SECTOR ASSESSMENT (SUMMARY): ENERGY

Sector Road Map

1. **Sector Performance, Problems, and Opportunity**
   
   a. **Introduction**

   1. The Kyrgyz Republic is a landlocked Central Asian country with a low per capita income (ranked 186 in the world); small area (200,000 square kilometers); and low population (ranked 112 in the world). The country enjoys abundant hydropower potential owing to its mountainous terrain covering 80% of the country, but less than 10% of its 150,000 gigawatt-hour (GWh) potential has been utilized.

   2. The Kyrgyz Republic has modest reserves of petroleum (ranked 81 in the world) and natural gas (ranked 90 in the world). In 2008, total primary energy supply was 2.86 Mtoe (million tonne of oil equivalent), of which 70% was supplied by imported oil, coal, and gas and 30% by domestic hydro sources. The Kyrgyz Republic is a substantial net energy importer while being a net exporter of electricity to the regional Central Asian Power System.

   3. Apart from hydropower, the Kyrgyz Republic’s principal energy resource is coal. Reserves are estimated at 27 billion tons, of which proven reserves are quoted at 1.3 billion tons.¹

   b. **Institutional Structure**

   4. Energy sector governance is implemented by the government through the State Property Fund and the Ministry of Energy and Industry. The State Property Fund acts as the owner and manager of state-owned power companies. The Ministry of Energy and Industry is responsible for industry development, including strategic planning, policy development, and forecasting.

   5. Kyrgyzenergo—the then state-owned vertically integrated power monopoly—was unbundled into one generation company (Electric Power Plants), one electrical grid transmission company (National Electrical Grid of Kyrgyzstan), and four regional electricity distribution companies. In Bishkek, thermal energy is distributed by the Bishkekteploset district heating company. Thermal energy is also supplied and distributed by municipalities in other smaller urban areas. Apart from minor hydro generation plants, all assets are state owned.

   6. Gas import, transportation, distribution, and sales are handled by the Kyrgyzgas state-owned monopoly. The coal industry has 30 mining companies both privately owned and state owned.

   7. The Kyrgyz Republic is an active participant of the Central Asia Regional Economic Cooperation Program supported by the Asian Development Bank (ADB).² In May 2003, the Kyrgyz Republic ratified the Kyoto Protocol to the United Nations Framework Convention on

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² The Central Asia Regional Economic Cooperation Program is a partnership of 10 countries and six multilateral institutions working to promote development through cooperation, leading to accelerated economic growth and poverty reduction. [http://www.carecprogram.org/](http://www.carecprogram.org/)
Climate Change. The Kyrgyz Republic is a signatory to the Energy Charter Treaty.³

c. Power and Thermal Sector

8. Total installed generation capacity is 3,863 megawatts (MW) of which 3,135 MW (81%) comes from hydroelectric power plants (HEPPs) and 728 MW (19%) from thermal combined heat and power plants (CHPP). Toktogul, the largest HEPP at 1,200 MW, and HEPPs in the downstream Naryn cascade produce 97% of the total hydro energy output and 92% of the country’s total electricity output. HEPPs are in need of upgrade and modernization. The two thermal CHPPs, fueled by imported gas, oil, and coal, generate less than 1,000 GWh per year of electricity output against a designed electricity output of 4,100 GWh. CHPPs are in poor condition and in need of complete rehabilitation or replacement.

9. Over 1.1 million customers are connected to the grid, with an electrification rate approaching 100%. The network utilizes 500 kilovolt (kV), 220 kV, and 110 kV transmission voltages (with 6,900 kilometers [km] of lines and 190 substations) and a range of distribution voltages (with 65,000 km of lines and 18,600 substations). Network assets are approaching the end of their life and are in need of major rehabilitation, replacement, and augmentation. This results in reduced reliability and high technical losses.

10. Toktogul reservoir provides a multiyear storage facility for irrigation in the downstream countries. Water releases are subject to annual intergovernmental agreements. Electricity generated associated with summer water release is in excess of domestic demand and is exported to Kazakhstan, Tajikistan, and Uzbekistan. With limited release of water in the winter and twice the demand in the summer, oil, coal, and gas are imported to fuel the CHPPs and meet demand. Trade in electricity is therefore interconnected with water release agreements. However, this trade is complicated by (i) the seasonality of regional electricity prices devaluing forced hydroelectric deliveries in the summer relative to winter imports of electricity or fuel; and (ii) the need for Kyrgyz water releases in downstream countries is not constant from year to year, imposing operational constrictions on the Toktogul reservoir.

11. Net supply to the domestic market amounted to 10,141 GWh in 2010, with domestic sales amounting to 6,091 GWh—implying a system loss of 40% of the net supply. Assuming a technical loss of about 15%, the remaining 25% comprises commercial losses representing metering error and theft. Such high commercial losses are unsustainable and among the highest in the world, with best industry practice having commercial losses of less than 1%. Inadequate metering between the generation, transmission, and distribution companies of exports and imports and of domestic consumer usage contributes to this high commercial loss.

12. Tariffs are set separately for the six different customer classes of households, industry, government organizations, agriculture users, pumping stations, and other users. Tariffs do not reflect cost but are based on affordability and social considerations and include cross-subsidization among the different consumer groups. In 2010, tariffs for all customers were increased to Som1.5/kWh, representing a cost recovery rate and a doubling of the 2009 household tariff. Following social unrest in 2010, which was partly attributable to this tariff increase, tariffs have now been reduced to Som0.7 /kWh for households and Som1.327 /kWh for all other customers. Based on current usage, this gives a weighted average tariff of $0.022 per kWh, which is insufficient to finance the required rehabilitation and augmentation.

³ The Energy Charter Treaty is an international agreement that provides a multilateral framework for energy trade, transit, and investments. http://www.encharter.org/
13. Consumers pay for electricity via lodgments to escrow bank accounts under the control of the Ministry of Energy. The funds are then distributed among generation, transmission, and distribution companies. In the event of full collection of invoiced sales, the funds are distributed among generation, transmission, and distribution companies in accordance with approved wholesale tariffs. However, full collection is not achieved and the ministry distributes the funds based on the priorities of the particular companies at that time—in an arbitrary and nontransparent manner. This complicates financial planning for the generation, transmission, and distribution companies and provides no incentive to reduce losses.

14. With tariffs below cost, an increasing cost base as capital expenditure increases, and high commercial losses, the sector’s financial performance is poor and costs exceed revenues. The sector has reported annual financial losses since 2007, with losses increasing each year. While average collections (payments/invoices) have improved from 86% in 2007 to 95% in 2009, legacy debt from earlier poor collection periods remains a problem. In July 2007, distribution companies’ debts were Som3.8 billion to electric power plants and Som2.3 billion to the National Electrical Grid of Kyrgyzstan. The sector also has substantial legacy tax debt.

15. The restructuring of the energy sector in 2001 is not viewed as a success because objectives of private sector participation, a competitive market, and improved quality of supply have not been met. The appropriateness of four distribution companies for a 1.1 million customer market is under question.

**d. Sector Issues**

16. The sector is characterized by (i) aged assets in need of rehabilitation and augmentation, (ii) high commercial and technical losses, (iii) a combination of subsidized below-cost electricity tariffs and market-based coal and gas tariffs providing distorted signals, (iv) poor financial performance and high legacy debt, (v) a suboptimum electricity industry structure, and (vi) electricity operational constraints imposed by the water–energy nexus and varied hydrology. These issues cause poor energy supply resulting in reduced economic development, political instability, and reduced energy access by poor households. Investment in the energy sector and improvement in its operational and financial performance is critical for the economic and social development of the Kyrgyz Republic.

**2. Government’s Sector Strategy**

17. The medium-term development program of the Kyrgyz Republic for 2010–2014 sets out the government’s social and economic development strategy. The program is complemented by the short-term energy sector development strategy and priorities for 2009–2012 (footnote 1), which sets out reforms and development plans for the energy sector.

18. The program and the strategy aim to (i) introduce cost-recovery tariffs, (ii) reduce electricity loss and theft, (iii) improve financial and corporate management of the energy sector, (iv) attract private sector development, (v) increase energy security by developing domestic energy resources, and (vi) expand regional power exports.

19. The government issued a presidential decree known as Fuel and Energy Sector Transparency Initiative on 20 July 2010 to increase transparency and reduce corruption in the

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4 The program was approved by government resolution number 540 in September 2011.
sector. The initiative calls for (i) the creation of a public advisory board for the energy sector, (ii) complete disclosure of financial information in the energy sector, (iii) the expanded use of escrow accounts in the sector, and (iv) the introduction of competitive tenders for electricity export and import.

3. **ADB Sector Experience and Assistance Program**

20. ADB’s energy sector strategy is coordinated with the Kyrgyz Republic’s strategy and program. It is further informed by (i) ADB’s Strategy 2020 and ADB’s Energy Policy, (ii) roles and strategies of development partners and stakeholders, and (iii) the Kyrgyz Republic’s energy sector development challenges.

21. Strategy 2020 identifies three strategic agendas: inclusive economic growth, environmentally sustainable growth, and regional integration—with infrastructure and regional cooperation being core areas of operations. ADB’s Energy Policy is designed to help developing member countries provide reliable, adequate, and affordable energy for inclusive growth in a socially, economically, and environmentally sustainable way. It emphasizes energy efficiency and renewable energy; access to energy for all; and energy sector reforms, capacity building, and governance. The Energy Policy does not envisage ADB participation in exploration and production of oil, gas, and coal resources.

22. Ongoing ADB projects include the Power Sector Improvement Project approved in December 2010, currently under implementation. The project includes (i) developing the automated metering and data acquisition system for the wholesale electricity market, (ii) modernizing the communication system and developing the supervisory control and data acquisition system, (iii) rehabilitating major substations, (iv) studying establishment of the electricity settlement center, and (v) developing the financial and corporate management capabilities of the National Electrical Grid of Kyrgyzstan.

23. ADB supports the government’s strategy to improve the performance of the energy sector, given the strong link between efficient and reliable energy supply and economic and social development. ADB’s strategy in the Kyrgyz energy sector is to focus on the power subsector where the greatest impact on poor households can be realized. ADB will coordinate with development partners in supporting projects that will increase the reliability of power supply to domestic customers and improve operational performance. ADB will promote regional cooperation by supporting commercially justified electricity projects that enhance energy security.

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6 ADB. 2010. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the Kyrgyz Republic for the Power Sector Improvement Project.* Manila (Loan 2671/ Grant 0218-KGZ, approved on September 2010).
Problem Tree for the Energy Sector

EFFECTS
- Reduced economic growth
- Political instability
- Winter power cuts
- Reduction in poor households’ access to electricity

CORE PROBLEM
- Inadequate and unreliable electricity supply

CAUSES
- Reduced output
- Poor financial performance

Reduced output
- Low power availability
- Low power output
- High technical losses
- Reduced output based on water release agreements
- Hydropower dependent

Poor financial performance
- Below cost electric tariffs
- Distorted energy pricing signals
- High commercial losses
- Poor operation performance
- Reduced energy trade

Water–energy nexus
- Variable hydrology
- Absence of independent regulator
- Poor billing and metering
- Governance and management system
- Decreased regional cooperation

Aging equipment
- Poor maintenance
## Sector Results Framework (Energy, 2012–2014)

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<th>Country Sector Outcomes</th>
<th>Country Sector Outputs</th>
<th>ADB Sector Operations</th>
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<tr>
<td><strong>Outcomes with ADB Contribution</strong></td>
<td><strong>Indicators with Targets and Baselines</strong></td>
<td><strong>Outputs with ADB Contribution</strong></td>
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<tr>
<td>Improved system efficiency</td>
<td>Hydroelectric power plant outage hours (planned and forced) reduced by 10% in 2015 (compared to 2010)</td>
<td>Hydroelectric power plant rehabilitated</td>
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<tr>
<td>Better energy security</td>
<td>Distribution loss reduced from 40% in 2008 to 20% in 2015</td>
<td>Electricity settlement center established</td>
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<td>More regional power trade</td>
<td>Net exports from the Kyrgyz Republic increased to [3,000 GWh] in 2017 from 2,200GWh average during 2000–2008</td>
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ADB = Asian Development Bank, GWh = gigawatt-hour.