ADDENDUM TO DESIGN DOCUMENT FOR CDM ACTIVITY TRANSITION REQUEST[1] (Version 01.0)

Title and UNFCCC reference number of activity	**Dagachhu Hydropower Project, Bhutan (2746)**
Environmental and social impacts	*Provide a summary of the environmental and social impacts and sustainable development benefits of the transitioning clean development mechanism (CDM) activity, and attach to this form a report prepared in accordance with the "Standard: Transition of CDM activities to the Article 6.4 mechanism" (hereinafter referred to as "transition standard"):* 1. Environmental impacts >>The project being a renewable and hydro based do not have any emission of SOx, NOx, fly ash, and Suspended Particulate Matter (SPM), which are typically generated from conventional fossil-fuel-based power generation. Thereby contributing to improvement of Air quality. Further environmental contributions include: • **Solid waste management**: The project promotes responsible end-of-life disposal and reused wherever possible. Thus reducing the solid waste. Other waste are disposed off at designated dumping yard approved by government. • **Watershed conservation**: Financial support are being extended for the revival and conservation of lakes and watershed zones, improving water security in the region. The use of the water for energy generation is as per the Water Act of Bhutan. • **Reduced pressure on forest ecosystems**: The project activity helps reduce the use of firewood and minimize deforestation through the provision of clean electricity. Though all the power are exported to India, the Project Activity supply power to domestic consumers when other plant are unable to supply ensuring reliable and easy access to electricity in the country and local communities. • and through the annual plantation saplings as part of afforestation drives. **Technology transfer and capacity building**: The project introduced latest hydropower technologies and trained local engineers and staff in their operation and maintenance. The Project adopts the latest hydropower and SCADA technologies imported from leading European manufacturers. Comprehensive

[1] This form is to be filled in, signed and submitted by the person authorized for scope (c) by the project participants of the clean development mechanism (CDM) project activity or programme of activities, as indicated in the modalities of communication submitted in accordance with the "CDM project cycle procedure for project activities" or "CDM project cycle procedure for programmes of activities" to the secretariat within 180 days of the publication of the host Party approval of the transition in accordance with the "Procedure: Transition of CDM activities to the Article 6.4 mechanism" available at: https://unfccc.int/sites/default/files/resource/A6.4-PROC-AC-001.pdf. The secretariat may convert this form into an electronic interface for the submission of this document, in which case the signature will be replaced with electronically secure means.

training for Bhutanese engineers and technicians in installation, operation, and maintenance has enhanced local technical capacity and institutional knowledge. This technology transfer and capacity building reduce dependence on foreign expertise, create skilled employment opportunities for local communities, and support the Government's goal of developing a self-reliant national workforce in the hydropower sector. The improved competencies also enable knowledge sharing across other projects, fostering sustainable growth of Bhutan's renewable energy industry

The Project activity is certified in **ISO 14001:2015 Environment Management System.** Further the National Environment Commissioning of Bhutan **regularly** monitors the project activity to ensure compliance with the requirements of Environment Act.

2. Social impacts

>>The Dagachhu Hydropower Project significantly contributed to the improvement of socio-economic conditions in Bhutan, particularly in Dagana District and surrounding communities. Beyond infrastructure development, the project delivered a wide array of tangible and sustained social benefits, including:

Improvement of income sources

The project opened opportunities for locals to generate income by leasing their land and renting construction machinery to contractors. In addition, villagers engaged in selling agricultural produce and locally-sourced materials to the project site, promoting rural entrepreneurship and diversifying household revenue streams in an area previously dependent on subsistence farming.

Employment

The project has employs about 12-15 locals on short term and 24 individuals in long-term operational roles. These included positions in support services, and administrative functions.

Job-related training, skill development, and internships

Technical training and capacity-building programs were provided to staff and local workers, equipping them with knowledge in electrical and mechanical systems, safety standards, and plant operations. The project also hosted engineering students from Bhutanese institutions as interns, exposing them to real-world hydropower systems and strengthening the national technical workforce.

Improved working conditions

The project adopted occupational health and safety practices consistent with ISO 45001:2018 Occupational health and safety management systems standards. This included the use of personal protective equipment (PPE), regular safety drills, structured incident reporting, and health screenings. These measures fostered a safety-first culture and set new benchmarks for industrial work environments in the region.

Health Improvement

Before the implementation of the project activity, travel time from Dagana to key urban centers such as Thimphu and Gelephu ranged from 8 hours to over a full day, significantly delaying medical referrals to regional hospitals. Health workers were often required to walk for several days to reach remote communities, limiting the reach and effectiveness of health campaigns. Basic public health

practices—such as safe drinking water testing, food preservation, or water boiling—were largely unknown or inaccessible to the local population.

The implementation of the Dagachhu Hydropower Project led to the construction and improvement of access roads across the project area. These roads not only facilitated project logistics but also significantly improved local mobility. As a result, travel time was reduced, and remote communities gained year-round access to health services. Health campaigns could now reach a wider population, contributing to improvements in public health.

Furthermore, the project regular testing its drinking water sources which is shared among the communities, leading to a decline in waterborne diseases. The project's adherence to ISO 45001:2018 (Occupational Health and Safety Management Systems) also served as a model for safe working practices. It helped foster a culture of safety awareness among workers and local residents, contributing to a reduction in work-related injuries and enhancing overall wellbeing in the project region.

Support for Education

Recognizing education as a driver of social upliftment, the project supported nearby schools by funding transportation for students, improving sanitation facilities, and providing support for clean drinking water. Additionally, waste management assistance was extended to local institutions, helping maintain hygienic and healthy environments for children.

Site visits and energy awareness

The project actively engaged with local schools by organizing guided visits to the power plant, allowing students and teachers to observe hydropower operations and environmental sustainability practices. These interactions helped raise awareness about renewable energy and inspired interest in science, engineering, and environmental stewardship among Bhutanese youth.

Contribution to poverty alleviation

By providing reliable employment, steady income, and community contracting opportunities, the project played a key role in reducing poverty in surrounding areas. Many households experienced improved financial resilience, with income used for education, healthcare, and home improvements. Women were also given equal opportunities for employment and contracting.

Business development

The presence of the project catalyzed the establishment of local businesses, such as shops, eateries, transport services, and equipment suppliers, many of which continue to thrive beyond the construction phase. This has contributed to the emergence of a local service economy in previously underdeveloped villages.

Transportation and telecommunications infrastructure

The project improved local connectivity by constructing access roads and rehabilitating existing routes, which significantly reduced travel time and improved mobility. Simultaneously, telecommunications infrastructure was enhanced through network coverage expansion and installation of digital communication

systems, contributing to digital inclusion in remote areas.

At the national level, although the electricity generated is exported to India, the resulting revenue has contributed to Bhutan's foreign exchange earnings, fiscal stability, and reinvestment into social sectors such as health, education, and rural electrification. The PA supports Bhutan's long-term hydropower strategy and its identity as a net carbon sink, aligned with its constitutional mandate for environmental preservation and sustainable development.

Therefore, even as a cross-border power export project, the PA demonstrably delivers tangible and measurable benefits across local communities and the broader national development landscape.

3. Sustainable development benefits

>>The Dagachhu Hydro Power Plant, located in Bhutan, is a significant project that contributes to sustainable development. Here are some of its sustainable development benefits:

1. Renewable Energy Generation, SDG7 & SDG 13

- The plant generates clean and renewable energy, reducing reliance on fossil fuels and lowering greenhouse gas emissions.
- It contributes to Bhutan's goal of maintaining carbon neutrality and supports global efforts to combat climate change.

2. Economic Benefits SDG 8

- Revenue generation through the export of electricity boosts Bhutan's economy.
- Revenue through Emission Reduction have also boosted country economic and have benefit the local community.

3. Environmental Conservation SDG 15

- Dagachhu have minimal environmental footprints compared to fossil fuel plants.
- The plant supports Bhutan's commitment to environmental preservation, which aligns with the nation's Gross National Happiness (GNH) philosophy and Bhutan goal to remain carbon negative.

4. Employment Opportunities SDG 8

- Dagachhu have provided employment opportunities to Local Communities during construction and operation phase boosting local employment.
- It also facilitates skill development and capacity building among the local workforce.

5. Community Development SDG 3, SDG 4 and SDG 9

- Dagachhu have contributed to regional development by improving local infrastructure, such as roads, healthcare, and education facilities.
- Communities in project vicinity have benefit the following
    - Improved access road
    - Transportation facilities access to electricity and related economic activities.
    - Financial Support for improvement of infrastructure like road, revival of lakes (source of drinking water)

- Financial support of improvement facilities at schools, Hospital and religious body.

6. Cross-Border Cooperation SDG 17

- By exporting clean energy, the project strengthens regional cooperation and energy trade between Bhutan and India, fostering goodwill and sustainable regional development.

7. Long-Term Socio-Economic Benefits SDG 9

- Resilient Economy: Diversifies Bhutan's economy, improves trade balance, enhances self-reliance, and reduces dependency on external aid.
- Empowerment of Local Communities: Revenue from the project supports education, healthcare, and social services, enhancing quality of life.

Justification of Sustainable Development Indicators

Health Improvement

The construction of project access roads has significantly improved the connectivity thereby reducing travel time to healthcare centers, enabling quicker access to emergency and routine care.
The water test conducted project benefited the community as the water source is shared with community, improving public hygiene and reducing waterborne disease.
ISO 45001:2018 implementation promoted occupational health and safety, raising community awareness of workplace risks and safe practices.

Baseline Scenario:

Limited or no road connectivity led to long delays in healthcare access; health workers walked for days to reach some villages.
Lack of water testing and poor sanitation contributed to high incidence of waterborne diseases.
No formal safety systems were in place at local workplaces.

2. Cost Savings from Fossil Fuel Displacement

Although electricity is exported, the infrastructure built for the project activity have helped transmission and distribution company to expedite rural electrification. Further the revenue earned by government and corporation from the project activity have enabled them to improve the infrastructure and facilities in the area.
This leads to local households switching from firewood to subsidized grid electricity—resulting in long-term fuel cost savings.

Baseline Scenario:

Households relied on firewood for cooking and heating, and used kerosene for lighting.
These sources were both costly and environmentally harmful.

3. Local Business Growth

	Improved infrastructure (roads, bridges, telecom) and influx of project-related employment boosted the development of small businesses (retail, logistics, machinery hire, fuel depots). Contractors and workers sourced goods and services from local entrepreneurs. **Baseline Scenario:** Limited economic activity due to poor connectivity and lack of demand. Few established businesses and low cash flow in rural areas. **4. Energy Access** National electrification efforts are funded partly by hydropower export revenues, including Dagachhu's. Grid investments made possible by these revenues extend access to clean energy in rural Bhutan, improving access to energy. **Baseline Scenario:** Households in remote areas lacked electricity or depended on non-renewable energy sources. School children used kerosene lamps for studying, affecting health and education.
Non-permanence risk	☒ **The transitioning activity uses fossil fuel for co-firing or as a backup fuel** *If this box is ticked, describe the monitoring plan to account for emissions from the use of fossil fuel in accordance with the transition standard.* >> The Project activity occasionally uses diesel as a backup fuel source during grid failures. It is reflected in the Monitoring Plan: • Monitoring parameter: Backup diesel fuel consumption (litres/year) – monitored monthly through DG running hours/fuel consumption maintained in DG logbooks • Emission accounting: CO2 emissions from diesel use are calculated annually using IPCC default emission factors. • Threshold compliance: Backup fuel emissions are compared against the total emission reductions each year to ensure they remain below the 1% limit specified in the methodology. • Data management: Records of fuel consumption and emissions are archived for at least 10 years, ensuring traceability and verification by the DOE, Supervisory Body, or National Authority. This approach ensures that all fossil fuel used as backup during grid electricity failure is transparently monitored and fully accounted for in emission reduction calculations, thereby mitigating non-permanence risk. ☐ **The transitioning activity applies one or more of the CDM methodologies listed as having a risk of negative emission reductions in paragraph 29 of the transition standard** *If this box is ticked, describe (i) the outcome of the assessment to*

	determine whether there was any accrual of net negative emission reductions in the past; and (ii) the monitoring plan to take into account such negative emission reductions in emission reductions occurring from 2021 in accordance with the transition standard. >>

	☐ **The transitioning activity applies one or more of the CDM methodologies listed as having a risk of non- permanence in paragraph 30 of the transition standard** ☐ *The fraction of non-renewable biomass (fNRB) value and/or discount factor for addressing leakage have been re-evaluated based on the latest information.* *Describe the outcome of the re-evaluation:* >> ☐ *Neither the fNRB nor the discount factor for addressing leakage are re-evaluated.*
	☐ **The transitioning activity is none of the above**
Compliance with the registered design document, including the application of the currently applied CDM methodology *Tick the applicable box*	☒ **No post-registration change (PRC) occurred since 2021:** I hereby confirm that the transitioning CDM activity has been implemented and monitored in accordance with the registered project design document (PDD), or programme of activities design document (PoA-DD) and component project activity design documents (CPA-DDs), as displayed on the project
	☐ **A PRC occurred since 2021:** I hereby confirm that I will seek approval of the PRC to the transitioning CDM activity under the mechanism established by Article 6, paragraph 4, of the Paris Agreement (Article 6.4 mechanism) after its transition to the Article 6.4 mechanism, noting that the PRC may not be approved by the Supervisory Body for the Article 6.4 mechanism. This may impact the crediting of Article 6, paragraph 4, emission reductions for the activity occurring after the PRC.
I confirm that the information provided in this form is correct	Date (15/10/2025):
	Names of the entity and the representative of the project participants[2]: Dagachhu Hydro Power Corporation Limited Namgay Dorji
	Signature: 

[2] Please write the name of the focal point entity designated by the project participants of the CDM project activity or PoA for scope (c) and the name of its representative as communicated to the secretariat in the modalities of communication in accordance with the relevant provisions in the "CDM project cycle procedure for project activities" or the "CDM project cycle procedure for programmes of activities", respectively available at: https://cdm.unfccc.int/Reference/Procedures/index.html

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