Bhutan: Promotion of Clean Power Export Development

Prepared by
PricewaterhouseCoopers Consortium
India

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ADB TA 7157 BHU - Promotion of Clean Power Export Development project

Final Report

January, 2012
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Introduction

The PricewaterhouseCoopers consortium was appointed as Advisors for TA 7157-BHU: Promotion of Clean Power Export Development project with the contract for the advisory services under COSO 190- 490 being signed between ADB and PricewaterhouseCoopers on March 4, 2009. The consultants commenced services from March 17, 2009. The contract required the Consultants to submit interim reports every six months, Draft Final Report (DFR) and Final Report (FR).

The first, second, third interim reports and the Draft Final Report were submitted in the month of October 2009, March 2010, October 2010 and November 2011 respectively.

The Final Workshop for the CDTA was conducted by the Consultants on 6th December 2011 with participation from ADB, the Department of Energy of the RGOb (Executing Agency) and Druk Green Power Corporation and DHI (Implementing Agencies). The consultants made presentations on the CDTA project overview, approach adopted, key factors that ensured success of the implementation and capacity building. The Consultants also presented an overview of the key actions taken under each module of the CDTA over the project duration, benefits realised by the client and the way forward. The workshop participants were highly appreciative of the collaborative approach adopted for the CDTA and the value realised by the client.

This Final Report covers the overall objectives of the various modules, issues, challenges, value addition and the way forward for each of the modules with annexure in separate volumes. A 500 word Knowledge Summary of the CDTA is also provided in this next section.

Context of the CDTA project

DGPC develops, owns, and manages a portfolio of hydro power generation facilities under public ownership and support. DGPC, as a steward of these national assets, aims to maximize wealth and generate revenues for the country, apart from meeting internal needs.

DGPC is a young organisation formed with the objective to develop and manage Bhutan's hydropower potential for the nation's economic growth: Druk Green Power Corporation (DGPC) was formed through amalgamation of the erstwhile Basochhu, Chhukha, and Kurichhu Hydro Power Corporations and commenced its business from January 1, 2008. Subsequently, Tala HEP was also amalgamated with it and around that time, DGPC was a Nu 65 billion company and was set to play a key role in hydro power development in Bhutan. The above amalgamation of HEPs was carried out with an objective to draw upon the synergies of the various plants and for efficient sharing of scarce and valuable resources. The other driving force behind setting up of DGPC was to form a single entity to represent RGOb's interests in the hydropower sector and to implement RGOb's policy of accelerating hydropower development.

Hydropower potential is the key resource available to Bhutan and its development is expected to be the key driver of Bhutan's socio-economic development: The hydropower potential in Bhutan is around 30,000 MW; out of which 23,495 MW is techno-economically feasible for development. Less than 5% of the total hydropower potential has been developed till date. Hydropower projects are an important source of income for the country and contribute about 19% of Bhutan's GDP; export of surplus electricity generates a trade surplus and brings 39% of all Government income.

For further development of hydropower, the key element of the Bhutan strategy is the Indo-Bhutan agreement on long term cooperation in the field of hydropower development. Under this Umbrella Agreement an accelerated target of 10,000 MW of electricity import by India from Bhutan by 2020 has been set. Ten projects were selected by Government of India and Royal Government of Bhutan
for the development of 10,000 MW under the Framework Agreement. Six projects from the above identified list would be developed bi-laterally by the two Governments. The remaining four namely Kholongchhu, Chamkharchu - I, Wangchhu Reservoir, Bunakha Reservoir, was decided to be taken up as joint ventures between Government Corporations of the two countries (DGPC from Bhutan's side). The Bilateral projects would be reverted back to DGPC after 2 years from COD. DGPC would be developing the rest of the four projects namely, Nikachhu, Khomachu, Rotphasong and Gamri on its own. The total investment required for developing all the above project would be to the tune of around Nu 190 Billion. For existing Plants, DGPC had identified an investment to the tune of around Nu 5 Billion for renovation and modernization.

**DGPC is stepping into a period of substantial growth with manifold increase in its assets, investments and operations by the year 2020.** DGPC would go through a period of unprecedented growth in next one decade till 2020.

DGPC has hitherto been largely involved in operating and maintaining projects developed bilaterally. However, DGPC is expected to play significant role in future development of projects. The organizational profile of DGPC would change at a rapid pace over the next few years. From being a closely knit organization with 3-4 plants, it would become an organisation with over 15 plant locations by 2020 and multiple on-going projects under its control. This has concomitant implications on DGPC's operations, staffing, strategy and processes.

**Objective and approach**

The objectives of the CDTA were:

- To promote hydropower development for Bhutan's economic growth
- Develop strategy & action plan to broaden financing avenues for hydropower projects
- Develop internal capacity development within DGPC for developing commercial hydropower projects.

Our overall approach adopted for the CDTA represented in the figure below covered identifying client priorities, working under a collaborative approach with client counterparts & management and promoting capacity building:

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<th>Identifying Client Priorities</th>
<th>Confirm scope and realign work plan</th>
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<td></td>
<td>Complement team with additional skill sets</td>
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<td>Collaborative Approach</td>
<td>Work with counterpart and project teams</td>
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<td>Regular discussions on draft deliverables to get organizational participation, ownership</td>
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<td>Hands-on training</td>
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Our approach also covered involving clients in workshops and various trainings sessions. The following trainings were provided during the course of the project to client teams:

- 3 workshops on developing the hydropower investment plan
- 4 financial modelling training sessions for DGPC, DOE and DHI
- 3 presentation at DGPC management meets covering CSP, Financing strategy, HR strategy, Power Market Strategy
- 2 workshops and training sessions to DGPC on Finance & Accounting Manuals
- 2 workshops and trainings to DGPC on Procurement & Inventory Manuals
- 3 day cost estimate training session to DGPC
- 2 workshops on CDM
- 2 workshops on ERP programme management to ERP core team and DGPC
- 2 workshops on Internal Audit and Risk Management to DGPC
- 3 workshops each on CPP and RE policy for DOE and other stakeholders

**Knowledge Summary of the CDTA**

When the CDTA commenced, DGPC was a young organisation incorporated about 1 year back for playing a key role in Bhutan hydropower development. It inherited old and diverse legacy operating practices. The comprehensive CDTA support has enabled DGPC develop into a dynamic organisation with the capacity to drive Bhutan’s hydropower development and economic growth.

The success of the CDTA was achieved through:

1. **ADB CDTA design and implementation support**: The TA design by ADB was comprehensive based on capacity building needs of a young DGPC and key sectoral policy requirements of Bhutan. ADB also ensured continued support to the client in incorporating scope changes to meet evolving client priorities & business requirements and make available requisite TA expertise to client.

2. **Client Commitment**: The senior client leadership adopted a participatory role and demonstrated enormous commitment to realise maximum value from TA support, implement priority actions with hands on consultant support and ensured availability of committed client counterpart teams for skills transfer and capacity building. The client commitment was most important factor in ensuring the CDTA success.

3. **Collaborative Delivery Approach**: The consultants demonstrated high understanding of local context and long term goals, brought in comprehensive skills in all areas of support to impart international practices customised to client context, adopted a collaborative approach working regularly with client personnel and delivered quality outputs and trainings.

The key outputs and capacity building over the CDTA were:

- **The DGPC Corporate Strategic Plan** identified key interventions, strategies and action plans with focus on creating a long term sustainable business plan for competitive positioning of DGPC as a major Asian Hydropower Utility.
The **Hydropower Financing Strategy** provides the framework to enable DGPC, as the steward of national hydropower assets, to maximize wealth and generate revenues for Bhutan and assist in developing domestic capital markets.

The **Power Import/Export strategy for Bhutan** helps meet domestic energy requirements and gainfully utilise upcoming capacities.

The full **life cycle ERP implementation support** assisted in building capacity of DGPC staff and achieving the first large scale ERP implementation in Bhutan on time and within budgets to realise the benefits of ERP implementation (such as better management information, enhanced controls, process improvements, etc).

**Manuals and SOPs for operational use** (for Finance & Accounting, Internal Audit and Risk Management, CDM, Procurement and Inventory) and trainings to DGPC personnel helped substantively enhance DGPC capacity, improve internal processes & controls and migrate smoothly to an ERP enabled environment.

The **HR Strategy and Plan** helped identify various areas of organisation restructuring, human resource planning, training and development, employee performance management and measures for attracting and retaining talent to meet challenges facing DGPC in achieving accelerated hydropower development.

The **CDTA has enabled DoE to develop the Rural Electrification Policy** (under final stage of approval) and the **Captive Power Policy** of Bhutan.

The CDTA success underscores the importance of comprehensive capacity building of young organisations of national importance in developing countries to enable realisation of growth plans.

## Contents of Final Report

The Final Report is for the whole period of the CDTA and contains the following for the various modules of the project:

- Brief outline and objective of the tasks under each module
- Challenges faced
- Key value additions
- Way forward
**Investment and Financing**

The ADB CDTA 7157 terms of reference requires the investment expert:

- To develop, update an Investment plan for DGPC till 2020 in line with the DGPC Corporate Strategy Plan
- Provide options for financing for future hydro projects
- Develop a financing strategy for DGPC to implement the DGPC Corporate strategy and visions 2020.
- To provide financial model training to DGPC and DoE as part of the capacity building exercise
- To develop the risk management framework for DGPC.

**Objective**

Given the context of DGPC embarking on its Vision 2020 to achieve the 10,000 MW hydropower capacity development goal of Bhutan, the key objective of the investment and finance module was:

- **Aligning the DGPC investment with Vision 2020**: The Vision 2020 of DGPC involved being a part of the 10,000 MW capacities as an investment, construction and O&M partner. This required drawing up investment plan for capital and institutional funding.

- **Developing Financing Road Map:**
  
  - **Financing Options**: The Investment Plan requires DGPC to raise significant debt and equity for the upcoming projects. It is recognized that the volume of funds required for the new projects may not be available locally due to limitations in domestic capital availability. As such, various options for raising funds (both debt and equity) from foreign markets through commercial borrowings, export credit, multilateral funding, IPOs, bond issuances, etc. are to be assessed. This requires assessment of various innovative financing options available both within the country and from external sources.

  - **Financing strategy and action plan**: Based on the investment plan and financing options, a comprehensive Financing strategy for DGPC has to be developed. The financing strategy would explore assessment of various options available to DGPC for financing both the debt and equity portion of proposed new hydropower projects from various domestic and foreign sources (such as listing of DGPC/SPV in local or foreign equity markets, ECBs, multilateral support, export credit, etc).

- **Capacity building for internal staff** (Financial Modelling training workshops): To equip DGPC, DOE and DHI personnel with requisite financial analysis and modelling skills in view of the large scale of Bhutan’s hydropower investment plans, the consultants were required to conduct financial Modelling training in phases. The training has to be provided to the staff of DGPC, DOE and DHI. The training would cover the basics of excel sheets, developing financial model, running financial models and generation tariff computations as per Indian CERC norms.
Challenges Faced

Bhutan’s hydropower development is expected to be the key driver of Bhutan’s economic and social development. The large scale investments planned for hydropower development necessitate a robust financing strategy for the proposed investments to channelize a range of competitive financing options for undertaking the investments. DGPC, DOE and DHI personnel require a high level of financial analysis, risk management and modelling skills to ensure the envisaged benefits of the planned investments are realised. The key challenges being:

**Under developed capital markets:** Investment in new hydropower projects is one of the main issues that RGoB and DGPC need to focus to achieve the goal of having installed capacity of 10,000 MW. Funds required would be around Nu 500 billion, out of which Nu 327 billion related to projects where DGPC would be the JV partner. The challenge lies in the fact that RSEB (the domestic stock exchange) has a market capitalisation of only Nu 8 billion and local banks and FIs have debt lending potential of only Nu 8-9 billion.

**Evolving regulations:** The investment regulations in Bhutan (especially for the power sector) are at an evolution stage. There are restrictions on Foreign Direct Investments, securing forex hedge for long term, formation of companies by external investors, local Bank borrowing and various regulations on Indian Financial Institutions to invest INR in Bhutan etc. Coordinated efforts from various stakeholders (such as DGPC, DHI, and RMA) are required for enabling regulations to promote the flow of investments in hydropower projects from various sources.

**Large scale capacity addition plan:** The hydropower sector is the engine of Bhutan’s economic development. Bhutan has developed a capacity of 1,500 MW and now has embarked on a mission to achieve 10,000 MW installed capacity. This required a high level of skills in risk management and enhancements in DGPC internal management reporting systems (such as consolidation of diverse legacy systems). Further, the evolution of DGPC role from a project operator to that of project conceptualisation & development and the need to access to various commercial financing sources also presented challenges for capacity building in the areas of financial analysis, reporting and risk management.

**Aligning corporate plan with financing strategy:** As mentioned above, the DGPC corporate strategy and investment plan foresee a significant capacity expansion for DGPC. In addition to financing, reporting & risk management, the growth plans required DGPC capacity building on various related aspects like power markets, HRD, manpower planning, process improvements, safeguards, procurement & operational practices. The entire CDTA team across modules worked together with the client to help in capacity building of DGPC.

Key Value Addition for DGPC

The key value additions for DGPC under this module are as follows:

- **Options and strategy to match with overall 2020 Vision:** The financing strategy developed by under the CDTA is aligned to the overall DGPC corporate plan to enable DGPC, as a steward of the national hydropower assets, maximize wealth and generate revenues for the country, apart from meeting internal needs. The innovative range of financing options advised would help DGPC raise both equity and debt in a competitive and sustainable manner.

- **Enabling domestic capital market development:** Whilst developing the Financing Strategy, we met RSEB, Insurance institutions and the RMA for assessing the market potential and regulatory requirements for DGPC or its SPV for an IPO. The financing strategy also provides various requirements for DGPC to raise financing from Bhutan’s domestic capital markets (both debt and equity) and the requisite stakeholder actions. DGPC being the largest corporate in Bhutan, greater access of domestic capital markets by DGPC is also expected to result in development of domestic capital markets in Bhutan. For instance an IPO
by DGPC or a SPV of DGPC on the local stock exchange, RSEB, can potentially draw a large pool of domestic investors into investing in local equities.

- **Hands on capacity building training to officers of the DGPC Finance & Accounts function:** The consultants have organized several training sessions on financial analysis, financial modelling and power sector tariff frameworks for DGPC Finance & Accounts staff from various plants and corporate office and for DoE. The hands on training along with live models, training exercises and other readings have enhanced the level of financial analytical skills of the personnel.

**Way Forward**

**Implementing the financing options and strategy:** DGPC needs to leverage the financing strategy options and road map for raising financing for its projects. Towards this, DGPC needs to engage and consult with various stakeholders such as DHI, RMA, local banks and regulators on the strategic options and policy initiatives required. IPO of DGPC or its SPV should be explored as a test case. The local listing will also help DGPC to raise funds in overseas markets, build credibility with external investors and also offer investors an exit option. It will also help develop the local equity markets.
Risk Management

Under the Investment Module of the CDTA, the Consultants were also required to carry out the following activities for the risk management sub module:

- Review the current activities followed in DGPC with respect to Internal Audit and Risk management
- Assist in developing Manuals for:
  - Internal Audit; and
  - Risk Management

Objective

The key objectives of enhancing capability in Internal Audit and Risk management were:

- Proactive risk identification and assessment – top down approach for risk management to become “Business As Usual”
- Defining Organisational Roles & responsibility with respect to Internal Audit & Risk Management
- Institutionalising Framework for mitigation of risk
- Leveraging Risk Management for Risk Based Internal Audit (RBIA) - both tools need to work together to support strong Corporate Governance
- Developing Risk Based Internal Audit (RBIA) framework – enhance existing capability for conducting risk based internal audits.

Challenges Faced

**New concept:** RM and IA are subjects on which the existing capacity was somewhat limited. The experience of the DGPC personnel in these areas was limited to conventional practices and could not be benchmarked with globally followed practices. Further, there was no separate team or laid down process for managing risks in the organisation and the risks were being managed largely through management decisions. However, the personnel were not trained to identify, assess and report business risks as a process.

**Expertise of existing resources:** With respect to internal audit function, the team was not fully equipped to interpret or follow the new age Internal Auditing system provided in the manuals. Implementation of the manuals requires enhancements in skill sets (both with respect to qualification as well as experience to understand and practice Risk based Internal Audit). As such, it was important not only to provide them with the manuals but also guide them towards implementing the manuals.

Key Value Addition for DGPC

Internal Audit & Risk Management framework are aligned to Corporate Governance Guidelines of OECD for SoEs and other international standards. Key value additions for DGPC under this module are as follows:

- **Enhance capacity of the personnel involved with Internal Audit and Risk management:** The Consultants organized a workshop for the officials involved with IA & RM
from the plants and corporate office. In the workshop, the consultants provided training to the DGPC officials on the manuals and explained the applicability of the manuals in the day to day business of DGPC. The workshop was attended by nearly 25 officials.

- **Detailed Manuals for operational use:** The manuals have been drilled down at the activity level. The articulation has been done with a view to help building a stronger foundation for the users of this manual. This has been done for better understanding of the users, ease of implementation and functioning of the manual. With DGPC's large growth plans and need to harness various financing sources, the Risk Management Manual also provides a good framework to address emerging risks that DGPC may face.

- **Roadmap for implementation:** We have also provided a roadmap for implementing the manual to assist the management in the transition. The roadmap details the various activities along with a suggested timeline for the management to gradually migrate to a Risk based Internal Auditing system.

**Way Forward**

**Enhance governance:** DGPC is looking at a large scale hydropower capacity addition over the next few years. Towards this, DGPC is required to strengthen its business processes and make it them more robust to enhance governance through improved monitoring of controls and by monitoring risks in a structured manner.

**Regular Training:** Going forward, DGPC needs to provide periodic training to relevant officials to help them remain abreast with the changing requirements of internal audit and risk management.

**Integration of IT in auditing:** DGPC is in the process of implementing ERP to leverage technology for enhancing efficiencies and automate its operations. In view of this, the DGPC internal auditors would need to henceforth conduct audits under an ERP environment. Given the additional complexities in audits under an ERP environment, DGPC needs to assess options for some initial hand holding for its internal audit personnel through professional support.
**Power Sector Management**

The Terms of reference require the Power Sector Management Expert to develop Strategic Power System planning capacity; Corporate Strategy plan for DGPC, Captive Power Policy and the RE policy.

**Module: Developing DOE's and DGPC's strategic power system planning capacity**

**Objective**

In 2006, Government of Bhutan and India signed an umbrella agreement to develop and trade an additional 5000 MW of hydropower by 2020. This target was revised to 10000 MW at a later date. A large part of these new capacities are being planned as bilateral projects with the Government of India under the Inter-Governmental and Joint Venture (public-public) models.

As the Indian power market operates under the Availability Based Tariff and Unscheduled Interchange (ABT/UI) mechanisms, one of the key driver of this module is to help Bhutan strategise on the means to respond to the ABT/UI framework. This forms an integral part of the power sector planning and power export strategy of Bhutan. This module also assessed the implications of implementation of such a commercial mechanism on the various stakeholders of Bhutan Power Sector.

The module also looked into the areas to develop an Import/Export strategy for Bhutan to meet the energy requirements and gainfully utilise the upcoming capacities.

**Challenges Faced**

- Bhutan will face power deficit primarily during the lean seasons till the commissioning of Punastangchu-I expected to happen around 2016.

- The major reason for this power deficit will be on account of the construction power required for commissioning of the ten mega power projects planned under Vision 2020.

- The drivers for demand growth reflected substantial increase of internal demand on account of accelerated rural electrification, increase in economic activity and growth in manufacturing sector.

- Existing contracts with India for the major power plants of Bhutan are structured to meet the requirements only when Bhutan is a net exporter. The contracts do not have provisions in case of net import of energy by Bhutan.

**Key Value Addition**

The work done under the CDTA has helped build recognition of the impending power deficit till the new bilateral projects are commissioned (on account of domestic demand increase and construction power requirements), the requirements for Bhutan to meet the forecast power deficits and the Long-Term & Short-Term strategic options available to Bhutan for responding to the integrated power market. A detailed analysis was carried out using one year data and understanding from ERLDC and NLDC, Bhutan for analysing responses over all the seasons. Such an analysis helped us in developing specific pointers on how Bhutan can respond to its most pressing challenge of meeting seasonal shortages which will be prevalent for the R-o-R based hydro resources. DGPC and DOE have initiated several actions such as:
Bhutan is currently negotiating with the eastern regional states of India for adopting strategies to mitigate the short-term energy crisis which is expected to prevail till commissioning of Punatsangchhu-I.

- Bhutan and West Bengal have a complementary demand characteristic. Such a profile is being gainfully utilised for entering into an arrangement wherein Bhutan will supply peaking power and import power during the lean periods during the lean seasons of Jan-March. This will meet the requirement of both the utilities and all transactions will be settled in kind.

- Both the utilities are also considering options of Bhutan settling the transaction at a later date beyond 2016 wherein they will become power surplus. In such case also, settlement will be done in kind with an additional quantum of 5% for each year passed.

- Back-up NLDC of India in Kolkata is getting visibility of the Bhutan power system through communication networks. Bhutan can gainfully utilise its SCADA/EMS system for having a better control over its generators and consumers. This will help them evolve as a more disciplined player in the integrated power market.

- Bhutan is evaluating options of responding to the ABT/UI market prevalent in India.

- Bhutan is having a clear roadmap for responding to the integrated power market thorough Long-Term & Short-Term strategies.

- Options for benefit sharing have been suggested for operating cascade hydro power projects.

**Way Forward**

- Bhutan may utilise the power transaction options for procuring power at optimised cost and exporting power for securing optimal returns.

- Bhutan needs to enter into a power procurement contract to meet the impending domestic power deficit primarily during the lean seasons.

- DGPC may assess options for developing some export oriented assets as joint venture with energy intensive consumers in India (Bhutan's key export power market) to partially meet its equity investment requirements and to manage energy off-take risks. However, in such transactions DGPC need to carefully evaluate the available market potential in India, counterparty risk and issues on account of tariff upside and fuel inflation prevalent in India.

- Bhutan may initiate the process of shadow mode of ABT compliance to prepare for any eventual regional grid operation and to help position itself as a disciplined player in an integrated power market. The initial steps are as follows:

  a) Establish a day-ahead generation planning and pondage management system to ensure high pondage availability for peak periods to extract the potential value possible
  b) Implement appropriate Decision Support Software for multi-unit projects for optimizing station performance based on Unit Characteristics.
  c) Post commissioning of Punatsangchhu-I and once the internal supply position is comfortable, use available business intelligence to monitor the internal and export market trends and use the assessment to schedule maintenance and overhauling
  d) Proper evaluation of metering infrastructure and associated communication system required to implement such a mechanism.
e) Such type of grid operation for positioning Bhutan in the integrated power market as a disciplined player will require capacity to instil certain capabilities like short-term demand forecasting, load management, Energy Accounting etc.

- DGPC and DOE may evaluate options for responding to the Indian power market through power traders or an independent trading arm of DGPC by utilising the 100% FDI route
Module: Developing Captive Power Policy

The formal approval to the “Sustainable Hydropower Development Policy 2008” was accorded by the Royal Government of Bhutan in June 2008. The Hydropower Policy provides for development of captive power generation by power intensive industries located within Bhutan to be covered under a separate Captive Power Generation Policy.

The ADB TA 7157 covers assistance to the Department of Energy in development of Captive Power Generation Policy. As part of this TA, the consultants are required to formulate a draft captive power generation policy and operational manual.

Objective

In this module the key objective are as under

- **Preliminary Policy Options** – Developing a policy would require analysis of the industrial energy availability, overall demand supply gap and key objectives of industrial growth as per Economic Development Policy of Bhutan and discussion with the key stakeholders viz. DOE, DGPC, GNH Committee.

- **Stakeholder Interactions and Workshops** – Stakeholder consultation workshop and feedbacks from DOE and representatives from industry was required to included before finalising the policy. Over the period of CDTA assignment the policy options was to be discussed with stakeholders over a number of interactions and workshops.

Challenges Faced

The key challenges faced in developing the CPP Policy were:

- **Make a distinction between CPP and IPP** – The electricity generation in Bhutan dips to nearly one-third of normal in the winter months of December-March every year. The growth in internal demand within Bhutan has resulted in peak and energy deficit during these months in last 3-4 years. The electricity supply to power intensive industries have been rationalised during these months through planned and unplanned supply cuts. The commissioning of the two planned projects of Punatsangchu and Mangadechu is expected to address this seasonal deficit. Captive power generation is seen as one of the options to ride over this short term crisis. During initial discussions with DOE, DGPC and other stakeholders, a need was felt to make a distinction between Captive Power units and IPP under Sustainable Hydropower Development Policy. The requirement is to minimise chances of provisions of the captive power policy being used to circumvent the provisions under the Sustainable Hydropower Development Policy. This included debate over whether CPPs should be allowed to export surplus generation and also the maximum captive generation capacity to be allowed to be set up by the industries.

- **Utilisation of fossil fuel** – Bhutan has limited fossil fuel resources (except for some deposits of low grade coal) and is dependent on India for import of fossil fuel resources for both industrial and domestic use. As allowing captive power plants to be set up using fossil fuel sources would result in increased import bill, a section of the stakeholders were of the view that utilisation of fossil fuel should not be allowed for CPPs. Another section of the industry was of the view that option for using fossil fuel should be kept open for industries if required.

- **Capturing various interfaces & ensuring alignment with other policies** – The CPP assets in Bhutan are likely to be hydropower based assets which results in various sizing and generation capability issues as well as difficulties in balancing the industrial load
requirements. Also hydro assets of certain sizes by qualification are covered under the Renewable Energy asset category which are governed by the proposed RE policy. As the CPPs in Bhutan are likely to be hydropower assets, the CPP Policy also needs to align with the key principles of the Sustainable Hydropower Development Policy 2008.

**Key Value Addition**

Key Value addition for Bhutan were

- Consultations with DOE, BPC, DGPC, NEA, BEA and representatives from industry has helped in developing a broad framework for captive power generation policy

- Ensuring adequate safeguards in CPP structuring aspects would help in safeguarding of overall hydropower development and minimise chances of the provisions of the Captive Power Policy being used to circumvent the provisions under the Sustainable Hydropower Development Policy
Module: DGPC Corporate Strategic Plan (CSP)

Objective
DGPC represents the Royal Government of Bhutan's interests in hydropower sector. DGPC develops, owns, and manages a portfolio of hydro power generation facilities developed under public ownership and support. It is entrusted with the challenge of developing 10,000 MW hydropower capacities by 2020. The DGPC, as a steward of these national assets, aims to maximize wealth and generate revenues for the country. This module inter alia covers the key strategic themes that are important in facilitating DGPC to achieve the sector targets and its Corporate Mission and Vision. The CSP is intended to facilitate key interventions, strategies and action plans for the DGPC Management with a focus on creating a long term sustainable business plan ensuring competitive positioning of DGPC as a major Asian Hydropower Utility.

Challenges Faced
The key challenges faced in developing the CSP were

- **Creating a Dynamic Plan** - Designing the document in the manner of a dynamic document that could be periodically updated was one of the principal challenges in the CSP. The document was intended to be a starting point or baseline that established the linkages to the Economic Development Policy of RGOb and the Vision and Mission of DGPC, strategic agreements with neighbouring countries and business requirements.

- **Capturing interfaces & linkages** - The CSP needed to reflect the external and internal interfaces and key drivers towards establishing the key inter linkages between various plans and specific client priorities in an interactive manner so that key policy changes can be updated for suitable changes in the CSP.

- **An inclusive development model for effective ownership transfer** - Ensuring that the design of the CSP and subsequent iterations are carried out in an inclusive manner with agreement and confidence of various stakeholders was key to developing a corporate strategy backed by the stakeholders for implementation. This is crucial in the view of the organization's need for complex interface management across a number of lending agencies, executing agencies at site, owners and other stakeholders.

Key Value Addition for DGPC
The key value addition for DGPC was:

- Establishing the model and key imperatives that DGPC needs to set in place for realizing the Vision considering the Business environment and the constraints facing our company during the plan period. We provided a strong strategic theme as well as a detailed action plan for the following areas, as well as international hydro benchmarking on technical and financial criteria.

  - Accelerated Hydropower Development
  - Investment & Financing
  - Market Development
  - Human Resources
  - Environment & Social
- Business & Operations Management
- Renewable Energy

We ran several workshops and presented to DGPC management on the DGPC CSP.

- Establishment of the Strategic Plan of DGPC towards providing future direction to the organization on all key institutional and business plans via on objective targets set out in the CSP and establishing the future role of DGPC in Bhutan's hydropower sector

- Identifying actionable targets along with responsibility earmarking for the various concerned departments thus setting the baseline for a monitoring and measurement and evaluation of project progress, benefits achieved, bottlenecks / impediments ensuring suitable course corrections
Module: Renewable Energy Policy

Objective

With increasing threats of climate change, the need for energy security to reduce reliance on hydropower, energy supply constraints and increasing demand of quality power in remote areas, there is a need to take appropriate policy measures by Bhutan for development of indigenous, local and dispersed clean energy sources in the future. The Renewable Energy Policy intends to provide the necessary direction for the promotion and development of Renewable Energy that not only contribute in meeting the current requirements but also shape future energy security options for Bhutan.

The primary objective behind the development of the Renewable Energy Policy for Bhutan is to ensure sustainable growth in energy generation while preserving the richness of the environment. There is also a need to create an enabling environment to attract public and private investments in the renewable energy (RE) sector. The framework and guidelines for the growth of RE in Bhutan is based on a comprehensive review of the barriers to investment, techno-commercial feasibility analysis and perceived risks in Bhutan. In line with the principles of Gross National Happiness (GNH), the broad goals of the policy are as stated below:

- Initiate exploration and development of RE resources.
- Institutionalize development of national and local capabilities for enhanced use of RE systems.
- Promote efficient and cost-effective RE based commercial application by providing fiscal and non-fiscal incentives.
- Mobilize funds and attract investments, especially private sector, for RE development.
- Contribute to socio-economic development.
- Enhance energy security.
- Establish the necessary infrastructure and institutional mechanism to carry out the mandates specified under various Acts and policies having an impact on RE.

Challenges faced

- The successful development and implementation of the RE policy would require sustainable growth in renewable energy generation with GHG emission reduction by using alternative energy resource potential.
- The development of the RE policy would require enabling environment for investment with socio-economic development. This need to be coupled with enabling framework for RE promotion, REDF, incentives, investment promotion and institutional mechanism

Key outcome

The RE policy prepared after extensive deliberations with various stakeholders (RGOB ministries, sector companies, private sector representatives, NGOs, etc) has been already presented to Prime Minister of Bhutan and is being finalised. The RE policy, which has been submitted to the Government is now the final stage of approvals.


**Information Systems**

**Objective**

The main work-streams in this module of the CDTA were:

1. Review existing information systems of DGPC.

2. Assess the options for an integrated management information system (MIS) in terms of costs (hardware, software, and implementation), timeframe, objectives, and products.

3. Develop an IT strategy and road map to implement MIS.

4. Design hardware and software specification for bidding documents and assist in evaluating and selecting the system implementation partner / vendor.

5. Assist project management for the MIS implementation.

Prior to the start of the CDTA, Druk Holding & Investments Limited (DHI) had undertaken a feasibility study to implement an Enterprise Resource Planning (ERP) solution in key companies under its control.

DHI intended to procure the required licenses of the selected ERP product and individual DHI companies were expected to select respective Implementation Partner (IP) to implement the system. In this context, DGPC sought our assistance in the entire bid process management for selection of the ERP implementation partner as well as to support in program management during the implementation of the ERP solution.

Based on the inputs from DGPC on the support requirements, we shared details of the tasks involved, the level of effort required, and the constraints in fitting it with the previous scope of work. Subsequently based on a revised staffing plan, a balanced approach involving efforts from all participants was agreed upon.

**Challenges Faced**

During the ERP program management the project team faced few challenges such as:

1. **First ERP implementation in Bhutan:** The DGPC SAP ERP implementation is the first ERP implementation in Bhutan. ERP implementation being a complex organisation wide exercise involves significant complexities (such as finalisation of specifications, bid process management, coordination between stakeholders, implementation partners and various vendors, ensuring inter linkages & dependencies are monitored and met, etc). ERP being a new aspect for DGPC and Bhutan, the level of capabilities available to address such issues were limited. The consultants extensively supported throughout the entire ERP implementation process.

2. **Frequent change in IP resources:** Except for Human Resource Management and Materials Management, IP changed the resources number of times. There was a risk of project getting delayed and not getting required support from the IP team. To mitigate the risks, we supported DGPC in reviewing the CVs of replaced consultants as well as suggested a process for proper knowledge transfer among the IP team. This helped in engaging quality resources and reducing the project knowledge gap among the new team joining the project.

3. **Data Centre:** As Thimphu Techpark was not complete for operations and other alternatives were not viable for providing quality services to DGPC, hosting the ERP application was
becoming an issue. We presented various options for SAP hosting to DGPC management along with advantage and disadvantage of each option. Based on the available options, DGPC decided to outsource the hosting requirements to an India based company on a managed colocation based hosting services model through a competitive bidding process. We also provided support to DGPC team during bidding process.

4. **Project Schedules:** The project got delayed by 5-6 months due reasons like change in IP team, unavailability of infrastructure and delays in completion of certain project activities. The consultants regularly appraised the DGPC management and counterpart team on the project progress, risks and measures to be taken. The consultants also engaged the IP senior management together with the DGPC management through project review meetings and steering committee meetings for resolving key issues affecting the project execution.

**Key Value Addition for DGPC**

Our support provided the following key benefits to DGPC:

1. **Project management:** We conducted workshops on ERP implementation life cycle, prepared framework for project assessment, developed processes for evaluating project milestones, helped in preparing internal team structure for implementation and post implementation support. These inputs helped DGPC in understanding the complexity involved in ERP implementation and successful project management. Our comprehensive program management support to DGPC helped DGPC achieve the ERP implementation practically on time and within budgets (many other utilities in the region have faced implementation delays of an year or more and significant cost overruns in their ERP implementation exercises). Our support also helped enhance the capacity of DGPC staff in ERP implementation and management.

2. **Project quality:** Our support in evaluating CVs, review of key deliverables like project plan, Business blueprint, training and help desk mechanism helped DGPC in achieving project milestones successfully.

3. **Data Centre:** Our support to DGPC in evaluating various options for SAP hosting and subsequent bid management and technical assistance helped DGPC getting professional technical support on IT infrastructure management which was critical for successful implementation.

**Way Forward**

We have assisted DGPC in taking following steps which need to be followed up by them on continuous basis for stabilisation of the SAP solution:

a. **End User feedback:** Getting feedback from end users through a survey to review SAP usage, use friendliness and solutions gap if any.

b. **Training Needs:** Assessing further training needs which will help DGPC to plan for further trainings in various modules

c. **Identification of SAP user coordinators exercise at plant level:** They will function as bridge between Plants and Core team for resolution of plant level issues by tracking of tickets and timely closures. They will also actively participate in identification of solution gaps or business requirements and taking it further with core team to get it resolved. This exercise will provide inputs on activities (such as further training requirements, refining user manuals, measures for increased usage of ERP for business transactions) to be taken by the management for optimal usage of SAP system.
Financial Management

Under the Financial Management Module of the CD TA, the consultants are required to carry out the following activities:

- Review the current of financial management followed in DGPC
- Develop Financial Management Manuals for:
  - Accounting;
  - Budgeting; and
  - Costing

Objective

The scope of work included preparation of the following financial management manuals

- Accounting Manual
- Budget Manual
- Costing Manual

The objectives of the financial management manual were as follows

- Standardize financial policy and process across various plants
- Adoption of Generally Accepted Accounting Principles
- Aligning financial process with the changing business requirement of DGPC in view of the aggressive growth strategy
- Develop financial management manual which will form the activity level guide for the process owners

Challenges Faced

Amalgamation of diverse legacies: DGPC was formed with the amalgamation of 4 existing hydro power plants of Bhutan. Each of these plants had diverse legacy financial management practices, for e.g. process followed for accounting for capital expenditure in different plants were not similar. This required standardization of the diverse practices followed at different plants.

Large scale capacity addition plan: DGPC is planning for a large scale capacity addition in the coming future. Certain business transactions envisaged for the capacity addition plan will have a complex accounting treatment. Some of these transactions include new projects construction under DGPC, ERP implementation, borrowing cost on capital asset, projects implemented through subsidiary companies and joint ventures, etc.

Changing business requirements and global financial reporting environment: DGPC is a young company with a very aggressive growth strategy. To support the growth strategy, DGPC will be required to access the global financial markets for project financing. The global financial reporting environment is very dynamic and fast changing, especially with the introduction of IFRS. It was important to ensure that the accounting principles adopted by DGPC for financial reporting adhere to the Globally Accepted Accounting Principles (GAAP)
ERP implementation plan of DGPC: DGPC was planning to implement ERP across the organization. The financial management practices form the basis for designing the functional requirement and business process for ERP implementation. Preparation of financial management manuals was a key step towards the preparation of the ERP implementation in DGPC.

Costing of internal services: There are various services which are provided internally within DGPC. Some of these services, like equipment hiring, are also provided to external agencies to improve the capacity utilization. Though these service centres are maintained as cost centres, the cost of the services are not allocated to the user department/plant, but absorbed by the department/plant providing the services. The Costing and Pricing of Goods and Services Manual was required for appropriate allocation of cost to the user department, pricing of services provided to external agency, cost recovery and performance management.

Allocation of corporate office cost to plant and projects: In DGPC, plants are profit centre and corporate office is a cost centre. All the plants have their own PPA. It was necessary to scientifically allocate cost incurred at the corporate office to the plants to ensure full cost recovery and correct pricing for DGPC as a whole.

Key Value Addition for DGPC

Key value additions for DGPC under this module are as follows

- **User friendly manuals:** The DGPC Financial & Accounting manual has been drilled down at the activity level. In case of complex processes we have used process flow charts and swim lane diagrams to explain the process. This has been done for better understanding of the user, smooth implementation and functioning of the manual.

- **Manuals helpful in ERP implementation:** The accounting manuals earlier adopted by other companies in Bhutan were structured on the basis of account heads like assets, debtors, creditors, loans, etc. We felt that structuring the manual on the basis of functions like purchase, asset management, account closing, sales, etc will make it more user friendly and comprehensive for the users at the functional level. For e.g. a user in the stores will be required to look at only the Purchase and Stores Manual for day to day function. Similarly, a clerk in the cash section is only required to look at the Cash and Treasury Manual. Moreover, functional segregation and activity level detailing of the manual has been helpful during the implementation of ERP in the company as the ERP packages are centered around functions and processes.

- **Manuals specific to the business requirements of DGPC:** We have also included certain other areas of accounting in the DGPC manual as required by the specific nature of business requirements. Some of the major areas have been listed below.

  - **Business Acquisition & Combination:** DGPC had started by taking over the assets of various plants under bilateral projects with GOI. In future, during expansion DGPC might/shall takeover the assets of projects constructed under bilateral projects.

  - **Intangible Assets:** This is required for the purpose of ERP and R&D activities to be taken up in future by DGPC.

  - **Project Accounting:** This is required for accounting for various capital projects to be taken up by DGPC.

  - **Capitalization of Borrowing Cost:** This is required on account of debt financing of the expansion projects.
Consolidation of Subsidiaries & Joint Ventures: This is required for JVs and subsidiaries to be formed under expansion plan.

Costing of goods and services: This will be required for costing of services provided internally and in some cases to the external agencies.

Allocation of corporate office cost: Allocation of corporate office cost to the plants is necessary to correctly calculate the cost of power at the respective plant and ensure full cost recovery.

- Adoption of best practices and preparatory step for IFRS adoption: The Accounting manuals have been aligned with International Accounting Standards. The manuals will help in adoption of IFRS in near future

- Capacity building of the officers of the Finance & Accounts function: Consultants organized a workshop for the officials of the Finance & Accounts from the plants and corporate office. In the workshop the consultants provided training to the DGPC officials on the financial manuals and explained the applicability of the manuals in the day to day business of DGPC. The workshop was attended by 20 officials from the finance and accounts function in corporate office and all the plants. The workshop was also attended by the finance and accounts representatives in the CDTA counterpart team for ERP implementation. During the training the consultants answered to the queries of the participants which were mostly related to the application of the manuals in the day to day functions.

Way Forward

Prepare for IFRS Implementation: DGPC is looking forward to a large scale capacity addition in the near future. For this DGPC is required to explore the global financial market. In order to tap the international financial market DGPC is required to adhere to the requirements of International Financial Reporting Standards (IFRS). Though IFRS is not applicable so far under Bhutanese statutory reporting requirements, it would be ideal for DGPS to start preparing for early adoption of IFRS for the financial reporting.

Regular Training: Going forward DGPC should provide regular training to the Finance & Accounts officials on the changing financial reporting environment.
Procurement & Technical Management

Under the Procurement and Technical Management Module of the CDTA, the consultants are required to carry out the following activities as per the Inception Report submitted in May, 2009:

- Review the current procurement & inventory management systems
- Develop policy and manuals for procurement and inventory management
- Assistance in conducting technical feasibility of demonstration projects, by bringing in a technical expert to assist in:
  - Recruitment of a technical consultant through competitive tendering. This support would include tasks such as scoping the studies, pre-bid meeting and clarifications, support in bid evaluation, and finalization of technical consultant
  - Managing the timeline for conducting the study, coordination as may be needed, and assistance in finalizing approach and any variations
  - Review of deliverables and providing inputs on costs and financial structuring

Objective

The scope of work included preparation of the following manuals and bidding documents:

- Procurement Manual for Goods
- Procurement Manual for Works
- Inventory Manual
- Standard Bidding Document (SBD) for Goods Procurement (ICB and DCB)
- SBD for EPC Contracts
- SBD for Civil Works Contracts
- Standard Request for Proposal for Consultancy Services

The objectives of the manuals and SBDs were as follows:

- To procure the right goods/ works/ services at the right time and at right price by giving fair and equal opportunities to all the bidders in a transparent manner and to get best value for the money spend
- To achieve uniformity, standardization, economy and efficiency in procurement of goods/ works/ services;
- To ensure fair and equal access to the bidders, the information required for the bidding process and ensure transparent procurement through the application of standard procurement procedures;
- To achieve uniformity in inventory handling, maintenance of inventory records and stores management so that the right material is available in right quantities at right place and time.
• To enhance proper planning, better utilization of inventory resources and reduction of costs associated with inventory;

• Ensure systematic receipts, issue, storage, and disposal of inventories through clearly defined policies & procedures and uniform record keeping;

**Challenges Faced**

**Amalgamation of diverse legacies:** Being a newly formed organization, DGPC inherited a diverse set of processes for procurement and inventory management from its four plants, e.g. the process of inventory control was so different among all the Plants that it led to quite a few audit qualifications from the Royal Audit Authority during the year 2009. Amalgamating best practices from each of the four plants and at the same time bringing in standard international practices within the overall ambit of RGoB Procurement Rules and Regulations was a challenge. This was successfully addressed through extensive stakeholder discussion at all levels as well as incorporating standard international practices.

**Requirement for flexible, transparent processes given large scale capacity addition plans:** Given the growth trajectory DGPC intended to achieve in term of its capacity additions, the need for effective procurement and contract management policies & procedures were imminent. The procurement manuals and SBDs thus address the challenge of achieving best value for the expenditure incurred during a procurement process. They allow DGFC to procure the right material at the right time and at right price by giving fair and equal opportunities to all the bidders in a transparent manner.

**ERP implementation plan of DGPC:** Given DGPC’s ongoing e-Green initiative of ERP implementation, the processes suggested in the Manuals had to be synchronized with forthcoming ERP implementation and resulting process changes. This challenge was addressed through continuous interaction with the ERP core team, both from DGPC and Implementation Partner, while redesigning the processes.

**Key Value Addition for DGPC**

Key value addition for DGPC under this module is as follows

• **Standardization of procurement processes with adoption of International Practices:** The approval and operationalization of the Procurement Manuals helped DGPC in standardizing procurement processes across all of its Plants and Corporate Offices. Besides, the Procurement Manuals brought in different aspects of ADB/ World Bank Procurement Rules & Regulations as well as international standard practices within the overall framework of RGoB Procurement Rules & Regulations.

• **Standardization of material handling processes in line with ERP implementation:** The Inventory Manual, similarly, standardized the material handling and control processes across the Plant stores. The Manual was also in line with the process reengineering DGPC underwent for ERP implementation, thereby facilitating DGPC’s transformation into an ERP enabled organization.

• **Capacity building in procurement & inventory management:** The workshops conducted for the Procurement and Inventory Manuals facilitated understanding of operational aspects of the Manuals at all levels of the organization. The doubt clearing sessions also enabled the DGPC officers to clarify various day-to-day issues faced, and understand standard practices to address those issues.

• **Capacity building in planning & cost estimation:** The training organized for Planning and Cost Estimation of Hydro Power Projects helped DGPC in taking a step towards making itself self
reliant in project development and cost estimation. The training provided valuable insights illustrated through real life case studies of two hydropower projects in India and Afghanistan.

- **Skill building in contract management**: The SBDs, which are within the overall ambit of DGPC's Procurement Manuals and RGoB Rules & Regulations, brings in international standard practices in DGPC's contracting procedures. These SBDs will further help DGPC in successful project development through effective contract management (thereby contributing to cost and time management) as well as cost efficient operations & maintenance.

**Way Forward**

**Post-award Project & Contract Management Procedures**: A comprehensive post award project & contract management procedure would be beneficial in controlling cost, time and quality in capital projects through a prudent mix of contractual and personnel management measures.

**Vendor Management Policy**: DGPC can develop policies & procedures for vendor management and development, which, among other things, should include methodologies for vendor evaluation and rating, incentive policies, blacklisting procedures, etc.

**Developing a Procurement Dashboard**: DGPC may develop a procurement dashboard which could continuously capture and monitor metrics like procurement cycle time, re-tendering cases, time overruns in material delivery, inventory cost vis-a-vis gross fixed assets, stock-out occasions, etc. to give better insights into improvement opportunities in stocking and order cycle.

**Regular Training**: Going forward DGPC should provide regular training to the officers in the Procurement & Contracts department and stores for updating them on various standard industry practices.
Institutional & Human Resources

Under the Institutional and Human Resources module of the CJTA, the consultants were required to carry out the following activities as per the Inception Report submitted in May, 2009

Human Resource Strategy and Plan- Druk Green Power Corporation

- Develop HR Strategy and Plan to include organisation structure and workforce planning, training and development plan, employee performance management system, attract and retain talent

Objective

The Objective of developing an HR Strategy and Plan was to:

- Create alignment between business objectives and HR Strategy, and engaging human resources to support these objectives
- Develop organizational capabilities required for executing strategy and achieve excellence
- Develop human resource pool required to efficiently construct the new projects and operate the commissioned projects
- Create a performance based organization with recognition and reward
- Create an environment to attract and retain talent and establish DGPC as an 'Employer of Choice'

Challenges Faced

The following are the challenges faced while developing the HR Strategy and Plan:

- Develop future human resource requirement
  - Assess human resource requirements based on dynamic technical details of projects, especially in absence of DPR /FR
  - For JV projects, assumption of the work share agreement, to arrive at human resource requirement for construction phase
- ERP implementation
  - To pre-empt human resource and organization structure requirements in the event of a complete ERP environment
- Project future job seekers of DGPC
  - Assessing the number of job seekers /available skill in the market, and the competition that would be faced by DGPC while recruiting, in the year 2020
- Analyse future training and development requirements
  - Assess training and development needs of the existing employees keeping in mind the increase in scale and size of operation of DGPC in next 10 years, and link with the future Corporate Strategy Plan
Key Value Addition for DGPC

The following have been the key value additions to DGPC:

**Redesigned Organisation structure**

- Director level positions to head key functions viz. Projects, O&M, Finance and HR&A to bring in more focus to manage increasing number of generation assets
- DGPC has initiated the creation of Director Corporate Affairs consisting of Corporate Planning and Strategy, Legal, Corporate Communications & PR, Quality Assurance and control, Health, Safety and Environment, Security and Fire Services
- DGPC has initiated the construction of Hydropower Service Centre (earlier Runner Reclamation Workshop).
- DGPC has initiated the strengthening of Contracts Management and Procurement Division in its Project department, strengthening of HR&A Department to bring greater focus on recruitment, training and development and performance management areas, strengthening of FID and Engineering and Planning Division and Performance Monitoring Division under Director O&M.

**Develop Human Resources Planning**

- DGPC has already initiated implementation of the recruitment plan as per the HR strategy Report and is in the process of completing manpower rationalisation of the plants

**Training and development of employees**

- DGPC has already initiated the process of creation of Training and Development division of HR&A
- DGPC has started to establish relationships with external agencies and individuals to conduct routine in-house trainings
- Structured induction programme for new recruits at all induction levels for both technical and non technical staff (such as 'Get ready programme', 'Young Generation Programme'); refresher training programme for all supervisory level personnel every 5 years of service
- Twinning arrangements with other hydropower utilities to share best practices and explore possibility of employee exchange programs with consulting firms, construction companies and hydropower Utilities; Bring in international experts in specialised areas on contract basis to provide knowledge and build internal capacity
- Develop in-house training centre and a pool of internal faculty preferably drawn from Centers of Excellence within DGPC

**Attracting and Retaining Talent**

- DGPC has conducted an Organizational Climate Survey in 2011; and are in the process of implementing action points developed based on the findings of the survey; DGPC has already started to provide facilities such as school buses, sports facilities etc for employee and their families at all new project sites

**Revised Performance Management System**
DGPC has already developed corporate level KPIs and a comprehensive KPI framework for all functions of DGPC.

**Way Forward**

The development of new hydropower projects and efficient operation of the hydropower plants is the key strategic theme in DGPC corporate strategy. The objective of the Human Resource Strategy Plan would be to recruit and retain capable and talented people, who are adaptable, motivated and involved in fulfilling DGPC's vision, mission and strategic objectives.

DGPC has already initiated implementation of some of the recommendations made in the HR Strategy Plan and Report. Key action plan items from ‘Training and Development’ and ‘Attracting and Retaining Talent’ would need to be taken up for implementation.
Training Needs Assessment – Department of Energy

Under the Institutional and Human Resources module of the CDTA, the consultants were required to carry out the following activities as per the Inception Report submitted in May, 2009:

- Finalize organisation structure, staffing for Energy Secretariat interaction with RCSC
- Staffing strategy for the secretariat and assessment of skill sets, Training Need Assessment and training areas for the existing employees of DOE and develop training programs

Objective

The Royal Government of Bhutan had approved setting up of Energy Secretariat through an executive order on July 2, 2008. As part of the previous ADB PPTA, we had provided inputs on the organisation structure, roles and responsibilities of the proposed Energy Secretariat. As part of this CDTA, we have identified the Training Need Assessment and Training Areas for the existing employees of DOE. The objective of the TNA was to:

- Assess the competencies and identify the training needs for Energy Secretariat
- Conduct Training Need Assessment for existing employees of DoE - develop departmental and individual training needs of DoE and analysis of the training needs identified.
- Identify Training Institutes to address the training needs of DoE based on the publicly available information, websites etc.

Challenges Faced

Developing competency requirement for Energy Secretariat was a challenge in absence of finalised organisation structure and staffing for Energy Secretariat, pending the final approval of RCSC.

Key Value Addition

In past, limited resources available, have forced DOE to adopt ad-hoc responsibility allocation depending on the work-load handled by individuals. In many cases, such responsibility allocations came without proper training or guidance. Individuals were forced to learn as they worked on these projects. It is important to mention that in next few years, DoE would be simultaneously handling a number of projects in various stages of implementation whereas in past it has handled mostly 1-2 projects at a time. Presently, each division of the DoE performs diverse activities and functions leading to lack of focus on key priority areas. This approach of ad-hoc responsibility allocation would not work in future as the time available for learning on the work would be limited.

This TNA would help current employees of DoE to handle larger and newer responsibilities in future. However, new recruitments are required for skills not available within the organization. Further, even in current roles, staffing requirement need to be assessed based on the increase in workload. In such cases the competency identified as part of this TNA exercise may be utilized for selection of the right fit candidate.

Way Forward

The implementation and subsequent roll out of the Energy Secretariat is an important way forward. Also finding the right fit candidate to meet the skill requirements based on the proposed organisation structure of DoE would be an important challenge for setting up of the Energy Secretariat.
Clean Development Mechanism

The CDM expert as part of the terms of reference has to develop the CDM manuals for DoE and DGPC.

The development of CDM manual was required to be developed with intent of providing first hand information about the UNFCCC procedures for development of candidate CDM projects in Bhutan.

Bhutan has a large potential of generation of electricity through hydro electric projects, which are also eligible under the present Kyoto regime as CDM projects. The focus of the manual was thus to provide updated information about the CDM project development procedures, approved methodologies followed by buyer requirements for purchase of emission reductions from both small as well as large scale registered hydro facilities.

The CDM manual has been developed in two volumes with first volume catering to:

- CDM Lifecycle
- PDD Development
- PDD Validation and Registration
- Transaction of CERs

Whereas the second volume covers:

- Documentary Requirements
- Requirements of DNA approval (both multi and host country)
- Emission reduction markets
- UNFCCC guidelines for change in project conditions post registration
- Programme of Activities

Objective

The country is heavily investing in development of hydro power projects in collaboration with Government of India, these initiatives if properly aligned with the requirements of Kyoto Protocol right from the inception stage of the project can help establish a secondary revenue stream which can assist in mitigation of GHG’s into atmosphere as well as help address the issues pertaining to time and cost overrun which make such projects an additional burden on the state resources until the debts are repaid.

The large scale hydro investment in Bhutan also require coordination with their Indian counterparts for the reason of regional electrical baseline (as the proposed projects plan to export electricity to India), it is even more demanding this situation for the Bhutanese authorities to come up to the technical skills at par with Indian agencies as well as uniform requirements of validation and verification of proposed CDM projects.

To make business case of CDM, the manual provides guidance to the reader in:

- UN treatment for LDCs and SIDs
- GHG emission reductions estimation
- Sustainable development requirements for large scale hydro projects
- CDM Consideration requirements
- Assessment of Project Additionality
- Environmental Impact Assessment
- Stakeholder Consultation
- Stakeholder Consultation Approach
In addition to the understanding of CDM due diligence process of stand-alone projects, the manual also meets the objective of programmatic approach and covers following additional aspects:

- Material change in project post registration
- Communication channels with UNFCCC
- Concept of Program of Activities and its requirements
- Suitability of PoA for Bhutan
- Understanding Validation and Verification Manual
- Voluntary markets for Pre-CDM emission reductions
- Multi-country DNA approval
- Transaction procedures and markets

The two manuals thus prepared will establish a base for firm understanding of the protocol procedures for development of CDM opportunities in Bhutan both for unilateral as well bilateral initiatives with India.

The manuals also target the transaction objectives of the European procurement (EUETS) that mandates following the WCD guidelines while implementing large scale hydro projects.

**Challenges Faced**

**Capacity Building:** CDM project development requires timely & consolidated efforts of all the participating stakeholders in a transparent manner along with documentary requirements at every stage to meet the rigour of project validation as well as UNFCCC registration, there were gaps in understanding between various stakeholders since the first large scale project from within Bhutan was under development and thus the issues are being addressed as they were faced, a streamlined process and well as planning through capacity building was required to be developed.

**Large scale capacity addition plan:** Bhutan is planning for a large scale capacity addition through implementation agreements with India; these projects would require understanding of regional baseline and allied statutory issues with respect to CDM requirements which are required to be captured right from the stage of MoU between the two countries. A complete understanding among the participating parties would greatly help in smooth project development.

**Key Value Addition**

Key value additions for DGPC under this module are as follows

- **Manuals discussed and deliberated at the activity level:** The CDM manual has been discussed and detailed out to all the relevant statutory bodies and important members of DGPC. For complicated processes, various examples have been cited to develop understanding of the reader. This has been done for better understanding of the user, smooth implementation and functioning of the manual.

- **Manuals specific to the business requirements of DGPC:** We have also included certain other areas of carbon markets including certain important requirements for procurement of emission reductions from large scale hydro projects as well as the latest UNFCCC guidance on very small scale CDM projects.

The set of 2 manuals would help in developing further understanding about prevailing CDM rules and framework and can be used in various capacity building programs within the country including knowledge sharing as part of curriculum in environmental engineering / economics courses taught at universities in Bhutan.
The document can also be used a referral handbook by the Designated National Authority in the country.

**Way Forward**

**Prepare for imparting of knowledge at all levels:** Bhutan is expanding its hydro electricity generation, wherein new SPVs and participating agencies have either been established or are going to be established in due course of time. Since CDM project development requires complete understanding of procedures and documentation at execution level, capacity building at every possible level would be required, and if possible should be taken up at priority.

**Regular training & updating:** The UNFCCC rules are updated & revised from time to time, it is therefore important to keep the participating authorities and their officials to get continuous training on the issues around carbon markets as well as newer opportunities like nationally appropriate mitigation actions (NAMA) etc.

Since the protocol has now got a new lease of life at Durban, it is advisable that the projects proposed under bilateral arrangements with Government of India may be considered for development as CDM opportunities. Also the recent change in CER prices may be given due consideration in establishing a business case for possible additional revenue stream through CDM while looking at the possibility of the viability gap between stand-alone and CDM case.
Regulatory and Legal

The Terms of the Reference of the CDTA requires the Regulatory and Legal expert to provide input for drafting and finalizing the Renewable Energy Policy and Captive Power Policy; provide input for modifications/amendments to Bhutan Electricity Act and legal assistance in conducting the bid process for the demonstration projects.

The scope of work of the CDTA required the legal expert to also support DGPC in preparing contractual arrangements for demonstration projects. As the envisaged demonstration projects are yet to be taken up by DGPC, a large part of the Regulatory and Legal expert’s budget was reallocated to other modules of the CDTA to meet the support requirements under the module.

The Regulatory and Legal expert has reviewed and provided inputs to the drafts of the Renewable Energy Policy and Captive Power Policy. The expert has also made comprehensive reviews of the draft Concession and Joint Venture Agreements for the DGPC Joint Venture Agreements with Government of India PSUs which have been submitted by the Consultants to DOE and DGPC.
Social Aspects

The scope of work for the social expert included developing a social safeguard manual for hydropower development based on relevant international standards and guidelines and assisting in developing the ToR for the social impact assessment for the demonstration projects.

Objective

The objective under the module was:

- **Align safeguard policy with local & international guidelines** – The Social safeguard manual was to be developed in accordance with the local and international guidelines. As DGPC is embarking on developing and partnering various projects, a clear laid down policy manual was required.

- **Provide robust social safeguards framework** – A robust social safeguard framework helps in getting multilateral financing. As such the development of a hydro project involving local issues would be much negated with a robust framework

- **Capacity building for internal staff** – A capacity building was required for implementation of the manual so that DGPC staffs can handle the social issues independently.

Key Value Addition for DGPC

The Social expert made several field visits to the Nikachhu, Punatsangchhu and Dagachhu project sites to discuss social safeguard issues with local inhabitants. The first draft Social safeguard manual was prepared and submitted to DGPC on 31st December 2009. A detailed presentation on the draft manual was made to the DGPC management on 27th February 2010. Valuable feedback and suggestions were received from DGPC such as on definition of affected people & indigenous people, compensation processes in cases such as when a community directly approaches the project for building a road through its village, etc.

Subsequently the draft manuals was appropriately updated and resubmitted to DGPC in April 2010. The revisions in the social safeguard manual were explained and the comments were clarified to the relevant DGPC project staff members.

The social safeguard consultant also made a final presentation of the social safeguard manual, with particular emphasis on the comments and feedback received from DGPC and their incorporation into the final report on 26th October 2010.

As such the key outcomes of the module are:

- Development of Social safeguard manual
- Assistance in developing the ToR for SIA for Nikachhu


**Environmental Aspects**

The ADB CDTA 7157 terms of reference requires the environmental expert to develop environmental safeguard manuals, Assist DOE and DGPC in developing the environmental impact assessment, collect baseline data on water flow, aquatic life patterns, air and soil quality, installation of a fish ladder (or other alternative devices) for fish migration if necessary for Dagachhu Project.

**Objective and Outcome**

**Assist DOE and DGPC in developing the ToR for EIA:** The role of the consultant was limited to drafting the Terms of Reference for conducting the EIA for the Nikachhu Hydropower Project. The consultant worked closely with the Projects Department of DGPC on the TOR for the EIA of the Nikachhu Hydropower Project. The EIA work was subsequently tendered.

**Collect baseline data on aquatic life patterns and recommendation for fish ladder:** A major focus area was monitoring aquatic life patterns at the project site, especially for the presence/absence of migratory fish species. The EIA for the project noted that there were no migratory fish species and therefore there was no need of a fish ladder at the dam. The EIA, however, recommended that a more detailed investigation be carried out to confirm the absence of migratory fish species. Moreover, NEC’s environmental clearance also stated that a fish ladder be constructed if there were migratory fish species. In order to fulfill these recommendations, a detailed investigation was carried out to determine whether there were any migratory fish species in the Dagachhu, especially in the area above the dam site for the project. For the study, Mr. G.K Pradhan, who grew up in Dagana and was a senior officer in the Department of Forests for many years, shared his immense knowledge of mahseer habits and habitats. Mr. G.K Pradhan’s services were used for 10 days. The Dagana Range Officer also participated in the investigation and was crucial in assisting the team in hiring the services of local fishermen. Our investigations were extended till the end of November with more than 180 man-days of observations along the river. As we did not detect the presence of a single long-distance migratory fish species, the investigation report recommends that a fish ladder is not needed.

**Baseline monitoring for water, air and soil:** Data collection and monitoring were carried out several times during the year. Wherever possible Environmental Specialist was also accompanied by the NEC team at the project site once a month to conduct the baseline monitoring. The monitoring reports indicate that water and air quality at the project site is good. As indicated in earlier reports, the competent authority for monitoring soil features recommended that there was no need to monitor the soil features more than once or twice during the project duration. Samples of soil from six sites around the project location were sent to the National Soil Service Centre.

**Environmental safeguard manual:** The environmental safeguard manual has already been submitted and discussed with client. Based on some of the comments it has been revised and submitted.