

Oregon Department of Energy

Saving Energy Saves Everything



Deschutes County hydroelectric plant generates income—offsets costs

Hydropower dominates Oregon’s electricity portfolio, providing up to 41 percent of the state’s power needs.

Most of Oregon’s hydropower comes from large hydroelectric dams with new growth in this sector to include small-scale projects for irrigation systems.

Irrigation districts are leading the way on building and operating low-impact hydropower developments, which can help a district offset system maintenance expenses and create revenue with a limited environmental footprint.

One leader is the [Central Oregon Irrigation District](#), which is comprised of two successful low-impact hydroelectric developments located outside of Bend. Established in 1918, the district offers industrial and agricultural water to nearly 45,000 acres and 7,000 customers in Deschutes, Crook and Jefferson counties. Pacific Power, which serves the three counties, purchases some of its electricity from the district as a part of its renewable energy portfolio.

The district’s Siphon Power plant, built in 1987, began operating in 1989 and produces, at capacity, a little over five megawatts of electricity. The newest project,

Juniper Ridge, built in 2009 and operational since late 2010, produces slightly over three megawatts of electricity with a capacity of 5 megawatts.

Both projects have created economic benefits for the district and together generate \$700,000 in annual revenue. The Juniper Ridge facility alone earns \$100,000 in yearly revenue with proceeds expected to increase to \$1 million annually after the project is debt-free in about 16 years.

“The ability to bring an additional revenue stream separate from assessing customers provides the district greater financial stability,” says Steve Johnson, district manager.

Johnson explains that establishing hydropower facilities—off channel—in the canals, behind fish screens, have limited additional impact on the environment. And that an irrigation district should strongly consider evaluating their irrigation canals for hydropower generation opportunities, particularly if the district already has certified fish screens on its diversions. Piping the canals to enhance power generation conserves water through reduced

evaporation and can return more water in-stream to benefit habitat and enhance water quality.

The district can serve the needs of its customers without diverting as much water from rivers. In fact, the pipeline constructed for the Juniper Ridge hydropower plant conserved nearly 19.6 cubic feet per second (cfs) of water that will be placed in-stream for the Deschutes River restoration.

Juniper Ridge Financial Analysis

The operating expense to maintain a low-impact hydropower plant is minimal once properly constructed, because the plant can operate for many decades without major problems.



The Juniper Ridge facility opened in September 2010

“These plants have a long lifespan and can operate up to 50 years without a major overhaul,” Johnson says.

The Juniper Ridge facility cost a little over \$24 million to build and the Oregon Department of Energy’s Small-scale Energy Loan Program (SELP) provided \$17 million of the financing. According to Johnson, state financing was critical for building the project, and without it, building the facility would not have been possible. The Central Oregon Irrigation District also invested over \$2 million. Other financial programs included the Business Energy Tax Credit pass-through option and grants from the Energy Trust of Oregon, Department of Environmental Quality and Portland General Electric’s Pelton Dam Fund.

Johnson noted SELP’s advantageous interest rates, but made it a point to explain that it also took in-depth research to solidify a site and to determine a realistic

project with realistic goals. “Without a concrete project proposal that includes construction assumptions, costs and time constraints, no one will touch you (lenders and/or contractors),” says Johnson.

The irrigation district leadership structured the project under an EPC—Engineering, Procurement & Construction—model where a single contractor takes responsibility for all three areas. The EPC contractor carries the project risk for the schedule as well as the budget in return for a fixed price. This limits cost overruns and change orders for the project and the contractor basically turns over the keys to a fully functional facility at project completion.

Prior to being built, the Juniper Ridge project underwent a review by the [Federal Energy Regulatory Commission](#) through a conduit exemption process, which, according to Johnson, was not as onerous or expensive as a full FERC licensing process. Once the project application was submitted, the FERC project order required up to six months for approval.

Largely the project received broad support from community members. Economic benefits extend beyond the district, including construction jobs for building the project.

“A locally-owned hydroelectricity facility keeps electric rate dollars local, provides irrigation districts long term financial stability which helps agriculture stay viable,” Johnson says.

Currently the district is exploring the possibility of building six additional plants near Bend and Redmond with the help of a \$36,000 grant funded from the Oregon Department of Energy’s Community Renewable Energy Feasibility Fund.

About the State Energy Loan Program

The purpose of the Small-scale Energy Loan Program (SELP) is to promote energy conservation and renewable energy resource development. For information, visit ODOE at Oregon.gov/ENERGY/LOANS/index.shtml

Interview with Steve Johnson, district manager, Central Oregon Irrigation District and article by Sylvia McDaniel, ODOE Public Affairs and Outreach