OAK RIDGE NATIONAL LABORATORY

Tapping Municipal and Industrial Water Systems for New Sources of Energy

Conduit hydropower generates electricity from the pressure and flow of water within existing public water supply (PWS) systems and other pipes and canals offering a significant yet underutilized opportunity to enhance distributed energy generation. The turbine is placed where excess water pressure exists within a system. In many cases, the location of a pressure-reducing valve offers an ideal spot for it, generating electricity with the energy that would otherwise be dissipated by the valve. The electricity produced can be used to offset the facility's power usage or sold.

Conduit hydropower installations generally have less than 10 megawatts (MW) of capacity, which categorizes them as small- or micro-scale hydropower projects.

However, a 2022 study by Oak Ridge National Laboratory (ORNL) estimated that all told 1,414 MW of unused conduit hydropower potential exists across the United States, enough to power roughly 1 million homes. The largest portion of conduit hydropower potential was found in the agricultural sector (662 MW), followed by the industrial (378 MW) and municipal (374 MW) sectors.

1 Million
Number of U.S. homes that could be powered by this untapped resource

8,700+
Number of public water systems in U.S. with conduit hydropower potential

169,000+
Data points collected for preliminary industrial manufacturing hydropower



Link to 2022 paper

OAK RIDGE National Laboratory

U.S. DEPARTMENT of ENERGY

25-G05913

Rapid regulatory review: A shortened, 45-day period

Because conduit hydropower leverages existing infrastructure, it typically has far fewer environmental impacts than traditional, large-scale hydropower dams. In recognition of its low impact and considerable potential benefits, Congress created a simplified, 45-day federal regulatory approval process for conduit hydropower projects through the Hydropower Regulatory Efficiency Act of 2013. However, additional challenges exist, particularly related to financing, power sales, site selection and feasibility assessment. ORNL is addressing these issues through the CHEETA project.

The CHEETA Approach

ORNL's Conduit Hydropower Engineering, Evaluation, and Technology Acceleration (CHEETA) project dedicates federal research and development efforts to improve deployment of conduit hydropower for municipal and industrial water systems by:

- Increasing awareness of this technology and reaching out to stakeholders to define challenges, identify lessons learned, and assess resources needed to make conduit hydropower projects successful
- Centralizing resources through the creation of a digital platform that can serve as a hub for information, resources, and networking for possible stakeholders involved in conduit hydropower
- Supporting deployment by developing new resources for assessing the technical and economic feasibility of conduit hydropower

Find Out More

If you are interested in this technology application and would like to connect with our research staff, please email Principal Investigator Scott DeNeale at **denealest@ornl.gov** or **hydropower@ornl.gov**. We would be happy to follow up with you. The team will also be discussing our research through webinars and conference presentations.



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