

Low revenues and underdeveloped infrastructure are among various problems inscribed in Tajikistan's energy sector. The authorities are seeking to invest in hydroenergy, which, as believed, will pave the way towards reaching the status of regional energy exporter. The issue of unreliable energy supply inside the country, however, remains unsolved. Sher Khashimov, an independent researcher, attempts to elaborate on the nuances of given problematique and discusses possible ways out of Tajikistan's energy dilemma.

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Administrative building of Barqi Tojik in Dushanbe, Photo: Asia-Plus

Tajikistan's energy sector faces a dilemma today: The country's state-owned electricity monopoly, Barqi Tojik, is in desperate need of raising its electricity tariffs to collect the revenue necessary to reform the energy sector, but the population cannot afford paying

higher tariffs, in many ways because unreliable electricity supply results in economic loss and low incomes. The roots of Barqi Tojik's revenue problem lie in low electricity tariffs, poor collection rates, and significant transmission losses. The Tajik government is reluctant to act on infrastructural and institutional reforms of the energy sector it has committed itself to on paper. Instead, the government has been heavily investing in turning the country into an energy exporter to raise desperately needed revenue. In the process, the government is over-centralizing electricity generation and is making the country's energy sector more vulnerable to climate change. The article builds up to a recommendation for the government to improve the situation in the energy sector by 1) diversifying and decentralizing electricity generation, and 2) taking advantage of the dampening effects of regional integration on food prices inflation to gradually raise electricity tariffs to cost-recovery level.

The issue and its roots

Tajikistan desperately needs to reform its energy sector. In 2013, over 10 percent of Tajikistan's enterprises considered unreliable electricity supply as a major constraint to doing business in the country. These enterprises reported 6 electrical outages per month lasting 4 hours on average and resulting in losses equal to 4.4 percent of annual sales.^[1] In 2019, the share of local enterprises who considered unreliable electricity supply as a major constraint to doing business fell down to 8.4 percent, still significantly above the average of 3.8 percent across Europe and Central Asia.^[2] Tajikistan currently ranks 163rd among 190 countries in terms of ease of getting electricity^[3] and 107th among 141 countries for the quality of electricity supply.^[4] In 2014, the economic losses associated with unreliable electricity supply equaled to USD 200 million or 3 percent of the country's GDP^[5].

Solving these issues would require significant financial investment in infrastructure (USD 4 billion, according to the 2012 assessment by the Central Asia Regional Economic Cooperation Program) and institutional reforms.^[6] But the state-owned electricity monopoly, Barqi Tojik, is hardly positioned to make any investments. Barqi Tojik owns and operates most of the electricity generating plants and transmits, dispatches, and distributes electricity to all regions of Tajikistan, except for Gorno-Badakhshan Autonomous Oblast in the east of the country. Despite its monopoly, Barqi Tojik held a TJS 12.5 billion (~USD 1.2 billion) debt in 2019, which constitutes 80 percent of total state-owned enterprise debt to the Ministry of Finance. The roots of Barqi Tojik's debt lie in low electricity tariffs, poor collection rates, and significant transmission losses.

Electricity tariffs in Tajikistan historically have been among the lowest in the world (an average of USD 0.018/kWh for domestic consumers in 2017). The low price of electricity is a

rare windfall for the economically strained population of Tajikistan, where annual per capita incomes hover around USD 1,000. Increasing electricity prices, even for the sake of long-term improvements in quality of life, thus may be a decision with dire political consequences. Reworking the tariff structure to recover the cost of electricity supply, however, is a condition frequently attached to foreign grants, and the government has been forced to reluctantly raise the tariffs.

Despite the gradual reform of the tariff structure, the electricity tariffs, on average, are still barely above 50 percent of the cost-recovery level and don't reflect the annual increase in debt service costs. The low tariffs, even with minimal production costs, prevent Barqi Tojik from recovering its operating costs, repairing and replacing its equipment, or improving its infrastructural and institutional capacity. Additionally, low electricity prices disincentivize efficient electricity consumption by removing financial burden of wasting electricity off of consumers. Tajikistan could surely benefit from demand-side management measures: The Ministry of Energy and Industry of Tajikistan estimates that energy consumption efficiency could be improved by 30 percent; UNDP research finds that houses in rural areas of the country are poorly insulated and lose between 50 and 60 percent of the heat thus requiring more energy for heating.

Collection rate for billed electricity is only 85^[8] percent, below the 95 percent threshold for well-functioning energy utilities and with 10 percent of electricity sales not generating any revenue. Barqi Tojik's total electricity losses are estimated at 24^[9] percent of total annual electricity generation, twice above the accepted level of technical losses in power systems with similar configuration and age. These excessive technical losses are due to under-spending on network rehabilitation and upgrades of the system that was mostly constructed in the 1960-70s and hasn't undergone any major capital upgrade.

Energy exporter status and its drawbacks

Under the pressure from international donors, the Tajik government committed to slowly reform Barqi Tojik. The government has initiated optimization of the organizational structure of the utility by unbundling it into separate electricity generation, transmission, and distribution companies, and is gradually raising the electricity tariffs. Additional limited investments are being made into upgrading the country's transmission lines. But while agreeing to these reforms on paper, the Tajik government has been reluctant to act on them fully and has been diverting most of its efforts towards increasing its energy exports as a way out of its current revenue dilemma.

The chase after the energy exporter status is rooted in Tajikistan's Soviet history. During

the Soviet years, Tajikistan utilized the Central Asian Power System (CAPS) to export surplus energy to its regional neighbors in summer and import energy in winter. This arrangement fell apart with the fall of the Soviet Union; Tajikistan has been chasing the energy exporter status ever since in an attempt to remain relevant regionally and to collect desperately needed revenue. But Islam Karimov's Uzbekistan shut Tajikistan out from CAPS in 2009 over regional water resources dispute, preventing Tajikistan from trading energy with other regional players and cutting off Tajikistan's import routes with Russia.

After a nine-year interruption, Tajikistan and Uzbekistan restored energy trade in April 2018; during the summer that year, Tajikistan exported 1.5 billion kWh to Uzbekistan.^[11] The countries are drafting a treaty to allow Tajikistan to use Uzbekistan's power grid for regional energy trade and are amidst a USD 35 million project to strengthen the relay protection and synchronize Tajikistan and Uzbekistan electricity networks, effectively restoring the Soviet-era Central Asian Power System.^[12] Tajikistan is also a key partner in the USD 1 billion Central Asia South Asia (CASA) Electricity Transmission and Trade Project (CASA-1000), which, if finished, would allow Tajikistan to export electricity to Pakistan through Afghanistan starting from 2022.

Both the restoration of CAPS and the construction of CASA are connected to the cornerstone of Tajikistan's project to become the heart of regional energy trade - the 3,600 MW Rogun hydropower plant. The plant has been in the works since 1976, but the fall of the USSR, the following civil war, and post-Soviet era dispute with Uzbekistan derailed the progress of the project. The government of Tajikistan had spent the post-civil war years trying to rally international support to revive Rogun. In 2016, the government of Tajikistan finally restarted the construction of the hydropower plant which is supposed to double Tajikistan's current energy generation and to turn the country into a net energy exporter. Hardset on the goal of becoming a net energy exporter, the government is not put off by the price: At the cost of almost USD 4 billion^[13] and with most of the funds borrowed from international creditors, the Rogun hydropower plant is creating a budget hole half the size of Tajikistan's USD 7 billion annual GDP. Just in 2025-2027, Tajikistan will have to pay USD 200 million in loan repayments.^[14]



Opening ceremony of the second turbine of the Rogun hydroelectric plant, Photo: fb.com/khadamotimatbuot

Tying Tajikistan's energy future to Rogun, however, has major drawbacks besides the plant's cost. The Nurek hydropower plant alone generates around 70 percent of Tajikistan's annual electricity demand today. Once - or if - the Rogun hydropower plant is finished, over 90 percent of Tajikistan's electricity capacity will be concentrated in just two hydropower impoundment plants - plants that rely on large river-fed reservoirs. Such over-centralization and lack of diversification will exacerbate Tajikistan's vulnerability to climate change as the country is projected to lose half of its glaciers by 2050.^[15] Tajikistan historically depends on glacier-fed rivers for over 95 percent of its electricity generation.^[16] Gradual disappearance of glaciers will significantly reduce river flows and render large impoundment powerplants useless. The government already received its first warning: This past July, in the middle of the surplus season, the water level in the Nurek reservoir was 17 meters lower compared to last year because the water flow of the Vakhsh and Panj rivers that feed into the reservoir reduced by 50 percent.^[17] Tajikistan was forced to cut off electricity exports to Uzbekistan on July 16 and to Afghanistan on July 27.^[18]

Another downside of over-centralization of electricity generation is the necessity of long transmission lines vulnerable to transmission and distribution losses (already a big problem for Tajikistan), natural disasters, and terrorist attacks.^[19] An attack on an overly-centralized energy system and subsequent large-scale blackout is one of the scenarios the US government trains Central Asian governments to respond to during its annual Regional Cooperation on Emergency Response exercises.^[20] In its recent assessment of Tajikistan's energy sector, the World Bank warned that "the projected impacts from climate change make Tajikistan increasingly vulnerable to heavy precipitation, landslides, earthquakes, and floods" and urged to increase the resilience of the energy systems to anticipated adverse effects of climate change.^[21] GIZ stated in its recent climate change profile of the country that "extreme weather and climate risks in Tajikistan have led to frequent damages to [...] irrigation channels and electric lines"; the profile warns that climate change will result in more frequent and severe droughts and floods and will affect the hydropower generation plants.^[22]

Looking forward

The current summer electricity surplus - while climate change has not wiped it out - is important to Tajikistan's regional role and ability to generate revenue necessary for loan repayment and further energy reforms, but only in the short term. The ever-changing political and security situation in Afghanistan holds energy trade between Tajikistan and South Asia hostage and is currently threatening the implementation of CASA-1000.^[23] Any dispute with Uzbekistan could shut Tajikistan out of the Central Asian Power System again. The country's long-term energy future thus lies in internal revenue sources and climate change-proof energy infrastructure.

The re-opening of bilateral borders with Uzbekistan after the death of Islom Karimov has improved availability of food imports from Uzbekistan, Kazakhstan, and Russia. Availability of imports has led to a decline in the consumer price inflation from 7.3 percent in 2017 to 3.9 percent in 2018.^[24] The dampening effects from food inflation helped the government offset the recent increases in electricity tariffs.^[25] Once the Covid-19 situation in the region stabilizes and the inner-regional borders reopen fully again, the Tajik government must take advantage of the damping effects of imports availability on inflation to keep raising electricity tariffs to the cost-recovery level until Barqi Tojik breaks even.

Tajikistan must enhance its Long-Term Program for the Construction of Small Hydropower Plants. Small hydropower plants are far less cost-intensive and less vulnerable to seasonal fluctuations of hydropower because they do not require large impoundment reservoirs to function.^[26] Use of small hydropower plants would also allow to localize electricity

generation, improve access to electricity in remote mountain areas, and remove the need for long and vulnerable transmission lines. The Pamir Energy Company that provides electricity to Gorno-Badakhshan Autonomous Oblast in eastern Tajikistan could serve as a model for generation decentralization: The Aga Khan Fund for Economic Development-owned company constructed and currently operates ten medium and small HPPs across the region at a tiny fraction of the cost of a powerplant like Rogun.^[27]

The government of Tajikistan has repeatedly expressed an intent to increase the proportion of electricity generated by non-hydro renewable sources to 20 percent of the portfolio by 2030.^[28] The circumstances favoring such intent could not be better: Tajikistan is located both in the so-called global Sun Belt^[29] and next to China – the largest producer of solar photovoltaic panels in the world.^[30] The cost of solar energy is already lower than the cost of coal- or natural gas-produced energy and the storage technology, while far from ideal, is rapidly improving. Moreover, China is actively looking for export markets for its solar technology in the light of the souring relations with the United States.

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