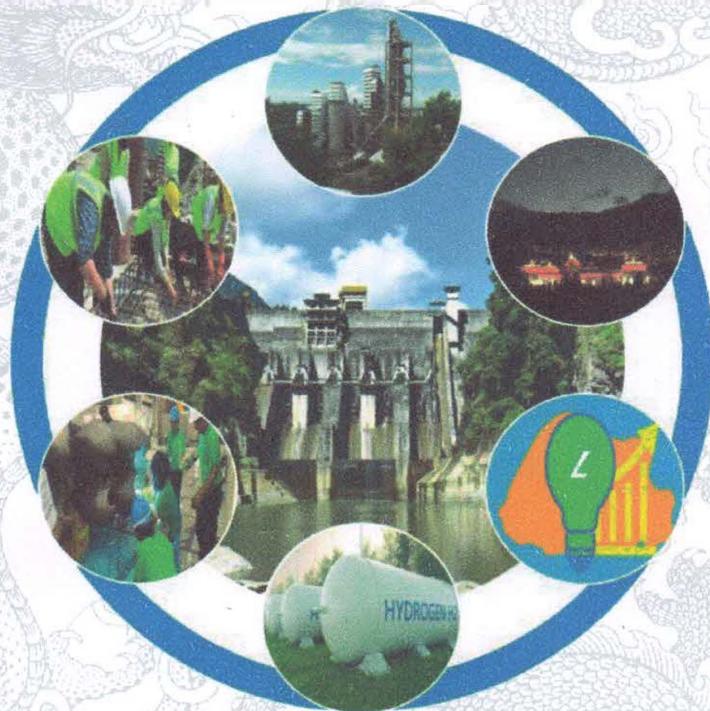




BHUTAN SUSTAINABLE HYDROPOWER DEVELOPMENT POLICY

2021



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Ministry of Economic Affairs Royal Government of Bhutan

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Ministry of Economic Affairs

Royal Government of Bhutan

DIRECTOR
DEPARTMENT OF HYDROPOWER & POWER SYSTEMS
MINISTRY OF ECONOMIC AFFAIRS
THIMPHU:BHUTAN



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MINISTRY OF ECONOMIC AFFAIRS
ROYAL GOVERNMENT OF BHUTAN
THIMPHU



Foreword

The Kingdom of Bhutan is endowed with abundant renewable hydropower potential. Over the last four decades, hydropower has assumed national strategic importance and is the main driver and backbone of the nation's economy. The phased development of hydropower with the present installed capacity of 2,335 MW over a span of four decades with commensurate grid expansion and promotion of small, medium and large industries has brought tremendous socio-economic benefits to the people of Bhutan. Even the remotest parts of the country today have access to clean, reliable and affordable electricity.

The Sustainable Hydropower Development Policy (SHDP 2008) was adopted in 2008 with the objective to accelerate hydropower development and to diversify investments in the sector. However, the acceleration with the projected generation capacity additions and the expected economic growth and the enhancement in the wellbeing of the Bhutanese people did not take place. Instead, it generated a lot more controversy undermining the confidence of the Bhutanese people in the hydropower sector. The priorities of the Government and aspirations of the people have since evolved. There is now this immense desire emerging to diversify the end use of the electricity generated, especially through establishment of clean and energy intensive industries, to generate employment



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and provide income at the grass roots level. As a key strategic national resource, there is a growing sentiment that the benefits from hydropower should accrue to all the people of Bhutan and not fall into the hands of a few. These evolving priorities and aspirations have created a compelling environment for a review of the SHDP 2008.

The domestic demand for electricity is continuing to grow and is projected to soon exceed firm generation capacity. While development of hydropower should keep pace with the increase in domestic demand, a key challenge facing the sector is the low proportion of firm power vis-à-vis the installed capacity as every hydropower project developed so far is a run-of-the river scheme. Strategic interventions are now a necessity to enhance energy security through reservoir/pump storage schemes and integration of hydropower with other renewables. There are opportunities to pursue innovative energy storage by-products such as hydrogen fuel, green ammonia and other emerging technologies to add value to the clean energy, besides providing reliable and affordable electricity to domestic consumers while ensuring competitively priced electricity for export. The revised policy addresses these prerogatives to enhance energy security and develop value chains in the domestic market, and generate export revenues.



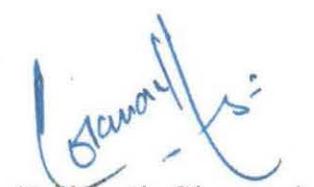
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Global warming and climate change are already impacting the monsoon and winter snowfall patterns and the snowline and glaciers are receding fast, the sources of Bhutan's abundant hydropower potential. There is a need to step up collective efforts to protect the catchment areas and for integrated management of the watersheds to ensure perpetual access to drinking water and irrigation and a climate resilient hydropower resource for all times to come.

I am confident that this Sustainable Hydropower Development Policy 2021 will ensure the sustainable development of our strategic hydropower resource, enhance socio-economic benefits, and bring about peace, prosperity and happiness for all the people of Bhutan.

Tashi Delek!


(Loknath Sharma)

Preface

Bhutan is endowed with an abundance of renewable hydropower potential. It has an estimated hydropower potential of 36,900 MW with annual production capability of 154,000 gigawatt hours (GWh). Over the last four decades, hydropower has assumed a stature of national strategic importance and is today the backbone and driver of the nation's economy. Hydropower has spurred Bhutan's high economic growth rates over the last couple of decades and its export revenues are helping the country to meet much of its recurrent and capital expenditures. The Bhutanese people are also deriving tremendous direct social and economic benefits with even the remotest regions of the country now having access to clean, reliable and affordable electricity. This success with hydropower therefore created a heightened sense of urgency to accelerate the development of its hydropower potential as Bhutan strives to gradually wean away from its huge dependence on external aid to implement its developmental plans.

In early 1980s and 1990s, hydropower development was more measured with a staggered implementation, primarily in collaboration with the Government of India. However, in the last decade, there has been a huge thrust on accelerating hydropower development, especially encouraged by the win-win benefits of the Bhutan-India bilateral projects. The two governments entered into an overarching umbrella agreement in 2006 to develop 5,000 MW of additional hydropower generation capacity by 2020. To facilitate the accelerated mode of implementation, Bhutan introduced its Sustainable Hydropower Development Policy in 2008 that enabled public and private investments in the sector to complement the

already very successful bilateral co-operation with the Government of India.

However, the 5,000 MW target was enhanced to 10,000 MW in 2008 and this was formalized—through a Protocol entered into between the two governments in 2009. The new understanding through the Protocol was that India would help Bhutan develop the 10,000 MW generation capacity by 2020 through the time-tested bilateral modality and Joint Venture modality between the public sector undertakings of the two countries. Therefore, private sector investment was kept in abeyance, as it no longer figured in the 2009 Protocol.

Meanwhile both private sector investment and joint venture modalities have come under a lot of scrutiny and criticism with the public perception that such arrangements tend to benefit a few, which is contrary to the constitutional provisions that the resource belongs to the State and therefore that the benefits should accrue to all the people of Bhutan.

While there is a consensus that hydropower is the backbone on which the future of Bhutan's economy will have to continue to ride on, there is a growing desire and aspiration that the hydropower sector has to value add and create many more opportunities for gainful employment and productive engagement of Bhutanese in providing goods and services commensurate with the investment size and the debt burdens as the people of Bhutan have to ultimately bear the responsibility for servicing these debts. There is also a felt need to diversify activities within the hydropower sector such as venturing into hydropower research and development,

manufacturing, and construction to help further build Bhutanese capacity.

There are also growing concerns regarding the competitiveness of Bhutan's hydropower in the Indian power market, especially with a situation emerging in India where supply is surpassing demand, at least under the present scenario. It will be critical for Bhutan to maintain its comparative advantage in costs and flexibility of supply to participate in the evolving energy markets in the sub-region/region and maximize benefits through trading of surplus electricity. To make electricity pricing competitive, there is as always, the need to continue to ensure that hydropower is developed in a most efficient and cost-effective manner. Domestic industries and other economic ventures need to be also encouraged to continue to add value to electricity, so that their products are competitive in the market and a multiplier effect is generated in the Bhutanese economy. However, keeping electricity pricing competitive will be difficult with the ever-increasing cost of construction and the likelihood of new policies being introduced such as environmental flow requirements amongst others.

The domestic demand for electricity is likely to continue to grow at a rate that may soon exceed firm generation capacity. While development of hydropower should keep pace with the increase in domestic demand, a key challenge facing the sector is the low proportion of firm power capacity vis-à-vis the installed capacity due to the highly varying seasonality-based river discharges. Innovative mechanisms such as integrating solar and wind energy with hydropower need to be explored to enhance energy security to meet the base load in the future. Economic stimulus will also need to be provided for energy storage by-products such as hydrogen

fuel, green ammonia and other such technologies that could consume some of the otherwise huge summer surplus in efforts to flatten out Bhutan's highly seasonal energy generation regime.

While committed and extensive efforts are being made for the preservation of its pristine ecology and environment, Bhutan has not been spared from the impacts of global warming and climate change. The impact is already visible by way of its receding snowlines and fast melting glaciers, which are the major "storage facilities" of Bhutan's water resources. There is a need to step up collective efforts for integrated management of the watersheds and catchment areas. With water becoming a scarce resource across the world, there is a heightened need and urgency to actively pursue the smart management of our water resources through cascades of check dams and reservoirs. Through such proactive and proven measures, Bhutan can expect to remain resilient and adapt to the severe impacts of global warming and climate change for achieving both water and energy security.

With the changing times, emerging issues, and evolving market conditions, the Government constituted a Committee to review the complete hydropower sector and prepare a strategy report with recommendations on how best this strategic resource could be developed to ensure maximum benefit to the people of Bhutan. The Hydropower Development Strategy Report 2017 was an outcome of extensive consultations amongst all the stakeholders and a thorough review that was undertaken. It was approved as the strategic roadmap for Bhutan's hydropower development in 2019. The Strategic Report recommends a clear way forward including the pacing and timelines for hydropower development in consideration of the changing economic, market, social and environmental



scenarios in addition to the country's evolving plans and policies. One of the key recommendations of the Strategic Report is also for a review of the Sustainable Hydropower Development Policy 2008 together with the Electricity Act 2001.

A thorough review of the SHDP 2008 has since been undertaken. In taking forward the hydropower sector in a holistic manner, the Sustainable Hydropower Development Policy 2021 is expected to guide the overall development of Bhutan's abundant hydropower resources in consonance with the national economic development goals, other relevant policies and laws, and more importantly to benefit the nation and achieve the larger aspirations of its people for peace, prosperity and happiness.

Abbreviations

ATS	Associated Transmission System
CA	Concession Agreement
CER	Certified Emission Reduction
DPR	Detailed Project Report
EIA	Environmental Impact Assessment
EMP	Environment Management Plan
GWh	Gigawatt hours
HDSR	Hydropower Development Strategy Report
IG	Inter-Governmental
JV	Joint Venture
MW	Megawatt
NLCS	National Land Commission Secretariat
NTGMP	National Transmission Grid Mater Plan
O&M	Operation and Maintenance
PPA	Power Purchase Agreement
PSMP	Power System Master Plan
PSU	Public Sector Undertaking
RGoB	Royal Government of Bhutan
RoC	Registrar of Companies
SHDP	Sustainable Hydropower Development Policy
SPV	Special Purpose Vehicle
TVET	Technical and Vocational Education and Training

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1. Introduction

Hydropower is a strategic renewable energy resource for the Kingdom of Bhutan. It has enabled economic growth and industrialization and has been fundamental in enhancing the living standards of the people, and is the backbone of Bhutan's economy.

The strategic importance of hydropower is enshrined in the Constitution of the Kingdom of Bhutan. During the National Day address on 17th December 2013, His Majesty commanded that "Hydropower is considered as our nation's most precious resource that belongs to all the people of Bhutan." This was further reinforced during the 14th Convocation of Royal University of Bhutan on 24th May 2019, where His Majesty commanded that "... enlightened economic policies ensured that benefits from valuable national resources such as hydropower was neither captured by narrow economic elite nor influential foreign investors. Instead, it was judiciously developed by the State to strengthen our economy and benefit the nation and the people at large."

Inspired by the His Majesty's farsighted vision, the hydropower resource is sustainably harnessed by the State to provide reliable, adequate, secure and affordable energy for all Bhutanese, while exploring export opportunities to enhance revenues. As such, the hydropower resource is the *raison d'être* for fulfilling the country's aspirations of social wellbeing and economic prosperity. The policy aligns the mode of hydropower development such that it not only maximizes benefits to the nation but also ensures that these benefits accrue equitably to the people of Bhutan.

Further, with ever increasing domestic demand, a major shift in focus is required from the development of Run-of-River (ROR)



hydropower projects to pumped storage/reservoir projects including hybrid energy technologies with other alternative renewable energy resources to address the firm power concerns and ensure energy security for the country. It also presents opportunities to reap other secondary benefits such as ensuring water security, water for irrigation, and flood control.

Therefore, the Sustainable Hydropower Development Policy 2008 has been revised with an aim that it is people centric and sensitive to the environment, so that the resource is harnessed and managed in a judicious and cautious manner to benefit not only the current generation, but also the future generations.

2. Scope

This Policy shall henceforth cover all aspects of hydropower resources development except where exemption is provided by the Electricity Act of Bhutan and shall supersede the Sustainable Hydropower Development Policy 2008 including all other contradictory policy provisions of the Royal Government of Bhutan (RGoB). However, hydropower projects already implemented and under implementation through various arrangements/development modes prior to adoption of this Policy shall be governed by the relevant Policies, Contracts and Agreements except for the new provisions under this Policy.

The policy will come into effect from March 17, 2021.

3. Objectives of the Policy

The objectives of the Policy are to:

- a) Provide universal access to sustainable energy as a means to reduce poverty by enhancing living standards and to



- help boost productivity;
- b) Ensure energy security for the economic development of the country by providing secure, adequate, reliable and competitively priced electricity;
 - c) Enhance cross border trade of electricity by participating in the evolving and innovative market mechanisms;
 - d) Secure/mobilize funds for sustainable development of hydropower projects;
 - e) Develop hydropower in a regionally equitable manner to benefit all the people of Bhutan;
 - f) Ensure the optimal use of water resources through integration with other end uses and alternative energy resources;
 - g) Contribute towards development of clean energy and technologies to adapt and mitigate problems related to global warming and climate change;
 - h) Strengthen the institutional arrangements and national capacities in the hydropower sector;
 - i) Promote hydropower related “water to wire” and other energy storage businesses such as hydrogen fuel, green ammonia, and other emerging technologies;
 - j) Create enabling eco-system for participation and engagement of Bhutanese in the construction of hydropower projects including providing goods and services; and
 - k) Promote Research, Demonstration and Development (RD&D), and create centers of excellences and knowledge hub in the region for the entire value chain of hydropower including hybrid energy technologies.

4. Institutional Arrangements

The following institutions have the responsibilities and stakes in the development and management of hydropower resources and related matters. These institutions and their successors, including any new agencies that the RGoB may appoint, shall adopt collaborative and synergistic approaches to realize the objectives of this Policy.

4.1 Department of Hydropower and Power Systems (DHPS)

The DHPS shall be the Nodal Agency for implementation of this Policy. The Nodal Agency shall:

- 4.1.1 Formulate national policies, plans, programmes and guidelines related to sustainable development, efficient utilization and management of hydropower and power systems in the Kingdom;
- 4.1.2 Serve as the Central Coordination Agency and the Focal point of the RGoB on all matters related to hydropower and power systems;
- 4.1.3 Prepare plans for security of electricity supply, national transmission grid network and cross-border electricity trading;
- 4.1.4 Oversee, monitor and evaluate the implementation of plans, programmes and projects related to hydropower, transmission and cross-border electricity trading for which suitable Steering Committees may be formed, on need basis, to monitor the progress of projects under construction;
- 4.1.5 Provide techno-economic clearances for all major projects and programmes related to hydropower, transmission and cross-border electricity trading before implementation;

- 4.1.6 Enter into and monitor Concession Agreements (CA);
- 4.1.7 Develop adequate capacity and be responsible, on behalf of the RGoB, to carry out power market analysis, pricing, cross border negotiations over power trade and tariffs, and Power Purchase Agreements (PPA) for projects; and
- 4.1.8 Conduct research, development, demonstration and adoption of emerging technologies and innovative value addition initiatives and energy storage/carrier activities.

4.2 Department of Renewable Energy (DRE)

The DRE shall be responsible for other alternative renewable energy resources in line with Alternative Renewable Energy Policy.

4.3 Bhutan Electricity Authority (BEA)

The BEA shall be an autonomous regulator for the electricity sector and carry out its mandates as provided in the Electricity Act of Bhutan.

4.4 Druk Green Power Corporation (DGPC)

The DGPC shall be responsible for developing and managing hydropower generating plants. It shall develop and manage new projects as may be directed by the RGoB. Projects that are funded through bilateral assistance or any project where the RGoB has a shareholding shall be managed by DGPC through a Concession Agreement (CA). DGPC shall be the bulk trader for export of surplus power and shall manage the PPAs for such trade.

4.5 Bhutan Power Corporation (BPC)

The BPC shall be responsible for electricity transmission, distribution and supply functions and develop Associated Transmission System (ATS) for integration of domestic power system and providing transmission access for export of surplus power outside of the country.

4.6 Bhutan Power System Operator (BPSO)

Bhutan Power System Operator (BPSO) shall be responsible for monitoring, control and operation of the National Grid and Power Systems including load dispatch procedures/ coordination both domestically as well as with external counterparts.

4.7 National Centre for Hydrology and Meteorology (NCHM)

NCHM shall be responsible for establishing state-of-art hydro-meteorological network and systems and provide hydrological data for hydropower resource assessment and forecasting of power generation from the hydropower plants.

4.8 Bhutan Power System Coordination Committee (BPSCC)

For proper coordination between power sector agencies and facilitation of the smooth operation of the power systems, a Bhutan Power System Coordination Committee (BPSCC) shall be formed with members from the stakeholder agencies. The Nodal Agency shall function as the Secretariat of the Committee.

4.9 Department of Geology and Mines (DGM)

The Department of Geology and Mines will assist the Nodal Agency in carrying out geotechnical studies and vetting geo-



technical reports of the DPR for the hydropower projects.

4.10 Department of Forest and Park Services (DoFPS)

The DoFPS is responsible for ensuring sustainable watershed management through catchment protection and other nature conservation works in order to support the availability of water for hydropower generation.

4.11 National Environment Commission Secretariat (NECS)

The NEC is the apex body for overall coordination of matters relating to water resources. The NEC is also responsible for accordinig environmental clearances of all projects as per the Environment Act and Regulations.

4.12 Ministry of Finance (MoF)

The MoF is responsible to ensure that public debt is managed to meet the public sector's financing needs and debt service obligations are met in a timely manner at the lowest cost. The MoF is also responsible to prescribe hydropower debt threshold in keeping with the Public Debt Policy.

5. Ownership and Financing Modes of Hydropower Development

The hydropower resources shall be developed with full ownership with the RGoB through the following implementation and financing modes:

a) RGoB initiatives

The RGoB may undertake the development of hydropower projects on its own. Under this arrangement, financing may be sourced from multilateral agencies and/or financing

institutions and/or may be financed on its own.

b) Inter-Governmental (IG)

The RGoB may undertake development of Hydropower Projects in collaboration with the government of development partner country(ies) wherein financing is provided by the partner country(ies).

c) Sub-regional & Regional Arrangement

The RGoB may take up projects as part of the regional/sub-regional/trilateral energy cooperation framework. Under this arrangement, the RGoB will pursue for financing by the partner country(ies) in the regional/ sub-regional/trilateral cooperation and/or multilateral/financing agencies/institutes.

6. Concession Agreement

- 6.1 Irrespective of the implementation mode, a project entity to be entrusted the responsibility of developing and/or operating a hydropower project shall be first required to register as a company with the Registrar of Companies (RoC) in keeping with the Companies Act of Bhutan. The company shall be a Special Purpose Vehicle (SPV) for developing and/or operating the project.
- 6.2 The Concession Agreement (CA) shall comprise of the rights and obligations of the SPV and all terms and conditions that will govern the construction, and the operation and maintenance (O&M) phases of the project.
- 6.3 The CA shall be signed between the Nodal Agency on behalf of the RGoB and the SPV. In case of projects, like the Inter-Governmental projects, where an SPV will be handing over the



project after development to a separate Company for O&M, separate CAs shall be signed between the Nodal Agency and the respective SPV/Company for the project development phase and the project O&M phase.

- 6.4 The Project Developer/ Operator (the SPV assigned with the O&M of the project) shall not have any claim over any revenue from infirm power injection into the grid.

6.5 During Construction Phase

- 6.5.1 In keeping with the provisions of the Companies Act of Bhutan, the SPV (or the Project Developer in this case of the construction phase) shall have a Board of Director(s) with a clear Terms of Reference and Delegation of Powers. The Board shall, on behalf of the Shareholders, closely monitor and guide the project development. In the case of Inter-Governmental projects, the Project Authority shall assume the role of Shareholders, whose role shall be mainly to provide overall policy directives and ensure smooth fund flow for the Project.
- 6.5.2 The Project Developer shall be required to obtain necessary statutory clearances, which will be detailed in the Concession Agreement.
- 6.5.3 The Project Developer shall accord priority for engagement of available local skills and expertise including allocation of main works to Bhutanese contractors/firms during the construction of the project. The details of such mandatory requirements shall be stipulated in the CA.



- 6.5.4 The Project Developer shall adopt, where possible, mechanization of construction works and deploy state-of-art technologies for efficient construction and performance of the plant.
- 6.5.5 The Nodal Agency or its designated agency shall, on behalf of the RGoB, from time to time inspect and monitor all projects under construction and exercise policy oversights over the projects. The Nodal Agency may also assign relevant sector specific entity to exercise technical oversights of the projects during construction.

6.6 During Operation and Maintenance (O&M) Phase

- 6.6.1 The Project upon achieving the unit-wise Commercial Operation Date (COD) will be deemed to enter into the O&M phase.
- 6.6.2 The Project Operator shall be required to obtain necessary licenses from the Electricity Regulator as per the Electricity Act of Bhutan.
- 6.6.3 The Nodal Agency or one of its appointed agencies will carry out mandatory inspections of the project during the concession period to ensure that the project assets are maintained to the required standard.
- 6.6.4 The Project Operator shall set aside a separate reserve fund sufficient to take up major replacements, renovation and modernization in consultation with the Nodal Agency.
- 6.6.5 At the end of the concession period, which will be of 30 years from the Commercial Operation Date (COD), the entire project shall be transferred and vested in the RGoB at no cost and in good running condition. The project shall be considered to be in good running condition if it fulfils the following:



- 6.6.5.1 The Plant should have consistently over the last five years demonstrated capability under rated design discharges to generate minimum of 99% of rated capacity at rated head.
 - 6.6.5.2 The power plant availability factor for the last year of the concession period should be at least the average of the last five years.
 - 6.6.5.3 At the end of the concession period, the Plant shall be reverted along with the spares equivalent to value of 15% of the O&M cost for the year.
 - 6.6.5.4 Any other technical factors to be decided during signing of the CA.
-
- 6.6.6 In addition to regular annual inspections, the Company and the Nodal Agency or its authorized representative will carry out joint inspection of the project facilities 5 years before the end of Concession period to ensure that the project assets are maintained in good running condition.
 - 6.6.7 The Project Operator is responsible for securing the market and sale of electricity generated after complying with licensing regulations.
 - 6.6.8 At the end of the CA covering the operation phase, the RGoB may extend the tenure of the CA to the same Project Operator or entrust the O&M of the project to another RGoB entity through a new CA.

7. Royalty Energy

- 7.1 Fifteen percent (15%) of electricity generated (net of auxiliary consumption) shall be provided free of cost to the RGoB as the Royalty Energy.
- 7.2 The RGoB shall have the option to avail the Royalty Energy

either as energy or as cash in lieu thereof based on the highest off take tariff.

8. Project Preparatory Studies

- 8.1 The Nodal Agency shall review the Power System Master Plan (PSMP) and update the same on regular basis to have a list of hydropower projects inventory with ranking on the basis of techno economic viability and other relevant factors.
- 8.2 The Nodal Agency shall carry out project preparatory studies at reconnaissance level. For the preparation of pre-feasibility studies/Detailed Project Reports (DPR), the Nodal Agency shall outsource these to the relevant sector specific RGoB institutions as provided in this Policy. All pre-feasibility studies and DPR reports shall conform to international standards/best practices in addition to the Bhutan Hydropower Guidelines 2018 and amendments thereto.
- 8.3 Whenever preparatory, pre-feasibility and DPR studies are conducted through engagement of expatriate experts/ consultancies, it shall be mandatory for them to engage the relevant sector specific RGoB institutions as provided in this Policy to ensure transfer of knowhow and expertise, to build internal capacity, and to incorporate best practices relevant to Bhutan. The RGoB entities may engage other local counterparts for specialized services as may be required.
- 8.4 Design and Engineering of the hydropower and associated infrastructure scheme shall adopt state-of-art-technologies for robust and modern automated power plants and systems.
- 8.5 The Nodal Agency shall assess and review and be the Authority to approve feasibility/DPR of hydropower projects and ATS.

9. Selection of Hydropower Projects

- 9.1 The identification and selection of hydropower projects for development shall be done in accordance with the Power System Master Plan (PSMP) and/or the Hydropower Development Strategy Report, as may be updated from time to time.
- 9.2 The installed capacity addition should be planned and determined based on long term national objectives, plans and policies; and take into consideration the evolving national priorities.
- 9.3 Priority shall be accorded to develop reservoir and pumped storage schemes, and hybrid technologies (e.g., integration of solar and wind to complement the lean season hydropower generation) to enhance domestic energy security. The establishment of cascaded water storage schemes/reservoirs both upstream and downstream of existing and planned hydropower projects shall be considered to address the water and energy security concerns.
- 9.4 The RGoB will encourage, where techno-economically feasible, an integrated development of hydropower projects with multipurpose use of water for drinking, irrigation, flood control and recreational purposes.
- 9.5 The RGoB may undertake review of the hydropower development plans for strategic interventions as and when required through formation of a Special Committee. The Nodal Agency shall act as Secretariat to the Committee.

10. Hydropower Related “Water to Wire” Businesses

- 10.1 The RGoB shall encourage the private sector to venture into hydropower related ancillary businesses and services.
- 10.2 Generation and transmission companies may, with the

approval of their Shareholder, form subsidiaries to set up viable businesses that are strategic to the sector, and explore opportunities and expand its businesses beyond the borders of Bhutan.

- 10.3 The RGoB shall encourage development and integration of hydropower value chain by adopting emerging renewable energy technologies and innovations such as hybrid technologies, integrated energy management and smart grid systems.

11. Hydrogen Economy

- 11.1 The RGoB shall encourage development and integration of hydropower value chain by adopting emerging renewable energy technologies and innovations such as hydrogen fuel, green ammonia and other such energy storage schemes and emerging innovative technologies.
- 11.2 The RGoB shall facilitate and create enabling eco-systems for innovations, investment and development of hydrogen economy for both domestic and foreign markets.
- 11.3 The RGoB shall promote and develop green hydrogen as an alternate fuel source for the transport and other related sectors.
- 11.4 The RGoB shall prepare a Green Hydrogen Roadmap for development of hydrogen economy, adoption of suitable technologies and related infrastructure and introducing regulatory frameworks.
- 11.5 The RGoB shall add hydropower generation capacity, where required to augment existing capacity, to facilitate production of hydrogen fuel and other energy storage products.
- 11.6 The RGOB will establish National Green Hydrogen Panel consisting of relevant experts in the field who shall



provide technical, advisory and facilitate the promotion and development of green hydrogen fuel, green ammonia and other emerging technologies. The Nodal Agency shall provide secretarial service to the Panel.

12. Cross Border Trade and Electricity Markets

- 12.1 The RGoB shall promote regional/sub-regional forums on regional/sub-regional electricity grid and market integration, and support initiatives towards market reforms and grid integration.
- 12.2 The RGoB may establish an Electricity Trading Company for consolidating energy export and cross border trading. The RGoB may also establish an Electricity Trading Company in a neighbouring country(ies) under the laws and regulations of the neighbouring country(ies).
- 12.3 The Nodal Agency shall track evolving regional/sub regional market trends and introduce suitable grid management practices and regulations.

13. Local Participation and Partnership

- 13.1 During construction, the Nodal Agency, in consultation with the Project Developer shall identify and determine the main works including the manufacture of electro-mechanical (E&M) equipment which shall be undertaken by Bhutanese firms/contractors, the details of which will be stipulated in the CA.
- 13.2 Mechanisms shall be built in the contract documents for projects to source locally available construction materials. Project Developers/Operators shall engage registered Bhutanese suppliers, transporters, contractors, manufacturers, and other service providers, provided they have the capacity



and meet quality requirements. Alternatively, Project Developers/Operators may be required to facilitate capacity building amongst such Bhutanese entities for providing the projects with the required goods and services.

- 13.3 Bhutanese firms or their consortium shall be encouraged to participate in the main contract works of hydropower construction by forming joint ventures with experienced firms from outside of Bhutan.
- 13.4 A firm nominated to undertake any work for the project shall not be allowed to appoint any intermediary agents for supply of goods and services which do not add economic value.

14. Expatriate Employment and Work Permits

- 14.1 Bhutanese shall be given preference for employment in projects to the extent possible, based on their skills and capability. The Nodal Agency shall issue a separate guideline to this effect.
- 14.2 Only after exhausting the provision 14.1, projects will be allowed to bring in expatriate personnel during the time of construction in accordance with prevailing laws of the country.
- 14.3 Whenever such expatriates of specialized skills are employed during the construction phase, it will be mandatory for the Project Developer to ensure skills transfer and capacity building of the local counterparts.

15. Domestic Power Allocation and Supply

- 15.1 Domestic electricity tariff shall be determined as per the Domestic Electricity Tariff Policy, 2016 and amendments thereof. Allocation of generation plants for domestic supply shall be in ascending order of generation cost, i.e., the plant



with the lowest cost of generation shall be first booked for domestic supply followed by next lowest cost of generation and so on.

- 15.2 The Nodal Agency shall direct relevant RGoB agencies for energy banking/swapping or other appropriate arrangements to meet the domestic baseload requirements.
- 15.3 The Nodal Agency shall carry out supply and demand forecasts and other relevant analysis on a periodic basis.
- 15.4 The Nodal Agency will assess and allocate power supply to an industry based on the recommendation of the relevant RGoB agencies on the type of industry to be promoted.
- 15.5 The following shall be the order of merit while prioritizing the supply of electricity:
 - i. Essential Public Institutions and Services
 - ii. Individual households
 - iii. General Commercial establishments (including other Public Institutions and Services)
 - iv. Industries including construction power

In the event of a power deficit scenario, requiring load shedding, the order of load shedding shall be in the reverse order as that in 15.5. To this effect, the Nodal Agency will seek approval of the Ministry and issue the notification for operationalizing the above provision during exigencies.

16. Transmission and Load Dispatch

- 16.1 The transmission and associated system for hydropower projects must be in conformity with the National Transmission Grid Master Plan (NTGMP). The NTGMP will be reviewed and updated regularly by the Nodal Agency.
- 16.2 The Project Developer will be responsible for laying



- transmission lines and connect to the nearest grid substation. Such transmission assets as constructed by the Project Developer shall be transferred to the transmission utility through appropriate arrangements.
- 16.3 The Project Developer shall be required to have a power evacuation agreement with the transmission utility at the time of CA signing to ensure provision of transmission facilities for wheeling the electricity within Bhutan and for export purposes, till the delivery point at the international border in coordination with the importing Country's transmission entity or at the delivery points as agreed to for regional/sub-regional/trilateral transactions.
- 16.4 The Project Operator shall pay transmission and wheeling charges as determined by the Electricity Regulator.
- 16.5 The RGoB shall provide necessary support for facilitating the transmission of power with the importing country's transmission entities.
- 16.6 Load dispatch procedures shall be as prescribed by the BPSO.

17. Social Considerations

- 17.1 The Project Developer shall locate project components (and other infrastructures) in the state reserve forest land to the extent possible. In the event where it is not possible, the RGoB shall acquire private land as per the Land Act. All land required for the project shall be leased to the Project Developer. Where the Project Operator is different, the rights to the land shall be transferred to the Project Operator.
- 17.2 The RGoB shall provide free electricity of 10,000 kWh per annum for every acre (or prorated thereof) from the Royalty Energy to the private land owner from whom land is

acquired with effect from the commencement of Commercial Operation Date till the end of initial concession period. Such benefits will continue for not more than 2 years beyond the initial concession period.

All prior arrangements for such additional benefits should be regularized to conform to this revised provision.

- 17.3 The land owner referred in 17.2 may either avail free electricity or cash in lieu thereof at the rates determined by the Electricity Regulator on an annual basis. The RGoB may also consider upfront payment of compensation for the entire initial concession period based on the generation tariff determined by BEA after achieving commercial operation of the Project. Further, transfer and sale of such rights is not permitted except bequeath as an inheritance to the legal heirs determined by a competent Court of Justice.
- 17.4 The Project Developer shall provide the details and cost of rehabilitation and resettlement of the displaced persons from the project area and other local development activities as a part of scope of DPR.
- 17.5 The Nodal Agency in collaboration with the National Land Commission Secretariat (NLCS) shall issue a separate Rehabilitation and Resettlement (R&R) guideline for hydropower and associated infrastructures. The Project Developer shall implement the Rehabilitation, Resettlement and Local Development Plan in consultation with the RGoB and local authorities.
- 17.6 The necessary infrastructure for the construction/development of the project and local area development will be part of the project and shall be developed by the Project Developer; the scope of which shall be indicated and elaborated in the DPR.

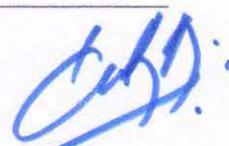
- 17.7 The Project Developer/Operator shall provide employment to one legal member of each of the Adversely Affected Family(ies) as a result of acquisition of land for the project during the construction period of the project. The details shall be covered under R&R guideline.
- 17.8 The Project Developer shall submit a Human Resources plan for the project implementation and Operation and Maintenance (O&M) phases to the Nodal Agency. The Nodal Agency in consultation with relevant RGoB agency(ies) will facilitate timely recruitment or development of skills in collaboration with the Project Developer.
- 17.9 The Project Developer shall also ensure that development of necessary skills (through programmes such as TVET) for the member of Adversely Affected Family(ies) and must be completed within the pre-construction period for recruitment during the construction phase.
- 17.10 The Project Developer shall provide training to eligible persons based on their educational qualification so that they are in a position to get employment for various jobs in the project. The Project Developer shall implement a training program endorsed by the Nodal Agency/other authorized RGoB agencies for transfer of technology and enhancement of skills of Bhutanese workers.
- 17.11 All regular employees shall be Bhutanese nationals during Operation and Maintenance (O&M) phase.

18. Environmental Considerations

- 18.1 The RGoB shall ensure that hydropower development, generation and transmission are in line with the environmental legislations of the country.



- 18.2 The RGoB shall reserve one or two river stretches free of hydropower development, till development in the basins with existing projects are no longer techno-economically competitive.
- 18.3 The RGoB shall facilitate in coordination with relevant agencies to secure blanket forestry and environmental clearances for projects.
- 18.4 The Project Developer shall be responsible for carrying out comprehensive Environment Impact Assessment (EIA) as part of the DPR as per the environmental legislations of the country and the Bhutan Hydropower Guidelines 2018 and amendments thereto.
- 18.5 The Project Developer shall determine the minimum quantity of water to be released at all times from the dams based on holistic and site-specific scientific assessment of aquatic habitats, socio-economic aspects, water catchment ecosystems, maintaining hydrological regime and other relevant factors as part of EIA at the DPR stage for new project(s).
- 18.6 The Project Developer shall make suitable provisions for mitigation of adverse impacts as per approved EIA Report. The implementation of Environment Management Plan (EMP) and other risk management measures will be the responsibility of the Project Developer. During the operation stage, the Project Operator shall continue to implement EMP relevant to the operation phase in keeping with the Hydropower Guideline 2018 and other relevant laws of the land.
- 18.7 The RGoB shall endeavour to avail/seize the opportunities under the new market mechanism/international carbon trading mechanisms for renewable hydropower energy.



- 18.8 The RGoB shall allocate any benefits derived from the Paris Agreement or any other mechanisms in terms of reduction of emissions of greenhouse gases to the Project Developer/Project Operator. Certified Emission Reduction (CER) or any other credits will be the property of the Project Developer/Project Operator.
- 18.9 The RGoB shall levy tax on the sale of CERs or any other credits to the Project Developer/Project Operator.

19. Resource for Sustainable Development of Hydropower

- 19.1 The RGoB shall allocate adequate resource for new project development activities including preparation of project profiles and reports, site investigation and studies, processing of clearances, capacity building, promotion of projects, and facilitation for development of hydropower and other energy resources.
- 19.2 In order to ensure sustainable growth and expansion of the sector, research and development activities in energy related field shall be encouraged.
- 19.3 The RGoB shall allocate adequate funds through the budgetary system to promote research, development, innovative and demonstration activities with regard to value addition initiatives and energy storage/carrier activities.

20. Taxation

- 20.1 All plants, construction materials, equipment, machineries and services imported for direct use by the principal contractors in construction of hydropower projects including Associated Transmission Systems (ATS) maybe exempted from any levies, taxes and duties as per the law of the country.



20.2 A separate Tax guideline for hydropower projects will be issued by the Ministry of Finance.

21. Policy Review and Amendments

This policy shall be reviewed and revised as and when deemed necessary by the RGoB.

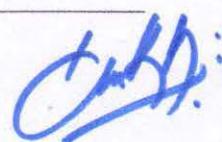
22. Interpretation of the Policy

In the event of conflict of interpretation, the Ministry of Economic Affairs shall, on behalf of the RGoB, be the authority to interpret various provisions of this policy which shall be final and binding.

23. Definitions

Unless specifically included in the list below, words or expressions are to be interpreted in good faith, in accordance with the ordinary meaning of its terms, in their context, and in light of the objective and purpose of this Policy. Whenever the following capitalised terms are used in the Policy, whether in the singular or with plural, in the future or past, they shall have the same meanings ascribed to each of them below, unless the context otherwise requires:

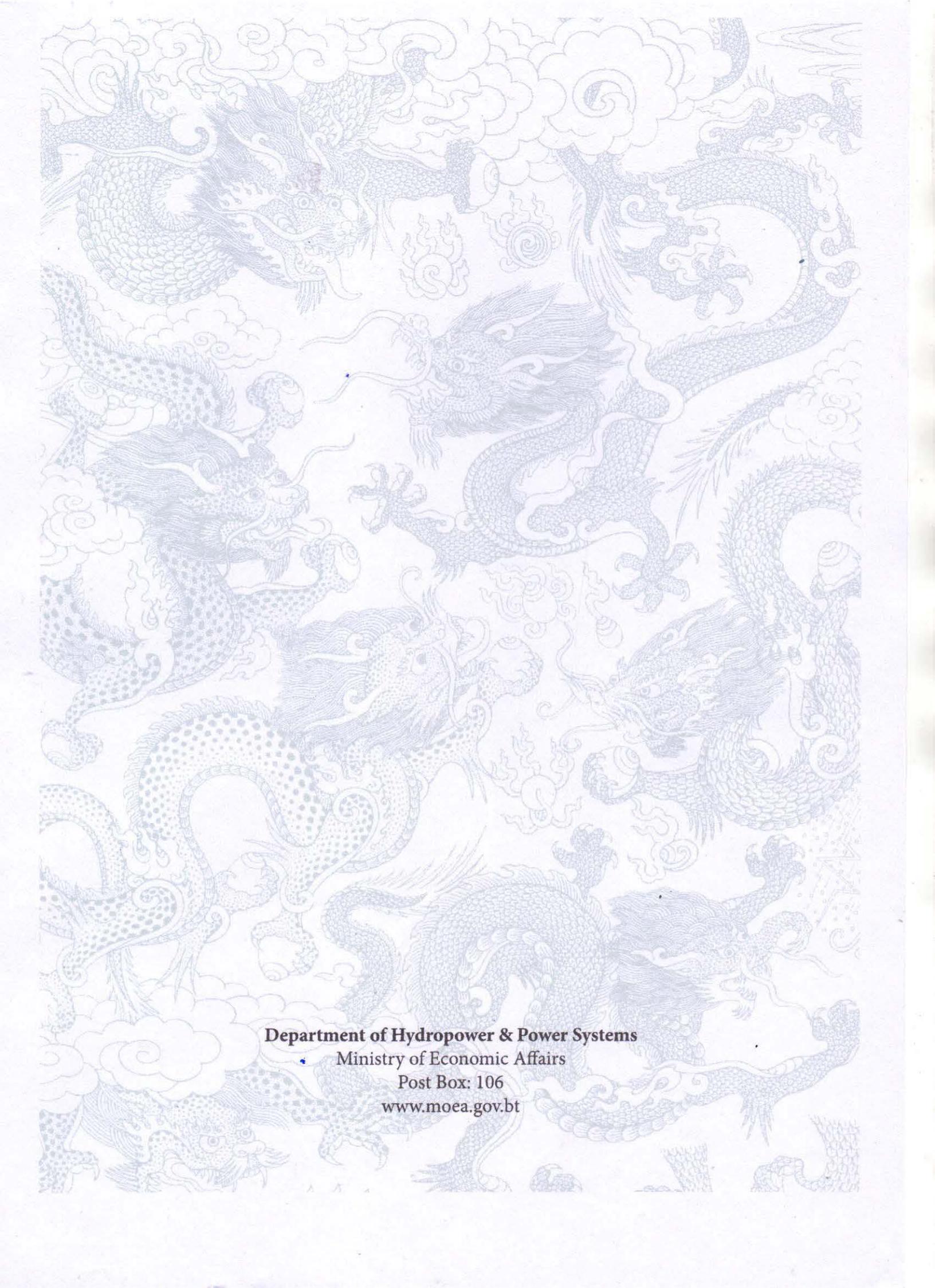
- i. **Adversely Affected Family:** Family(ies) losing more than twenty five percent (25%) of registered land holdings or families losing both homestead and portion of land.
- ii. **Certified Emission Reductions (CER):** A CER is the technical term for the output of Clean Development Mechanism (CDM) projects, as defined by the Kyoto Protocol. One Certified Emission Reduction unit represents one tonne of carbon dioxide (CO_2) equivalent reduced.
- iii. **Commercial Operation Date (COD):** The commercial operation date shall be reckoned as the date on which each unit of generating plant and equipment is jointly



- declared as commissioned by the RGoB and the Project Developer.
- iv. **Concession Agreement:** A legal instrument through which the Royal Government of Bhutan grants concession rights and obligations to the project developer for the construction and operational period of 30 years from the COD and terms and conditions for reversion of the project to the Royal Government of Bhutan at the end of the concession period.
 - v. **Construction Power:** Power used for construction of hydropower and other infrastructures.
 - vi. **Electricity Regulator:** Bhutan Electricity Authority (BEA) or its successor as per the Electricity Act of Bhutan.
 - vii. **Environment Impact Assessment (EIA):** Is a study which provides a description of the potential environmental effects on the environment, a recording of those effects in a report, undertaking a public consultation, and taking into account of comments and the report when making the final decisions as to whether to go ahead with the project, and how best to go about it in an environmentally conscious manner.
 - viii. **Essential Public Institutions:** Institutions such as Hospitals, Military establishments, Communication establishment and services, Dzongs, Schools, Religious institutions and Government offices.
 - ix. **General Commercial Establishment:** Commercial establishments such as hotels, shopping malls, supermarkets, business complex, etc.
 - x. **Importing Country:** Means the country that is final destination to which the electricity generated is being sent to.
 - xi. **Industries:** All industrial establishment in the order as follows:
 - i. Cottage and Small enterprises

- ii. Medium industries from 1MW up to 10MW
 - iii. Large industries above 10MW
- xii. **Infirm Power:** means any power injected into the grid prior to the COD of a unit of the generating plant.
- xiii. **Local:** For the purposes of this Policy a local is either:
- A person who is a citizen of Bhutan; or
 - An entity which is incorporated /registered within Bhutan
- xiv. **Nodal Agency:** Department of Hydropower and Power Systems (DHPS) or its successors.
- xv. **Power Purchase Agreement (PPA):** An agreement or contract between a buyer and producer to purchase electricity for a set price and period of time.
- xvi. **Project Developer:** A SPV established for design and engineering, construction and commissioning of a hydropower project.
- xvii. **Project Operator:** A SPV established for the O&M of a hydropower project.
- xviii. **Public:** Refers to an agency as well as corporations owned by the RGoB or/and sectors of the general government of foreign countries (e.g., central, state and local government units) as well as their state-owned enterprises. Any public partnership mentioned in this Policy shall in the first place mean the RGoB agency.
- xix. **Public Sector Undertaking (PSU):** A company where majority of the shares are owned by the Government.
- xx. **Royalty Power/Energy:** The free Power/Energy that would be made available to the RGoB under a project during the concession period i.e., the period starting from the commercial operation date of the project.
- xxi. **Special Purpose Vehicle (SPV):** Is a body corporate

- created to fulfil narrow, specific or temporary objectives, primarily to isolate financial risk.
- xxii. Transmission Utility:** State Owned Enterprise responsible for the transmission of power.
- xxiii. Wheeling charges:** Means charges for transfer of power per unit of energy payable to the owner of the transmission network.



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