



Our Energy Future

Don't ignore the potential of hydropower

By Tim Culbertson



Editor's note: Tim Culbertson, general manager for the Grant County Public Utility District, recently testified before the House Subcommittee on Water and Power about the potential of hydropower to provide clean, renewable energy into the future.

Grant PUD operates two hydroelectric dams on the Columbia River – Priest Rapids Dam and Wanapum Dam – which make up the Priest Rapids Project. The PUD also helped establish two small hydroelectric projects in conjunction with local irrigation districts.

Below are excerpts from Culbertson's testimony before the congressional subcommittee on June 12:

My message today is simple – there is tremendous untapped, emissions-free hydro electric generation potential in the U.S.

Too often, hydropower is overlooked or taken for granted. This is an unfortunate oversight because hydropower – which does not generate any greenhouse gas emissions – is a domestic resource that deserves more attention as part of the nation's renewable energy supply.

In 1901, Congress passed the first Water Power Act, enabling hydropower to make extraordinary contributions to our nation's economy and security. With congressional assistance, hydropower capacity in the United States tripled between 1920 and 1940.

Today, hydropower is the largest renewable resource in the United States – and there is more hydropower that can be readily obtained.

Existing hydropower generation in the U.S. totals 289 million megawatt hours, which represents approximately seven percent of the net energy generation in the U.S. Domestic hydropower equates to over 190 million tons of avoided greenhouse gas emissions in the U.S. per year.

According to a March 2007 report released by the Electric Power Research Institute, there are 90,000 megawatts of untapped water power generation potential in the U.S. This could produce enough energy to serve the needs of 22 cities the size of Washington, D.C., and equates to over 250 million tons of potential reductions in greenhouse gas emissions per year that is unrealized in the U.S.

By the year 2025, EPRI reports that the U.S. has the potential to develop 10,000 megawatts (or 11 percent of the total above) from new small hydro, capacity gains at existing hydro sites and new generating facilities at existing dams.

Let me repeat: 10,000 megawatts of clean, renewable hydropower without building a single large new dam. This is enough renewable energy to serve Washington, D.C., Baltimore, and Richmond, Va., and represents over 29 million tons of potential avoided greenhouse gas emissions per year.

Building a sustainable U.S. energy future will require the use of all climate-friendly technologies currently available, as well as new and advanced hydropower technologies.

Adding hydropower capacity has the dual benefit of providing significant and much needed “firming” support for other clean, renewable resources.

For example, as the U.S. increases the amount of renewable resources in its

overall portfolio, hydropower is one of the few baseload, climate-friendly generating resources well suited to “firming” intermittent or non-dispatchable resources such as wind. [Baseload is the demand on a utility system that remains at a nearly steady level.]

Firm power is energy that is guaranteed to be there when you need it. As the development of wind, solar and other intermittent resources grows, hydropower is the perfect partner to “firm” and “shape” those resources because it can respond immediately to fluctuating electricity demand.

In addition, today's hydro turbines convert over 90 percent of available energy into electricity, making it one of the most efficient forms of power generation. Without reliable, efficient and climate-friendly baseload “firming” resources such as hydropower, the value of intermittent or non-dispatchable resources is greatly reduced.

Keeping our nation's hydropower resources operating while also meeting today's important environmental standards represents a significant investment by utilities and consumers.

For example, according to the “Sixth Annual Report to the Northwest Governors on Expenditures of the Bonneville Power Administration” by the Northwest Power and Conservation Council, consumers in the Pacific Northwest have invested approximately \$9 billion through 2006 on fish and wildlife recovery efforts since the passage of the Northwest Power Act in 1980.

For our part, Grant PUD – in collaboration with tribes, federal and state fish agencies and environmental interests – has met or exceeded the 93 percent fish passage survival standard for spring chinook salmon

at our two-dam Priest Rapids Project on the mid-Columbia River.

In April 2008, the Federal Energy Regulatory Commission (FERC) unanimously

approved a new 44-year license to Grant PUD to operate the Priest Rapids Project. Grant PUD's new license for the Priest Rapids Project is proof of the potential gains available at existing dams across the country. Our capacity is increasing from 1,755 megawatts under the old license to 1,893 megawatts with turbine replacements at Wanapum Dam – an increase of 138 megawatts. These capacity and efficiency improvements ensure that more than 1,000 average megawatts of clean, renewable hydropower – along with substantial new natural resource protection measures – continues for many years into the future.

As described in the EPRI report, 10,000 megawatts of untapped small hydro, capacity gains from existing facilities and new generation facilities at existing dams can be achieved by the year 2025. However, that will require aggressive congressional support and expansion of economic incentives, such as the Production Tax Credit and Clean Renewable Energy Bonds program, to include all hydropower resources and new, advanced technologies.

In addition, federal funding is almost non-existent for the Department of Energy's Hydropower & Waterpower R&D Program. This program received a mere \$10 million in 2008. At a minimum, \$54 million is needed in FY 2009. This amount corresponds to the research, development

and deployment needs and opportunities identified in the EPRI report.


For our part, Grant PUD has already begun to optimize existing water resources with more efficient hydro generating equipment. At Wanapum Dam, we are installing new advanced hydropower turbines – which show a three percent efficiency increase and improved fish protection. All ten turbines at Wanapum Dam will be replaced with new, advanced hydro turbines by the year 2014, and at a cost of \$150 million...

Continued and additional federal support, in partnership with industry, is critical to expand the development of untapped, renewable hydropower resources and technologies.

By the way, new technologies also include new environmental technologies, which can translate into more energy output from the same amount of water flow. For example, Grant PUD just completed installation of a

\$35 million fish bypass system at Wanapum Dam to improve survival for downstream migrating salmon. Better fish passage technologies allow dam operators to potentially reduce non-generating "spill" through a project. As a result, more renewable energy can be generated using the same amount of water. We can increase both fish protection and renewable hydropower generation.

The bottom line: reducing emissions will require federal partnership and support for the rapid deployment of this substantial untapped, renewable, emissions-free resource. Hydropower can be part of the domestic energy solution and is one of the few baseload, renewable energy sources in the U.S. that is both emissions-free and can "firm" intermittent or non-dispatchable energy, such as wind.

Working together, we can realize hydropower's potential, increase our nation's domestic clean energy portfolio and reduce our electric sector emissions by nearly 10 percent. 

To learn more about the Grant County PUD hydroelectric operations, go to www.gcpud.org.

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The Potholes East Canal Headworks Project, operated by Grant PUD since 1990, generates 6.5 megawatts of power using water flow in the irrigation canal.