

SUMMARY SECTOR ASSESSMENT: ENERGY

1. Tajikistan is a landlocked country, with an area of 143,000 square kilometers (km); most of the country (93%) is mountainous, and almost 50% is above 3,000 meters. Tajikistan's power system has an installed capacity of 5,055 megawatts (MW) comprising eight large and a few small hydropower plants (4,737 MW), and two fossil fuel-fired combined heat and power plants (318 MW). In 2012, internal power generation was 14,419 billion kWh, with and internal consumption of 13,646 billion kWh.¹ The high reliance on hydrologic resources for power generation results in a power surplus in summer, and a deficit in winter.

2. Tajikistan's power assets have aged beyond their economic life. Maintenance has been inadequate as a result of a lack of both spare parts and funding at Barki Tojik, the vertically-integrated state power utility. According to the power sector regional master plan, prepared in 2012 under the Central Asia Regional Economic Cooperation program,² nearly 80% of all generation and transmission assets in Tajikistan need to be replaced to meet demand and eliminate the winter power deficit.

3. Tajikistan has substantial explored and proven reserves of coal and some potential reserves of gas, only a small fraction of which have been exploited. There are close to 740 coal deposits with total coal reserves of over 4 billion tons. Tajikistan is estimated to have 3 billion cubic meters of proven gas reserves.³

1. Sector Performance, Problems, and Opportunities

4. Since 1990, the production and consumption of electricity has declined. Consumption declined by a third, primarily as a consequence of the lack of available electricity. Power is supplied for just a few hours per day in the winter. Power cuts have become more frequent, even in large cities. The lack of capital investment in the energy sector has meant that obsolete infrastructure systems have not been properly maintained or replaced. Low tariffs, poor collection, system losses, low-quality maintenance, and inadequate management add to the sector's poor performance. Development of new capacity has been slow in part because of (i) the significant resources needed to develop hydropower plants and associated transmission assets, and (ii) lack of regional cooperation due to issues regarding the sharing of river water.

5. The winter energy deficit results in human suffering, and is a significant impediment to economic growth and development. Resolution of this problem will require (i) improving the efficiency of existing assets; (ii) negotiating commercial trading arrangements with Tajikistan's neighbors; and (iii) attracting private investment to develop coal, gas, and hydroelectric power.

6. **Hydropower.** Tajikistan is the eighth-richest country in the world in terms of hydropower resources, with approximately 220 terrawatt-hours (TWh) technically recoverable. Hydropower plants generate about 98% of the country's electricity. The biggest hydropower plants are: Nurek (3,000 MW), Sangtuda 1 (670 MW); Baipaza (600 MW Golovnaya (240 MW), Sangtuda 2 (220 MW) and Kairakum (126 MW). Sangtuda 1 and 2 are recently constructed power plants with financing coming from Russia and Iran, respectively. With exception of these, all other power plants have outlived their economic and technical life and need urgent rehabilitation.

7. **Thermal resources.** There is sufficient coal for coal-fired power plants to complement hydropower generation and produce some hydro-thermal synergy. The volume of coal mining doubled between 2008 (199,200 tons) and 2012 (412,000 tons).⁴ Construction of the 200 MW

¹ Source: Barki Tojik.

² ADB. 2009. *Research and Development Technical Assistance: Power Sector Regional Master Plan*. Manila.

³ Ministry of Energy and Industry.

⁴ Ministry of Energy and Industry.

coal-fired Dushanbe-2 combined heat and power plant (CHP) is ongoing (capital cost is estimated at \$178 million). The completion of the first phase (100 MW) is expected by October 2013, with the second phase to be completed in 2014. The government is considering also attracting private investors for construction of the 300 MW Shurob coal-fired CHP (the preliminary cost is \$329 million).

8. The country's accessible oil and gas has been almost entirely exhausted. Due to low domestic production, Tajikistan is currently entirely dependent on imports of natural gas (from Uzbekistan) and petroleum products (mainly from Russia). Most of the potential gas reserves (85%) are located in the south, with a potential estimated annual production of 2.5 billion cubic meters.⁵ However, the prospected gas reserves require complex boring to a depth of 5–7 km.

9. **System losses.** System losses are around 20%, with more than half of this amount attributable to technical losses in the transmission and distribution network. These have increased in recent years as a result of (i) increased use of electricity for space heating, thus overloading the networks; and (ii) limited network maintenance. The remaining losses result from nontechnical causes (e.g., theft, defective metering, and billing and collection norms).

10. **Electricity tariff and subsidy.** The government has fixed energy prices at a rate generally lower than required to fully recover costs. In 2006, the weighted average tariff was \$0.006/kilowatt-hour (kWh). It was increased in phases to \$0.015/kWh by December 2008, with subsequent further step-by-step tariff increases. The latest tariff increases (22% for the population and 25% for industrial categories) were implemented in April 2012, and brought the weighted average tariff to \$0.02/kWh. The government plans further tariff increases.

11. The most pressing problem requiring the government's urgent attention is the unsustainable energy subsidy, which distorts the pricing structure. Reducing the subsidy will make funds available for energy sector development and for social sector programs to improve the quality of life. The increased tariff and resulting improvement in the sector's financial position is expected to increase investment in sector infrastructure and make the sector profitable and financially viable, thereby attracting private investment.

12. **Governance.** Governance is an increasingly important sector issue. Weak governance results in inefficient utility operations, power theft, illegal power connection, reduced billing and tariff collections, and nonpayment of arrears. These practices open the way for massive waste.

13. **Billing and collection.** The financial situation of Barki Tojik and other sector entities has been adversely affected by increased power and gas receivables. In January 2013, Barki Tojik receivables were more than TJS770 million (equivalent USD160 million). The main delinquent accounts are the Ministry of Land Reclamation and Water Resources (TJS215 million) and pumping stations (TJS213 million). Barki Tojik lacks some essential systems required to support management operations and decision making. For example it lacks a computerized customer billing system to support management control of revenue collection.⁶

14. **Institutional issues.** Institutional weaknesses in the sector have affected decisions on investments and electricity tariffs. Barki Tojik has sufficient technical capacity, but requires stronger capacity for planning, power operations and financial management.

2. Government's Sector Strategy

15. **Policy.** The government's energy security policy aims to provide reliable, adequate, and affordable energy for domestic consumption and for national economic growth in a socially,

⁵ Source: Ministry of Energy and Industry.

⁶ The installation of billing system is being implemented with assistance of the World Bank.

economically, and environmentally sustainable manner. The policy aims to (i) provide access to energy for all; (ii) maximize energy savings through rational energy use; (iii) improve sector performance by commercializing utility operations; (iv) attract private investment in energy sector development; (v) increase energy exports on a commercial basis; and (vi) undertake energy sector reform, capacity building, and governance.

16. **Strategy.** To achieve the policy objectives, the government strategy calls for a dual approach, with a focus on (i) domestic energy—including electricity, gas, and heating—to satisfy the needs of households, industries, and manufacturing, through a series of policy and investment measures; and (ii) export markets, focusing on the sector’s significant potential to contribute to economic growth through electricity exports; the government is also actively encouraging development of the domestic gas subsector and of coal mines and coal-based power on a commercial basis.

17. The government recognizes that the management and development of the power subsector must be improved to address the deteriorating infrastructure, inadequate capacity, weakened institutions, and governance issues. With the country’s large hydropower potential, the government’s priority is to expand hydropower-generating capacity to meet domestic demand and to increase exports to neighboring countries.

18. **Financing options for energy development.** The investment climate and business environment remain poor and have failed to attract the domestic private sector investment needed to secure foreign direct investment. Government interference remains pervasive, government capacity is severely constrained, infrastructure is poor, and access to finance is limited. Recognizing that infrastructure improvements are important to serve the needs of the population and to attract the foreign direct investment needed for sustainable development of Tajikistan’s natural resources for both export and domestic use, the government is engaged in and seeking assistance in formulating appropriate policies and sound strategies.

19. The government understands that investment decisions made over the next 5 years will be critical in determining the security of the country’s energy supplies. To meet the large investment needs, the government seeks assistance from the Asian Development Bank (ADB) and other development partners to extend the needed investment funds and provide new financing instruments to enhance the provision of private capital, goods, and services.

3. ADB Sector Experience and Assistance Program

20. ADB supports clean and environmentally sustainable energy operations, modernization of transmission and distribution facilities, and sector reforms. ADB is the largest multilateral development partner in Tajikistan’s energy sector. Since 1998, five operations have been approved totaling \$237 million.⁷ In addition, 10 TA grants totaling \$8 million have been provided for project preparation, institution building and policy advisory activities, including for: (i) improvements in Barki Tojik’s institutional structure, operational efficiency, and financial

⁷ ADB. 2000. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the Republic of Tajikistan for the Power Rehabilitation Project*. Manila; ADB. 2002. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the Republic of Tajikistan for the Emergency Baipaza Landslide Stabilization Project*. Manila; ADB. 2006. *Report and Recommendation of the President to the Board of Directors: Proposed Loans, Technical Assistance Grants, and Administration of Loan by OPEC Fund to the Islamic Republic of Afghanistan and the Republic of Tajikistan for the Regional Power Transmission Interconnection Project*. Manila; ADB. 2008. *Report and Recommendation of the President to the Republic of Tajikistan for the Nurek 500 kV Switchyard Reconstruction Project*. Manila; ADB. 2010. *Report and Recommendation of the President to the Board of Directors: Proposed Grant to the Republic of Tajikistan for the Regional Power Transmission Project*. Manila.

performance; and (ii) development of regional energy trade with Afghanistan and other countries in Central and South Asia.

21. The overall performance of Barki Tojik with regard to ADB project implementation has been satisfactory. However, Barki Tojik has not met the financial covenant ratios in the grant agreements of the ongoing projects. Based on the auditor's report, financial management of Barki Tojik is improving; however, there is further room for improvement, which requires assistance from International Financial Institutions.

22. **ADB's strategic sector vision and sector operational performance improvement program.** The government plan calls for strengthening sector's institutions and legal and regulatory framework. To assist the government in transforming the development and operation of the energy sector on market-based principles, ADB focuses on sector reform, which includes institutional strengthening and reorganization of Barki Tojik using a phased approach—with phase 1 to focus on sector assessment, phase 2 on preparation of a detailed restructuring plan, and phase 3 on actual restructuring—through a sector operational performance improvement (SOPI) program under the ongoing Regional Power Transmission Project (footnote 7).

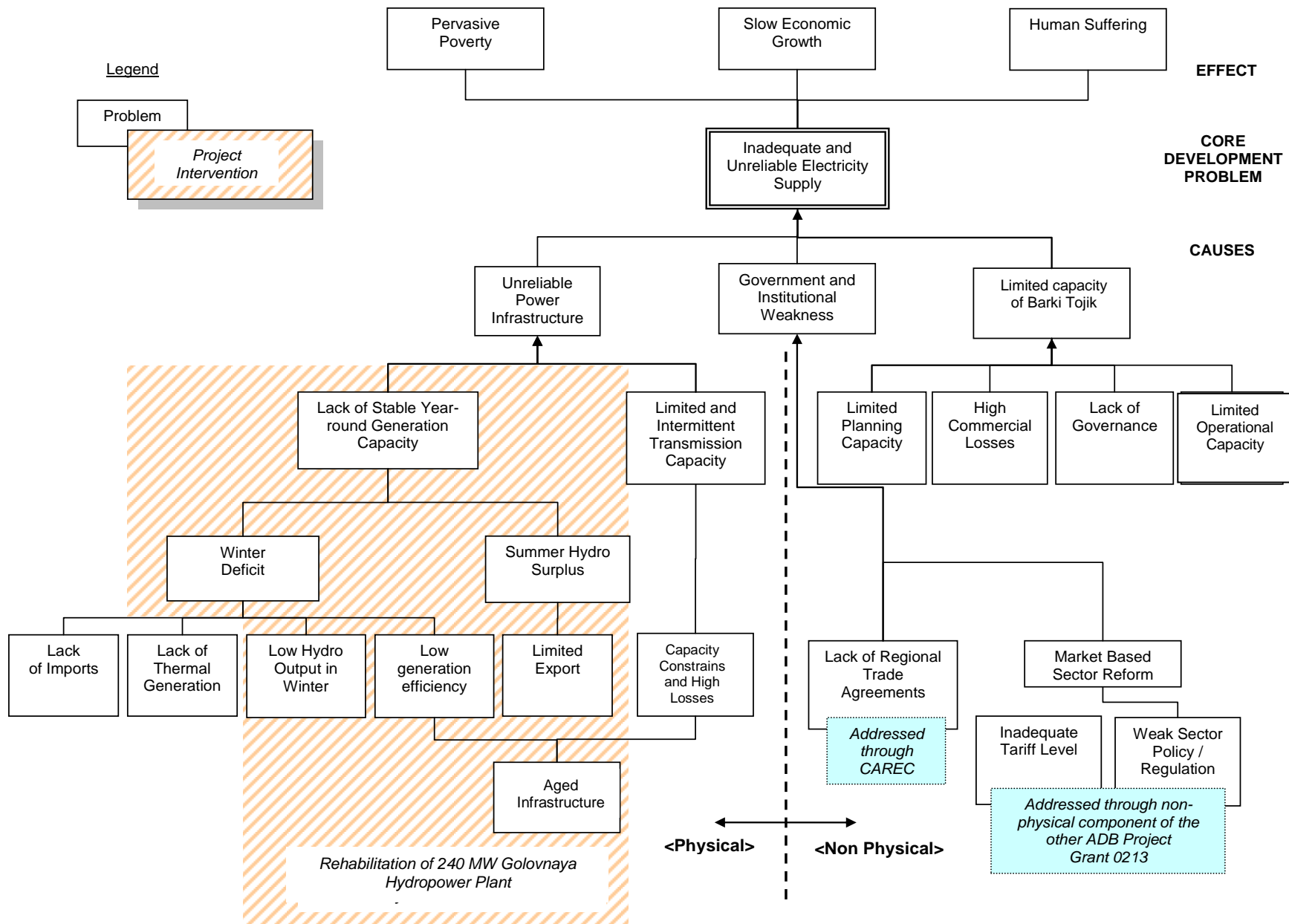
23. The government initiated the reform process by adopting the individual restructuring plan for Barki Tojik on 30 August 2011, which is in line with the agreement reached with ADB. The restructuring is managed by the Supervisory Board, established in May 2012 and chaired by the first deputy prime minister. The SOPI consultants completed the phase 1 in February 2013. The assessment report, including a new structure for Barki Tojik and proposed areas of intervention, was reviewed by concerned ministries during February–May 2013. The first Supervisory Board meeting was held on 11 June 2013, and the board approved: (i) the assessment report; (ii) the intervention plan of SOPI consultants; and (iii) the new structure of Barki Tojik. The board also instructed Barki Tojik to establish three departments (generation, transmission and distribution) and appoint department heads in consultation with the Ministry of Energy and Industry. Following the board's guidance, the Barki Tojik chairman issued resolution on appointment of the three new department heads on 28 August 2013. The next step is to finalize a detailed action plan, implementation schedule and restructuring progress indicators in November 2013.

24. **Links to the country partnership strategy.** The main link to planned outcomes in the Tajikistan country partnership strategy, 2010–2014 is the crucial contribution that a more effective and efficient energy system and, in particular, a reliable year-round electricity supply, will make to gross domestic product growth.⁸ Tajikistan needs support to achieve its overall development objectives. Links to thematic areas in the country partnership strategy include (i) governance—through support for continuing institutional and management reforms of Barki Tojik and other sector institutions designed to enhance transparency and reduce corruption; (ii) private sector development—through support for increased private investment (including foreign direct investment in coal, gas, and electricity) and promotion of possible public–private partnerships; and (iii) regional cooperation—through support for export of summer surplus hydroelectricity to Afghanistan and other Central Asian countries.

25. **Future ADB interventions.** ADB will continue helping Tajikistan to (i) improve energy security to meet domestic energy needs and expand economic growth; (ii) expand hydropower potential, primarily focusing on rehabilitation of existing plants and development of run-on-the-river power plants; (iii) enhance energy efficiency through demand side improvements and cost recovery tariffs; and (iv) develop capacity to support sector modernization and reforms of utility operations. In addition, addressing environmental management, and social aspects will continue to be an important element in ADB's assistance programs.

⁸ ADB. 2010. *Country Partnership Strategy: Tajikistan, 2010–2014*. Manila.

Problem Tree for Energy Sector



Rehabilitation of 240 MW Golovnaya Hydropower Plant

<Physical> <Non Physical>

CAREC = Central Asia Regional Economic Cooperation, MW = megawatt.

Sector Results Framework (Energy, 2014–2016)^a

Country Sector Outcomes		Country Sector Outputs		ADB Sector Operations	
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
<p>Improved energy security of the country</p> <p>Sustainable financial performance in electricity sector</p> <p>Expanded regional trade in electricity on a commercial basis</p> <p>Increased private sector participation</p>	<p>Winter deficit decreased from 2.7 TWh in 2012 to 1.4 TWh in 2016</p> <p>Tariffs increased to cover costs by 2016</p> <p>Collections reach 94% of billings by 2016 from 87% in 2012 (baseline: 86% in 2010)</p> <p>Annual summer electricity exports reach 1.4 TWh by 2016 from 0.6 TWh in 2012 (baseline: 0.09 TWh in 2010)</p> <p>Institutional and capacity strengthening of the public agency in charge of the energy sector is completed by the end of 2016</p>	<p>Rehabilitation of existing and construction of new sector assets</p> <p>An effective and efficient energy sector system to support overall economic development and to help reduce poverty</p> <p>Development of energy resources to alleviate electricity shortages and increase electricity exports</p> <p>Institutional strengthening and capacity development program at Barki Tojik implemented</p>	<p>Golovnaya HPP and switchyard commissioned by 2021</p>	<p>Planned key activity areas</p> <p>\$201 million for 2014–2016, 53.4% of total COBP^a envelope of \$376.2 million (investment and technical assistance projects), of which: RCI–100%, GEN+EGM–10%, PSD–10%</p> <p>Ongoing projects with approved amounts</p> <p>Regional Power Transmission Project (\$122 million)</p> <p>Nurek 500 kV Switchyard Reconstruction Project (\$54.8 million)</p>	<p>Governance improvement through sector reform covering institutional, regulatory, and legal framework</p> <p>Planned key activity areas</p> <p>Small and/or medium run-of-the-river hydropower for year-round power generation</p> <p>Ongoing projects</p> <p>By 2015: (i) two new 220 kV lines totaling 140 km constructed and energized; (ii) one 500 kV and five 220 kV substations rehabilitated and energized; (iii) SCADA system installed and operating at high voltage substations and national control center</p> <p>Barki Tajik's new organizational and business process structures fully operational by 2015</p> <p>New Nurek 500 kV switchyard commissioned in 2014</p>

ADB = Asian Development Bank, COBP = country operations business plan, EGM = effective gender mainstreaming, GEN = gender equity; HPP = hydropower plant, km = kilometer; kV = kilovolt; MW = megawatt; PSD = private sector development; RCI = regional cooperation and integration, SCADA = supervisory control and data acquisition; TWh = terawatt-hour.

^a The Country Operations Business Plan for 2014–2016 was consulted and cleared by the government, with ADB Management approval expected in November 2013.

Source: Asian Development Bank