

Transboundary Water and Energy Management

An Overview of USAID Activities in Central Asia



Development Challenge

Joint use of water and energy resources is a key issue among the Central Asian countries. The two largest rivers, the Amu Darya and Syr Darya, originate in the mountainous upstream countries of Kyrgyzstan and Tajikistan and flow through the arid plains of the downstream countries of Uzbekistan, Turkmenistan and Kazakhstan towards the Aral Sea. These downstream countries have considerable reserves of fossil fuel, whereas the upstream countries have large partly developed hydroelectric resources but limited fossil fuel reserves. Before independence, these differences were addressed through a centrally managed, integrated water and power system. Large storage reservoirs in the mountainous upstream countries provided water supply for irrigation in the downstream countries and generated hydropower. A regional high-voltage grid balanced the seasonal hydro energy with the output of thermal plants in the downstream countries. In return, the downstream countries supplied the fossil fuel needs of the upstream countries.

Since independence, there has been a sharp decline in the sharing of resources. The output of the combined heat and power plants in Kyrgyzstan and Tajikistan is now half of the pre-independence level due to reduced oil, coal and gas imports. Without fossil fuels to provide winter heating, consumers have switched to electricity, increasing the winter demand by over one hundred percent. The countries' economies are so depressed that energy tariffs cannot be raised to financially sound levels to purchase fuel and energy. Both countries also have major losses in their electricity distribution systems. As a result, Tajikistan and Kyrgyzstan experience severe shortages of winter energy.

To meet the high winter demand, the operational priority of Kyrgyzstan's Toktogul Reservoir was switched from irrigation to electricity generation, requiring major water releases during winter. The sharp increase in winter releases has caused a major environmental impact. The Lower Syr Darya does not have enough capacity in the winter to transport surplus flows to the Aral Sea. Since 1992, annual winter spills from the river into the desert have damaged land and infrastructure in Uzbekistan and deprived the Syr Darya Delta and the Northern Aral Sea of much-needed water. Winter releases also cause summer irrigation water shortages in the downstream countries resulting in significant potential for conflict between regions.

USAID's Response

USAID provided technical assistance to ministerial delegations at various meetings that led to the March 17, 1998 Framework Agreement between Kazakhstan, Kyrgyzstan and Uzbekistan on the Use of Water and Energy Resources of the Syr Darya Basin. Tajikistan became a party to this Agreement on June 19, 1998. Since 1999, the annually agreed water and energy exchanges have been implemented reasonably well. Fuel has been delivered to Kyrgyzstan as required, but unfortunately, these deliveries still fall short of what is needed. As a result, increasing depletion of the Toktogul Reservoir creates major risks for the millions of electricity consumers in Kyrgyzstan and farmers in Uzbekistan and Kazakhstan.

USAID's Transboundary Water and Energy Project supports an improved implementation of the 1998 Agreement. The approach is based on the adoption of fixed rules for operating Toktogul Reservoir and a simplified concept for managing the remainder of the Syr Darya Basin. A reservoir simulation model is being completed that will help decision-makers agree to fixed operating rules for Toktogul. The simulation model will then help the irrigation and energy operators make operational decisions on water releases. USAID is also helping the River Basin Organization with programs to predict the

irrigation season's total water resources and manage the Middle Syr Darya throughout the key summer irrigation season.

USAID is helping Kyrgyzstan reduce winter electricity demand by implementing an immediate loss reduction demonstration program including, regulatory recommendations, public outreach programs and demonstration projects for reducing technical and non-technical system losses. A 2002 study identified electrical losses at 40% to 47%. Pilot loss-reduction projects were designed and are now being implemented in Bishkek, Osh and Cholpon Ata.

USAID has assessed possible long-term structural solutions for the water and energy issues in the Syr Darya Basin. An initial assessment has been made of the proposed Kambarata 1 and 2 Hydropower Projects that are located upstream of the Toktogul Reservoir. The report concludes that further study of these projects is justified to refine designs and cost estimates, assess benefits and risks in more detail, and investigate possibilities for financing. The report is now being discussed with the main stakeholders in Kyrgyzstan, Kazakhstan and Uzbekistan.

USAID is supporting a planned Power Trade Relations Agreement between Uzbekistan and Tajikistan. The agreement is a precondition of a loan to be provided by Asian Development Bank (ADB) and European Bank for Reconstruction and Development (EBRD) to upgrade the electric transmission networks of the two countries. The agreement establishes a framework for bi-lateral power trading to reduce the combined electricity costs of the two countries by \$20 million a year in the near term. The potential long-term benefits are much larger, as the agreement specifies the conditions needed to develop a power pool in Central Asia.

Benefits

Establishing fixed operating rules for Toktogul Reservoir and the use of the decision support system for managing the Syr Darya will simplify and stabilize river management, reduce annual winter releases from the Toktogul dam in Uzbekistan, make more water available for the environmental needs of the Northern Aral Sea, and provide greater energy security to Kyrgyzstan and water security to Uzbekistan and Kazakhstan.

Implementation of the electrical loss reduction projects will demonstrate the ability to decrease energy losses from the present level of over 40% to no more than 20%. Comparable technical losses in efficient electrical systems vary between 10 and 13 percent. Associated training, regulatory and public awareness campaigns will make the demonstration projects replicable throughout the Kyrgyz energy system.

The initial assessment of Kambarata 1 shows that construction of this dam would resolve the conflict between irrigation and environmental needs of the downstream countries and the energy needs of Kyrgyzstan. The assessment also shows that completion of the Kambarata 2 dam would add to Kyrgyzstan's summer electricity surplus which could be exchanged for fuel imports or hard currency. The assessment has already led to the World Bank's active involvement in discussions to develop these projects.

Contact Information

http://www.usaid.gov/regions/europe_eurasia/car/index.html

Mission Director: George Deikun
Deputy Mission Director: Mike Fritz
Phone: 011-7-3272-50-76-12

USAID/Central Asia Region
Park Place Building
41 Kazibek Bi St. B Wing
Almaty, Kazakhstan 480100

Central Asia Desk Officers: Tim Alexander
& Claire Ehmann
Phone: 202-712-1669

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