# Project Information Document/ Identification/Concept Stage (PID)

Concept Stage | Date Prepared/Updated: 25-Sep-2020 | Report No: PIDC225036

## BASIC INFORMATION

### A. Basic Project Data

| Project ID | Parent Project ID (if any) | Environmental and Social Risk Classification | Project Name |
|---|---|---|---|
| P174327 | | High | Sustainable Hydropower Development Project |
| **Region** | **Country** | **Date PID Prepared** | **Estimated Date of Approval** |
| SOUTH ASIA | Bhutan | 25-Sep-2020 | |
| **Financing Instrument** | **Borrower(s)** | **Implementing Agency** | |
| Investment Project Financing | Druk Green Power Corporation Limited, Department of Hydropower and Power Systems, Ministry of Economic Affairs, Royal Government of Bhutan | Druk Green Power Corporation Limited | |

## PROJECT FINANCING DATA (US$, Millions)

### SUMMARY

| | |
|---|---|
| **Total Project Cost** | 3.93 |
| **Total Financing** | 3.93 |
| **Financing Gap** | 0.00 |

### DETAILS

**Non-World Bank Group Financing**

| | |
|---|---|
| Counterpart Funding | 1.43 |
| Borrower/Recipient | 1.43 |
| Trust Funds | 2.50 |
| South Asia Regional Integration Partnership | 2.50 |

## B. Introduction and Context

### Country Context

Bhutan is a small landlocked country nestled deep in the Himalayas with steep mountains and deep valleys, and scattered settlements. Nearly half the land area is protected to help to preserve biodiversity. Bhutan is the only carbon-negative country in the world. In fact, the country's constitution stipulates that 60 percent of all land must be covered by forests at any time. This constitutional requirement is indicative of Bhutan's commitment to preserving the unique natural, cultural, historic, and religious characteristics of the country. Bhutan's independence throughout its history has helped preserve its rich heritage and traditions. The country was under an absolute monarchy until 2008 when it adopted the current constitution and transitioned to democratic constitutional monarchy. Bhutan started opening up to the outside world only in the early 2000s. Today, its political and economic ties are mainly with India.

Bhutan is the only country in the world to adopt an approach to development that does not focus on economic growth and per capita income. Under this development paradigm, Bhutan seeks to maximize happiness as the guiding metric for development, instead of pursuing purely economic growth. Bhutan's overall unique philosophy is expressed by Bhutan's Gross National Happiness (GNH) as guiding principle of development. Coined in 1972 by its Fourth King, Jigme Singye Wangchuck, GNH stands for "development with […] fundamental values of kindness, equality and humanity and the necessary pursuit of economic growth." Self-sufficiency, preservation, and conservation of environment and culture remain at the heart of Bhutan's approach to development. This approach is grounded in four pillars: (i) sustainable and equitable socio-economic development; (ii) preservation and promotion of culture; (iii) conservation and sustainable utilization and management of the environment; and (iv) promotion of good governance. In July 2011, Bhutan's proposal for "Happiness: Towards a Holistic Approach to Development" was unanimously adopted by the 193-state members at the United Nations, officially placing the country's Gross National Happiness (GHN) development philosophy in the global development arena.

Bhutan's philosophy of preservation and conservation has been coupled with rapid development progress and economic growth in the last decade. Driven mainly by hydropower development and electricity exports to India, and despite its challenging geographic settings, the country has experienced rapid growth and poverty reduction. Since the early 1980s, real GDP has grown at average 7.5 percent annually, making Bhutan one of the fastest growing countries in the world. With a Gross National Income (GNI) per capita at US$3,080 in 2018, the country is approaching the threshold for upper middle-income countries and is expected to graduate from the list of Least Developed Countries (LDCs) by 2023.

Bhutan has also experienced significant poverty reduction. The official poverty headcount declined from 23.2 percent in 2007 to 12 percent in 2012, and then further to 8.2 percent in 2017. Extreme poverty, measured at US$1.90 per day, fell below 2 percent in 2017. Poverty reduction was likely driven by improvements in agricultural productivity and better prices of cash crops. However, poverty is highly concentrated in rural areas, and there is wide variation in poverty across districts. Bhutan performs relatively well in shared prosperity, measured as the per capita consumption growth of the bottom 40 percent, though progress has slowed down in recent years: between 2007 and 2012, the consumption growth of the bottom 40 percent grew by an annualized rate of 5.2 percent, but the consumption growth rate fell to 2.6 percent between 2012

and 2017. This stands in contrast to the acceleration of consumption growth of the average of all households from 4.2 percent during 2007-2012 to 4.8 percent during 2012-2017. Despite large improvements across broad measures of monetary and non-monetary welfare, vulnerability is high, partly because rural households are exposed to various uninsured risks

Large-scale hydropower projects have provided fiscal space and multiplier effects for the government to invest in human and physical capital, allowing the country to significantly improve service delivery and educational and health outcomes. Access to electricity has become almost universal. The state-led hydropower sector currently accounts for around 13 percent of GDP, and 20 percent of export receipts and domestic revenues. Hydropower projects drive economic growth through boosting aggregate demand, both during the construction phase and when projects are commissioned. The existing hydropower projects are financed mostly by India based on special inter-governmental agreement with all surplus hydroelectricity (i.e. 70 percent) exported to India. In addition to hydropower, tourism is also a major sector in the Bhutanese economy. Since Bhutan opened to international tourists in 1974, tourism has grown to become the highest foreign currency earning sector in Bhutan, accounting for about 20 percent of its non-hydro export income. Notwithstanding this, economic growth slowed to an estimated at 3.9 percent in 2018/19, with Real GDP growth averaging 5.5 percent in the past five years, slightly below the South Asian average. On the demand side, growth has primarily been driven by private consumption and investment while on the supply side, growth has been supported by the services sector, mainly transport and communication, retail, and hotels and restaurants.



The COVID-19 pandemic has had an immediate impact on Bhutan. A global slowdown in growth and severe travel restrictions are affecting Bhutan's economy through a sharp drop in tourism, which has been the secondary driver of growth in the country after hydropower. Bhutan is furthermore impacted through reduced demand for its (non-hydro) exports and import disruptions. In addition to reducing economic activity, these developments are expected to reduce public revenue collection, affect the prices of imported goods and increase public expenditure.

Greater regional cooperation has the potential to produce significant economic gains, and accelerate shared growth and poverty reduction, across all the countries of South Asia. Hitherto inadequately connected regions in the Himalayas spanning across Afghanistan, Bhutan, India Nepal and Pakistan or the riverine communities in the Sundarbans delta can benefit immensely - socially and economically - from increased intra-regional trade and connectivity. In particular, landlocked countries such as Bhutan have the need and potential for substantial gains by achieving efficient forms of connectivity to countries of the region and beyond.

Bhutan has been at the forefront of regional cooperation in South Asia, forming an integral part of several platforms (such as BBIN – Bangladesh, Bhutan, India, Nepal Initiative) and signatory to key agreements. A key pillar of the World Bank's regional integration program in South Asia supports the formation of regional electricity markets which would enable Bhutan to diversify its markets for hydropower. Similarly, facilitation and adoption of regional approaches to management of transboundary river basins will improve water

resources information systems, climate resilient planning for hydropower sector and enhanced water security.

Supporting development in Bhutan means to maintain a balance between the country's constitutional commitment to cultural preservation and environmental and conservation on the one hand, and the need for a diversified economy. A successful development model needs to account for the country's unique philosophy by supporting the development model of GNH through promoting diversification and private sector growth with a particular emphasis on equity and resilience. An outward-oriented growth model led by private sector growth, regional and global integration faces inherent tensions with the country's traditional adherence to conservation and a cautious, State-managed approach to development. Therefore, a nuanced and long-term approach to private sector growth will be important, allowing for slow adaptation that does not contradict the country's philosophy.



Sectoral and Institutional Context

**Bhutan has a significant untapped hydropower potential.** Drained by the watershed of the Brahmaputra river basin, Bhutan has considerable hydropower generation potential. The Power System Master Plan, last updated in 2004, estimates the overall hydropower potential at 30,000 MW. To date, the RGoB has identified individual projects with a total projected installed capacity of more than 25,000 MW, of which 1,606 MW has already been constructed and another 3,658 MW is under construction and scheduled to be completed by 2023/24. The favorable conditions, steep mountains and plenty of water resources, make the average cost of hydropower lower than in most other countries.

Sustainable hydropower development is a critical part of Bhutan's socio-economic development strategy. Hydropower revenues, from export sales of about 70% of hydropower generation to India, comprise about 27 percent of government revenues and 13 percent of GDP. Its share of GDP can rise to 30 percent when hydropower is under construction from jobs, supply chains, civil works, and services created. The revenues from hydropower through taxes, dividends and royalties will reach Nu 26 billion, or 36 percent of the total government revenues by the end of the 12th Five-Year-Plan (FYP, July 2018-June 2023). Gross value added to the economy will be Nu 65 billion, or 35 percent of GDP.

**Hydropower in Bhutan has faced significant technical and other constraints.** Significant delays in major hydropower projects delay expected government receipts and create other macroeconomic challenges. The hydropower projects so far developed in Bhutan have suffered complications due to unexpected complex geology and other technical challenges, which have resulted in significant cost-overruns and delays in commissioning. As more hydropower projects are commissioned, operational issues need increasing attention. In the short term, variation in rainfall and snowmelt from year to year leads to fluctuations in hydro production. Although the hydropower plants are technically designed to be sustainable and to withstand major floods, glacial outburst, and earthquakes, extreme events may temporarily disrupt operations for one or two of these projects (some of the hydropower plants are located in a cascade in the same river). If this occurs for major schemes, such as Tala Hydropower Project which today contributes to 60

percent of the power production, governmental revenues may be significantly hurt for the period of disruption. This emphasizes the need for development and implementation of a regulatory framework for good practices in development and construction, environmental and social stewardship and appropriate maintenance, dam safety regulations and inspections of hydropower plants to ensure resilience and sustainable development of this precious natural resource. Such measures will help to support a reliable and growing stream of revenues

**Financing new hydropower projects faces additional challenges.** Raising finance via bilateral arrangements will continue but the sheer size of financing requirements for new hydropower projects will require diversification of financing sources. In addition, the large size and scale of the hydro projects and the contracts make it difficult for local Bhutanese companies to meet the requirements and participate. Finally, new demands on public finances stemming from responses to the COVID-19 pandemic will be further impetus to explore various financing modes that can obtain the best terms to match the long term nature of hydropower plants.

The regional dialogue on cross-border electricity export in South Asia has been evolving. Sustainable hydropower development will enable Bhutan to contribute via electricity trade to system-wide CO2 emissions reductions from the power sectors of Bangladesh and India whose systems rely on fossil fuels for meeting rapidly growing demand. Bhutan's potential enables cleaner alternatives to flow regionally and can help provide important balancing services to complement India's rapidly scaling variable renewables. As a carbon neutral country, Bhutan is in a unique, win-win position to positively contribute to its neighbors' Nationally Determined Contributions. In addition, Bhutan's untapped potential can continue to contribute to a healthy development of a regional power market fueled by clean power. Bhutan's significant hydropower potential and favorable conditions make average cost of hydropower potentially among the lowest in the region. This contributes to the compelling case for greater regional connectivity in the sector. In parallel with its domestic contributions over the past decade, Bhutan's hydropower contributed to initial stages of developing a still nascent regional power market. Efforts are needed for Bhutan to diversify export markets and financing sources, and apply international good practices for sustainable hydropower development.

In 2018, the RGOB adopted National Guidelines for the Development and Construction of Hydropower. These Guidelines incorporate good international practices that aim to reduce technical risk, support cost effective development and integrate environmental and social considerations to avoid or mitigate negative impacts. Dam Safety Regulations and Guidelines on Standard Bidding Documents for Works in hydropower projects are expected to be adopted soon. The RGOB would like to develop its human and institutional capacity by applying this refreshed framework to the development of specific projects, an on-the-job, learning-by-doing approach. A request for such assistance was received from the Ministry of Finance on March 11, 2020.

The World Bank's has had a four-year engagement in supporting the development of this improved policy framework. Several other joint collaborations provided advice and capacity building on how Bhutan could develop hydropower sustainably, including: the application of the Hydropower Sustainability Assessment Protocol to the Mangdechhu HPP (2016), Status of Aquatic Biodiversity in Bhutan (2017), Development of the National Repository for Aquatic Biodiversity in Bhutan (2017), and the Cumulative Impact Assessment of the

Kuri-Gongri River Basin (including Dorjilung HPP) (2018). This forms a solid basis for moving toward applying this framework to specific projects.

Relationship to CPF

The proposed project is aligned with the WBG Country Partnership Framework (CPF) for Bhutan currently being developed. Specifically, the project would contribute to Focus Area 2 – "resilience", CPF Objective 2: Economic Resilience. This investment project would provide productive technical support to develop human and institutional capacity through the development of a hydropower project and by applying the RGOB's newly approved *Guidelines on Sustainable Hydropower Development* which the Bank helped to develop. The Bank has received an approval from the SARIC Trust Fund for a $3 million program to support the application of the regulatory framework to a proposed hydropower project and associated institutional capacity building. Based on need, the project may seek additional financing.



## C. Project Development Objective(s)

Proposed Development Objective(s)

The Project Development Objective is to strengthen the capacity of the power sector agencies in Bhutan to plan and prepare regional hydropower and transmission line projects following international good practices.

Key Results

Key Results Indicators proposed are: (a) 1000MW of hydropower capacity prepared; (b) 40km of transmission line length prepared; (c) Number of government agency officials and specialists' trained in hydropower planning and preparation.

This project would provide productive technical support to build capacity in Bhutan to develop hydropower applying international good practices. The RGOB's newly (2018) Guidelines for the Development and Construction of Hydropower reflect these international good practices. The RGOB has asked for support to build its capacity to apply these guidelines and international good practices to the development of new hydropower projects. It has selected the proposed 1,125 Dorjilung Hydropower Project as the candidate project for this purpose. Dorjilung is a potential candidate project for exporting power to Bangladesh (in addition to India) which would help to diversity its Bhutan's power export markets and contribute to the sustainable development of a regional power market.

## D. Preliminary Description

Activities/Components

Component 1. Preparation Studies/Technical Assistance for Hydropower Plant and Transmission Line Projects. The component will support preparation studies and technical assistance to support RGOB with

preparing the Dorjilung Hydropower Project (DHPP) (1,125MW) and associated transmission lines to be identified during preparation. It will finance (a) preparation studies for DHPP and associated transmission lines, including updated detailed project reports, geotechnical investigations, preliminary engineering designs, an Environmental and Social Impact Assessment and mitigation studies; (b) a dam safety panel of experts and an environmental and social risk management panel of experts.

The proposed Dorjilung Hydropower Project is a proposed pipeline project for development in the coming decade with a potential for export of clean energy to the South Asia power market (India and Bangladesh). The project is located on Kurichhu River, upstream of the existing Kurichhu Hydropower Plant (with an installed capacity of 60 MW and commissioned in 2002), in Mongar District about 450 km east of the capital Thimphu. The dam site is located about 7 km downstream of the small village of Autsho and the underground powerhouse at the confluence of Kurichhu and Shongarchhu rivers near the village of Kurizampa.



Component 2. Capacity Building for the Sustainable Development of Hydropower. The component will support capacity building of government agencies and Druk Green Power Corporation (DGPC) (Implementing Agency of the proposed Project) for managing the RGOB's policy and regulatory framework for hydropower development, and for hydropower management. It will finance studies, technical advice, computerized analytical tools and training for (a) regulatory reviews for major elements of hydropower projects; (b) project management, including environmental and social risk management.

The SHDP will support the RGOB's objective of apply its updated framework to new hydropower projects in the pipeline. The SDHP will build upon a three-year World Bank engagement resulting in *Guidelines for Sustainable Hydropower Development*, which have been adopted by RGOB. These incorporate good international practices that aim to reduce technical risk, support cost effective development and integrate environmental and social considerations to avoid or mitigate negative impacts. Additional studies conducted in those three years will inform future development and integrate consideration of environmental and social impacts. These include cultural heritage, a cumulative impact assessment of the Kuri-Gongri basin, the largest river basin in Bhutan and where DHPP is located, and a climate change assessment. Draft Dam Safety Guidelines were also developed and under consideration by RGOB.

SDHP will be financed with grant financing mobilized by the World Bank and with counterpart financing. Note that there has been no decision to finance any downstream investments and SDHP focuses only on preparatory studies, related technical assistance and institutional capacity building.

## Environmental and Social Standards Relevance

### E. Relevant Standards

| ESS Standards | Relevance |
|---|---|

| | | |
|---|---|---|
| ESS 1 | Assessment and Management of Environmental and Social Risks and Impacts | Relevant |
| ESS 10 | Stakeholder Engagement and Information Disclosure | Relevant |
| ESS 2 | Labor and Working Conditions | Relevant |
| ESS 3 | Resource Efficiency and Pollution Prevention and Management | Relevant |
| ESS 4 | Community Health and Safety | Relevant |
| ESS 5 | Land Acquisition, Restrictions on Land Use and Involuntary Resettlement | Relevant |
| ESS 6 | Biodiversity Conservation and Sustainable Management of Living Natural Resources | Relevant |
| ESS 7 | Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities | Not Currently Relevant |
| ESS 8 | Cultural Heritage | Relevant |
| ESS 9 | Financial Intermediaries | Not Currently Relevant |

**Legal Operational Policies**

| Safeguard Policies | Triggered | Explanation (Optional) |
|---|---|---|
| Projects on International Waterways OP 7.50 | Yes | Kurichhu River on which the proposed Dorjilung HPP is planned is a tributary of Drangmechhu River which flows into India. Thus this policy is triggered. LEGEN will be consulted on the course of action to be taken during the implementation of the TA for the notification of riparian states and LEGEN's advise will be taken forward accordingly. In addition, the TOR of the ESIA, which will also be supported by this TA, will include examination of any potential riparian issues. |
| Projects in Disputed Areas OP 7.60 | No | |

Summary of Screening of Environmental and Social Risks and Impacts

The downstream investment would have a series of potentially adverse, significant and long term environmental and social risks and impacts due to the construction of the generation facilities, creation and permanent inundation of the reservoir, and construction of the required transmission line and ancillary facilities such as access roads, workers camps, etc. Some impacts are permanent while some impacts are only related to construction. Social risks and impacts would include land acquisition, resettlement, labor, occupational and community health and safety, gender, GBV. Environmental risks and impacts will involve permanent inundation of the reservoir area and permanent changes in landscapes, impacts on terrestrial and aquatic ecosystems, ecosystem services and biodiversity; air and water pollution during construction and potential cumulative impacts.

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### Implementing Agencies

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|---|---|---|---|
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