



Central Asia Energy-Water Development Program

Energy Development

Tajikistan's Winter Energy Crisis: Electricity Supply and Demand Alternatives

Background and Context

Tajikistan's electricity system is in a state of crisis. Approximately 70 percent of the Tajik people suffer from extensive shortages of electricity during the winter. These shortages, estimated at about 2,700 GWh (a quarter of winter electricity demand), impose economic losses estimated at over USD 200 million per year, or three percent of gross domestic product (GDP). In addition to the financial costs of inadequate electricity, the Tajik people also suffer social costs, including indoor air pollution from burning wood and coal in homes and assorted health impacts from extreme winters. Electricity shortages increased considerably in 2009, when Tajikistan's energy trade with neighboring countries through the Central Asian Power System (CAPS) stopped, and they continue to worsen as the condition of power generation assets deteriorate. Currently, hydropower supplies all electricity needs, including heating during the cold winters in this mountainous country. Needed investments in new electricity sources or maintenance of existing assets have not been undertaken. Meanwhile, with some of the lowest electricity prices in the world, there is no financial incentive for consumers to reduce consumption. In the face of growing demand, without prompt action to remedy the causes of Tajikistan's electricity crisis, the shortages could increase to about 4,500 GWh (over a third of winter electricity demand) or worse by 2016.

Purpose of Document

The World Bank initiated this study to assist the Government of Tajikistan in finding ways to overcome its current electricity shortages and establish a solid platform for meeting its growing electricity demand, with a particular focus on minimizing the recurring winter shortages. This report outlines the investments and policy reforms needed between now and 2020 to strengthen the financial, technical and institutional capacity of the Tajik power sector. The study focuses on multiple initiatives that can be started immediately and simultaneously, and which will establish fundamental components of energy security for Tajikistan: moderate unsustainable growth in demand, protect the current asset base, and remedy the thermal/hydro imbalance in the energy sector. The study examines alternative investments for both managing electricity demand and expanding supply in the period up to 2020. On account of its short-term time horizon, the study excludes hydropower projects with large (seasonal) storage, as implementation and impact of such large-scale infrastructural projects fall outside of its immediate implementation scope.

Major Findings/Outcomes

Tajikistan's water supply is highly dependent on glacial melt, which occurs naturally during the spring and summer. The correspondingly lesser river flows in the winter lead to low hydropower output during that time, thus causing electricity shortages precisely when demand is highest as people turn to electricity for their sole source of heat. Most existing hydropower projects in Tajikistan are run-of-the-river, providing little storage capacity for off-season needs. Rebuilding the regional power trade could provide substantial and affordable relief for Tajikistan's winter power shortages.

The World Bank has identified three issues upon which the Government of Tajikistan should focus immediate attention: (1) reduce domestic demand through the implementation of an ambitious energy efficiency programs; (2) increase the existing domestic hydropower supply during the winter; and (3) increase energy imports to leverage surplus electricity supply in neighboring countries. An integrated package of policy reforms, trade promotion, and investments is needed. Measures to manage demand, switch fuels for winter heating, and reduce losses would be the most significant and immediate contributors to solving the problem, covering about 40 percent of the expected energy deficit in 2016.

An ambitious energy efficiency program should be broad-based, not only addressing the industrial sector buildings but also scaling up the power network loss reduction program and aligning electricity tariffs. Reducing energy losses in the Tajik power transmission and distribution networks is vital. Rehabilitation of the existing hydropower assets is similarly critical. Another method for increasing supply includes fast-tracking the implementation of the proposed thermal power plant and making it dual fired (coal and gas), starting out using low-cost coal with the goal of eventually switching over to natural gas. Gas would either be sourced locally (something that needs to be explored more thoroughly) or through the re-establishment of gas imports from Uzbekistan and Turkmenistan. Increasing the use of waste heat from industrial buildings to heat domestic buildings should also be considered.


This multifaceted plan would cost USD 3.4 billion over the next eight years, calling upon a broad range of international support and requiring the Tajik government to increase electricity prices and correspondingly develop a targeted social safety net to assist the most vulnerable electricity consumers.

The Central Asia Energy Water Development Program (CAEWDP) is a donor-supported technical assistance program with the objective of building energy and water security for the five countries of Central Asia and Afghanistan. Divided into three main objectives: energy development, energy-water linkages, and water productivity, the program balances national and regional activities, recognizing that both are necessary for effective regional dialogue and national prosperity.

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