SECTOR ASSESSMENT (SUMMARY): ENERGY

Sector Road Map

1. Sector Performance, Problems, and Opportunities

1. Nepal has considerable potential for renewable energy while its fossil fuel resources are negligible. Biomass accounts for more than 80% of the country's total primary energy supply and its final energy consumption. Biomass and hydropower are widely available throughout the country, and solar power to some extent. Developing these abundant renewable resources is doubly important for (i) providing clean energy that enhances economic and social development and (ii) generating revenues by exporting excess electricity. Since the turn of the millennium, energy development has focused on large-scale hydropower projects, and greater emphasis was placed on energy efficiency improvements and diversification of energy sources to improve energy security. Nonetheless, progress in the sector has been slow because of a history of weak and inconsistent policies, lack of comprehensive planning, public sector financing limits, the credit and offtake risks of the Nepal Electricity Authority (NEA), and land acquisition and right-of-way issues. As a consequence, Nepal has suffered from a severe shortage of power with frequent load shedding. The quality of electricity supply in Nepal is among the poorest in the world, ranking 137th out of 147 countries.[1]

2. **Generation.** The installed generation capacity has grown steadily from 706 megawatts (MW) in FY2011 to 851 MW in FY2016, at an average annual rate of 3.8%, while the peak demand for electricity has outstripped the growth of supply capacity at an annual average rate of 7.9% for the same period, thus significantly widening the demand–supply gap. The peak demand in FY2016 was 1,385 MW, with a deficit of about 550 MW. Imports from India have risen at an average annual rate of 20.4% during FY2011–FY2016, and load shedding used to occur for about 12–14 hours per day in most parts of the country. However, due to its recent exemplary initiatives—more efficient operation of its generation assets, demand-side management, and additional import of power from India—NEA has been able to curb the load shedding in major cities such as Kathmandu.

3. **Transmission.** Lack of infrastructure to deliver electricity from generation plants to load centers continues to be a major bottleneck. The previous twelfth Three Year Development Plan (FY2011–FY2013) aimed to add, by FY2013, 700 kilometers of transmission lines to the existing 1,916 kilometers, but as of FY2011, the network had been expanded by only 64 kilometers. After commissioning the first 400 kilovolt (kV) cross-border transmission link with India, and using existing cross-border connections, imports of more than 1,000 MW became possible in FY2016. A transmission master plan has been completed.

4. **Distribution.** NEA has a de facto monopoly in the distribution of electricity in Nepal, and is responsible for overall management of distribution services and networks. In FY2016, the number of consumers rose to 2,968,576, an increase of 4.82% on the previous period. Electricity sales in FY2016—3,746 gigawatt-hours (GWh) in total—amounted to NRs31,545 million, an increase of 4.56% on the previous period. This translated into revenues of NRs34,710 million, or an increase of 11.28%. The domestic consumer category accounted for 94.2% of the total consumer base in FY2016, contributing 48.4% to total sales. Industrial and commercial consumer categories together represented only 2.1% of the total number of consumers, but accounted for 40.0% of total electricity sales.

[1] Asian Development Bank. 2015. *Asian Development Outlook.* Manila.

2. Government's Strategy

5. The energy sector policy and regulatory framework is based on the Electricity Act of 1992 and the Hydropower Development Policy of 2001, both of which emphasized hydropower development. This legislation and policy have not been sufficiently robust to create an enabling environment for commercial energy development and a sustainable electricity business. The Asian Development Bank (ADB) has assisted the government in drafting a new Nepal Electricity Act and the Nepal Electricity Regulatory Commission Act, which were approved by the cabinet and submitted to the Parliament, but have been stalled by the legislature since May 2012. The former act aimed to restructure NEA through unbundling of its operations. The latter act aims to set up an independent regulatory regime for the electricity subsector, long needed to attract investment into the energy sector.

6. In February 2016, Nepal's cabinet meeting endorsed an action plan to end the energy crisis within 2 years. The cabinet meeting also directed the Ministry of Energy to prepare a concrete action plan to reduce power shortages within 1 year and eliminate them altogether within 2 years. The cabinet meeting also declared the National Energy Crisis Reduction and Electricity Development Decades, an action plan comprising 99 activities that are relevant to energy sector operations. Ultimately, the reform program will be successful only if energy and electricity pricing are rationalized and the sector shifts to a fully commercial basis, as government budgets have not been sufficient to cover energy subsidies.

7. **Public utility operations**. As a government corporation, NEA has dominated Nepal's electricity subsector since it was established in 1985. It has recorded poor operational and financial performance, and its accumulated losses at the end of FY2015 were NRs26.8 billion. In FY2015 alone, NEA incurred losses of NRs6.5 billion.[2] The financial position of NEA is further deteriorating for various reasons: (i) no tariff adjustments since 2012 until September 2016;[3] (ii) high cost of service resulting from an elevated internal purchase price at generation point, annual escalation of the costs of purchasing electricity from independent power producers (IPPs), operation of thermal plants, import of relatively high-cost seasonal energy from India, and increased operation and maintenance costs; (iii) high system losses at over 24%;[4] and (iv) increased arrears largely from the public sector, including municipalities.

8. **Private sector participation**. The government is committed to attracting private investment in hydropower generation. Since initial operations in 1992, IPP power plants have increased to 50 and now account for 324 MW of grid-connected capacity and 37.9% of total electricity supply. More than 100 IPP projects are now under construction or consideration, which will add 1,847 MW of generation capacity by 2022. The government has also allowed the private sector to become involved in distribution: Butwal Power Company is supplying electricity to about 36,000 consumers, and about 73,000 households have been electrified through 94 community group arrangements. No private participation exists in the transmission segment.

[2] NEA. 2015. Annual Report. Kathmandu.
[3] The current tariff was set in September 2016.
[4] NEA has reportedly succeeded in reducing total system losses from 25.78% in FY2016 to 17% in March 2017, but official figures on annual average losses are yet to be known.

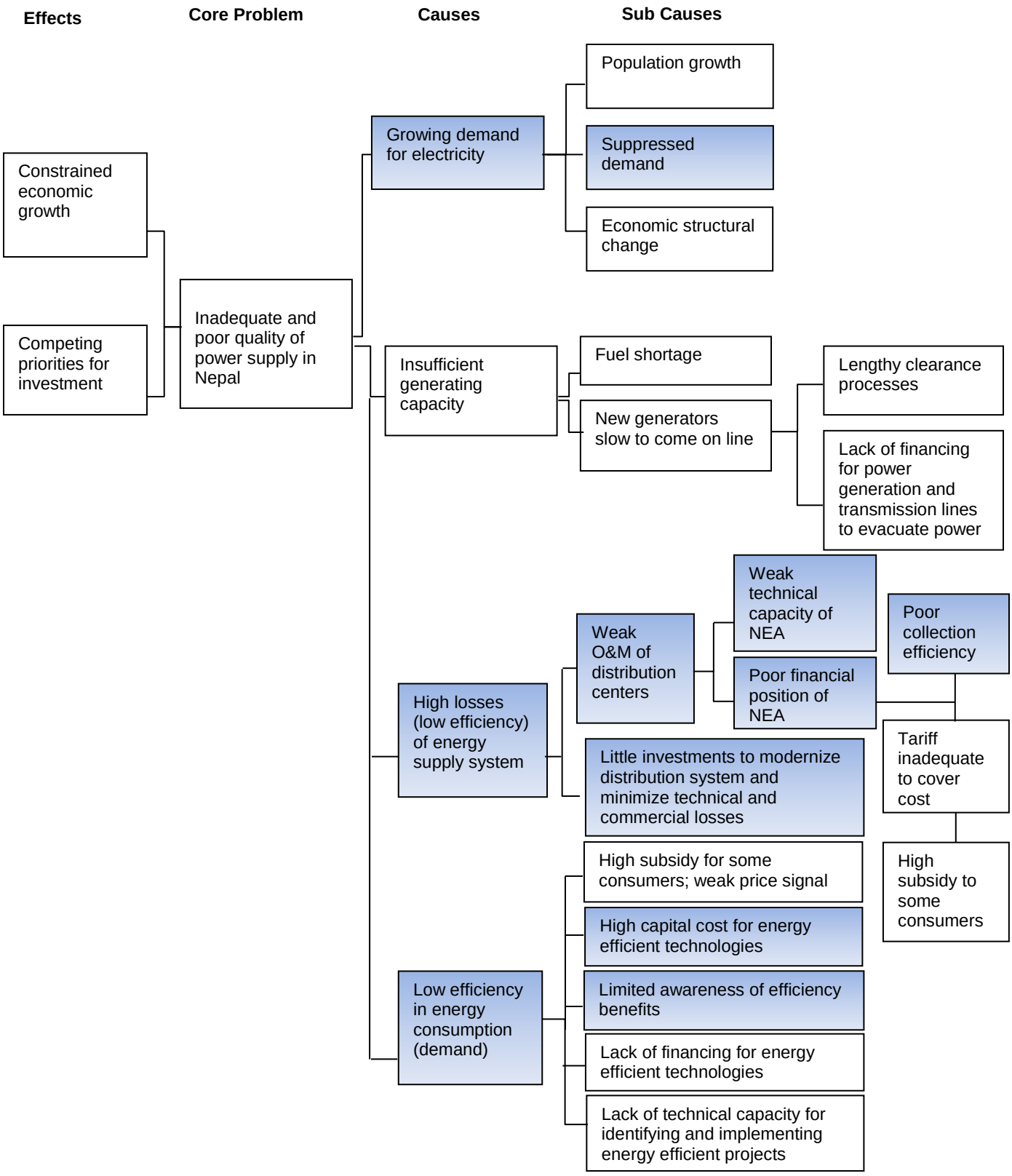
3. ADB Sector Experience and Assistance Program

9. ADB has been the leading partner in Nepal's power sector, supporting a broad spectrum of interventions in generation, transmission, distribution, and access to energy. The central theme for the energy sector is to contribute to Nepal's development outcomes by achieving energy security at home and developing energy exports. ADB's main focus in the country partnership strategy, 2013–2017 for Nepal is to make the country's energy sector a key driver of inclusive economic growth.

10. Since 2009, ADB has approved six projects with a portfolio size of $434.2 million. These include five loans for $391.7 million and three grants amounting to $42.5 million. Since 2014, ADB's overall investment strategy has followed a logical sequence: (i) improve reliability and quality of grid-supplied electricity through network expansion, efficiency improvements, and expanded imports; (ii) rationalize tariffs, with eventual elimination of non-lifeline subsidies; (iii) mobilize technical assistance to develop large-scale hydropower; (iv) provide additional financing for national electricity grid connected utility-sale solar power development; and (v) continue financing for access to energy via renewable energy mini grids, supply-side efficiency, and other "last mile" interventions such as rehabilitation of distribution systems (e.g., the proposed Power Transmission and Distribution Efficiency Enhancement Project).

11. ADB's intervention in the energy sector will comply with stringent social and environmental safeguard requirements, and will further enhance inclusive economic and environmentally sustainable growth. ADB will support the development of the institutional capacity of sector agencies to address such concerns as the need to enhance inclusiveness in access to energy. ADB will maintain a policy dialogue with the government to (i) improve the governance and efficiency of the energy sector; (ii) create an independent regulatory authority for energy and water; and (iii) introduce appropriate structural reforms, including the enactment of the relevant legislation, full implementation of NEA's financial restructuring plan, and regular tariff revisions. Support for sector planning frameworks, such as a regional transmission master plan and basin-level planning, will also be considered, in coordination with other development partners. ADB will also consider supporting the action plan endorsed by the cabinet in February 2016 to end the energy crisis, in coordination with other development partners.

Problem Tree for Energy Sector



NEA = Nepal Electricity Authority, O&M = operation and maintenance.