

ATTACHED TECHNICAL ASSISTANCE

A. Introduction

1. The attached capacity development technical assistance (TA) is Acceleration of Hydropower Trading Development, which is included in the Asian Development Bank's (ADB) country operations business plan, 2014-2016.¹ It aims to strengthen the power sector's key frameworks and systems to enhance Bhutan's hydropower development and trading. The government of Bhutan and ADB agreed to implement the TA along with the Second Green Power Development Project. The estimated cost of the TA is \$1,000,000 excluding the government's counterpart support. The TA will support activities of the Department of Hydropower and System (DHPS), and the Department of Renewable Energy (DRE), Ministry of Economic Affairs, the Bhutan Power Corporation (BPC), the Druk Green Power Corporation (DGPC), the Tangsibji Energy Hydro (THyE), and the Department of Forest and Park Services (DOFPS), Ministry of Agriculture and Forests.

B. Outputs and Key Activities

2. Along with the outputs defined in the Second Green Power Development Project, the TA will focus on the following five components:

- (i) **Sector reforms.** Sector reforms to be studied in terms of a functional segregation of distribution and transmission, an independent system operator ["Bhutan Power System Operator (BPSO)"], and a power consolidator to facilitate trading of power from small/micro and other renewable energy producers.
- (ii) **Sector policy reviews.** Experts' reviews on the existing sustainable hydropower development policy and draft tariff policy.
- (iii) **THyE's equity finance.** DGPC's and THyE's equity financing to help DGPC and THyE select a joint venture's private partner through public private partnerships (PPP) and/or issue initial public offering (IPO) for equity participation in the Nikachhu hydropower development.
- (iv) **THyE's safeguard strengthening.** DGPC's and THyE's safeguard implementation and monitoring to assure compliances and enhancement of the Nikachhu hydropower plant and related transmission line.
- (v) **DGPC's institutional capacity enhancement.** DGPC's institutional capacity enhancement in new business priority areas.

3. (i) **Sector reforms.** With growing domestic demands, there are challenges for the sector to provide secure, reliable and efficient supply of electricity at affordable rates. This translates into provision of huge subsidies and related concerns of sustainability compounded by increased investment required to meet the growth in power demand. This necessitates key intervention in terms of assessing the structure of business entity which currently is being delivered through BPC responsible for provision of both distribution and transmission utility. A major reform intervention to unbundle transmission and distribution will be assessed mainly looking at bringing in more transparency in defining and designing subsidies, investments in transmission and distribution to minimize technical losses, demand-side management to improve efficiency of end-use and minimize wastage, road map for privatization of distribution utility in future, and increased roles of transmission utility for both from domestic supply and export. As per the current institutional arrangement, the National Load Dispatch Centre (NLDC)

¹ ADB. 2014. *Country Operations Business Plan, Bhutan, 2014-2016*. Manila.

has been set up under BPC which is responsible for scheduling and dispatch of electricity, monitoring of power system operations and ensuring the security of the national and/or in conjunction with the cross-border grid for integrated and efficient operation of the national power system. As per the Electricity Act 2001, there is a need to have an independent body designated as the system operator to undertake the above functions. For now, BPC along with the transmission and distribution license has also been issued the license of a system operator by Bhutan Electricity Authority. However, with rapid growth in the hydropower sector, the associated power system development and its operations would become more complex requiring the sector to have a full-fledged independent power system operator. Therefore, it is necessary to study and assess the establishment of the independent system operator currently being conceived as BPSO.

4. With the adoption of the Alternative Renewable Energy Policy in 2013 and the formulation of the policy rules and regulations currently underway, Bhutan aims to promote alternative renewable energy and it is necessary to study and assess the needs for creating a power consolidator to facilitate trading of power from small/micro and other renewable energy producers.

5. **(ii) Sector policy reviews.** In 2008, Bhutan introduced the Sustainable Hydropower Development Policy, which allows private investments in hydropower development. The policy is being reviewed by the DHPS task force and how it has been functional in expanding business opportunities of hydropower trading. The revised policy proposal will be reviewed by the experts (In case there is a need for improvement, the policy and relevant policies and frameworks will be turned up to achieve the original policy initiatives). The tariff policy is being drafted by DHPS to strengthen relevant sections described in the Electricity Act.² This will also be reviewed by the experts.

6. **(iii) DGPC's and THyE's equity financing.** The equity of the Nikachhu hydropower projects can be raised from any strategic private parties and the Bhutanese general public. Part of THyE's equity will be diluted based on PPP and/or IPO. This implementation process will be supported. DGPC's bond issuance will also be studied. DGPC's and THyE's foreign currency risk management will be strengthened.

7. **(iv) DGPC's and THyE's safeguard implementation and monitoring.** In accordance with environmental impact assessments (EIA), environmental management plans (EMP), and a resettlement plan (RP) prepared for the Second Green Power Development Project (the Nikachhu hydropower development), the TA will support safeguard implementation and capacity building. The TA will help DGPC, THyE, and DOFPS conduct and monitor the implementation and set up the reporting formats acceptable to ADB and the relevant stakeholders. The TA will also support DGPC and THyE strengthen communications with external parties including civil society organizations. Given the existing Mangdechhu river basin studies and the project's monitoring data,³ the TA will further help classify the Mangdechhu river basin including the Nikachhu sub-basin in detail based on the Bhutanese and/or international requirements (including hydrology, seasonality, water quality, different water user requirements, population distribution, habitat types, forest cover, and other environmental features) so that the output can

² The Bhutan power sector's financial and economic efficiency will also depend on the sector's regulatory systems and power exports. Part of the power generation has been allocated in free to the government's royalties, and subsidized to make domestic tariffs affordable. While the regulator transparently sets retail tariffs on cost recovery principles, tariff setting systems and their future directions will be defined as a policy in a comprehensive manner.

³ The Department of Energy, Ministry of Trade and Industry, Government of Bhutan. 2003. Water Resources Management Plan and Power System Master Plan. Thimphu.

be used for effective catchment area management as defined in the project's EMP, in coordination with an ongoing ADB TA for Adapting to Climate Change through Integrated Water Resources Management.⁴

8. An important element of the safeguard support will be the design of a downstream ecological flow analysis along with actual monitoring data, covering both the Nikachhu and the Mangdechhu rivers in the area affected by both hydropower projects. Integrated with the initial aquatic habitat monitoring already defined in the EMP, the design of this analysis will include more detailed assessment of discharge from tributaries near the confluence of the rivers, measurement of river cross-sections, water depths, and velocities at critical points, and fish sampling in different seasons to determine the specific dependencies between river discharge, aquatic habitats, and fish movements. This analysis and design should be adjusted based on actual monitoring data during the project construction and operational periods. The TA will support the design and testing of methodology for the analysis so that the actual implementation will subsequently be undertaken by DGPC, THyE and DOFPS (Watershed Management Division) in the immediate pre-operation and during-operation phases of both the Nikachhu and Mangdechhu projects. This analysis will then be used for implementation of an integrated water resources management (IWRM) in Bhutan, in particular the establishment of appropriate ecological flows for different project conditions and locations in the future. The TA will help DGPC set up a reserve fund from the project's dividends to ensure sustainable IWRM.

9. An important element of the safeguard support will be coordination of a biodiversity conservation and wildlife management plan. The TA will help THyE establish the biodiversity management committee, finalize the implementation plan, and initiate capacity building of DOFPS (Wildlife Conservation Division) as defined in the EIA and the EMP. Among various stakeholders identified in the plan, the TA will help launch various activities, including rescue of flora; establishment of a botanical garden; rehabilitation of all cleared sites; wildlife conservation; anti-poaching measures; mitigation of human/wildlife conflicts; compensatory afforestation to ensure offset of habitat loss.

10. **(v) DGPC's institutional capacity enhancement.** The TA will help DGPC strengthen its business priority areas of human resources, procurement, corporate planning, and finance and accounting. They specifically include (a) development of human resources master plan, (b) standard bidding document's finalization, (c) review of a corporate strategic plan, financing strategy and investment plan, and (d) full compliance with international financial reporting standards of DGPC's financial reporting. Classroom training will be rolled out in these priority areas.

C. Cost and Financing

11. The TA is estimated to cost \$1,000,000, which will be financed on a grant basis by ADB's Technical Assistance Special Fund (TASF-V). The government and DGPC will provide local currency costs through in-kind contributions, including office accommodation, facilities, data, and other information as necessary. The detailed cost estimates and financing plan are given in Table 1.

⁴ ADB. 2014. *Technical Assistance report to the Kingdom of Bhutan for Adapting to Climate Change through Integrated Water Resources Management*. Manila.

Table 1: Cost Estimates and Financing Plan

(\$'000)

Item	Total Cost
Asian Development Bank ^a	
1. Consultants	
a. Remuneration and Per Diem	
i. International Consultants (24 person months)	683.0
ii. Domestic Consultants (15 person-months)	75.0
b. International/Local Travel	150.0
c. Reports and Communications	3.0
2. Equipment ^b	10.0
3. Workshops, Resource Persons, and Seminars, study tours and conferences	20.0
4. Vehicle Rental ^c	9.0
5. Surveys	10.0
6. Miscellaneous Administration and Support	2.4
7. Contingencies	37.6
Total	1,000.0

Note: The TA is estimated to cost \$1,000,000, of which contributions from ADB are presented in the table above. The government will provide counterpart support in the form of local currency costs through in-kind contributions, including office accommodation, facilities, data, and other information as necessary. The value of government contribution is estimated to account for 3% of the total TA cost.

^a Financed by the ADB's Technical Assistance Special Fund (TASF-V).

^b The equipment will become the property of the executing agency at the end of the TA. The equipment will include 2 copy machines.

^c Includes costs for temporary rent of vehicles.

Source: Asian Development Bank estimates.

D. Implementation Arrangements

12. The executing agencies will be DHPS and DRE for components (i) and (ii) and DGPC for the other components (iii), (iv) and (v). The executing agency will oversee day-by-day TA implementation and help the consultants liaise with other government ministries and agencies, local authorities, and other stakeholders, and obtain data and documentation from them. The executing agencies will provide sufficient office space, furniture, and support facilities to the TA consultants on time.

13. The TA will be implemented over 24 months from April 2015 to May 2017. It will require 39 person-months of consulting services (25 international and 15 national). ADB will engage a consulting firm or consortium of firms using its quality- and cost-based selection procedures (a 90:10 blend between quality and cost) in accordance with the Guidelines on the Use of Consultants (2013, as amended from time to time). Equipment financed by the TA will be procured under ADB's Procurement Guidelines (2013, as amended from time to time). The TA will be disbursed in accordance with ADB's Technical Assistance Disbursement Handbook (2010, as amended from time to time) and any appropriate trust fund policy guidelines.

14. The consultant team will cover 13 experts, including 9 international and 4 national persons. An international expert in power sector management will be the team leader, who will coordinate the inputs of all the other consultants, provide quality control on all outputs, harmonize proposals and recommendations, and ensure that the consultation process is adequate in terms of the stakeholder's participation and ownership. Each expert will also

provide training opportunities to the stakeholders. An overview of the required consulting services is summarized in **Table 2**, and described in detail in the project administration manual.⁵

Table 2: Summary of Consulting Services

Area of Expertise	Duration (Person-months)
A. International	
1. Power Sector Management Specialist	6
2. Financial Management Specialist	3
3. Tariff Specialist	1
4. Regulatory/Legal Specialist	1
5. Investment Specialist	2
6. Procurement Specialist	2
7. Human resource/Institutional Specialist	2
8. Environment Specialist	6
9. Communication Specialist	2
Subtotal (A)	25
B. National	
10. Environment Specialist	6
11. Social Development Specialist	3
12. Communication Specialist	3
13. Power System Specialist	3
Subtotal (B)	15
Total (A+B)	40

Source: Asian Development Bank.

⁵ Project Administration Manual (accessible from the list of linked documents in Appendix 2).