Modernizing irrigation conduits with hydropower generation

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Abstract

Modernizing irrigation systems is a win-win opportunity to jumpstart the United States' water conservation efforts and generate consistent renewable energy. Improving irrigation conduits can improve efficiency and reliability of water supply to Americas farms, generate renewable energy with in-conduit hydropower turbines, and create resilient rural electrical grids.

Information in this report was collected through review of public documents from United States federal agencies including the Departments of Energy and Agriculture and interviews with irrigation district managers and experts in irrigation modernization research, planning, and engineering. The findings show that additional investment in irrigation systems can strengthen agricultural resilience to the effects of climate change, while generating revenue from hydropower to reinvest in the watershed.

The biggest barrier to expansive irrigation infrastructure overhaul is a recent, sharp decline in the power purchase rate for renewable energy. Irrigation districts historically could finance some costs of modernization with revenue generated by hydropower production; now, the price per kilowatt hour (kWh) has fallen too low to provide meaningful contribution toward satisfying modernization costs. However, when aggregated along thousands of miles of irrigation canals, the benefits from irrigation modernization have critical importance.

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