SECTOR ASSESSMENT (SUMMARY): ENERGY

Sector Road Map

1. Sector Performance, Problems, and Opportunities

1. Sri Lanka’s national grid serves the entire country. In 2014, the peak demand on the national grid was 2,152 megawatts (MW), and 12,357 gigawatt-hours (GWh) of electricity was delivered to the transmission network. The country’s electrical energy requirement grew at an average rate of 4.3% over 2000–2014. Growth in generation was 5.8% in 2014 and 6.7% in 2015. The growth is expected to continue in the foreseeable future, as the country moves through its development path to a middle-income economy. Sri Lanka’s national electrification ratio has grown from 29% in 1990 to 98% in 2014, and compares favorably with other South Asian countries. Disparities in access to electricity that existed across the provinces, particularly in the Northern and Eastern provinces, are being addressed. As of 2014, per capita electricity sales were 532 kilowatt-hours (kWh). Transmission and distribution losses were reported to be 10.47% of net generation in 2014, lower than the target of 12.00% established for 2015 in the National Energy Policy and Strategies (NEPS) and by the Public Utilities Commission of Sri Lanka (PUCSL).

2. Installed electricity generating capacity on the grid was 3,932 MW in 2014. The average growth in installed capacity during 2008–2014 was 5.8%. Primary sources of energy used for power generation in 2014 and the respective energy share in generation were hydropower and other renewables (38%), coal (27%), and oil (35%). Ceylon Electricity Board (CEB) and Lanka Electricity Company Limited (LECO) are the only two power utilities. CEB is an integrated utility fully owned by the government, engaged in separately licensed activities of generation, transmission, and distribution of electricity. CEB has 2,824 MW of installed generation capacity, with additional thermal generating capacity being procured from independent power producers, and nonconventional renewable energy-based capacity from small power producers. CEB owns and operates the entire transmission network and performs the bulk power purchase and delivery functions. CEB’s four distribution entities serve about 91% of all customers in the country. LECO purchases bulk power from CEB and distributes to about 527,000 customers in urban areas in the western coastal belt, representing about 9% of all customers in Sri Lanka in 2014. Private sector participation in the power subsector is limited to power generation, with a total installed capacity of 1,108 MW of both oil-fired thermal generation (by the independent power producers) and renewable generation (by the small power producers).

3. The growth in demand since 1995 was generally met with oil-fired thermal generation, and the addition of coal-fired plants over 2011–2014. The share of thermal power in the generation mix increased from 50% in 2006 to 71% in 2012, and declined to 62% in 2014. The share of thermal power in the generation mix in 2012 was disproportionately high because of monsoon failure, resulting in low hydro generation in the country. The Power Sector Policy Directions, 1997 and 2002, which stated that thermal power plants would be built only with

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1. This excludes a few islands off the northern Jaffna peninsula that are served by isolated mini-grid systems.
6. Nonconventional renewable energy sources include mini hydropower (less than 10 MW capacity), wind, solar, and biomass.
private financing, resulted in a proliferation of small and costly oil-fired plants. Implementation of cheaper base-load power plants needed to contain the costs of electricity production was delayed for several decades. Three smaller oil-fired power plants that reached the end of their contract periods have since been retired. The remaining six oil-fired private power plants operating in 2014, with an aggregate capacity of 671 MW, provided 21% of the country’s energy requirements. The growth in oil-fired plants, increase in oil prices, and delayed construction of new hydropower plants have significantly increased the cost of generation, until it reached its peak in 2013. The completion of the first coal-fired base-load power plant in 2014 has since caused the cost of generation to decline.

4. Retail tariffs in Sri Lanka do not reflect the cost of supply. In 2011, in its first tariff determination, PUCSL published the total estimated national average cost of electricity supply per kWh to be SLRs14.90, whereas the approved tariffs would yield only SLRs13.68. In 2013, the corresponding approved cost per kWh was SLRs20.35 and the national average price was SLRs18.51. Provisional estimates for 2016 specify the average cost of supply per kWh as SLRs20.06 against the national average price of SLRs17.16.

5. The continuing disparity between allowed costs and approved prices, and the absence of a credible mechanism to bridge the difference, limits CEB’s ability to undertake investments in generation, transmission, and distribution. The low-voltage distribution network requires improvements and expansion to meet the needs of new housing and commercial developments. Overdue investment in the medium-voltage distribution network has caused overloading, lower reliability, and excessive voltage drops at many locations. The growth in demand for power distributed over the medium-voltage network requires a matching investment in the transmission system. Immediate investments in the transmission and distribution network are needed to reduce system losses, ensure the reliability of the entire power system, and encourage private sector investment in nonconventional renewable energy. Sri Lanka’s electricity demand profile has a sharp peak in the evening, and the off-peak demand is about 40% of the peak demand. More vigorous demand-side management (DSM) initiatives beyond the mandatory time-of-use tariffs to larger customers need to be implemented to manage this severe disparity between peak and off-peak demand.

6. Major issues in the power subsector are (i) high costs of electricity generation, high electricity prices, and low reliability of supply; (ii) CEB’s increasing debt portfolio and discouraging private sector investments; (iii) the urgent need to undertake DSM and energy efficiency measures; and (iv) the need to streamline and facilitate the development of renewable energy. As a result, electricity supply costs are high, the costs of the main utility (CEB) are not fully recovered through tariffs, and supply reliability is below expectations.

2. Government’s Sector Strategy

7. The government aims to ensure sustainable development of energy resources by improving the power supply systems to provide access to electricity services to the entire population. Sri Lanka has a national investment program, including sector investments that are based on the NEPS (footnote 4). The NEPS includes a sector road map, a long-term investment program, and policy and reform measures. The government’s development strategies aim to (i) increase the supply capacity of the system to 6,367 MW by 2020; (ii) increase the share of nonconventional renewable energy in grid energy supply to 20% by 2020; and (iii) reduce the network’s total technical and commercial losses to 10% by 2020.
8. The country’s main energy sources are indigenous biomass, imported petroleum products, imported coal, and hydropower. More than half of the country’s hydropower potential of 2,000 MW has been developed. Increased penetration of indigenous resources, reduced consumption of fossil fuels, and diversification into cheaper fuels are available options. In the short term, generation costs are expected to remain stable, reflecting lower global oil and coal prices. In the medium term, the government aims to lower generation costs by adding three more lower-cost, coal-fired plants: Trincomalee 1 (2 x 250 MW), Trincomalee 2 (500 MW), and Southern Coal Power Project (300 MW). In the NEPS, the government has imposed a moratorium on oil-burning power plants until non-oil sources provide 90% of grid energy. The Puttalam coal power project (900 MW) financed by the People’s Republic of China was completed in 2014. Trincomalee 1 (500 MW), with target commissioning in 2020, is proposed as a joint venture project between the National Thermal Power Corporation of India and CEB.

9. The government established PUCSL in 2002 as a regulator for the energy and water sectors under the PUCSL Act, 2002. Parliament approved the Sri Lanka Electricity Act in March 2009, empowering PUCSL to regulate the electricity supply industry from April 2009. The first licenses to CEB (generation, transmission, and distribution), LECO, and some generating companies were issued in October 2009. In 2011, PUCSL established the tariff methodology and a road map for tariff reforms and rebalancing. Three tariff filings were conducted and tariff determinations announced, and tariff determination for 2016–2020 is currently open for public comments. In 2012, PUCSL implemented a fuel adjustment charge for most customer categories, outside the tariff methodology. Other regulatory interventions for customer service (commercial quality), supply quality (technical quality), grid and distribution codes, disclosure of plans, and others are in progress, but the degree and speed of implementation are slow. For DSM initiatives, PUCSL prepared the draft DSM regulations in August 2013. However, the government has not issued the regulations yet. Similarly, distribution performance regulations, the key document that establishes targets for reliability of electricity supply and distribution licensees’ responsibilities in reaching such targets, as well as responsibilities to report reliability and power quality, has not been enacted yet. Therefore, in spite of PUCSL’s efforts, both economic and technical regulation of the electricity supply industry continues to be weak.

10. CEB has converted its generation, transmission, and distribution operations into six functional business units (FBUs)—one for generation, one for transmission, and four for distribution. Financial accounts are required to be segregated to allow each FBU to operate as a profit center. PUCSL commenced regulating each FBU separately, and licenses issued in 2009 align with the functions of each FBU. CEB’s board was expected to delegate day-to-day management and decision-making power to fulfil the FBU’s obligations under its license to the heads of each FBU, including decisions on capital and other investments, recruit personnel, and incur revenue expenses to the extent required to ensure that the FBU achieves its targets established by PUCSL. The target set by PUCSL for financial independence of FBUs for the end of 2011 has not been fully achieved yet, causing FBUs to depend on CEB corporate to allocate funds for investments and operations.

11. In spite of regulatory reforms requiring the six licensed entities of CEB to be technically and financially independent, CEB continues to report its financial performance as one corporate entity. In tariff determinations by PUCSL, the allowed revenue for each of the six licensed entities of CEB includes 2% annual return on assets in addition to all approved expenditure. The allowed revenue is determined on the same principles to LECO that reports profits. Accumulated profits or losses in the bulk supply transactions account maintained by the CEB transmission licensee are not transferred to their responsible parties, electricity customers (in case of changes in fuel prices and hydropower output), or the government (in case of subsidies
to the sector pledged at each tariff decision). Such profits in the bulk supply transactions account are not shown as payables in CEB accounts. This gives rise to sporadic reports of profits in years of high rainfall. Losses in the bulk supply transactions account are not shown as receivables from the government in CEB accounts. Tariff reforms need to progress without disruption, along with the provision of government subsidies, to continue providing lifeline tariffs to a large portion of household customers.

12. In 2007, the government established the Sustainable Energy Authority (SEA) with a mandate for (i) energy planning and policy analysis; (ii) development and implementation of policy for renewable energy development; (iii) energy efficiency and conservation, and demand management; and (iv) energy fund management. SEA provided an institutional framework to promote renewable energy projects through private investment. SEA plays a pivotal role in renewable energy development by helping private investors (i) identify potential projects, (ii) obtain government clearance, (iii) gain access to government subsidies from the sustainable energy fund managed by SEA, and (iv) enter into power purchase agreements with CEB.

3. ADB Sector Experience and Assistance Program

13. ADB’s energy sector strategy in Sri Lanka focuses on (i) renewable energy development, including wind and other clean energy sources; (ii) energy efficiency improvement and system loss reduction; (iii) transmission and distribution system enhancement to remove grid constraints in absorbing additional capacity from renewable energy sources, achieving energy-efficiency and reliability improvements, and expanding energy access for lagging regions; and (iv) creating an enabling environment for clean power development, particularly through public–private partnerships (PPP) and greater private sector participation. The Asian Development Bank (ADB) closely coordinates and ensures synergies and complementarity of ongoing and planned activities with major development partners in the power sector.

14. In 2009–2014, ADB’s energy sector interventions addressed (i) strengthening the transmission infrastructure, (ii) improving the reliability and efficiency of the medium-voltage network, (iii) supporting rural electrification, (iv) contributing to energy efficiency and renewable energy development, (v) strengthening power system regulation and CEB’s internal reforms, and (vi) promoting PPP. The recent Clean Energy and Network Efficiency Improvement Project supports transmission infrastructure, network efficiency improvements, and pilot solar rooftop power generation investments. The Green Power Development and Energy Efficiency Improvement Investment Program includes support for the construction of a 30 MW run-of-river hydropower plant, transmission infrastructure enhancement for the absorption of wind energy, network efficiency improvements, and innovative DSM interventions. ADB supported the development of the Sri Lanka Renewable Energy Master Plan and the Master Plan for Wind Development in Mannar District, and proposed a business model for PPP in Mannar.

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Problem Tree for Energy

Slow and unsustainable economic growth, limited access to growth opportunities

Electricity system cannot (i) meet demand at sufficiently low cost and acceptable reliability, and (ii) attain sustainability in the long term

Core Development Problem

Technical constraints

Transmission network constraints

High MV and distribution network equipment failures in provinces

Inappropriate generation mix and inadequate low-cost generation capacity

Inadequate funding available

Required network augmentation not completed

Inadequate maintenance and asset replacement activities performed

Delays in developing low-cost thermal-fired power

Delays in developing renewables

Network losses not optimized

Increasing demand for electricity

Inadequate reactive power management due to insufficient reactive compensation devices

Insufficient energy efficiency and DSM measures

Funding constraints

Insufficient funding for energy efficiency and DSM initiatives

Inadequate planning and uncertainty over long-term generation plan

Inadequate reactive power management due to insufficient reactive compensation devices

Institutional constraint

CEB = Ceylon Electricity Board, DSM = demand-side management, MV = medium voltage.