

SUSTAINABLE DEVELOPMENT MONITORING PLAN

DAGACHHU HYDRO POWER CORPORATION LIMITED (2746)

1. Introduction

This monitoring plan is prepared in accordance with the requirements under the Article 6.4 Mechanism and the applied CDM methodology ACM0002. It outlines how emission reductions and sustainable development co-benefits will be monitored following the transition of the Dagachhu Hydropower Project from CDM to Article 6.4.

2. Purpose

This monitoring plan describes how the implementation and operation of the Dagachhu Hydropower Project will be monitored to:

- ✓ Track emission reductions in accordance with the registered CDM methodology (ACM0002)
- ✓ Monitor any emissions from backup fossil fuel use
- ✓ Ensure delivery of sustainable development benefits
- ✓ Comply with the Article 6.4 transition requirements

3. Methodology

Applied CDM Methodology: ACM0002 – Consolidated methodology for grid-connected electricity generation from renewable sources

- ✓ Baseline scenario: Grid electricity (dominated by thermal power) in Bhutan and India
- ✓ Project scenario: Renewable hydroelectric power displacing baseline electricity

4. Parameters to Be Monitored

Parameter	Unit	Monitoring Method / Source	Frequency
Net electricity supplied to the grid (EGy)	MWh/year	SCADA System and Billing Records	Continuous
Emission factor of grid (EFgrid)	tCO ₂ /MWh	Published by grid operators (Bhutan/India)	Annual
CO ₂ emission reductions	tCO ₂ /year	Calculated: EGy × EFgrid	Annual
Backup diesel fuel consumption	Litres/year	DG fuel logbook and invoices	Monthly
CO ₂ emissions from backup fuel	tCO ₂	Calculated using IPCC default EF for diesel	Annual
Threshold compliance for backup fuel (<1%)	% of total ER	Compare backup emissions to total ER	Annual

5. Monitoring Table for 8 Sustainable Development Indicators

Sl. No	SD Indicator	Pre-Project Baseline	Monitoring Method / Data Source	Observed / Expected Impact	Unit of Measurement	Monitoring Frequency
1	Renewable Energy & Energy Security	Electricity supply was limited to a 200-kW mini-hydro and fossil fuels (LPG, kerosene, firewood), with frequent shortages in lean season.	Generation records (GWh); grid export/import balance; household energy-use surveys; grid reliability records.	Enhanced grid reliability, reduced fossil fuel reliance, expanded rural electrification, supported Bhutan's self-sufficiency.	MWh/year	Annual
2	Economic Benefits	Minimal economic opportunities, weak private sector.	Revenue and Employment records; land lease agreements; contractor contracts.	New income opportunities from contracts, land leasing, agriculture and service businesses.	No. of Jobs/contract awarded	Annual
3	Environmental Conservation	Due to poor accessibility to Electricity, most of the household depend on firewood and fossil fuels as source of energy for lighting & cooking leading to deforestation.	Afforestation carried out and Financial Support for environment	Watershed and forest conservation programs, designated waste sites, lake revival initiatives.	No. of trees planted /amount spent for Environment	Annual
4	Employment Opportunities	Few formal jobs in Dagana; majority engaged in subsistence agriculture.	HR employment records; contracts awarded; disaggregated by gender.	81 employees hired including 20 from the local community; skills development and capacity building.	No. of Job provided/ No. of trainings provided	Annual
5	Community Development	Schools with poor infrastructure, limited exposure to large projects; poor road access and limited healthcare facilities.	CSR records; training and site visit reports; community surveys.	Improved schools, healthcare, access roads, revival of lakes, and financial support to local institutions.	No. of facilities improved; Nu/year CSR spend	Annual
6	Cross-Border Cooperation	Minimal energy trade with India.	Power purchase agreements; export/import statistics.	Export of clean electricity to India; strengthened bilateral cooperation.	MWh/year exported	Annual
7	Long-Term Socio-Economic	Communities relied mainly on subsistence farming and seasonal labor, with low incomes, few jobs,	Stakeholder consultations; Consumer satisfaction surveys;	More reliable electricity supply; improved stakeholder satisfaction; stronger community	% stakeholder satisfaction; No. of	Annual

	Benefits	high youth outmigration, and poor infrastructure.	CSR activity records.	benefits.	household benefited	
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6. Data Management

- All monitoring data will be stored digitally and physically for a period of **10 years**.
- All records will be available for inspection by the Designated Operational Entity (DOE), Article 6.4 Supervisory Body, or National Authority upon request.
- Data logs will include source, date of collection, responsible staff, and any deviation from baseline or prior years.

7. Verification

- ✓ Internal review: An internal audit team from DHPC will conduct a review once per year.
- ✓ Third-party verification: A DOE will review the SD co-benefit performance at least once every crediting period or as required under the Article 6.4 rules.
- ✓ Stakeholder engagement: Local community members and authorities will be consulted annually to validate perceived social benefits and allow grievance redressal.

8. Alignment with SDGs

The monitoring plan supports and tracks contribution to the following Sustainable Development Goals (SDGs):

SDG	Related Parameter	Corresponding SD Indicator (from Section 5)
SDG 3 – Good Health & Well-being	Water safety, health screenings, access roads	Community Development (5)
SDG 4 – Quality Education	Support to schools, internships	Community Development (5)
SDG 7 – Affordable & Clean Energy	Renewable energy generation, access	Renewable Energy Generation & Energy Security (1)
SDG 8 – Decent Work & Economic Growth	Job creation, safety standards	Employment Opportunities (4), Economic Benefits (2)
SDG 9 – Industry, Innovation & Infrastructure	Roads, telecom, hydropower tech	Community Development (5), Long-term Socio-Economic Benefits (7)
SDG 13 – Climate Action	GHG reduction, fossil fuel displacement	Renewable Energy Generation & Energy Security (1), Environmental Conservation (3)
SDG 15 – Life on Land	Afforestation, watershed conservation	Environmental Conservation (3)
SDG 17 - Partnerships for the Goals	Cross-border electricity trade, regional cooperation	Cross-Border Cooperation (6)



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