



Technical Assistance Report

Project Number: 43021
Capacity Development Technical Assistance (CDTA)
December 2009

Kingdom of Bhutan: Capacity Building of the National Environment Commission in Climate Change (Financed by the Japan Special Fund)

CURRENCY EQUIVALENTS

(as of 15 November 2009)

Currency Unit	–	ngultrum (Nu)
Nu1.00	=	\$0.022
\$1.00	=	Nu46.35

ABBREVIATIONS

ADB	–	Asian Development Bank
CCM	–	climate change modeling
CDM	–	clean development mechanism
COP	–	conference of parties
Danida	–	Danish International Development Assistance
GLOF	–	glacial lake outburst flood
IWRM	–	integrated water resources management
JICA	–	Japan International Cooperation Agency
NAPA	–	National Adaptation Programme of Action
NEC	–	National Environment Commission
PDD	–	project design document
TA	–	technical assistance
UNDP	–	United Nations Development Programme
UNFCCC	–	United Nations Framework Convention on Climate Change
MW	–	megawatt (1,000 kilowatts)

TECHNICAL ASSISTANCE CLASSIFICATION

Type	–	Capacity development technical assistance (CDTA)
Targeting classification	–	General Intervention
Sector (subsectors)	–	Multisector (large hydropower, renewable energy, water-based natural resource management, transport management and policies)
Theme (subtheme)	–	Environmental stability (global and regional transboundary environmental concerns), social development (disaster risk management), capacity development (institutional development)
Climate change	–	Medium impacts on mitigation and adaptation
Location impact	–	Rural, urban, national and regional (medium)
Partnership	–	Japan Special Fund

NOTE

In this report, "\$" refers to US dollars.

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I. INTRODUCTION

1. The Government of Bhutan requested technical assistance from the Asian Development Bank (ADB) in building the capacity of the National Environment Commission (NEC) for managing climate change mitigation and adaptation. ADB included the TA in its country operations business plan for Bhutan in 2008.¹ An ADB fact-finding mission visited Bhutan from 24 August to 7 September 2009, and the government agreed with the TA impact, outcome, output, implementation arrangements, cost estimates, and terms of reference. The TA will strengthen NEC's capacity to promote climate change mitigation and adaptation in the spheres of energy and water resources management.

II. ISSUES

2. Bhutan is a least-developed, mountainous, and landlocked country whose population and ecosystems are vulnerable to climate change. It is expected that climate change will lead to increasingly erratic precipitation patterns, including delayed arrival of seasonal rainfall and snowfall, geographical shifts in the distribution of precipitation, flash flooding (exacerbated by glacial runoff), and acute droughts in the dry season. Eventually climate change will make significant impacts on river water flows, which are the backbone of the country's economy and life. Exports of hydropower-generated electricity account for more than 40% of national revenue. Seventy percent of the population lives in rural areas and depends heavily on irrigated agriculture. It is crucial that Bhutan protect its energy and water resources from climate change risks. To do so, it will have to act on two fronts: mitigation and adaptation.

3. **Mitigating climate change.** Mitigation of climate change will require policies and development actions that will reduce greenhouse gas emissions. While the potential for mitigation activities are limited in Bhutan itself because the country is a net sequester of carbon, further development of hydropower for export could substantially reduce greenhouse gas emissions in the subregion including neighboring countries. Of total power generated in Bhutan, 70% is exported to India. In July 2009, the Dagachhu hydropower project for power export from Bhutan was validated for the clean development mechanism (CDM) of the United Nations Framework Convention on Climate Change (UNFCCC). Once this project is registered at UNFCCC, it will be the first cross-border CDM project where the baseline of the CDM benefits is defined by the Indian power supply system, which consists mainly of coal-fired power generation.

4. NEC is the designated national authority for climate change issues and is responsible for approving CDM projects in Bhutan. However, it lacks sufficient staff, guidelines, and procedures to manage CDM activities. At present, NEC takes environmental protection alone into account when assessing CDM projects. It pays little attention to the role of sustainable social and economic development in climate change. While CDM opportunities do exist, the country has not tapped adequate resources available for climate change. Currently Bhutan and India are planning more hydropower projects, totaling 10,000 megawatts (MW), in accordance with a mutual umbrella agreement. As a result, there will be an urgent need to develop a more comprehensive assessment framework that ensures that water resources will be exploited in a sustainable manner and CDM and carbon trading will be promoted. Setting low carbon standards will contribute to the country's sustainable development in the key ADB-supported sectors of power and transport, which together account for a large proportion of CO₂ emissions.

¹ ADB. 2008. *Bhutan: Country Operations Business Plan, 2009–2011*. Manila. The TA first appeared in the business opportunities section of ADB's website on 18 August 2009.

High consumption of firewood in rural areas will also require mitigation through development of alternative clean energy sources.²

5. **Adapting to climate change.** Adaptation is considered integral to reducing vulnerability to the effects of climate change. The retreat of Himalayan glaciers and glacial lake outburst floods (GLOFs) are serious threats to Bhutan.³ In 2006, NEC prepared the National Adaptation Programme of Action (NAPA), which included 45 adaptation activities and nine priority adaptation projects. Water resources management is one of the priority areas of the NAPA. It is predicted that global warming will decrease stable water flows from the Himalayas, in turn increasing the risk of water-related natural disasters, including GLOFs, flash floods, and landslides. Such disasters could seriously damage not only human settlements but hydropower systems as well. Of more than 3,000 glaciers and glacial lakes, 25 are assessed to be in danger of melting. Bhutan has started artificially lowering the water level of one glacial lake to prevent flooding, and is installing early warning systems in one river basin,⁴ but it lacks the finances to take similar disaster-prevention measures for its other glaciers and glacial lakes. Proper exploitation of water resources is another crucial issue. Planned hydropower projects must be ecologically sustainable and able to adapt to climate change. Climate change will likely increase the sedimentation and soil erosion of rivers and watersheds, affecting irrigation networks, crop productivity, forestry, and water supply. Coupled with temporal and spatial water-flow variations, these changes will severely affect hydroelectricity production and the export revenues for the country.

6. Currently no ministry or agency is in charge of overseeing water resources management. Provisionally NEC has a mandate to coordinate water issues among relevant ministries and agencies. Along with formulating a Water Act, NEC proposes to establish the Bhutan Water Authority to carry out integrated water resources management (IWRM), which will need to formulate specific guidelines, business procedures and clear responsibilities for sustainable water usage among the stakeholders. Long-term infrastructure investment in energy and water resources in Bhutan should take CDM into account as a way of enhancing project benefits, and adapt adverse impacts to climate change in integrating energy and water resources management, to make sustainable use of such vital resources.

7. **ADB operations and external assistance.** ADB has assisted Bhutan in using energy resources efficiently — one of the main emphases of climate change mitigation. Energy efficiency can further be promoted by use of hydropower, renewable energy, and cleaner fuel for purposes of lighting, cooking, heating, and transport. Particularly, hydropower development is the largest driver of pro-poor economic growth in Bhutan. The government aims to develop an additional 10,000 MW for trading power and carbon benefits by 2020. In 2008 ADB provided loans⁵ to assist Dagachhu hydropower export development through a public–private partnership and CDM, with attached TA⁶ to develop institutional capacity to promote more hydropower projects. In 2009, a project preparatory TA was approved to prepare the Rural Renewable

² In 2009, the Japan International Cooperation Agency (JICA) initiated work to study CDM potential from rural electrification projects of ADB and JICA in Bhutan.

³ The fourth assessment report of the Intergovernmental Panel on Climate Change warned that Himalayan glaciers are receding faster than in any part of the world and may even disappear by the year 2035.

⁴ A GLOF from Thorthormi Lake was predicted to burst as early as 2010. The United Nations Development Programme and Austria are mainly supporting a project to adjust the lake water level and reduce this risk. The lake is located in the Punakha–Wangdi valley where the Basochhu hydropower plant and the upcoming Punachangshu hydropower plant are installed.

⁵ ADB. 2008. *Report and Recommendation of the President to the Board of Directors: Proposed Loans, Asian Development Fund Grant, Technical Assistance Grant, and Administration of Grant to the Kingdom of Bhutan for the Green Power Development Project*. Manila.

⁶ ADB. 2008. *Technical Assistance to the Kingdom of Bhutan for Promotion of Clean Power Export Development*. Manila.

Energy Development Project, which will promote rural electrification and alternative natural energy use of solar, wind, and biogas.⁷ Promotion of low-emission forms of energy is in line with ADB's Strategy 2020,⁸ components of which include environmentally sustainable growth through transfer of environmentally friendly technologies, adaptation of environmental safeguard measures, and building institutional capacity to strengthen enforcement of environmental safeguards.

8. Building capacity in the field of environment management, including adaptation to climate change, is one of the key crosscutting themes of ADB's assistance for Bhutan. ADB has approved three TA projects targeting capacity development within NEC to improve environmental safeguards and compliance since the 1990s.⁹ The Danish International Development Assistance (Danida) has also provided NEC with comprehensive assistance for environment and climate change activities, including preparation for UNFCCC's conferences of parties (COP15).¹⁰ The World Bank has supported sustainable land management, and the Japan International Cooperation Agency (JICA) is conducting a risk assessment of GLOFs in one river basin.¹¹ In 2006, the United Nations Development Programme (UNDP) helped NEC prepare the NAPA and the National Disaster Risk Management Framework, and UNDP is currently supporting the preparation of a second national greenhouse gas inventory assessment. Despite the importance of water resources in Bhutan, no external assistance has focused on IWRM with consideration of climate change adaptation. Potential adverse impacts on hydrological flows for power plants and irrigation will be sensitive to the national energy and food security and inclusive economic growth. These impacts will also increase threats of water related disasters (including GLOFs). It is critical that NEC prioritize climate change adaptation as an essential component of environment management to assess sustainable natural resources usage.

III. THE TECHNICAL ASSISTANCE

A. Impact and Outcome

9. The TA's impact will be a functioning and sustainable climate change mitigation and adaptation system for energy and water resources available in the country and the subregion. This impact will be realized through the incorporation of a sustainable climate change framework in planning procedures within ministries and agencies managing energy and water resources in Bhutan. The TA 's outcome will be enhanced capacity of NEC to function as a designated national authority that will prioritize climate change risks in energy and water resources development and promote climate change mitigation and adaptation activities. The success of the capacity development will be measured by (i) NEC's ability to properly evaluate project design documents applied for CDM and its relevant framework (e.g., voluntary emission reductions); (ii) NEC's ability to effectively coordinate the work of ministries and agencies

⁷ ADB. 2009. *Technical Assistance to the Kingdom of Bhutan for Preparing the Rural Renewable Energy Development Project*. Manila. It includes (i) on-grid rural electrification sourced from hydropower, (ii) off-grid rural electrification sourced from solar power, (iii) wind power mill(s), and (iv) biogas plants.

⁸ ADB. 2008. *Strategy 2020: The Long-Term Strategic Framework of the Asian Development Bank, 2008–2020*. Manila.

⁹ ADB. 1996. *Technical Assistance to the Kingdom of Bhutan for Strengthening Environmental Impact Assessment Capabilities and Preparation of Environmental Guidelines*. Manila; ADB. 2003. *Technical Assistance to the Kingdom of Bhutan for Strengthening Environmental Sector Capacity*. Manila; and ADB. 2005. *Technical Assistance to the Kingdom of Bhutan for Capacity Building to Implement Environmental Assessment Procedures*. Manila.

¹⁰ Danida mainly supports (i) preparation for COP15, (ii) adaptation activities for agriculture and forestry, (iii) early warning systems for floods, and (iv) capacity development of local government officials in climate change.

¹¹ Through the Japan Science Technology Agency, JICA is assisting in the risk assessment of GLOFs and earthquakes in the Mangdechu river basin.

dealing with IWRM; and (iii) NEC's ability to expand the country's access to financing for climate change mitigation and adaptation projects. The design and monitoring framework is in Appendix 1.

B. Methodology and Key Activities

10. The TA's outputs will focus on NEC's capacity development for climate change in energy and water resources. These include: (i) component 1: Institutional development strategy and organizational framework to manage climate change mitigation and adaptation activities; (ii) component 2: NEC's own operational toolkits, including guidelines, manuals, and business procedures and responsibilities to take into account environmental assessments and CDM appraisal, particularly in the spheres of hydropower (including transmission links), renewable energy, and transport;¹² (iii) component 3: NEC's operational toolkits defined in IWRM taking climate proofing into consideration; (iv) component 4: Climate change modeling and a national road map with a time-bound action plan and financing avenue for climate change activities; and (v) component 5: In-house workshops and training programs for managing the toolkits and building awareness of sustainable energy and water resources development.

11. The climate change mitigation activities will primarily target hydropower, renewable energy, and transport emission control.¹³ The climate change adaptation activities will be based on IWRM, and will focus on hydropower, watersheds, irrigation, environment management, and water-related disaster risk management.¹⁴

12. NEC will set up a climate change unit before the end of 2009. NEC will appoint the counterpart team for each component, and the team and consultant will collaborate in producing the deliverables through a learning-by-doing approach. The training will target the NEC secretariat and local offices, and selective officials from relevant ministries and agencies. To make the training activities sustainable, NEC will train some NEC officials to be trainers who will continue to conduct the training programs after the TA has been completed.

13. The TA will be coordinated with the work of other civil society groups and donors, including Danida, JICA, UNDP, and the World Bank, to avoid duplication of activities and maximize the synergy effects of coordination. In consultation with these groups and donors, the TA will launch mass communication and awareness programs among the government's ministries and agencies to build up the consensus of action plans on a national level.

C. Cost and Financing

14. The total cost of the TA is estimated at \$750,000 equivalent. ADB will provide \$700,000 on a grant basis from the Japan Special Fund, funded by the Government of Japan. The Government of Bhutan will finance the remaining \$50,000 equivalent of local currency costs through in-kind contributions, including office accommodation and facilities, counterpart staff, data, and other information. The detailed cost estimates and a financing plan are in Appendix 2.

¹² It will define the baseline study, data collection, and analysis methodologies in planning, reviewing, evaluating, and monitoring the projects.

¹³ The main stakeholders for components 2, 4, and 5 include (i) NEC; (ii) the Department of Energy, Ministry of Economic Affairs; and (iii) the Road Safety and Transport Authority.

¹⁴ The main stakeholders for components 3, 4, and 5 include (i) NEC; (ii) the Policy and Planning Division and the Watershed Management Division, Ministry of Agriculture; and (iii) the Department of Energy, and the Department of Geology and Mines, Ministry of Economic Affairs. They will also consult with other relevant ministries, including the Ministry of Home and Cultural Affairs for disaster management, the Ministry of Works and Human Settlement for urban water supply, and the Ministry of Health for rural water supply.

D. Implementation Arrangements

15. NEC will be the executing agency and one of implementing agencies (IAs) for the TA project. The Ministry of Agriculture, the Ministry of Economic Affairs, and the Road Safety and Transport Authority will also act as IAs. The NEC's director general will be the project director, overseeing day-to-day TA project implementation. For each of the components, NEC will establish the counterpart project team and appoint its manager and members from the IAs to work with the consultants and help them liaise with other government ministries and agencies, and obtain data and documentation. NEC will provide office space, furniture, and support facilities to the TA consultants.

16. The TA will require 25 person-months of consulting services (19 international and 6 national). The consultant team will cover major areas of expertise: (i) climate change management, (ii) transport management, (iii) climate change economics, (iv) environment management, (v) water resources management, and (vi) water regulation. The team leader will be an international expert in climate change management. The international consultants will be expected to spend more than 90% of their time in the field. The outline terms of reference are in Appendix 3. The study is expected to be implemented over 18 months, from April 2010 to September 2011. A consulting firm or consortium of firms will be engaged by ADB through its quality- and cost-based selection procedures in accordance with ADB's Guidelines on the Use of Consultants (2007, as amended from time to time), and the TA-financed equipment will be procured under ADB's Procurement Guidelines (2007, as amended from time to time). The disbursements will be made under ADB's *Technical Assistance Disbursement Handbook*.¹⁵

17. The consultant will submit to NEC, the IAs, and ADB an inception report focusing on the work program no later than 1 month after commencing the consultancy services. Interim reports will be submitted 6 months and 12 months after the start of the services. A draft final report will be submitted 16 months after incorporating all of the deliverables and the performance evaluation achieved under the TA. Tripartite meetings will be held in Bhutan to discuss the inception, interim, and draft final reports among the consultant, NEC, the IAs and the ADB mission. Every 6 months, the consultant will prepare progress reports highlighting any achievements and issues that are critical for the timely completion of the TA. Within 2 months of the tripartite meeting to discuss the draft final report, the consultants will submit a final report in a format acceptable to ADB after addressing all comments received from the government and ADB.

IV. THE PRESIDENT'S DECISION

18. The President, acting under the authority delegated by the Board, has approved the provision of technical assistance not exceeding the equivalent of \$700,000 on a grant basis to the Government of Bhutan for the Capacity Building of the National Environment Commission in Climate Change, and hereby reports this action to the Board.

¹⁵ ADB. 2008. *Technical Assistance Disbursement Handbook*, Manila.

DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
<p>Impact</p> <p>Functioning and sustainable climate change mitigation and adaptation system for energy and water resources</p>	<p>Incorporation of sustainable climate change mitigation and adaptation measures in planning procedures of Bhutan's energy and water resources ministries and agencies</p> <p>Reduction of greenhouse gas emissions equivalent to additional 10,000 MW of hydropower exports on a cross-border basis by 2020</p> <p>Reduction of vulnerability to climate change, particularly unforeseen water-related disasters, from 25 glacial lakes by 2020</p>	<p>Annual reports of NEC and relevant ministries and agencies, including GNHC, MoA, MoEA, MoHCA, and RSTA</p> <p>UNFCCC's registry</p> <p>Government statistical reports</p> <p>Statistical reports of ADB, Danida, IMF, JICA, UNDP, and the World Bank</p>	<p>Assumptions</p> <p>Government continues to prioritize hydropower development</p> <p>Bilateral and multilateral assistance for hydropower development and climate change adaptation activities continues</p> <p>Risks</p> <p>Lack of funding for investment</p> <p>Insufficient development of CDM trading market</p> <p>Low preventive disaster risk management capacity of central and local bodies</p>
<p>Outcome</p> <p>Enhanced capacity of NEC to prioritize climate change risks in energy and water resources development</p>	<p>At least four project design documents for energy and water sectors, evaluated by NEC in line with operational toolkits for CDM by 2013</p> <p>NEC's effective coordination of ministries and agencies dealing with integrated water resources management (IWRM), in line with operational toolkits for at least one hydropower project by 2013</p> <p>NEC, MoEA, and GNHC jointly access concessional financing for at least one flood-hazard preventive project/program by 2013</p>	<p>Annual reports of NEC and relevant ministries and agencies including GNHC, MoA, MoEA, MoHCA, and RSTA</p>	<p>Assumptions</p> <p>Continued CDM framework after 2012</p> <p>NEC fully staffed to carry out its missions</p> <p>Promotion of planned hydropower and climate change adaptation projects in the 10th Five Year Plan</p> <p>Continued priorities to NAPA and National Disaster Risk Management Framework</p> <p>Risk</p> <p>Lack of budget funds for NEC and relevant implementing ministries</p>

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
<p>Outputs</p> <p>1. NEC's institutional development strategy and organizational framework approved to manage climate change mitigation and adaptation activities</p> <p>2. NEC's operational toolkits adapted for environmental assessments and CDM appraisal</p> <p>3. NEC's operational toolkits adapted for IWRM, taking climate proofing into consideration</p> <p>4. NEC's climate change modeling (CCM) system developed and the national climate change road map formulated with a time-bound action plan and financing</p>	<p>Establishment of a climate change unit in NEC by 2009</p> <p>Time-bound strategy and framework with terms of references for the existing officials to improve work efficiency and productivity by 2010</p> <p>Guidelines, operational manuals, and procedures for environmental assessments and CDM applications and appraisals developed for key sectors, including hydropower (including transmission), renewable energy, and transport emission control by 2010</p> <p>Rules and regulations, guidelines, operational manuals, and procedures developed for sustainable IWRM, in line with the Water Policy and the Water Act issued, by 2010</p> <p>Clear roles and responsibilities for IWRM defined among relevant ministries and agencies by 2010</p> <p>Implementation body for IWRM set up by 2011</p> <p>Climate change modeling systems with monitoring indicators for key sectors, including hydropower, renewable energy, and transport emission control, by 2011</p> <p>10-year investment plan</p>	<p>ADB review mission's aide memoire</p> <p>TA reports</p> <p>The Government's and NEC's rules and regulations</p>	<p>Assumptions</p> <p>Dagachhu hydropower project's registration in UNFCCC</p> <p>Satisfactory consultant performance</p> <p>Risk</p> <p>Lack of coordination between NEC and other ministries and agencies</p>

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
<p>avenue</p> <p>5. Workshops for building awareness and consensus of strategies for sustainable energy and water resources development and in-house training programs for managing the toolkits</p>	<p>with financing avenue for mitigating water-related hazards and at least two investment priorities for managing flood hazards, by 2011</p> <p>Training needs assessments with baseline and monitoring target by 2010</p> <p>NEC (including district offices) and selective relevant ministerial officials trained in (i) environmental assessments, (ii) CDM, (iii) IWRM, (iv) CCM, and (v) action plan and funding access, by 2011</p> <p>Information awareness programs developed for NEC and other officials responsible for climate change mitigation and adaptation in planning, monitoring, and evaluating energy and water resources development, in coordination with other donors, by 2011</p>		
<p>Activities with Milestones</p> <p>1. 1 month for submission of inception report</p> <p>1.1 Review the TA scope and requirements</p> <p>1.2 Review the existing information, data, policies, regulations, strategies, and carbon footprint in Bhutan</p> <p>1.3 Make a preliminary assessment of institutional capacity of NEC and relevant ministries and bodies for climate change</p> <p>1.4 Make a preliminary assessment of barriers, constraints, and opportunities for climate change</p> <p>1.5 Develop the detailed TA work program, schedule, milestone, and any additional proposals</p> <p>2. 2–6 months for submission of the first interim report</p> <p>2.1 Finalize the assessment of institutional capacity of NEC and relevant ministries and bodies for climate change</p> <p>2.2 Finalize the assessment of barriers, constraints, and opportunities for</p>			<p>Inputs</p> <p>ADB \$700,000</p> <p>Government \$ 50,000</p>

Activities with Milestones	
<p>climate change</p> <p>2.3 Propose an institutional development plan in short and medium terms</p> <p>2.4 Finalize the training needs assessment</p> <p>2.5 Set up the baseline information for the analyses and post evaluation</p> <p>2.6 Propose training programs to be conducted with trainers</p> <p>2.7 Launch awareness workshop(s) in coordination with other ministries and agencies, and donors</p> <p>3. 7–12 months for submission of the second interim report</p> <p>3.1 Prepare a road map with a time-bound action plan and strategy for climate change mitigation and adaptation</p> <p>3.2 Develop operational kits and handbooks</p> <p>3.3 Develop climate change modeling and economic impact analyses methods</p> <p>3.4 Implement the institutional development plan in short term</p> <p>3.5 Conduct workshops and training programs</p> <p>3.6 Conduct consensus workshop(s) among other ministries and agencies, and donors</p> <p>4. 13–16 months for submission of draft final report</p> <p>4.1 Provide on-the-job training for appraising applications for CDM or its relevant framework through new guidelines and business procedures</p> <p>4.2 Evaluate the results and workshops and training programs</p> <p>4.3 Finalize the road map with the time-bound action plan and strategy for climate change mitigation and adaptation</p> <p>4.4 Update investment opportunities for climate adaptation</p> <p>4.5 Conduct promotion workshop(s) in coordination with other ministries and agencies, and donors</p> <p>5. 17 months for submission of final report</p>	

ADB = Asian Development Bank, CCM = climate change modeling, CDM = clean development mechanism, Danida = Danish International Development Assistance, GNHC = Gross National Happiness Commission, IMF = International Monetary Fund, IWRM = integrated water resources management, JICA = Japan International Cooperation Agency, MoA = Ministry of Agriculture, MoEA = Ministry of Economic Affairs, MoHCA = Ministry of Home and Cultural Affairs, NAPA = National Adaptation Programme of Action, NEC = National Environment Commission, RSTA = Road Safety Transport Authority, UNDP = United Nations Development Programme, UNFCCC = United Nations Framework Convention on Climate Change.

Source: Asian Development Bank

COST ESTIMATES AND FINANCING PLAN
(\$'000)

Item	Total Cost
A. Asian Development Bank Financing^a	
1. Consultants	
a. Remuneration and Per Diem	
i. International Consultants	423.00
ii. National Consultants	30.00
b. International and/or Local Travel	104.50
c. Reports and Communications	2.20
2. Equipment ^b	11.30
3. Workshops, Training, Resource Persons, and Seminars, and Conferences ^c	
a. Facilitators	2.00
b. Training Program ^c	37.50
4. Vehicle Procurement ^d	22.50
5. Miscellaneous Administration and Support ^e	1.10
6. Representative for Contract Negotiations	6.00
7. Contingencies	59.90
Subtotal (A)	700.00
B. Government Financing	
1. Office Accommodation ^f and Transport ^g	10.00
2. Remuneration and Per Diem	35.00
3. Others	5.00
Subtotal (B)	50.00
Total	750.00

^a Financed by the Japan Special Fund, funded by the Government of Japan.

^b The equipment will become the property of the National Environment Commission at the end of the technical assistance. The equipment will include 1 computer, 1 printer, 1 scanner, 1 fax machine, 1 digital video camera, and 1 copy machine.

^c Includes printing and tools for workshops, training, and seminars and conferences.

^d Procurement of a vehicle is justified because of the need for data gathering, project site reviews, and commuting to the offices. The vehicle will become the property of NEC upon completion of the TA.

^e Includes office utilities.

^f Includes office space, installation of 2 telephone lines for fax machine, 2 internet connections, air conditioners in the consultant's office, electricity, and water charges.

^g Includes transport of counterpart staff.

Source: Asian Development Bank estimates.

OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

1. The technical assistance (TA) will support capacity building in the National Environment Commission (NEC) through a learning-by-doing approach. The executing agency will be NEC. The implementing agencies (IAs) will be NEC, the Ministry of Agriculture, the Ministry of Economic Affairs, and the Road Safety and Transport Authority (RSTA).

2. The TA will require 25 person-months of consulting services (19 international and 6 national). The consultant team will cover the following major areas of expertise: (i) climate change management, (ii) transport management, (iii) climate change economics, (iv) environment management, (v) water resources management, and (vi) water regulation. The team leader will be an international expert in climate change management. The team leader will coordinate the inputs of 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. The consultants' outline terms of reference will include, but not necessarily be limited to, the following.

A. Climate Change Management Specialist/Team Leader (international, 5.0 person-months)

3. The climate change management specialist will:

- (i) Assess NEC's institutional capacity and prepare strategies and organizational framework for managing climate change mitigation and adaptation, particularly for key energy and water sectors. Focus on hydropower, renewable energy, and transport emission control and fuel consumption.
- (ii) Support NEC in forming a functioning climate change unit.
- (iii) Review related existing and ongoing government 5-year plans, policies, regulations, and strategies in energy and water resources; review carbon footprints and assess barriers, constraints, and opportunities for climate change in Bhutan.
- (iv) Propose policies and regulations to enable NEC, as the designated national authority for climate change, to prioritize climate change.
- (v) Propose incentive mechanisms, including subsidies and tax exemptions, to promote technology transfer and standardization, and private sector participation in climate change mitigation and adaptation.
- (vi) Develop an operational toolkit and handbooks, including quick checklists, rules, guidelines, appraisal (baseline setting and methodologies), and business procedures and responsibilities for applications for the clean development mechanism (CDM) and its relevant incentive systems. Focus on hydropower, renewable energy, and transport emission control and fuel consumption.
- (vii) Support NEC in reviewing project design documents (PDDs) applied for CDM.
- (viii) Develop (a) detailed action plans in the short term; and (b) road maps over 10 years, with a time-bound action and investment plan and financing avenue for climate change mitigation and adaptation, particularly in the areas of hydropower, renewable energy, and transport emission control and fuel consumption. Collect and indicate baseline information for the road maps and plans with other experts.
- (ix) List financing sources for climate change mitigation and adaptation and help NEC tap them for projects and programs.

- (x) Develop an information awareness and outreach strategy and program for internal and external stakeholders, to manage sustainable energy and water resources development in line with climate change.
- (xi) Develop and conduct in-house training programs on CDM for NEC trainers, other NEC head office and district office officials, and relevant line ministries, based on a training needs assessment. Establish baselines and targets for the capacity development programs and monitor and measure achievement against baseline data. Record the training programs to devices (e.g., videotapes and/or websites) for future use.
- (xii) Clarify and map out supporting priority areas among other donors, including Austria, Japan (JICA), Denmark (Danida), the United Nations Development Programme (UNDP), and the World Bank, in climate change and environment management of energy and water resources. Coordinate activities and arrange co-hosting workshop(s) to exchange information and build consensus among relevant ministries, agencies, and donors on a national level.
- (xiii) Prepare and disseminate awareness-raising materials on climate change for the private sector and potential internal and external stakeholders.

B. Transport Specialist for Climate Change (international, 2.0 person-months)

4. The transport specialist for climate change will:

- (i) Help the climate change management specialist conduct NEC's institutional capacity building and help NEC and RSTA prepare strategies and organizational framework for managing climate change mitigation and adaptation, particularly in transport emission control and fuel consumption.
- (ii) Define clear roles and responsibilities for climate change activities for the transport sector among the IAs and other relevant ministries and agencies.
- (iii) Develop an operational toolkit and handbooks, including quick checklists, rules, guidelines, appraisal (baseline setting and methodologies), and business procedures and responsibilities for applications for CDM and its relevant incentive systems. Focus on mass transit systems including fuel consumption and emission control.
- (iv) Help the climate change management specialist develop (a) detailed action plans in the short term; and (b) road maps over 10 years, with a time-bound action and investment plan and financing avenue for climate change, focusing on transport emission control and fuel consumption (including an assessment of electric vehicles sourced from hydropower). Collect and indicate baseline information for the road maps and plans with other experts.
- (v) List financing sources for climate change mitigation and adaptation and help NEC and RSTA tap them for projects and programs.
- (vi) Develop and conduct in-house training programs on CDM for NEC trainers and other officials from NEC head and district offices and line ministries, based on a training needs assessment. Establish baselines and targets for capacity development programs and monitor/measure achievement against baseline data. Record training programs to devices (e.g., videotapes and/or websites) for future use.

C. Climate Change Economist (international, 3.0 person-months)

5. The climate change economist will:

- (i) Review the existing greenhouse gas inventory assessment and collect baseline information and data to prepare climate change models with specific indicators, and project how climate change will impact energy, water, and transport under different scenarios. Simulate climate change impacts on (a) transport control in selected cities (e.g., Thimphu) to make a time-bound action plan for climate change mitigation; and (b) water resources in selected river basins (e.g., the Wangchu and/or Mangdechu basins) to make a time-bound action plan for climate change adaptation.
- (ii) Formulate methods to include CDM baseline scenarios and greenhouse gas accounting in PDDs and other economic and environmental assessments.
- (iii) Support NEC in reviewing PDDs applied for CDM.
- (iv) Assess the economic viability of climate change activities based on investment costs and benefits if applicable.
- (v) Assess vulnerability of the poor and the country's economy to climate change.
- (vi) Develop and conduct in-house training programs on CDM and its relevant framework for NEC trainers and other officials from NEC head and district offices and relevant line ministries, based on a training needs assessment. Establish baselines and targets for capacity development programs and monitor/measure achievement against baseline data.

D. Environment Specialist (international, 4.0 person-months)

6. The environment specialist will:

- (i) Develop quick checklists and operational manuals used for NEC officials to help them carry out environmental impact assessments and monitoring for hydropower, renewable energy, and transport projects; impact assessments should be concise and comprehensive with an emphasis on climate change.¹ Develop criteria and methodologies to define climate change mitigation measurements and adaptation design (e.g., minimum river flows, fish ladders). Refer to the Asian Development Bank's environment safeguard guideline.
- (ii) Clarify business procedures including interministerial coordination processes of environment impact assessment. Streamline the procedures as much as possible.
- (iii) Train NEC officials to become trainers and strengthen overall staff skills and knowledge on environment impact assessment to mainstream climate change risks.
- (iv) Provide on-the-job-training at NEC in environmental assessment and environmental protection management, including training in modeling, measuring, planning, reviewing, monitoring, and evaluating activities in hydropower, transmission, renewable energy, transport, and other key areas.
- (v) Develop and conduct workshops and training programs on environmental assessment for NEC head and district office staff, based on a training needs assessment. Establish baselines and targets for capacity development programs and monitor/measure achievement against baseline data. Record training programs to devices (e.g., videotapes and/or websites) for future use.

¹ The existing manuals for user's applications are being revised through World Bank technical assistance.

E. Water Resources Management Specialist (international, 4.0 person-months)

7. The water resources management specialist will:

- (i) Review the existing and ongoing national policies and regulations related to water resources management (e.g., the Water Policy, the Sustainable Hydropower Policy, the National Irrigation Policy, the National Land Policy, the National Environment Protection Act 2007, and the Electricity Act 2001), and assess barriers, constraints, and challenges for water resources management in Bhutan.
- (ii) Support NEC in formulating policies and regulations in water resources development and management if necessary.
- (iii) Develop an operational toolkit and handbooks including rules and regulations, guidelines, appraisals, and business procedures for an integrated water resources management (IWRM). Focus on hydropower development, irrigation, sanitation, water quality monitoring, watershed and soil erosion management, and flood control, in line with related policies and legislations. Review existing policies and plans related to water-related disaster risk management, including flood hazards. Incorporate disaster risk management in the operational toolkits, in collaboration with the climate change management specialist and the environment specialist.
- (iv) Define clear roles and responsibilities for IWRM among the IAs, the Gross National Happiness Commission, the Disaster Management Department, Ministry of Home and Cultural Affairs, the Ministry of Works and Human Settlement, the Ministry of Health, other relevant ministries and agencies, and any proposed institutional apex body (e.g., the Bhutan Water Authority) to coordinate or implement IWRM. Manage inter-organizational coordination among them.
- (v) Present the international best practice of IWRM and propose a model suitable to Bhutan. Assess institutional options of the apex body to implement IWRM, and propose the best option in consultation with the IAs and other ministries involved. Support NEC and the government in establishing the apex body as applicable.
- (vi) Assess the awareness of water-related hazards in energy and water-resource-related infrastructure projects. In the event of problems, propose ways to improve awareness and take remedial measures in the business procedures.
- (vii) Establish investment priorities to mitigate water-related hazards and provide cost estimates (investment and recurrent expenditures) and their implementation plan. Coordinate with the departments of Geology and Mining, and Energy, Ministry of Economic Affairs, and relevant donors.
- (viii) Develop and conduct workshops and training programs on IWRM for NEC head and district office officials and relevant line ministries, based on a training needs assessment. Establish baselines and targets for capacity development programs and monitor/measure achievement against baseline data. Record training programs to devices (e.g., videotapes and/or websites) for future use.

F. Water Resources Regulatory and Legal Specialist (international, 1.0 person-months)

8. The water resources regulatory and legal specialist will:

- (i) Review existing policies and regulations related to water resources management, and identify any gaps in the legal and regulatory framework. Recommend additions or revisions to policies and legislation, if any.

- (ii) Working with the water resources management specialist, assist NEC in formulating policies and regulations in water resources development and management, and provide legal reviews, if any.
- (iii) Help the water resources management specialist formulate legal requirements in establishing the new apex body to implement IWRM, if necessary.

G. Project Coordinator (national, 6.0 person-months)

9. The project coordinator will:

- (i) Support the international specialists in all tasks, in particular by gathering data and performing fieldwork and logistical work.
- (ii) Coordinate the training programs and workshops, and liaise with NEC, the IAs, and other relevant ministries and agencies.
- (iii) Help the climate change specialist coordinate mass communications and awareness programs among NEC, the IAs, other relevant ministries and agencies, and other donors.