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House Appropriations Energy and Water Subcommittee
Department of Energy (Water Power Technologies Program); Corps of Engineers; and Bureau of Reclamation

The National Hydropower Association¹ submits this statement in support of \$90 million for the U.S. Department of Energy's (DOE) Water Power Program and its research and development (R&D) initiatives for FY 2015.

In addition, NHA also strongly advocates directing additional resources to the operations and maintenance (O&M) programs of the U.S. Army Corps of Engineers (USACE) and Bureau of Reclamation (BuRec) to increase both capacity and generation at the federal facilities, as well as to those programs that fund the engagement and review of applications for third-party development at USACE's and BuRec's water infrastructure.

Requesting \$90 million in FY 2015 funding for the DOE Water Power Technologies Program

Funds should be directed across all water power technology sectors – hydropower, pumped storage, marine and hydrokinetic (MHK), and conduit technologies. The DOE divides funding generally across 2 broad program areas: hydropower and MHK. For FY 2015, NHA supports funding \$40 million for hydropower and \$50 million for MHK.

Over the last 18 months, a notable surge in federal and state policymaking in support of hydropower has taken place. Examples include: passage of 2 hydropower regulatory improvement bills – the Hydropower Regulatory Efficiency Act (HREA) and the Bureau of Reclamation Small Conduit Hydropower and Rural Jobs Act; support for new hydropower development on non-powered dams as part of the President's Climate Action Plan; adoption of state-FERC MOUs and new state programs to support small hydropower and conduit projects, and more.

As a result of this policy leadership, the U.S. hydropower industry is transitioning from a period of stasis to one of increased growth. FERC reports that 387 MW of new hydropower capacity was brought online in 2013, which was an increase from 288 MW of new capacity installed the year before in 2012.² The Commission also reports tens of thousands of megawatts of proposed pumped storage, hydropower, conduit and MHK projects in the early stages of the approval process. This is a resurgence unparalleled in the hydropower industry in the last 3 decades. As the need for new sources of clean dispatchable baseload power has grown, policymakers, utilities, state PUCs, grid operators and others are turning back to the original renewable resource – hydropower.

¹ NHA, with over 180 members, is the national trade association dedicated to promoting the nation's largest renewable electricity resource and advancing the interests of the hydropower, pumped storage, and ocean, tidal, conduit and in-stream hydrokinetics industries.

² <http://www.ferc.gov/legal/staff-reports/2013/dec-energy-infrastructure.pdf>

Importance of the Department of Energy Water Power Technologies Program

The renewed and growing commitment for research and development (R&D) initiatives on the federal level through the DOE Water Power program has been as instrumental to the hydropower renaissance underway as the work on regulatory improvements and incentives. Continued research into how to increase the cost effectiveness of the nation's hydropower resources will quicken the pace to commercialize and make use of new water power generation advancements and innovation.

The DOE Water Power Program is growing the U.S. global position by funding cutting-edge research to produce the next generation of hydropower, pumped storage, conduit and marine and hydrokinetic (MHK) technologies, and by accelerating the development of markets for these technologies. Over the years, the program has been the smallest of the DOE R&D programs, yet as described below, will play a central role as the country looks to transition to a clean energy economy, bring more new renewable energy online and integrate increasing amounts of intermittent energy resources.

The Water Power Program supports cutting-edge research, development, demonstration and deployment efforts for innovative new technologies and operations that could generate cost-effective renewable electricity from across the water power sector and improve the security and reliability of the electric grid. Federal R&D support also stimulates private investments in the construction, manufacturing, engineering and environmental science sectors and strengthens the thousands of businesses that make up the U.S. supply chain. The further development of these industries can expand and employ a substantial skilled workforce.³

NHA's request for continued federal support for the Water Power Program is in line with both the Administration's and Congress' pledge to spur investments that create well-paying domestic jobs and economic opportunities for localities.

Increasing hydropower generation provides more clean and renewable megawatts to the grid, and also increases the amount of grid reliability, stability and integration services needed to support the penetration of intermittent resources like wind and solar. Hydropower and pumped storage projects can provide utility and grid-scale energy storage, and other ancillary services, but doing so will require projects to operate in new ways, and in some cases, utilize new technologies.

This makes continued federal research investments vitally important and needed if the DOE is to achieve its goal for water power technologies to provide 15% of the nation's energy by 2030.⁴

³ The U.S. hydropower industry employs upwards of 300,000 workers with a domestic supply chain that spans the country. These supply chain companies work on U.S. projects, but also provide equipment and expertise on hydropower projects around the globe. See: <https://fortress.maptive.com/ver3/nhasupplychainsnapshot>.

⁴ <http://energy.gov/eere/water/about-water-power-program>.

Priority Hydropower R&D Needs

NHA has identified industry R&D priority topics that will enhance the industry's ability to grow and develop new projects, technologies, and operational modes, to maintain and enhance generation at existing projects as well as support new project deployment.⁵

- **Resource assessments** – the HREA of 2013 directed the DOE to conduct an assessment of pumped storage opportunities to support integration of intermittent resources and of conduit project opportunities, for which a national study has never been performed.
- **Technology advancements/innovations** – while the DOE is currently supporting several initiatives for turbines (conventional, pumped storage in-conduit and MHK), generators, fish passage technology, etc., further investigation is warranted – particularly funding for demonstrations. Federal and state resource agencies and other stakeholders prefer independent analysis and study of new technology improvements before agreeing to deployment in the field.
- **Market development/benefit recognition** – one of the barriers to increased hydropower project deployment is the undervaluation of its energy and grid attributes, which if addressed, would establish revenue streams to support the significant capital outlays required in the sector. The DOE can analyze the market gaps that exist across the various RTOs and regions, which could assist in the development of new market proposals and products – capacity, fast-ramping, integration, etc.
- **Small hydropower** – one of the major potential growth areas for the industry is in the small hydropower sector. However, U.S. small hydropower resources are underutilized due to the capital expense, mitigation and licensing costs that occur relative to the project size. Advances in small turbine designs to reduce the cost of installation and/or environmental mitigation would lead to an increase in hydropower generation.
- **Climate modeling/drought management** – climate change presents opportunities and challenges for the hydropower industry and all industries that rely on water. The DOE has only just begun to examine some of these issues. Topics such as increased reservoir storage, both existing and new, project operational changes (to maintain and/or increase generation while serving other needs) and better short and long-term forecasting are all potent areas for future scientific investigation.
- **Pumped Storage** – 99 percent of energy storage in the U.S. and globally comes from hydropower pumped storage. However, while thousands of megawatts of new projects are proposed, most are finding financing difficult. The DOE can assist by investigating ways to reduce costs for new technology, such as variable speed turbines (not currently deployed in the U.S.) and modular pumped storage, and validate the transmission and grid benefits of such projects.
- **MHK** – Commercialization of technologies to harness these resources require federal funding to augment research and development efforts already underway. The nascent marine energy today is in a position similar to wind and solar 1 to 2 decades ago, where

⁵ This list is not exhaustive and NHA incorporates by reference its past Energy and Water Appropriations statements (particularly FY 2014), which contain additional details and further R&D proposals and items.

support is needed to develop promising technologies on the verge of commercial viability. Early funding support, along with development of full-scale device testing centers (still unavailable here in the U.S.), are taking place in Europe and elsewhere, with the U.S. falling behind in the deployment of these technologies.

Additional Initiatives

- **EPAAct 2005 Section 242 hydropower production incentive** – In the FY 2014 omnibus appropriations bill, report language included \$3.6 million in funding for this incentive designed to help bring down costs that in turn can determine the viability of a given project. NHA supports continued funding for the program, which DOE is currently in the process of implementing. With the uncertainty of the extension of the production tax credit (PTC) and investment tax credit (ITC), certainty with the Section 242 program will not only help hydropower developers overcome cost barriers, but the commitment to this program will also assist the electric power industry in making important contributions to air quality and renewable energy supply goals.
- **Funding support for hydropower development at federal facilities** – NHA also urges the Committee to direct support to the Army Corps of Engineers Civil Works and the Bureau of Reclamation efforts to operate, maintain, and upgrade their existing hydropower projects, as well as to build on their existing non-powered infrastructure.⁶

Conclusion

NHA urges Congress to adopt this funding request of \$90 million for the DOE Water Power Program as well as to adequately fund the hydropower programs of the Corps of Engineers and the Bureau of Reclamation.

These investments will increase not only the amount of clean, renewable hydropower generation, but also the grid services needed to expand the use of intermittent, variable energy resources as well.

NHA further directs the Committee to the DOE Water Power Program's Hydropower and MHK reports covering activities from FY 2008 through FY 2014. These reports highlight in detail the successful initiatives, programs and awards funded through the Program to improve technology performance, lower costs and deploy new and innovative technologies.

See <http://energy.gov/sites/prod/files/2014/04/f14/CH-4.4.14.pdf> for Hydropower and also see <http://energy.gov/sites/prod/files/2014/04/f14/MHK%20FNAL.pdf> for MHK.

⁶ Recent federal studies show that thousands of megawatts of new hydropower capacity exist at non-powered dams owned or operated by the Army Corps of Engineers as well as significant growth potential at existing Bureau dams, canals and conduits.