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## A revolution in hydropower makes waves in rural Colorado

*Big dams were the hydro giants of yesteryear. The future of hydropower is small.*

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**Carl Segerstrom** | ANALYSIS | May 11, 2018

*This story is a part of the ongoing [Back 40 series](https://www.hcn.org/topics/back40) (<https://www.hcn.org/topics/back40>), where HCN reporters look at national trends and their impacts close to home.*

On the Western Slope of the Colorado Rockies, winter opens the door to spring as fruit tree buds flit away and green shoots emerge from their slumber — that fish-dark sound of slow-moving water returns to the hillsides. Moving water is how the arid West has been brought to bear fruit. Now people are eyeing the irrigation works of the past as clean electricity sources for the future.

Around three thousand years ago the San Pedro people brought water from nearby streams to maize fields near modern-day Tucson, Arizona. As waves of European settlers pushed west they introduced different technologies to irrigate the thirsty land. Beginning in 1909, canal projects in the Uncompahgre Valley, of southwest Colorado, moved water from the mighty Rockies, greening the arid lands below. For a century these canals made agriculture possible in the high desert. But only in the last five years have they started to bring electricity to the communities of Delta and Montrose.

The big hydroelectric dams of the 20<sup>th</sup> century put the rivers of the West under their imposing concrete thumbs, but their unintended consequences have water managers and entrepreneurs thinking the future of hydroelectric power is small. Advances in technology, federal reforms and Colorado's ideal geography and friendly policies are paving the way for a new wave of small hydropower projects in the state that could be the template for a new generation of hydroelectric power.

## [GALLERY]

In Montrose, Colorado, in the shadows of the Elk and San Juan mountain ranges, five small hydroelectric facilities are now incorporated into a canal system that delivers water to more than 83,000 acres of farmland for the Uncompahgre Valley Water Users Association. The hydroelectric generators combine a diversion from the canal with metal gates and a large metal pipe that carries water into what from the outside looks like an average metal storage shed. Inside the shed the deafening drone of the turbine equipment hums along during the seven months of the year when water moves through these irrigation canals.

One of the major selling points of this technology is that it takes advantage of the power generating potential of water that is already moving through man-made infrastructure. “It’s the same amount of water as if (the turbines) weren’t there,” says Steve Anderson, who was born about 30 miles from Montrose and is following in his father’s footsteps as the manager of the UVWUA. Anderson, who is in his sixties, wears overalls, a long-sleeved maroon shirt and a black baseball hat and “loves showing off our hydros.” He says that if for some reason the hydroelectric facilities stopped working, it wouldn’t affect the delivery of irrigation water that the surrounding communities depend on. For the stakeholders in the irrigation association, the projects have become a source of income without any sacrifice of water delivery.

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Projects like the hydroelectric facilities in Montrose are popping up across the West — in part thanks to a lobbying effort by hydroelectric interests and the advocacy group American Rivers. These groups came together in support of a 2013 bill, the Hydropower Regulatory Efficiency Act, which passed the house by a unanimous vote and was signed into law by President Barack Obama. The bill encourages new projects by lessening the regulatory and permitting hurdles for hydroelectric installations. In the past small projects like these were subject to a lengthy Federal Energy Regulatory Commission permitting process that, according to small hydro advocate Kurt Johnson, could be more expensive than the hydroelectric hardware itself. He says the new law is a “game changing improvement” for developing these projects on private water infrastructure.

The Montrose hydroelectric facilities, which are part of a Bureau of Reclamation water system, have different permitting requirements. Anderson says that the permits for their hydro projects went through in about two months and were a simple process because they only affect man-made infrastructure.

Small hydroelectric installations, like the ones in Montrose, hit a sweet spot for water managers and conservationists. These so-called conduit hydropower projects don't inherently disrupt natural river systems and instead use existing off-stream infrastructure. Conduit hydropower can take different forms, from diversion and turbine systems on irrigation canals to micro-hydro installations that are inserted in the place of pressure-reducing valves, which are a necessary and ubiquitous component of water delivery and treatment infrastructure. Kelly Catlett, with the advocacy group Hydropower Reform Coalition, says that from an ecosystem and watershed health standpoint the only real worries are making sure that diversion points from rivers have proper fish screens and that new conduit hydropower projects aren't used to justify larger diversions of water. Catlett says that as long as those issues are addressed, "this is one area a lot of us can agree on and be supportive of."

But not all of the small hydro projects promoted by the 2013 law hit this sweet spot, because the law also allows the electrification of on-stream dams that don't already have turbines. American Rivers, which lobbied for the bill but also promotes the removal of some dams, got pushback in the conservation community for supporting the bill. Matt Rice, the program director for American Rivers in the Colorado Basin, says updating old dams and adding energy producing turbines can ultimately help improve ecosystem conditions like dissolved oxygen and stream flow, and in some cases prevent the building of additional dams on free-flowing rivers. Other river advocates see the powering of unpowered dams as a potential roadblock to restoration. Eric Wesselman, the executive director of the California-based advocacy group Friends of the River, says he's concerned about expedited reviews of small hydropower projects because "the influence of power production could delay dam removal in the future."

The combination of extensive irrigation works, mountainous terrain and friendly state policies make Colorado an epicenter for the growth of small hydroelectric projects in the United States. The state is second only to California in small hydro installations and is pushing to expand in the future. Colorado Energy Office analyst Samantha Reifer says that the state is promoting small hydro projects through a combination of outreach, assistance with navigating regulatory barriers and low-interest finance programs.

“Hydropower isn’t people’s first idea because in the past it’s been giant dams,” Reifer says. “We are working to raise awareness that this is an opportunity on existing water infrastructure.”

Kurt Johnson has been at the forefront of lobbying for regulatory reform, advising Colorado on hydropower policies, and facilitating small hydropower projects as the president of the Colorado Small Hydro Association and CEO of Telluride Energy. He foresees the future of hydropower being in smaller installations more akin to rooftop solar than the large dams of the past. “It’s a political slam dunk because the industry and the environment are hand-in-hand,” Johnson says.

Small hydropower is not a silver bullet to sate our energy appetite. But in places like Montrose and Delta counties it is already playing an important role. The five hydropower projects of the UVWUA are generating about half a million dollars of annual profit for the water users association, which it uses to keep rates low and reinvest in improving water infrastructure. The facilities, which the association is eyeing to add to in the future, account for about 13 percent of the power used by the roughly 70,000 people served by the Delta-Montrose Electric Association. “An old cowboy once told me every blade of grass is important,” Anderson says. “Well, every electron is, too.”

*Carl Segerstrom is an editorial intern at High Country News.*

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