No	Minor emission source
		Other	No	No other GHG emission were emitted from the project
Project Activity	Greenfield Hydro Power Project Activity	CO2	No	No CO2 emissions are emitted from the project
		CH4	No	Project activity does not emit CH4
		N2O	No	Project activity does not emit N2O
		Other	No	No other emissions are emitted from the project

C.5. Establishment and description of baseline scenario (UCR Protocol) >>

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 CO2 emission factor (tCO2/MWh) which will be associated with each unit of electricity provided by an electricity system. The Universal Carbon Registry (UCR) recommends a default conservative emission factor of 0.9 tCO_2/MWh for the vintage years 2013–2023.

The project uses a more recent and conservative figure of 0.757 tCO_2/MWh for the 2024 vintage year, which is aligned with the combined margin emission factor calculated by the Central Electricity Authority (CEA) in India. This emission factor reflects a weighted average of both the operating margin and build margin and considers the growing contribution of renewable energy but still reflects the dominance of fossil fuel-based generation. As this value results in higher emissions than the default factor, it has been used for emission reduction calculations to ensure a conservative and credible approach.

Net GHG Emission Reductions and Removals

$$\text{Thus, } ERy = BEy - PEy - LEy$$

Where:

ERy = Emission reductions in year y (tCO2/y)
BEy = Baseline emissions in year y (t CO2/y)
PEy = Project emissions in year y (tCO2/y)
LEy = 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:

$$BEy = EGPJ,y \times EFgrid,\text{CM},y$$

BEy	Baseline emissions in year y (t CO2)
$EGPJ,y$	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)
$EFgrid$,CM,y	UCR recommended emission factor of 0.9 tCO2/MWh has been considered. (Reference: General Project Eligibility Criteria and Guidance, UCR Standard, page 19 equation 11)

Project Emissions

As per ACM0002 Version 22.0, 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 57 equation 11. The project power density is higher than 10 W/m^2.

Hence**, PEy = 0**

Leakage

As per ACM0002 Version 22.0, 'No other leakage emissions are considered. The emissions potentially arising due to activities such as power plant construction and upstream emissions from fossil fuel use (e.g., extraction, processing, transport etc.) are neglected.

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 = [95942.94MWh/year + 396130.83MWh/year] X 0.9 tCO2/MWh + [113433.68 MWh/year + 448781.24MWh/year] X 0.757 tCO2/MWh

= 868460.99944tCO2/year (i.e., 868460.99944 CoUs/year)

C.6. Prior History>>

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

C.7. Monitoring period number and duration>>

First Issuance Period: 2 years, 3 months – 30/10/2022to 31/12/2024

C.8. Changes to start date of crediting period >>

The crediting period under UCR has been considered from 01/01/2013

C.9. Permanent changes from PCN monitoring plan, applied methodology or applied

standardized baseline >>

PCN version 1.0 should be considered for the latest information about the project activity.

C.10. Monitoring plan>>

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

Data/Parameter	UCR recommended emission factor
Data unit	tCO2 /MWh
Description	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 2013- 2023 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/UCR StandardAug2024updatedVer7_020824191534797526.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

Data/Parameter	UCR recommended emission factor
Data unit	tCO2 /MWh
Description	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 0.757 tCO2/MWh for the 2024 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://cea.nic.in/wp-content/uploads/2021/03/User_Guide_Version_20.0.pdf
Value applied	0.757
Measurement methods and procedures	-
Monitoring frequency	Ex-ante fixed parameter
Purpose of data	For the calculation of Emission Factor of the grid

Data / Parameter:	*EGPJ,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 / Parameter:	*EGy*
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 / 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:	27MW
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:	m2
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:	-
Purpose of data:	The Data/Parameter is required to calculate the Power Density of the project activity used to determine the Project Emissions.

Annexure: Documentation of Nepal–India Grid Power Export Arrangement

The export of hydroelectric power from Nepal to India is carried out via established cross-border interconnections through the Muzaffarpur (ISTS) Substation, in compliance with guidelines for cross-border trade of electricity between the two nations. This transaction is authorized for specific Nepalese hydro projects and corresponding Indian distribution utilities, with all regulatory, operational, and data-sharing requirements stipulated by the Central Electricity Authority (CEA), Ministry of Power, and Government of India.

भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power
केन्द्रीय विद्युत प्राधिकरण
Central Electricity Authority
विद्युत प्रणाली योजना एवं मूल्यांकन प्रभाग-II
Power System Planning & Appraisal Division-II

सेवा में/To
Shri Arvind Patle, AGM (SO & Commercial),
NTPC Vidyut Vyapar Nigam Limited, 5th Floor,
EOC, A-8A, Sector-24, Noida – 201301.

विषय/ Sub: Approval of Designated Authority for import of power from Nepal to India for procurement of power by Haryana Discoms on medium term basis – reg.

महोदय/Sir,

This has reference to NVVN application dated 10.07.2023 seeking approval of Designated Authority (DA) for import of upto 200 MW of power from 5 power projects in Nepal to Haryana Discoms on medium term basis through NVVN for wet season months.

1. Key aspects of the proposed transactions are as under:
   a) Details of the Generators and Quantum proposed:

Name of the Generators	Quantum proposed (MW)	Time Period
Solu Khola (Dudhkoshi) Hydropower Project	83.42	i. 10th August 2023 - 31st October 2023 ii. 1st June 2024 - 31st October 2024 iii. 1st June 2025 – 31st October 2025 iv. 1st June 2026 – 31st October 2026 v. 1st June 2027 – 31st October 2027
Super Madi Hydropower Project	42.68	
Mistri Khola Hydropower Project	40.74	
Dordi Khola Hydropower Project	26.19	
Upper Chaku 'A' Hydropower Project	6.97	
200 MW		

सेवा भवन, आर. के पुरम-I, नई दिल्ली-110066 टेलीफोन : 011-26732347 ईमेल: cea-pspa2@gov.in वेबसाइट: www.cea.nic.in
Sewa Bhawan, R.K Puram-I, New Delhi-110066 **Telephone**: 011-26732347, **Email**: cea-pspa2@gov.in **Website**: www.cea.nic.in

b) Drawal point in India: 400 kV bus at Muzaffarpur (ISTS) Substation in India (India side of Dhalkebar - Muzaffarpur Transmission Line)

2. The matter has been examined in accordance with the Guidelines for Import/Export (Cross Border) of Electricity- 2018 and Procedure for Approval and facilitating Import/Export (Cross Border) of Electricity. Based on the concurrence from MoP, approval of Designated Authority is hereby conveyed to NTPC Vidyut Vyapar Nigam Limited (NVVN) for import of upto 109.61 MW of power from 2 power projects in Nepal to Haryana Discoms through NVVN for time period as mentioned below:

S.No.	Name of the Generators	Name of the Generating Company	Quantum approved (MW)	Time Period
1.	Solu Khola (Dudhkoshi) Hydropower Project	Sahas Urja Ltd.	Upto 83.42 MW	i. 5th September 2023 - 31st October 2023 ii. 1st June 2024 - 31st October 2024 iii. 1st June 2025 – 31st October 2025 iv. 1st June 2026 – 31st October 2026 v. 1st June 2027 – 31st October 2027
2.	Dordi Khola Hydropower Project	Himalayan Power Partner Ltd.	Upto 26.19 MW	
			Upto 109.61 MW	

3. This approval is subject to the following conditions:
   (a) Real time generation data (MW, MVAR, etc.) and daily energy generation (MWh) of the Solu Khola (Dudhkoshi) Hydropower Project and Dordi Khola Hydropower Project shall be made available to NLDC, India.
   (b) In case, there is a change in the equity pattern of Sahas Urja Ltd. and Himalayan Power Partner Ltd. of Nepal, NVVN shall intimate the Designated Authority within thirty (30) days from such change in equity pattern for continuation of the approval.

(c) Govt. of India reserves the right to import/ export electricity from/ to neighbouring countries for reason of larger policy interests, and same shall be binding on the Participating Entity.

(d) NVVN and other participating entities, involved in this transaction, shall comply with the applicable Rules/Guidelines/Regulations/Standards of Government of India/CEA/CERC. The grant of approval by the Designated Authority for participation in Import/Export (Cross Border) of Electricity shall not entitle NVVN any rights or extra privileges over and above the applicable laws.

भवदीय/Yours faithfully,

(बी.एस.बैरवा/ B.S.Bairwa)
निदेशक/ Director
For Nodal Officer to the DA

Copy to:

1. Director (Trans.), Ministry of Power, SS Bhawan, New Delhi
2. ED, NLDC- may ensure availability of generation data at NLDC, before scheduling.
3. CGM, NVVN (as SNA) – for necessary action as per the guidelines
4. US (Nepal), MEA

Annexure: Turbine Commissioning Certificates

Dordi Khola: Wet Test and Commissioning Certificates (Unit I, II, III)—dated 10/09/2022

Himalayan Power Partner Limited
DordiKhola Hydropower Project 27 MW

6. ANNEX 2: WET TEST

Generating Unit - I
Individual Unit Load Rejection Test and Observation Results

Date: 079-05-25 (10/09/2022 AD)

S.N	Load			Guide Opening	Speed			Frequency			Voltage			Governor Closing Time (Sec.)	Penstock Pressure (Bar)			Remarks
					Before LR	After LR	Change	Before LR	After LR	Change	Before LR	After LR	Change		Before LR	After LR	Change	
	%	kW	kVAr	%	RPM	RPM	%	Hz	Hz	%	kV	kV	%	Sec.	Bar	Bar	%	
1	50	4490	50	47.62%	750	894	19.20	50.03	59.62	19.17	10.91	11.03	1.10	6	20.4	22.40	9.80	By Unit Breaker
2	100	9220	90	85.30%	751	1038	38.22	50.3	69	37.18	11.01	11.22	1.91	9	20.4	23.50	15.20	By Unit Breaker

NEA REPRESENTATIVES:

1.Mr.Bikram Poudel(PPA Department)
2.Mr Sitaram Sigdel(PPA Department)
3.Mr Madhav Poudel(Grid,Pokhara)
4.MrGopal Yadav(LDC)
5.Mr Deepak Bashyal(Middle Marshyangdi HEP)
6.MrShiva Kunwar(Marshyangdi Corridor 220 KV TL Project)
7.MrGovinda Shrestha(LamjungDCS)

COMPANY REPRESENTATIVES:

1.Munna Shakya
2.DhirajSigdel
3.SudipKhanal

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Himalayan Power Partner Limited
DordiKhola Hydropower Project 27 MW

Generating Unit - II
Individual Unit Load Rejection Test and Observation Results

Date: 079-05-25 (10/09/2022 AD)

S.N	Load			Nozzle Opening	Speed			Frequency			Voltage			Governor Closing Time (Sec.)	Penstock Pressure (Bar)			Remarks
					Before LR	After LR	Change	Before LR	After LR	Change	Before LR	After LR	Change		Before LR	After LR	Change	
	%	kW	kVAr	%	RPM	RPM	%	Hz	Hz	%	kV	kV	%	Sec.	Bar	Bar	%	
1	50	4.5	-662	49.27	749	920	22.83	49.94	61.33	22.81	11.07	11.58	4.6	6	20.66	23.5	13.75	By unit Breaker
2	100	8.98	1152	93%	751	1036	37.95	49.96	68.46	37.03	10.37	11.51	11	9	20.16	24	19.05	Emergency

NEA REPRESENTATIVES:

1.Mr.Bikram Poudel(PPA Department)
2.Mr Sitaram Sigdel(PPA Department)
3.Mr Madhav Poudel(Grid,Pokhara)
4.Mr Gopal Yadav(LDC)
5.Mr Deepak Bashyal(Middle Marshyangdi HEP)
6.Mr Shiva Kunwar(Marshyangdi Corridor 220 KV TL Project)
7.MrGovinda Shrestha(LamjungDCS)

COMPANY REPRESENTATIVES:

1.Munna Shakya
2.DhirajSigdel
3.SudipKhanal

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Himalayan Power Partner Limited
DordiKhola Hydropower Project 27 MW

Generating Unit - III
Individual Unit Load Rejection Test and Observation Results

Date: 079-05-25 (10/09/2022 AD)

S.N	Load			Nozzle Opening	Speed			Frequency			Voltage			Governor Closing Time (Sec.)	Penstock Pressure (Bar)			Remarks
					Before LR	After LR	Change	Before LR	After LR	Change	Before LR	After LR	Change		Before LR	After LR	Change	
	%	kW	kVAr	%	RPM	RPM	%	Hz	Hz	%	kV	kV	%	Sec.			%	
1	50	4.59	-1520	49.59	751	907	20.77	49.94	60.33	20.8	10.99	11.58	5.37	6	20.66	24	16.16	By unit Breaker
2	100	9.04	-1288	82.50%	750	1054	40.53	49.96	69.728	39.57	10.93	12.3	12.53	9	20.07	23.05	14.84	Emergency

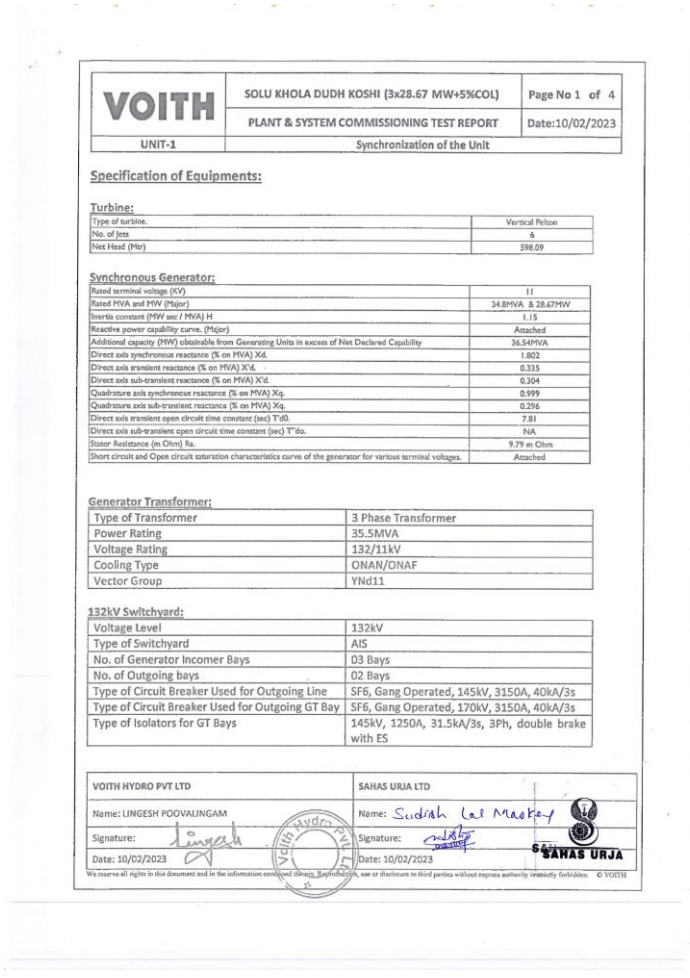
NEA REPRESENTATIVES:

1.Mr.Bikram Poudel(PPA Department)
2.Mr Sitaram Sigdel(PPA Department)
3.Mr Madhav Poudel(Grid,Pokhara)
4.Mr Gopal Yadav(LDC)
5.Mr Deepak Bashyal(Middle Marshyangdi HEP)
6.Mr Shiva Kunwar(Marshyangdi Corridor 220 KV TL Project)
7.MrGovinda Shrestha(LamjungDCS)

COMPANY REPRESENTATIVES:

1.Munna Shakya
2.DhirajSigdel
3.SudipKhanal

Solu Khola (Dudhkoshi): Commissioning Test Reports for Unit 1 (10/02/2023), Unit 2 (11/02/2023), Unit 3 (12/02/2023)



VOITH | SOLU KHOLA DUDH KOSHI (3x28.67 MW+5%COL) | Page No 1 of 4
PLANT & SYSTEM COMMISSIONING TEST REPORT | Date:10/02/2023
UNIT-1 | Synchronization of the Unit

Specification of Equipments:

Turbine:

Type of turbine.	Vertical Pelton
No. of jets	6
Net Head (Hn)	598.09

Synchronous Generator:

Rated terminal voltage (KV)	11
Rated MVA and MW (Major)	34.8MVA & 28.67MW
Inertia constant (MW sec / MVA) H	1.15
Reactive power capability curve. (Major)	Attached
Additional capacity (MW) obtainable from Generating Units in excess of Net Declared Capability	36.54MVA
Direct axis synchronous reactance (% on MVA) Xd.	1.802
Direct axis transient reactance (% on MVA) X'd.	0.335
Direct axis sub-transient reactance (% on MVA) X"d.	0.304
Quadrature axis synchronous reactance (% on MVA) Xq.	0.999
Quadrature axis sub-transient reactance (% on MVA) Xq.	0.296
Direct axis transient open circuit time constant (sec) T'd0.	7.81
Direct axis sub-transient open circuit time constant (sec) T"do.	NA
Stator Resistance (in Ohm) Ra.	9.79 m Ohm
Short circuit and Open circuit saturation characteristics curve of the generator for various terminal voltages.	Attached

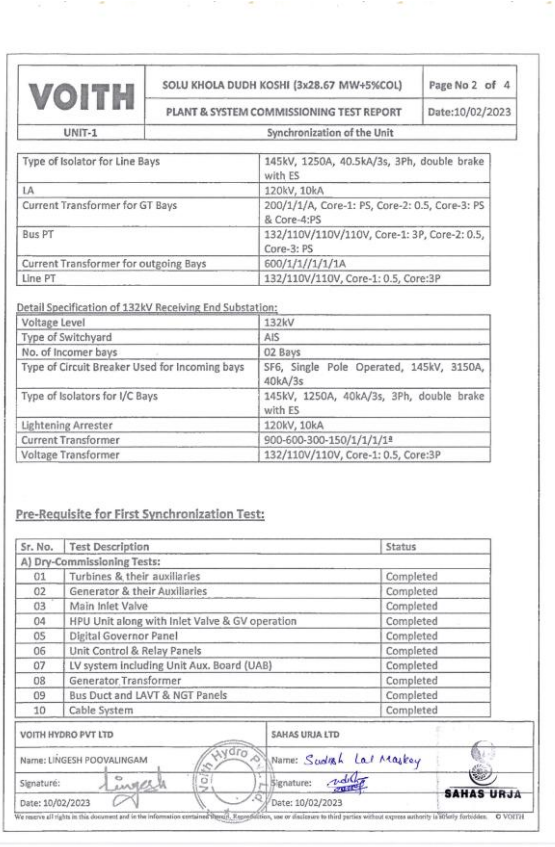
Generator Transformer:

Type of Transformer	3 Phase Transformer
Power Rating	35.5MVA
Voltage Rating	132/11kV
Cooling Type	ONAN/ONAF
Vector Group	YNd11

132kV Switchyard:

Voltage Level	132kV
Type of Switchyard	AIS
No. of Generator Incomer Bays	03 Bays
No. of Outgoing bays	02 Bays
Type of Circuit Breaker Used for Outgoing Line	SF6, Gang Operated, 145kV, 3150A, 40kA/3s
Type of Circuit Breaker Used for Outgoing GT Bay	SF6, Gang Operated, 170kV, 3150A, 40kA/3s
Type of Isolators for GT Bays	145kV, 1250A, 31.5kA/3s, 3Ph, double brake with ES

VOITH HYDRO PVT LTD	SAHAS URJA LTD
Name: LINGESH POOVALINGAM	Name: Sudish Lal Maskey
Signature:	Signature:
Date: 10/02/2023	Date: 10/02/2023



VOITH | SOLU KHOLA DUDH KOSHI (3x28.67 MW+5%COL) | Page No 2 of 4
PLANT & SYSTEM COMMISSIONING TEST REPORT | Date:10/02/2023
UNIT-1 | Synchronization of the Unit

Type of Isolator for Line Bays	145kV, 1250A, 40.5kA/3s, 3Ph, double brake with ES
LA	120kV, 10kA
Current Transformer for GT Bays	200/1/1/A, Core-1: PS, Core-2: 0.5, Core-3: PS & Core-4:PS
Bus PT	132/110V/110V/110V, Core-1: 3P, Core-2: 0.5, Core-3: PS
Current Transformer for outgoing Bays	600/1/1//1/1/1A
Line PT	132/110V/110V, Core-1: 0.5, Core:3P

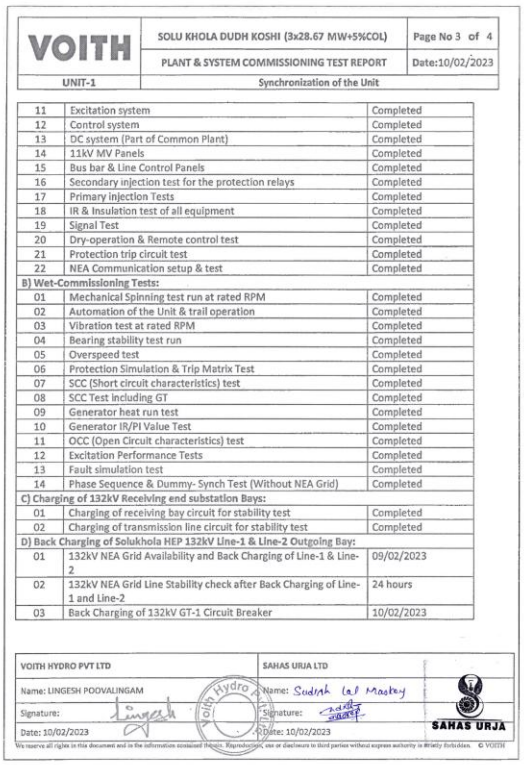
Detail Specification of 132kV Receiving End Substation:

Voltage Level	132kV
Type of Switchyard	AIS
No. of Incomer bays	02 Bays
Type of Circuit Breaker Used for Incoming bays	SF6, Single Pole Operated, 145kV, 3150A, 40kA/3s
Type of Isolators for I/C Bays	145kV, 1250A, 40kA/3s, 3Ph, double brake with ES
Lightening Arrester	120kV, 10kA
Current Transformer	900-600-300-150/1/1/1/1
Voltage Transformer	132/110V/110V, Core-1: 0.5, Core:3P

Pre-Requisite for First Synchronization Test:

Sr. No.	Test Description	Status
A) Dry-Commissioning Tests:		
01	Turbines & their auxiliaries	Completed
02	Generator & their Auxiliaries	Completed
03	Main Inlet Valve	Completed
04	HPU Unit along with Inlet Valve & GV operation	Completed
05	Digital Governor Panel	Completed
06	Unit Control & Relay Panels	Completed
07	LV system including Unit Aux. Board (UAB)	Completed
08	Generator Transformer	Completed
09	Bus Duct and LAVT & NGT Panels	Completed
10	Cable System	Completed

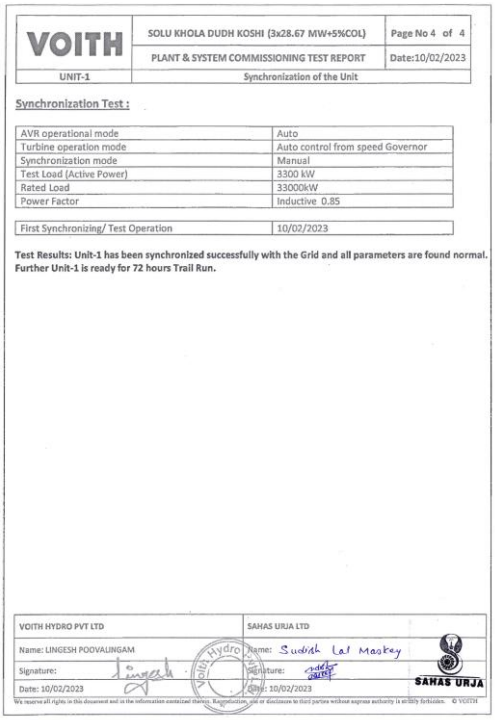
VOITH HYDRO PVT LTD	SAHAS URJA LTD
Name: LINGESH POOVALINGAM	Name: Sudish Lal Maskey
Signature:	Signature:
Date: 10/02/2023	Date: 10/02/2023



VOITH	SOLU KHOLA DUDH KOSHI (3x28.67 MW+5%COL)	Page No 3 of 4
	PLANT & SYSTEM COMMISSIONING TEST REPORT	Date:10/02/2023
UNIT-1	Synchronization of the Unit	

11	Excitation system	Completed
12	Control system	Completed
13	DC system (Part of Common Plant)	Completed
14	11kV MV Panels	Completed
15	Bus bar & Line Control Panels	Completed
16	Secondary injection test for the protection relays	Completed
17	Primary injection Tests	Completed
18	IR & Insulation test of all equipment	Completed
19	Signal Test	Completed
20	Dry-operation & Remote control test	Completed
21	Protection trip circuit test	Completed
22	NEA Communication setup & test	Completed
B) Wet-Commissioning Tests:		
01	Mechanical Spinning test run at rated RPM	Completed
02	Automation of the Unit & trail operation	Completed
03	Vibration test at rated RPM	Completed
04	Bearing stability test run	Completed
05	Overspeed test	Completed
06	Protection Simulation & Trip Matrix Test	Completed
07	SCC (Short circuit characteristics) test	Completed
08	SCC Test including GT	Completed
09	Generator heat run test	Completed
10	Generator IR/PI Value Test	Completed
11	OCC (Open Circuit characteristics) test	Completed
12	Excitation Performance Tests	Completed
13	Fault simulation test	Completed
14	Phase Sequence & Dummy- Synch Test (Without NEA Grid)	Completed
C) Charging of 132kV Receiving end substation Bays:		
01	Charging of receiving bay circuit for stability test	Completed
02	Charging of transmission line circuit for stability test	Completed
D) Back Charging of Solukhola HEP 132kV Line-1 & Line-2 Outgoing Bay:		
01	132kV NEA Grid Availability and Back Charging of Line-1 & Line-2	09/02/2023
02	132kV NEA Grid Line Stability check after Back Charging of Line-1 and Line-2	24 hours
03	Back Charging of 132kV GT-1 Circuit Breaker	10/02/2023

VOITH HYDRO PVT LTD	SAHAS URJA LTD
Name: LINGESH POOVALINGAM	Name: Sudrah Lal Maskey
Signature:	Signature:
Date: 10/02/2023	Date: 10/02/2023



VOITH	SOLU KHOLA DUDH KOSHI (3x28.67 MW+5%COL)	Page No 4 of 4
	PLANT & SYSTEM COMMISSIONING TEST REPORT	Date:10/02/2023
UNIT-1	Synchronization of the Unit	

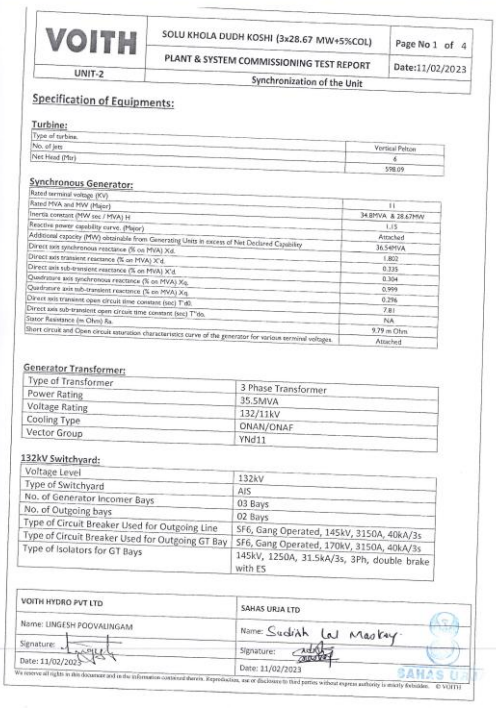
Synchronization Test :

AVR operational mode	Auto
Turbine operation mode	Auto control from speed Governor
Synchronization mode	Manual
Test Load (Active Power)	3300 kW
Rated Load	33000kW
Power Factor	Inductive 0.85

First Synchronizing/ Test Operation	10/02/2023

Test Results: Unit-1 has been synchronized successfully with the Grid and all parameters are found normal. Further Unit-1 is ready for 72 hours Trail Run.

VOITH HYDRO PVT LTD	SAHAS URJA LTD
Name: LINGESH POOVALINGAM	Name: Sudrah Lal Maskey
Signature:	Signature:
Date: 10/02/2023	Date: 10/02/2023



VOITH	SOLU KHOLA DUDH KOSHI (3x28.67 MW+5%COL)	Page No 1 of 4
	PLANT & SYSTEM COMMISSIONING TEST REPORT	Date:11/02/2023
UNIT-2	Synchronization of the Unit	

Specification of Equipments:

Turbine:

Type of turbine	Vertical Pelton
No. of jet	4
Net Head (Nr)	598.09

Synchronous Generator:

Rated terminal voltage (KV)	11
Rated MVA and MW (Major)	34.8MVA & 28.67MW
Inertia constant (MW sec / MVA) H	1.15
Reactive power capability curve. (Major)	Attached
Additional capacity (MW) obtainable from Generating Units in excess of Net Declared Capability	36.54MVA
Direct axis synchronous reactance (% on MVA) Xd.	1.802
Direct axis transient reactance (% on MVA) X'd.	0.335
Direct axis sub-transient reactance (% on MVA) X"d.	0.304
Quadrature axis synchronous reactance (% on MVA) Xq.	0.999
Quadrature axis sub-transient reactance (% on MVA) X"q.	0.296
Direct axis transient open circuit time constant (sec) T'do.	7.81
Direct axis sub-transient open circuit time constant (sec) T"do.	NA
Stator Resistance (in Ohm) Ra.	9.79 m Ohm
Short circuit and Open circuit saturation characteristics curve of the generator for various terminal voltages.	Attached

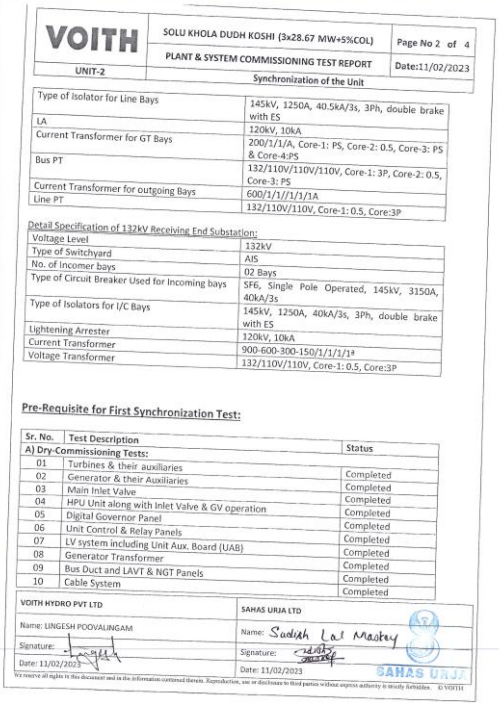
Generator Transformer:

Type of Transformer	3 Phase Transformer
Power Rating	35.5MVA
Voltage Rating	132/11kV
Cooling Type	ONAN/ONAF
Vector Group	YNd11

132kV Switchyard:

Voltage Level	132kV
Type of Switchyard	AIS
No. of Generator Incomer Bays	03 Bays
No. of Outgoing bays	02 Bays
Type of Circuit Breaker Used for Outgoing Line	SF6, Gang Operated, 145kV, 3150A, 40kA/3s
Type of Circuit Breaker Used for Outgoing GT Bay	SF6, Gang Operated, 170kV, 3150A, 40kA/3s
Type of Isolators for GT Bays	145kV, 1250A, 31.5kA/3s, 3Ph, double brake with ES

VOITH HYDRO PVT LTD	SAHAS URJA LTD
Name: LINGESH POOVALINGAM	Name: Sudrah Lal Maskey
Signature:	Signature:
Date: 11/02/2023	Date: 11/02/2023



VOITH	SOLU KHOLA DUDH KOSHI (3x28.67 MW+5%COL)	Page No 2 of 4
	PLANT & SYSTEM COMMISSIONING TEST REPORT	Date:11/02/2023
UNIT-2	Synchronization of the Unit	

Type of Isolator for Line Bays	145kV, 1250A, 40.5kA/3s, 3Ph, double brake with ES
LA	120kV, 10kA
Current Transformer for GT Bays	200/1/1/A, Core-1: PS, Core-2: 0.5, Core-3: PS & Core-4:PS
Bus PT	132/110V/110V/110V, Core-1: 3P, Core-2: 0.5, Core-3: PS
Current Transformer for outgoing Bays	600/1/1//1/1/1A
Line PT	132/110V/110V, Core-1: 0.5, Core:3P

Detail Specification of 132kV Receiving End Substation:

Voltage Level	132kV
Type of Switchyard	AIS
No. of Incomer bays	02 Bays
Type of Circuit Breaker Used for Incoming bays	SF6, Single Pole Operated, 145kV, 3150A, 40kA/3s
Type of Isolators for I/C Bays	145kV, 1250A, 40kA/3s, 3Ph, double brake with ES
Lightening Arrester	120kV, 10kA
Current Transformer	900-600-300-150/1/1/1/1
Voltage Transformer	132/110V/110V, Core-1: 0.5, Core:3P

Pre-Requisite for First Synchronization Test:

Sr. No.	Test Description	Status
A) Dry-Commissioning Tests:		
01	Turbines & their auxiliaries	Completed
02	Generator & their Auxiliaries	Completed
03	Main Inlet Valve	Completed
04	HPU Unit along with Inlet Valve & GV operation	Completed
05	Digital Governor Panel	Completed
06	Unit Control & Relay Panels	Completed
07	LV system including Unit Aux. Board (UAB)	Completed
08	Generator Transformer	Completed
09	Bus Duct and LAVT & NGT Panels	Completed
10	Cable System	Completed

VOITH HYDRO PVT LTD	SAHAS URJA LTD
Name: LINGESH POOVALINGAM	Name: Sudrah Lal Maskey
Signature:	Signature:
Date: 11/02/2023	Date: 11/02/2023

11	Excitation system	Completed
12	Control system	Completed
13	DC system (Part of Common Plant)	Completed
14	11kV MV Panels	Completed
15	Bus bar & Line Control Panels	Completed
16	Secondary injection test for the protection relays	Completed
17	Primary injection Tests	Completed
18	IR & Insulation test of all equipment	Completed
19	Signal Test	Completed
20	Dry-operation & Remote control test	Completed
21	Protection trip circuit test	Completed
22	NEA Communication setup & test	Completed
B) Wet-Commissioning Tests:		
01	Mechanical Spinning test run at rated RPM	Completed
02	Automation of the Unit & trail operation	Completed
03	Vibration test at rated RPM	Completed
04	Bearing stability test run	Completed
05	Overspeed test	Completed
06	Protection Simulation & Trip Matrix Test	Completed
07	SCC (Short circuit characteristics) test	Completed
08	SCC Test including GT	Completed
09	Generator heat run test	Completed
10	Generator IR/PI Value Test	Completed
11	OCC (Open Circuit characteristics) test	Completed
12	Excitation Performance Tests	Completed
13	Fault simulation test	Completed
14	Phase Sequence & Dummy- Synch Test (Without NEA Grid)	Completed
C) Charging of 132kV Receiving end substation Bays:		
01	Charging of receiving bay circuit for stability test	Completed
02	Charging of transmission line circuit for stability test	Completed
D) Back Charging of Solukhola HEP 132kV Line-1 & Line-2 Outgoing Bay:		
01	132kV NEA Grid Availability and Back Charging of Line-1 & Line-2	09/02/2023
02	132kV NEA Grid Line Stability check after Back Charging of Line-1 and Line-2	24 hours
03	Back Charging of 132kV GT-2 Circuit Breaker	11/02/2023

VOITH HYDRO PVT LTD	SAHAS URJA LTD
Name: LINGESH POOVALINGAM	Name: Sudish Lal Maskey
Signature:	Signature:
Date: 11/02/2023	Date: 11/02/2023

Synchronization Test :

AVR operational mode	Auto
Turbine operation mode	Auto control from speed Governor
Synchronization mode	Manual
Test Load (Active Power)	3300 kW
Rated Load	33000kW
Power Factor	Inductive 0.85
First Synchronizing/ Test Operation	11/02/2023

Test Results: Unit-2 has been synchronized successfully with the Grid and all parameters are found normal. Further Unit-2 is ready for 72 hours Trail Run.

VOITH HYDRO PVT LTD	SAHAS URJA LTD
Name: LINGESH POOVALINGAM	Name: Sudish Lal Maskey
Signature:	Signature:
Date: 11/02/2023	Date: 11/02/2023

Specification of Equipments:

Turbine:

Type of turbine.	Vertical Pelton
No. of jets	6
Net Head (Mtr)	598.09

Synchronous Generator:

Rated terminal voltage (kV)	11
Rated MVA and MW (Major)	34.8MVA & 28.67MW
Inertia constant (MW sec / MVA) H	1.15
Reactive power capability curve. (Major)	Attached
Additional capacity (MW) obtainable from Generating Units in excess of Nes Declared Capability	36.54MVA
Direct axis synchronous reactance (% on MVA) Xd.	1.802
Direct axis transient reactance (% on MVA) X'd.	0.335
Direct axis sub-transient reactance (% on MVA) X"d.	0.304
Quadrature axis synchronous reactance (% on MVA) Xq.	0.999
Quadrature axis sub-transient reactance (% on MVA) Xq.	0.296
Direct axis transient open circuit time constant (sec) T'd0.	7.81
Direct axis sub-transient open circuit time constant (sec) T"do.	NA
Stator Resistance (in Ohm) Ra.	9.79 m Ohm
Short circuit and Open circuit saturation characteristics curve of the generator for various terminal voltages.	Attached

Generator Transformer:

Type of Transformer	3 Phase Transformer
Power Rating	35.5MVA
Voltage Rating	132/11kV
Cooling Type	ONAN/ONAF
Vector Group	YNd11

132kV Switchyard:

Voltage Level	132kV
Type of Switchyard	AIS
No. of Generator Incomer Bays	03 Bays
No. of Outgoing bays	02 Bays
Type of Circuit Breaker Used for Outgoing Line	SF6, Gang Operated, 145kV, 3150A, 40kA/3s
Type of Circuit Breaker Used for Outgoing GT Bay	SF6, Gang Operated, 170kV, 3150A, 40kA/3s
Type of Isolators for GT Bays	145kV, 1250A, 31.5kA/3s, 3Ph, double brake with ES

VOITH HYDRO PVT LTD	SAHAS URJA LTD
Name: LINGESH POOVALINGAM	Name: Sudish Lal Maskey
Signature:	Signature:
Date: 10/02/2023	Date: 10/02/2023

Type of Isolator for Line Bays	145kV, 1250A, 40.5kA/3s, 3Ph, double brake with ES
LA	120kV, 10kA
Current Transformer for GT Bays	200/1/1/A, Core-1: PS, Core-2: 0.5, Core-3: PS & Core-4:PS
Bus PT	132/110V/110V/110V, Core-1: 3P, Core-2: 0.5, Core-3: PS
Current Transformer for outgoing Bays	600/1/1//1/1/1A
Line PT	132/110V/110V, Core-1: 0.5, Core:3P

Detail Specification of 132kV Receiving End Substation:

Voltage Level	132kV
Type of Switchyard	AIS
No. of Incomer bays	02 Bays
Type of Circuit Breaker Used for Incoming bays	SF6, Single Pole Operated, 145kV, 3150A, 40kA/3s
Type of Isolators for I/C Bays	145kV, 1250A, 40kA/3s, 3Ph, double brake with ES
Lightening Arrester	120kV, 10kA
Current Transformer	900-600-300-150/1/1/1/1[a]
Voltage Transformer	132/110V/110V, Core-1: 0.5, Core:3P

Pre-Requisite for First Synchronization Test:

Sr. No.	Test Description	Status
A) Dry-Commissioning Tests:		
01	Turbines & their auxiliaries	Completed
02	Generator & their Auxiliaries	Completed
03	Main Inlet Valve	Completed
04	HPU Unit along with Inlet Valve & GV operation	Completed
05	Digital Governor Panel	Completed
06	Unit Control & Relay Panels	Completed
07	LV system including Unit Aux. Board (UAB)	Completed
08	Generator Transformer	Completed
09	Bus Duct and LAVT & NGT Panels	Completed
10	Cable System	Completed

VOITH HYDRO PVT LTD	SAHAS URJA LTD
Name: LINGESH POOVALINGAM	Name: Sudish Lal Maskey
Signature:	Signature:
Date: 10/02/2023	Date: 10/02/2023

11	Excitation system	Completed
12	Control system	Completed
13	DC system (Part of Common Plant)	Completed
14	11kV MV Panels	Completed
15	Bus bar & Line Control Panels	Completed
16	Secondary injection test for the protection relays	Completed
17	Primary injection Tests	Completed
18	IR & Insulation test of all equipment	Completed
19	Signal Test	Completed
20	Dry-operation & Remote control test	Completed
21	Protection trip circuit test	Completed
22	NEA Communication setup & test	Completed
B) Wet-Commissioning Tests:		
01	Mechanical Spinning test run at rated RPM	Completed
02	Automation of the Unit & trail operation	Completed
03	Vibration test at rated RPM	Completed
04	Bearing stability test run	Completed
05	Overspeed test	Completed
06	Protection Simulation & Trip Matrix Test	Completed
07	SCC (Short circuit characteristics) test	Completed
08	SCC Test including GT	Completed
09	Generator heat run test	Completed
10	Generator IR/PI Value Test	Completed
11	OCC (Open Circuit characteristics) test	Completed
12	Excitation Performance Tests	Completed
13	Fault simulation test	Completed
14	Phase Sequence & Dummy- Synch Test (Without NEA Grid)	Completed
C) Charging of 132kV Receiving end substation Bays:		
01	Charging of receiving bay circuit for stability test	Completed
02	Charging of transmission line circuit for stability test	Completed
D) Back Charging of Solukhola HEP 132kV Line-1 & Line-2 Outgoing Bay:		
01	132kV NEA Grid Availability and Back Charging of Line-1 & Line-2	09/02/2023
02	132kV NEA Grid Line Stability check after Back Charging of Line-1 and Line-2	24 hours
03	Back Charging of 132kV GT-3 Circuit Breaker	12/02/2023

VOITH HYDRO PVT LTD	SAHAS URJA LTD
Name: LINGESH POOVALINGAM	Name: Sudish Lal Maskay
Signature:	Signature:
Date: 10/02/2023	Date: 10/02/2023

Synchronization Test :

AVR operational mode	Auto
Turbine operation mode	Auto control from speed Governor
Synchronization mode	Manual
Test Load (Active Power)	3300 kW
Rated Load	33000kW
Power Factor	Inductive 0.85

First Synchronizing/ Test Operation	12/02/2023

Test Results: Unit-3 has been synchronized successfully with the Grid and all parameters are found normal. Further Unit-3 is ready for 72 hours Trail Run.

VOITH HYDRO PVT LTD	SAHAS URJA LTD
Name: LINGESH POOVALINGAM	Name: Sudish Lal Maskay
Signature:	Signature:
Date: 10/02/2023	Date: 10/02/2023

Annexure: Combined Emission Reduction Calculations

Year	2022	2023	2024
Month			
January		7126680	31872180
February		5339140	26418520
March		12453450	23281640
April		23755320	22581210
May		24999740	22254290
June		33988050	29496440
July		49860130	63497970
August		70590660	73692600
September		69860740	79414640
October	2820340	71774700	68617900
November	4915620	61303460	70828810
December	8482470	44803270	50258720
TOTAL	**16218430**	**177881430**	**189705430**

Year	Total electricity delivered to grid in kWh	Verified Electricity delivered in /1000 MWh	Recommended emission factor tCO2/MWh	Total CoU generated
2022	16218430.00	16218.43	0.9	14596
2023	475855340.00	475855.34	0.9	428269
2024	562214920.00	562214.92	0.757	425596
TOTAL		**1054288.69**		**868461**