POWER SECTOR ASSESSMENT

A. Power Sector Institutional Structure

1. The Ministry of Energy is the line ministry with the primary jurisdiction and authority over the energy sector. However, the Ministry of Supplies is responsible for all petroleum products, and the Alternative Energy Promotion Centre (AEPC) under the Ministry of Environment has responsibility for rural electrification, hydropower up to 10MW and other renewable energy forms. The Ministry of Energy's Department of Electricity Development is responsible for (i) promoting the development of hydropower resources, (ii) preparing standards for transmission and distribution of electricity, (iii) issuing and monitoring licences for hydro surveys, hydro construction and operation, and (iv) inspection and monitoring of hydropower projects. The Electricity Tariff Fixation Committee (ETFC) was established to review and approve tariff filings by the Nepal Electricity Authority (NEA) and other licensed entities under the Electricity Act 1992. The ETFC was expected to be replaced by an independent electricity regulatory commission and the legislation is awaiting Parliamentary approval. However, this has been delayed for more than three years. ETFC was reconstituted in September 2011. The NEA, a wholly government owned corporation, dominates Nepal's power sector. It is responsible for most of Nepal's electricity generation, dispatch, transmission, distribution, and retailing. It operates hydropower plants with a total installed capacity of 407 megawatt (MW), two diesel plants with total installed capacity of 53 MW, and two small (50 kilowatt, kW) solar power facilities.

2. There has been private sector participation in the Nepal's power sector since 1992, under the Hydropower Development Policy 1992[1] and the Electricity Act 1992. In 2001, the Government approved a Hydropower Development Policy[2]. Since the legislative changes required for implementing certain components of the Hydropower Development Policy 2001 have not yet been enacted, The Hydropower Policy 1992 still provides the framework for private sector participation in power generation. Twenty three independent power producers (IPPs) contribute 174 MW of generation capacity. Six large hydro plants, totalling 1,335 MW are either in advanced planning stages or under construction. About 107 kilometres (km) of transmission lines are privately owned. One large privately-owned distribution company supplies electricity to 23,000 consumers, and there are many community-managed distribution schemes scattered across the country.

B. Power Sector Policy

3. **Hydropower Development Policy 2001**. This policy sets out a list of specific objectives and rules to govern the hydroelectric sector. It provides for (i) the functions pertaining to the operation of the power centres, operation of electricity transmission and the national grid, and electricity distribution owned by the NEA; (ii) the creation of an independent (power) system operator; and (iii) encouragement of local body, community, and private sector participation in the operation of the electricity distribution system.

4. **National Water Resource Strategy 2002.** The key policy directives pertaining to the power sector contained in this document are that (i) the NEA is to become commercially viable through corporatization, improved management, and separation of its rural electrification operations; (ii) the NEA is to be unbundled by separately creating a transmission/load dispatch

[1] Hydropower Development Policy 1992 AD (2049 BS), Department of Electricity Development, Ministry of Energy, Nepal.
[2] Hydropower Development Policy 2001, Ministry of Water Resources, Nepal.

centre; (iii) generation will be the responsibility of a separate corporation; (iv) distribution operations will be sold or contracted out to municipal or private operators; and (v) the NEA will operate as a holding company.

5. **Interim Plans (2008–2010 and 2010/11-2012/13).** The Government of Nepal and the National Planning Commission issued a Three Year Plan Approach Paper in August 2010 which is available as an unofficial translation in English. In an updated version released in 2011, the Government of Nepal's long-term strategy for the power sector includes the increase in private, community/cooperative investment in electricity generation and transmission for domestic use, the extension of transmission as a high priority, and an increase in the overall electricity generation to minimize load shedding. The utilization of water resources to meet domestic power demand and the export of surplus power to increase the country's foreign earnings is also seen as important. Some of the key strategies to be adopted are (i) introducing effective regulation of generation, transmission, and distribution of electricity, and related businesses; (ii) adopting a one-stop-shop approach to encourage investments in hydropower development to allow investors to obtain all approvals from a single agency, (iii) consistent efforts in the expansion of electricity generation potential, (iv) expanding transmission capacity, targeting both local consumption and export potential, and (v) strengthening and expanding the electricity distribution system. The working policy within the Approach Paper includes investment in the construction and improvement of transmission lines "by giving a high priority and making special institutional arrangement." The Approach Paper also indicates the intention to adopt a river basin approach to hydro development. This would assist NEA in the planning and strengthening of transmission, and allow concentration of transmission investment in specific geographical areas, rather than randomly throughout the country.

C. Sector Issues

6. **Generation.** Of the total hydropower capacity, storage-type hydropower represents only 14%. The dominance of run-of-river and daily storage hydropower plants has led to acute capacity shortages during the dry season when the demand rises sharply. The wet season sees a glut of energy available in the system which has yet to find a market. The Interim Plan (2008–2010) envisaged hydropower projects with a total capacity of 105 MW being commissioned within the plan period to meet the domestic electricity demand, with 85 MW of this capacity built by the public sector, and the balance by the private sector. This has largely been achieved. Initiation of 2,085 MW of new capacity was also envisaged within the plan period. However, constraints on funding and process inefficiencies has caused delays, and this target has not been achieved. A new 5 year interim plan was due for release in draft in July 2011, but as yet, only an Approach Paper has been available. The Approach Paper does include a priority for reservoir based projects, rather than run-of-river projects. The 128 MW Upper Seti project, in the early stages of construction planning by NEA, is one such project.

7. **Small hydropower.** There are 16 NEA owned small hydropower stations with a total capacity of 13.84 MW connected to the national grid. Another 23 isolated power plants with a total capacity of 4.54 MW are owned by NEA and some of them are operated by the communities. NEA has been implementing a plan to rehabilitate some of these aging small hydropower plants which can provide an enhanced output once rehabilitated. In addition 21 small hydropower plants established by the private sector under the small power purchase agreements provide 78.5 MW of power to the national grid.

8. **Transmission.** The NEA transmission system consists of 1,563 km of 132 kV lines, 350 km of 66 kV lines, and 2,500 km of 33 kV lines. A 132 kV transmission ring around the

Kathmandu valley is being completed by the NEA. The completion of this series of projects will cater to the demand growth in the Kathmandu valley, will reduce losses, and improve supply quality and reliability. Timely commissioning of transmission lines is critical for evacuation of much-needed new hydropower generation. Several IPPs have been constrained in undertaking new power development initiatives because of the difficulties in power evacuation. The NEA completed its most recent comprehensive transmission planning study in July 2006. However, the study did not directly address increased transmission connectivity with India, an issue that has far-reaching implications for Nepal's power sector and the development of large-scale export-focused hydropower plants in Nepal. Construction of 175 km of high-voltage transmission line and 377 megavolt-amperes (MVA) of transmission substation capacity was programmed for the Interim Plan period. Construction of the first of three planned 400 kV India–Nepal transmission interconnections, a privately funded line from Muzzafarpur to Dhalkebar was to be completed by 2010, within the Interim Plan period but has so far only reached the advanced planning stage. Further progress has been made in 2011, but construction has not commenced yet.

9. **Distribution.** The NEA presently serves near to 2 million customers across all 75 districts of the country. It sold 2,204 gigawatt-hours (GWh) of electricity in FY2007, an increase of 10% over the previous year. Domestic and industrial consumers represent almost 80% of sales. Only 40% of the population has access to electricity services, with 33% having access to the grid and the NEA off-grid facilities, with the remaining 7% served by micro-hydro plants developed by local entrepreneurs, and other alternate sources. The Interim Plan expressed the need to connect an additional 450,000 rural households to the national electricity grid and has identified 651 km of 33 kV lines, 3,163 km of 11 kV lines, 5,978 km of low-voltage lines, and 113 MVA of 33/11 kV substation capacity to be added during the plan period.

10. **Barriers to Private Sector Participation.** The Government has already taken some steps to attract private investment in the power sector. With the exception of some run-of-river hydropower plants funded by domestic investors, little investment has taken place. Reasons for the reluctance of the private sector to become involved in the sector include (i) lack of transparency and accountability in the licensing process, (ii) incompatibilities and inconsistencies in legal and regulatory frameworks, (iii) difficulties in raising non-recourse finance, (iv) discriminatory tariff setting for projects greater than 5 MW, (v) inadequate transmission network capacity to evacuate power, and (vi) the political risk.

11. **Financial Sustainability.** NEA's financial position continues to deteriorate in the absence of tariff increases since 2001. While revenues have been increased at a CAGR of 9% in the last 3 years (2009-11, as against 1.7% during 2007-09), operating costs have increased by 14% during the same period (as against 7.3% during 2007-09). The increase in revenues is on account of a 12% increase in energy sold during the period. 68% of the operating cost in FY 11 is on account of power purchases while 18% is on account of distribution costs, growing at 19% and 6% CAGR respectively during 2009-11. Accumulated losses at the end of FY11 were at NRs 27 Billion. The main reasons for financial loss include i) no tariff adjustment since 2001, ii) high cost of energy purchased, (iii) high system losses, (iv) interpretation of the basis for charging royalty, and, (v) delays in project implementation.

12. An important recent development[3] has been the submission of a report by a task force set up by the GoN to prepare a comprehensive financial restructuring plan (FRP) for NEA. The key recommendations of the FRP are summarized below:

Financial Institution Reform

• Improving the net worth of NEA by recapitalization
  o Increase of share capital from NRs 35 Bn to NRs 75 Bn
  o Writing off accumulated losses (NRs 27 Bn)
  o Conversion of IDC payable by NEA to GON to equity
  o Writing off foreign technical assistance
• LT Loans and grants
  o Finalize pending SLAs
  o For grant supported projects, capitalize at market costs or upto 50% of the grant/ project cost
• Reduction of prevailing interest rates
• Adopt recommendations on capitalization of Middle Marsyangadi Project
• Settle arrears between GON and NEA including payment of streetlight bills through departmental budgets
• Streamline methodology for royalty calculation (on the basis of selling price at generation point as against point of sale at a price fixed by government)
• Separate rural electrification company responsible for operations, assets and liabilities from NEA and transfer to a new company
• Reconstitute ETFC
• Subsidy for operating DG sets
• Issue of debentures (secured by GON) for project financing

Managerial Issues
• Minimize administrative costs

[3] August 2011

• Establish employees retirement fund • Reduce electricity loss • Review organizational structure of NEA
Increase of electricity tariff as per revenue requirement

Problem Tree Analysis