



Powering Electronic Instruments on a Rotating Shaft

Launch: Summer 2018

Problem Statement: The Bureau of Reclamation is the second largest hydropower producer in the nation, operating 53 powerplants across the western United States. Reclamation's generation capacity is 14,730 megawatts, producing over 40 billion kilowatt-hours of electricity annually.

Reclamation's hydropower generating units are expected to safely and reliably produce the power that is delivered to the western electric grid. Equipment monitoring via electronic instruments on the generator shaft provide a critical advancement toward keeping these units operational and reducing costly outages. However, the monitoring equipment requires a continuous power source in order to keep it online and performing its key role. New power source solutions are needed to permanently install low power instruments on the generator's rotating shaft to collect continuous data pertinent to operation and performance of the machine.

The solution we seek: Reclamation and its collaborators seek novel methods and technologies to reliably provide direct current power for loads of up to twenty watts to instruments on rotating shafts. Proposed solutions must be applicable to rotating shafts that are 18- to 144-inch diameter, whether at rated speed (72 to 550 revolutions per minute), standstill, or when ramping up or down. Small, lightweight solutions are preferred, and could be achieved via multiple methods, including air movement, light, vibration, magnetic induction, kinetic motion, or wireless energy transfer.

Solutions could be applicable to other industries that are undergoing advancement in instrumentation and monitoring on their respective rotating shafts, including automotive, aviation, and manufacturing industries.

Prize Competition Scope: A two-phase prize competition is envisioned, with Phase 1 consisting of white paper submissions to find the most promising theoretical solutions. Reclamation will fund a \$50,000 prize purse to be split among eligible solvers. Selected Solvers from Phase 1 will be request to submit a prototype device for Phase 2 laboratory evaluation. The prize purse for Phase 2 will be \$200,000, and Reclamation plans to invite commercialization partners to seek potential business opportunities with participants.

Collaborators:

RECLAMATION
Managing Water in the West



Learn more at: <https://www.usbr.gov/research/challenges/shaft-power.html>