Tiny Turbine Developers Energized by Hydro Law

By Bobby Magill

- Miniature hydropower expected to turn irrigation canals, city water plants into renewable electricity generators
- Congress eased permitting requirements for hydropower turbines placed in pipes and canals

Hydropower’s equivalent of rooftop solar could be spinning up more electricity in irrigation ditches, water pipes, and treatment plants thanks to a congressional boost and companies ready to sell tiny turbines.

Generating electricity from small hydropower turbines inside water pipes—called “conduit” hydro—allows landowners and water system operators to generate electricity behind the meter as a “distributed” form of renewable energy. Congress threw more support behind conduit hydro development in October when President Donald Trump signed a water infrastructure law (S. 3021) easing federal permitting requirements for projects of up to 40 megawatts.

“The growth size of that market is really big,” Ryan Cook, director of hydropower development for Ohio-based Rickly Hydrological, told Bloomberg Environment. “We’re seeing some pretty rapid doubling, but it’s still sub-scale.”

Clean Kilowatts

Miniature hydropower projects have the potential to use renewable energy to shift municipal water treatment plants and farm irrigation operations away from fossil fuels.

No comprehensive analysis of conduit hydropower generating potential has been completed for the U.S., but the Energy Department said in a 2016 report that it could be around 2,000 megawatts nationwide, roughly the same generating capacity as Hoover Dam.

Even though the amount of electricity conduit hydro can produce is small, “In a world where you need to extract every clean kilowatt you can for carbon reduction, it’s nice to know there may be 1,000 to 2,000 megawatts of carbon-free energy” available for development, Kurt Johnson, CEO of the Colorado-based hydropower consultancy Telluride Energy and president of the Colorado Small Hydro Association, told Bloomberg Environment.

Today about 1 percent of U.S. hydropower is generated using conduits, with just over 800 megawatts installed nationwide, according to Oak Ridge National Laboratory data.

But conduit hydropower investors are more bullish on its growth potential.
“The aggregated small hydropower generating potential may rival every other renewable source,” Michael Prendergast, founder of Colorado-based small hydro investment company Infinite Peaks Holdings, told Bloomberg Environment.

Small Turbines, Big Growth

Small hydro, including dams that haven't yet been fitted with hydropower generators, is growing in the U.S., but conduit hydropower is growing the most, Lindsay George, a Colorado-based consultant, told Bloomberg Environment.

About 7.4 percent of all electricity in the U.S. comes from hydropower.

The National Hydropower Association considers conduit hydropower growth potential “huge” in the U.S., where turbines can produce renewable energy with very low environmental risk because no dams or reservoirs need to be built, spokesman LeRoy Coleman told Bloomberg Environment.

Johnson, who is working with Oak Ridge National Laboratory to study the U.S. conduit hydropower potential, said the nation's 55,000 water treatment plants have the potential to be transformed into power generators.

“It's zero-environmental-impact clean energy because it's generated entirely using water that has already been diverted from an existing natural waterway. In many cases, you're talking about building systems inside existing buildings,” Johnson said.

American Rivers, which opposes hydropower development that it considers harmful to rivers, said it supported the new water infrastructure law when it passed in October.

Local Interest

Though Congress has allowed larger conduit hydropower turbines to be installed with reduced permitting requirements, developers said the greatest interest in conduit hydro today is from local governments interested in installing the smallest hydropower turbines in their water systems.

George said she hasn't yet seen much interest in installing larger conduit hydro turbines, given there aren't many canals that can accommodate them.

But she said little public outreach has been done about the new water infrastructure law, so there isn't much awareness about the opportunities it presents for conduit hydro development.

Building hydropower of any size has traditionally been fraught with funding and technology hurdles, Prendergast said. Conduit hydropower can grow if developers promote it by offering landowners turbine technology, installation, and financing in a single package, he said.

“We believe this approach combined with the effects of the bill will open up hundreds of new sites to hydropower generation and generate recurring revenue streams with reduced financial risk,” Prendergast said.