Northwest Power and Conservation Council

September 29, 2010

MEMORANDUM

TO: Council Members

FROM: Terry Morlan
Director, Power Planning

SUBJECT: Presentation on New Sustainable Hydro Power

Andrew Munro, Grant PUD Director of Public Affairs and President of the National Hydropower Association, and Jessica Matlock, Government Relations Director for Snohomish PUD, will discuss "New Sustainable Hydro Power" development and potential. Denny Rohr will introduce their presentation.

Three attachments provide background information on the presentation. The first is a summary of the presentation. The second is a short summary of hydropower potential and the third is a news article by Mark Garner and Tim Culbertson from *Roll Call.*

This presentation is a good follow-up to our tour of small hydro projects in Bend, and for further Council investigation of new hydropower development potential.

Attachments

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Presentation: New Sustainable Hydropower = 1.4 Million American Jobs by 2025

According to a new study from Navigant Consulting, America's hydropower industry has the potential to create over 1.4 million jobs* between now and 2025. These are good paying engineering, manufacturing, construction and operations jobs that could revitalize communities. The hydropower industry has the potential to create jobs in every state, building a 21st century clean energy infrastructure.

*Jobs: Idaho = 35,443

Montana = 28,195

Oregon = 115,612

Washington =218,381

Hydro's Current Strengths:

- 7% of U.S. electricity generation
- Employs 300,000 family-supporting American jobs
- Avoids 225 million metric tons of CO2 annually

Hydro's Potential:

- Theoretical potential of 400,000+ MW
- 60,000 MW of new capacity by 2025
- 1.4 million family supporting American jobs by 2025

Today, U.S. hydropower capacity is 96,000 megawatts (MW). The industry has a goal to double its contribution to our national renewable energy portfolio. This growth in capacity will be made possible by new technologies and other advancements.

- Pumped Storage: The largest utility-scale energy storage option in wide use today. It can provide grid reliability benefits, support balance between supply and demand, and enable greater use of variable energy such as solar and wind.
- Converting Non-Hydropower Dams: Just 3 percent of the nation's 80,000 dams generate electricity. By adding renewable generation to these dams, we can help meet our growing clean energy needs.

- New Capacity and Modernization: By modernizing turbines and generators at existing hydroelectric facilities and adding new capacity, we can maximize our existing renewable energy generation.

- New Small, Low-Impact Hydro: Run-of-river systems, which do not require large storage reservoirs, can be used and have minimal effect on the natural environment and are carbon-free producers of electricity.

- Hydrokinetic Technologies:

    - In-Stream Generation: By harnessing the power of moving currents, these "underwater windmills" and other technologies represent a promising new hydropower development.

    - Ocean and Tidal Power: By harnessing the natural movement of waves and tides, these technologies have incredible generation potential

- Constructed Waterways: Utilizing both conventional and hydrokinetic technologies in irrigation canals and other constructed waterways can add carbon-free electricity to the grid.

HYDRO WORKS FOR AMERICA

NHA
National Hydropower Association

Hydropower: For a Clean Energy Future

Hydropower is a sustainable-energy solution that America needs. Clean hydropower is essential to addressing our nation's greatest challenges: achieving energy independence, creating jobs, and combating climate change.

Leading U.S. Renewable Resource

Available in every region of the country, hydropower is America's largest source of clean, renewable electricity, accounting for 67 percent of domestic renewable generation and 7 percent of total electricity generation. It is a reliable, proven, and domestic technology that can expand in environmentally friendly ways.

Stable, Reliable Electricity

In addition to clean electricity production, hydropower serves an essential purpose: Stabilizing America's electric grid. Hydropower can adjust output rapidly, to serve real-time electricity demand. Hydro's "black start" capabilities helped restore power after the 1965, 1977, and 2003 blackouts.

Hydropower also enables the integration of more variable renewable energy resources, like solar and wind, onto the electric grid as in Europe.

Climate-Friendly Energy

Current, U.S. hydropower generation annually avoids 225 million metric tons of carbon emissions, equivalent to the output of approximately 42 million passenger cars.

Hydropower's positive impact has been documented through satellite imagery showing that the Pacific Northwest – the country's most hydro-intensive region – is an "island" of low-carbon emissions in the United States.

Hydropower is a renewable, affordable, and domestic electricity resource for American families and businesses.

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Hydropower = 1.4 million jobs

According to a study from Navigant Consulting, America's hydropower industry has the potential to create over 1.4 million cumulative jobs by 2025. These are good-paying engineering, manufacturing, construction, and operations jobs that could revitalize American communities. With the right federal policies, the hydropower industry has the potential to create jobs in every state, building a 21st century clean energy infrastructure.

President Barack Obama, shown touring Voith Hydro's York, PA, manufacturing facility with CEO Mark Garner during the 2008 campaign, has called on hydro and other renewables to double.

Hydro Can Double

Today the U.S. hydropower capacity is 96,000 megawatts (MW). The industry has a goal to double its contribution to our national energy portfolio. This growth in capacity will be made possible by new technologies and other advancements:

- **Pumped Storage:** The largest utility-scale energy storage option in wide use today, this clean energy solution provides grid reliability benefits, is vital to maintaining the balance between supply and demand, and enables the greater use of variable renewable sources like solar and wind.
- **Converting Non-Powered Dams**: Less than 3% of the country's 80,000 dams generate electricity. By adding generation to these dams, we can help meet our growing power needs.
- **New Capacity and Modernization:** By modernizing turbines at existing hydroelectric facilities and adding new capacity, we can maximize our renewable-energy generation with these readily-deployable projects.
- **Hydrokinetic Technologies:**
  - In-stream Generation: By harnessing the power of moving currents, these "underwater windmills" and other technologies represent a promising new hydropower development.
  - Ocean and Tidal Power: These technologies, which use the natural movement of waves and tides, have incredible generation potential.

Wanted: The Right Policies for Growth

For America's hydropower industry to grow, create jobs, and reduce emissions, we need the right policies to create certainty and unleash the power of the private market:

- **Strong Renewable Electricity Standard:** A meaningful standard that grows the renewable electricity industry, keeps jobs in the U.S., and attracts long-term investment.
- **Tax Credit Parity:** Playing such a vital role in America's renewable electricity future, hydropower should receive tax treatment on par with other renewable technologies (i.e. hydropower currently receives only one-half the value of the production tax credit).
- **Tax Credit Extension:** For qualifying hydroelectric technologies, production and investment tax credits should be extended to 2019 and new tax incentives are needed for pumped storage.
- **More Efficient Regulatory Process:** For minimal impact projects, such as converting existing non-powered dams and closed-looped pumped storage projects, the regulatory process takes years to complete. Expediting the process will help developers attract financing, putting hydro on equal footing with other renewable and clean energy resources in the marketplace for investment.

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Garner & Culbertson: No Clean Energy Future Without Hydro

April 26, 2010, 12:55 p.m.
By Mark Garner and Tim Culbertson
Special to Roll Call

As the Senate prepares to debate climate and energy legislation in earnest, it's very clear what our priority must be: passing a bill that's effective at creating jobs and reducing emissions. An ideal policy would tap into new energy technologies and renewable sources like wind and solar, while also exploring new, sustainable ways to develop more traditional sources.

But there's one largely overlooked solution, a major generator of clean energy that was dubbed "America's best kept secret" by Energy Secretary Steven Chu — hydropower.

Already responsible for more than 70 percent of all U.S. renewable energy generation, hydropower eclipses all other renewable sources, feeding electricity to 30 million homes. Hydropower is affordable, sustainable and, with the right policies, can double its capacity — providing affordable electricity for millions more Americans and creating millions of jobs. And because it uses the energy stored in our domestic freshwater supply, it's 100 percent renewable and doesn't depend on volatile commodity markets or the politics of foreign regimes.

Unfortunately, many Americans — particularly inside the Beltway — seem unaware of the promise of hydropower. The debate over our renewable energy future has focused largely on wind and solar — both of which must be part of the solution. But all along, hydropower has been the sleeping giant of renewable energy, quietly providing dependable, base load renewable electricity generation for countless communities and ensuring a reliable electric grid.

As representatives from both sides of the hydro economy, we know that its potential is real and immediate. We come from the perspective of a West Coast public utility that is in the midst of investing more than $800 million to install more efficient hydropower turbine and generator technologies and a Pennsylvania-based manufacturer with more than 550 employees that has grown 27 percent and added 194 family-supporting jobs during a recession. We've seen this technology's ability to spur economic growth and provide utility-scale clean power in communities that need it. It's something that can be utilized across the U.S., and the time to embrace it is right now.

A recent study from independent firm Navigant Consulting Inc. found that investment and growth in the hydropower industry could create a cumulative 1.4 million jobs by 2025. These jobs would employ a range of skilled American workers in manufacturing, development, engineering, operations and maintenance — in particularly job-hungry places such as Ohio, Tennessee, Florida and Virginia.

And because many of these jobs will be located at existing hydropower facilities and non-powered sites that would be retrofitted to generate electricity, they will improve the economies of nearby communities without additional environmental impacts.

This potential is a central reason why the Obama administration has recently expanded its

commitment to hydropower. In March, Energy Secretary Chu, Interior Secretary Ken Salazar and Assistant Secretary of the Army Jo-Ellen Darcy signed a memorandum of understanding to increase hydropower generation at federal facilities. They recognize the role this technology has to play. The question is, does Congress?

Past policies such as the Investment Tax Credit, Production Tax Credit and Clean Renewable Energy Bond program have gone a long way in supporting growth in hydropower. But it's time to take the next step and support hydro technologies that not only create jobs themselves, but are crucial to enabling other renewables to come to scale.

The most important of these is pumped storage, the only commercially viable form of utility-scale energy storage in existence. The recent explosive growth in wind power generation has created a need for large-scale energy storage, and pumped storage allows us to retain tens of thousands of unused megawatts of electricity, dispatching it at times of peak demand and "smoothing" availability from other sources of power. Energy Secretary Chu last September called pumped storage "astoundingly efficient" and noted the "massive amounts of energy" it stores. Indeed, this proven technology already represents 20 gigawatts of domestic energy capacity, with another 31 gigawatts in the approval pipeline now.

Supporting pumped storage and valuing it properly through national policies such as a strong Investment Tax Credit, transmission incentives and inclusion in a national Renewable Electricity Standard would let America deploy the most economical, most available and most effective solution to the power storage question hanging over our clean energy future. It's a problem we simply have to solve — and hydro is the answer.

Washington will be focused in the coming weeks on climate and energy legislation. At the end of the day, we absolutely must have a strong, smart policy that simultaneously deploys more renewable energy assets and ensures they're viable at scale. That policy also must not leave affordable megawatts or available jobs on the table. Hydro should be at the center of achieving all of those priorities.

The power of clean, moving water has already served the nation for generations. With the right signals from Washington, we are poised to continue turning water into good American jobs, continued economic growth, greater energy independence and a clean and sustainable future.

Mark Garner is president and CEO of Voith Hydro, a group division of Voith and a producer of hydropower equipment. Tim Culbertson is the general manager of the Grant County Public Utility District in Washington state, the nation's second-largest generator of nonfederal hydroelectric power.