

SECTOR ASSESSMENT (SUMMARY): ENERGY

A. Sector Performance

1. The Maldives recorded an increase in energy consumption from 224,000 tons of oil equivalent (TOE) in 2002 to 396,000 TOE in 2011, driven mainly by rising demand for electricity and transportation. Of the country's population of 351,000 (2013), about one third resides in the capital, Malé, the others are scattered over nearly 200 inhabited islands. It is not possible to gain scale and efficiency through a countrywide electrical grid system. Small, dispersed electric generators provide electricity to each island's grid. All inhabited islands in the Maldives have access to electricity.

2. Petroleum-based fuels are a major import in the Maldives because the country almost entirely depends on them for power generation. In 2012, the Maldives spent over \$470 million on oil imports, and fuel for electricity generation took the largest share.¹ The country's electricity retail tariffs for businesses are among the highest in South Asia at about \$0.40 per kilowatt-hour (kWh). For certain categories such as domestic consumers, government subsidies for fuel surcharge and usage cover over 50% of the cost of electricity, particularly on the outer islands. In 2012, electricity generation capacity included about 120 megawatt (MW) on the inhabited islands, 105 MW on the resort islands, and 20 MW on the industrial islands. Electricity demand is expected to double by 2020, led by an increase in tourism. The Maldives is considering promoting alternative energy sources to diversify consumption, and supporting energy efficiency initiatives to slow growth in demand.

3. In 1990, only six islands had reliable 24-hour access to electricity. By 2008, the Maldives had succeeded in providing all inhabited islands with access to 24-hour electricity. Until 2009, the State Electricity Company (STELCO) was the integrated utility responsible for electricity generation and supply to about 40 islands across the Maldives, while island cooperatives provided electricity to over 150 islands. In 2009, the government established six new regional utilities and put them in charge of electricity supply for the areas not licensed to STELCO.² In 2012, these regional utilities were integrated into FENAKA, a new utility responsible for providing electricity, water, and sewerage services on the outer islands. In 2012, STELCO and FENAKA used nearly 120 million liters of diesel to produce electricity. FENAKA needs significant technical, commercial, and financial support as it executes its responsibilities for the outer islands while also integrating island development communities into its operations.

B. Sector Issues

4. **Dependence on imported fuels.** The Maldives has no known indigenous petroleum, gas, or coal resources, and hydropower is not feasible due to its topography. Diesel for power generators is entirely imported and subject to fluctuation in international prices. A study by the United Nations Development Programme³ (UNDP) places the Maldives among the countries most vulnerable to oil price variations in the Asia Pacific region. The Ministry of Economic Development indicates that dependence on imported fuels has worsened in the last 20 years—petroleum products accounted for 15.8% of total imports in 1990 and nearly doubled to 31.0% by 2012, representing the largest category of imports. While wind potential is limited, the Maldives receives over 2,700 hours of sunshine a year. Solar energy is already used to

¹ Maldives Economic Diversification Strategy, Ministry of Economic Development, Government of Maldives, 2013.

² STELCO is now responsible for electricity supply in Greater Malé, i.e., Malé and adjacent islands.

³ United Nations Development Programme. 2011. SIDS Dock Support Program. New York

provide hot water in some resorts and is beginning to be used for photovoltaic installations on Greater Malé rooftops. Nonetheless, renewable energy is yet to be commercially harnessed on a significant scale and integrated into the grid in a reliable manner. The ability of the utilities to implement such projects also needs to be developed.

5. **Emerging legal and regulatory framework.** The government has a national energy policy⁴ to support the development of the electricity industry. The Ministry of Environment and Energy has formulated a draft electricity act. The changes arising from the creation of new utilities, different kinds of regulated entities, absorption of island development committees within the regional utilities, and other reforms require prioritized action in the technical, licensing, and regulatory environment. The capacity of existing institutions to undertake these activities in the short term is limited, and this is compounded by a shortage of qualified staff and consulting support.

6. **Inadequate financing.** Unavailability of financing for sector investments is a key constraint on meeting the country's target for power generation from renewable energy sources. Utilities have cash-flow issues because they cannot fully recover volatile input costs, which in turn results in high government subsidies and puts a strain on the state budget. The government seeks to overcome this through concessional financing from the multilateral development banks, cofinancing, and alternative funding sources such as private investment. However, to become an investment destination for the private sector, the Maldives needs to address various sector- and technology-related aspects. Past instances of soliciting private investment in the Maldives have met with limited success.

7. **Limited planning.** Traditionally, each island cooperative provided electricity to its own inhabitants. The consolidation of service provision into two utilities, STELCO and FENAKA, aimed to ease sector-wide planning. The government is updating its medium-term sector plan based on (i) expected growth in demand in Greater Malé and the outer islands, (ii) an evaluation of suitable technology options for adoption within different time frames, (iii) nature and modality of required investments, and (iv) an adequate risk mitigation framework to support such investments. Opportunities for energy efficiency and fuel conservation also exist.

8. **Barriers to renewable energy investment.** Consultations during the preparation of the five year medium term investment plan⁵ in 2011–2012 highlighted several barriers to renewable energy development: (i) lack of data on the availability of renewable energy sources, (ii) absence of a framework, including roles of different agencies in development, implementation, and monitoring of renewable energy use; (iii) absence of standardized instruments to support investments, such as tariff schemes and power purchase agreements; and (iv) unavailability of capital because of investment risk perceptions.

C. Government's Sector Policy and Strategy

9. In 2012, the Ministry of Environment and Energy was established to cover energy, climate change, environment, and water resources. An Energy Department was set up within the ministry to develop policies and oversee implementation of energy sector programs. The results

⁴ Government of Maldives. 2010, *National Energy Policy and Strategy*. Maldives

⁵ Government of Maldives. 2012, *SREP Investment Plan*. Maldives

framework for the Strategic Action Plan⁶ for 2009–2013 indicates the following objectives:

10. **Access to affordable and reliable electricity for all.** Power systems, particularly on the outer islands, were developed ad hoc, had low reliability and efficiency, and led to high costs of electricity and electricity subsidies. The government needs to upgrade power infrastructure on islands while reducing the costs to industry standards.

11. **Achieving carbon neutrality.** The Strategic Action Plan indicates that a carbon-neutral plan would be developed based on an assessment of energy demand and supply forecasts, and of greenhouse gas emissions. The SREP medium term investment plan to support renewable energy development has been prepared by the Government. Feasibility studies for the different regions were conducted. The government expects that overall demand for diesel fuel should decrease from a business-as-usual scenario as investments are made. A revised road map for the transition to renewable energy is being considered by the present government and is expected to be finalized in late 2014.

12. **Cost reduction through energy efficiency and conservation.** Fuel efficiencies range from 0.26 liters/ kWh to as high as 0.68 liters/kWh on smaller outer islands. The government will undertake investments to replace generator sets in a few outer islands. A concerted effort to reduce inefficiencies through supply-side investments and use of renewable energy along with demand-side measures would support a reduction in energy losses, in fuel imports for electricity generation, and in the level of sector subsidies.

13. **National energy security increased via diversified energy sources.** The government targets (i) greater use of indigenously available renewable energy, (ii) scaling up of the few solar photovoltaic and biogas projects, and (iii) development of local capacity through adoption of renewable energy courses in schools and colleges. Meanwhile, petroleum stores would be set up at regional centers across the country.

14. **Stronger institutional and legal frameworks.** Taking forward implementation of the energy policy and regulations to support the development of renewable energy and energy efficiency are part of the government's plan. It is developing guidelines, and design requirements and certification norms, for energy efficiency including for buildings.

15. The key objective of the medium-term investment plan is to scale up renewable energy investments to increase national energy security. The government has set the duties for imports related to renewable energy to zero and is formulating policies and regulations to promote renewable energy and its integration in the grid. The sector strategy for 2014–2017 is being formulated under the new government. Several of the key priorities are expected to be continued. In addition, research on feasible alternative energy sources is to be undertaken.

D. ADB Sector Experience and Assistance Program

16. The Asian Development Bank (ADB) has historically been a significant contributor to the power sector of the Maldives, extending four loans totaling over \$30 million and seven technical assistance projects totaling \$1.7 million since 1984. Under earlier assistance, the primary focus was to increase the electricity generating capacity in Malé to service its rapidly growing electricity demand and strengthen sector institutions such as STELCO. Under the Outer Island

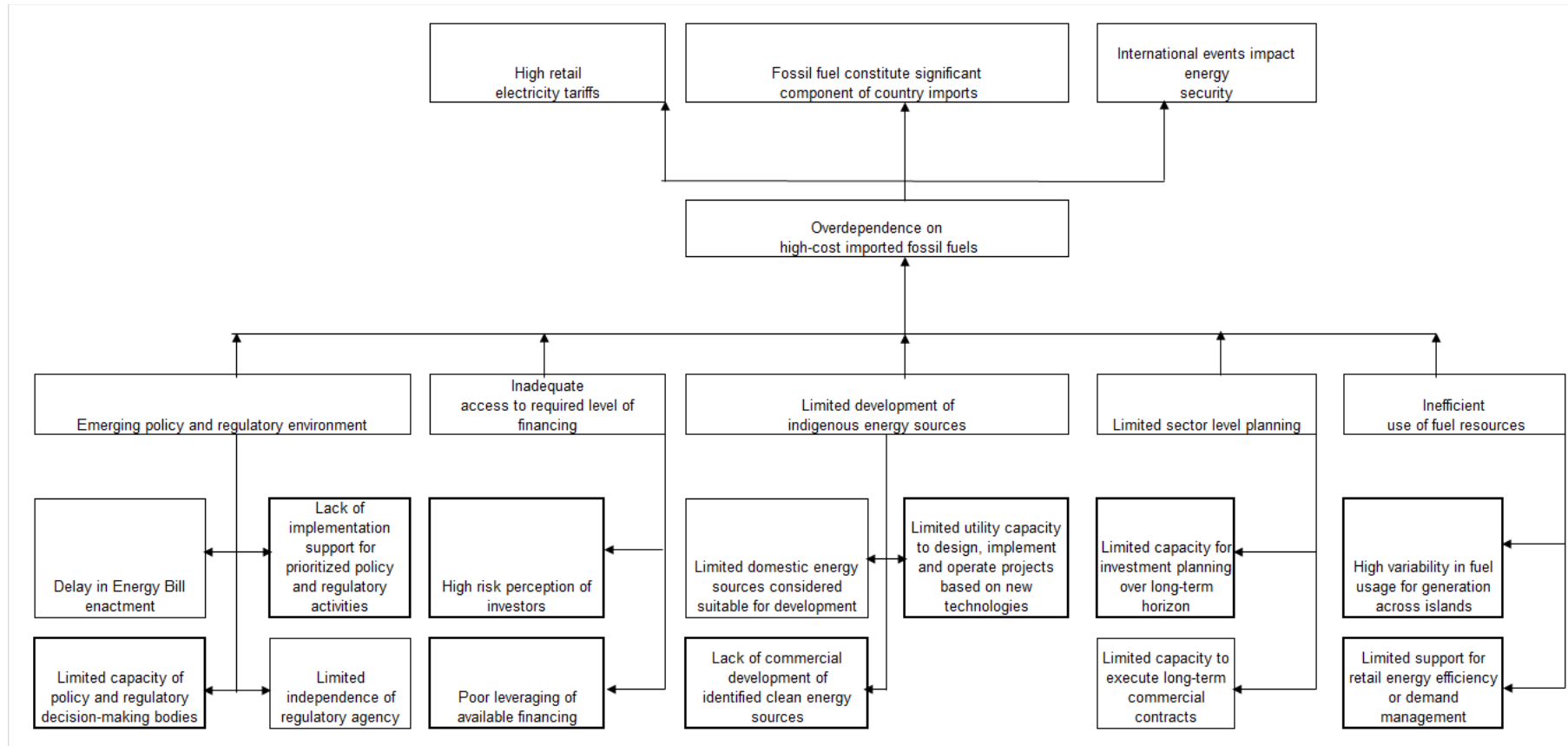
⁶ Government of Maldives. 2009, *Strategic Action Plan*. Maldives

Electrification Project⁷), the focus shifted toward electrification of the outer islands.

17. ADB assistance will strengthen sector institutions through capacity development, and encourage the use of renewable energy and supply-side energy efficiency. ADB has assisted the Maldives Energy Authority (MEA) since 2011 by building capacity for formulation and implementation of priority regulations for licensing, technical codes and standards, tariff regulations, and instruments related to renewable energy. ADB is also supporting preparatory activities for renewable energy and energy efficiency while ADB's private sector operations are evaluating opportunities to support innovative investments in renewable energy on resort islands.

⁷ ADB, 2001. *Outer Islands Electrification Project*. Manila.

Problem Tree for Energy Sector



————— Areas that the project will help improve

Sector Results Framework (Energy, 2014–2015)

Country Sector Outcomes		Country Sector Outputs		ADB Sector Operations	
Sector Outcomes with ADB Contribution	Indicators with Targets and Baselines	Outputs with ADB Contribution	Indicators with Incremental Targets	Planned and Ongoing ADB Interventions	Main Outputs Expected from ADB Interventions
Sustainable development of energy resource and efficiency	<p>All the citizens provided with access to reliable, affordable, and sustainable energy supply</p> <p><u>Indicator:</u></p> <p>At least 25% of the population to have at least 5% of installed power capacity from renewable sources by 2015 (2013 baseline: 0%)</p>	Energy system expanded, improved, and well managed in the Outer Islands	<p>Renewable energy and energy efficiency related standards, codes and regulations drafted by MEA by 2015</p> <p>At least 75% relevant staff members at MEA and utilities trained on various aspects of developing renewable energy projects by 2015 (Baseline, 2013: 0%)</p>	<p>Planned key activity areas: energy generation (31% of funds); energy efficiency (19% of funds); renewable energy (50% of total funds)</p> <p>Pipeline project with estimated amounts: Preparing Outer Islands for Sustainable Energy Development Project (2014—\$38 million with at least \$62 million in additional co-financing from SREP and other sources)</p> <p>Ongoing Project: Technical Assistance for Capacity Building of Maldives Energy Authority (2011—\$400,000) with additional financing of \$400,000 for approval in 2014 with SREP funds</p>	<p>Planned key activity areas: Licensing, compliance, other technical regulations and tariff regulations issued; efficiency standards shared and monitored</p> <p>STELCO and FENAKA annually filing tariff petitions for review by MEA</p> <p>Capacity building programs in the areas of economic and technical regulation conducted for all the MEA staff.</p> <p>Pipeline projects</p> <p>Solar photovoltaic -diesel hybrid systems to be introduced, as needed, for over 100 outer islands with co-financing support</p> <p>Ongoing Project: More than half of relevant MEA staff trained in modern techniques of management of regulatory bodies (2011—\$400,000)</p>

ADB = Asian Development Bank, FENAKA = Fenaka Corporation Limited, MEA = Maldives Energy Authority, SREP = Scaling Up Renewable Energy Program in Low Income Countries, STELCO = State Electric Company Limited.

Sources: Government of the Maldives. 2011. *Result Frameworks for SAP 2009-2013*. Malé and ADB. 2014. *Interim Country Partnership Strategy 2014-2015*. Manila