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Committee on Appropriations - Subcommittee on Energy and Water Development
Department of Energy (Water Power Program); Corps of Engineers; Bureau of Reclamation

The National Hydropower Association (NHA)¹ respectfully submits this statement in support of \$100 million for the U.S. Department of Energy's (DOE) Water Power Program and its research and development (R&D) activities and initiatives for Fiscal Year 2016.

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 these federal hydropower facilities, as well as to those programs that fund the engagement and review of applications for non-federal hydropower development at USACE's and BuRec's water infrastructure.

Requesting \$100 million in FY 2016 funding for the DOE Water Power Program

The Water Power Program's R&D efforts focus on improving the performance, lowering the cost, and accelerating the deployment of cutting-edge technologies that generate clean, renewable, environmentally responsible, and cost-effective electricity from the nation's hydropower and marine energy resources.

Funds should be directed across all water power technology sectors – hydropower, pumped storage, marine and hydrokinetic, and conduit power. The DOE divides funding generally across two main technology areas: hydropower/pumped storage and marine and hydrokinetic. **For FY 2016, NHA supports funding \$40 million for the hydropower program area and \$60 million for the marine and hydrokinetic program area.** These investments support production of advanced technologies and accelerate adoption in the marketplace.

For both hydropower and marine energy, the Water Power program is also working to reduce the time and costs associated with siting, permitting and licensing projects; to better quantify the potential magnitude, costs, and benefits of generation; and to identify and address other barriers to deployment. The program has released reports and maps that assess the nation's hydropower resources along with initial estimates of the nation's wave and current (tidal, river and ocean) resources.

In the hydro sector, the program has embarked on a Hydropower Vision Report, a first-of-its-kind roadmap for the industry designed to usher in a new era of growth in hydropower over the next half century. NHA supports a similar report for the marine energy industry.

¹ NHA is the national association dedicated to advancing the interests of hydropower, pumped storage, conduit power and marine energy technologies. NHA's membership includes over 200 organizations including utilities, independent power producers, developers, equipment manufacturers and service providers. In 2014, NHA established a Marine Energy Council (MEC) in support of the ocean wave, tidal, current and ocean thermal technologies.

Making the case for increased R&D investment in water power technologies²

In Fiscal Year 2008, the Committee reestablished the DOE Water Power program with an initial investment of \$10 million after the program had been zeroed out. Unfortunately, the Water Power program remains one of the smallest of the Office of Energy Efficiency and Renewable Energy (EERE), particularly when compared to the funding levels for other EERE programs, such as wind and solar.³⁴ However, NHA appreciates and is encouraged by the Committee's growing investments in the DOE's Water Power program activities in recent years,⁵ along with the Administration's FY 2016 budget request which recommended total funding at a historic level - \$67 million. We believe there is a growing recognition for the need to expand our underutilized hydropower and marine energy resources and capture the substantial grid services and clean air benefits they can provide.

The Water Power Program support of cutting-edge research, development, demonstration and deployment efforts for innovative new technologies and operations will 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 support of these industries can expand and employ an already sizable skilled U.S. workforce.⁶

NHA's request for increased support for the DOE Water Power Program is in line with the "all-of-the-above" energy strategy supported by both Congress and the Administration. These investments will also spur domestic industries that create well-paying jobs and economic opportunities for localities.

Hydropower's role in America's energy portfolio and future growth potential

Hydropower is America's single largest source of domestic renewable electricity, providing clean, affordable generation in every region of the country. In 2014, hydropower accounted for approximately 6.5 percent of total electricity generation and just under half of all renewable electricity generation.

The key strengths of hydropower, and potentially marine energy, versus other renewables are base load power, dispatchability, grid stability and reliability, and low cost of electricity. In

² NHA notes that historically, the DOE's R&D budget for all energy technologies has declined precipitously. See "Key Challenges Remain for Developing and Deploying Advanced Energy Technologies to Meet Future Needs" (GAO-07-106)

³ See Wind Program Budget History: <http://energy.gov/eere/wind/wind-program-budget>

⁴ See FY2016 Solar Program Request P.102-103:

http://energy.gov/sites/prod/files/2015/02/f19/FY2016BudgetVolume3_7.pdf

⁵ See Water Power Program Budget History: <http://energy.gov/eere/water/water-power-program-budget>

⁶ The U.S. hydropower industry employs upwards of 300,000 workers with a domestic supply chain that spans the country. <http://www.hydro.org/why-hydro/available/industrynapshot/>

addition, generation from the existing hydropower system avoids approximately 200 million metric tons of carbon emissions each year. In fact, regions that rely on hydropower as a primary electricity source reap the benefits of significantly cleaner air as well as the lowest electricity prices in the country.

While a proven renewable resource, hydropower is also a resource for our future having a tremendous growth potential. One myth about hydropower is that there are no new opportunities for growth in the industry. Several new reports demonstrate significant areas for growth including: expanding capacity at existing hydro projects, adding generation to existing non-powered dams, new pumped storage facilities, and new stream-reach development.⁷

The work to realize this potential is happening now. New projects are under construction. Bloomberg New Energy Finance reports over 1GW of new capacity added over the last 5 years.⁸ In addition, the Federal Energy Regulatory Commission has nearly 200 preliminary permits to investigate conventional hydropower and pumped storage projects.⁹ However, to maximize the potential of our hydropower resources, expanded funding support for the Water Power Program is critical to develop and deploy advanced technologies, improve operational procedures, and provide rigorous engineering, environmental and market analysis.

Potential of marine energy to be the nation's most robust, clean power resource

Marine renewable energy technologies generate power from predictable and forecastable ocean currents, waves, tidal flows and in-stream sources. By any measure, the U.S. has significant marine energy resources. The DOE has estimated that the technically extractable resource potential is almost 900 TWh/yr for wave energy and 400 TWh/yr for tidal and ocean current.¹⁰ This represents up to 25 percent of projected U.S. electricity generation needs by 2050. With more than 50 percent of our population living within fifty miles of coastlines, there is significant potential to provide power from marine energy systems to these coastal communities.

Looking to Europe, a recent study predicted that by 2050 the British marine energy sector could be worth £76 billion to the U.K. economy, support 68,000 jobs, and total generation capacity could reach 27.5 GW, enough to supply more than a fifth of the U.K.'s current electricity demand.¹¹ It predicted that Britain could capture almost a quarter of the global market if it builds on its technology development leadership position. The majority of the jobs would result from the growing export markets into countries that have substantial resources. The E.U. has made this sector a priority and invested over \$1 billion on marine energy development over the past ten years.¹² Early funding support, along with development of full-scale device testing

⁷ http://www1.eere.energy.gov/water/pdfs/npd_report.pdf and <http://nhaap.ornl.gov/nsd>

⁸ <http://www.bcse.org/images/2015%20Sustainable%20Energy%20in%20America%20Factbook.pdf>

⁹ <http://ferc.gov/industries/hydropower/gen-info/licensing.asp>

¹⁰ http://www.energy.senate.gov/public/index.cfm/files/serve?File_id=1574a931-2233-4f98-9d0c-4bd683bbe1e1

¹¹ <http://www.carbontrust.com/resources/reports/technology/accelerating-marine-energy>

¹² http://www.siocean.eu/en/upload/docs/SIOcean_Market_Deployment_Strategy-Web.pdf

centers (still unavailable in the U.S.), demonstrates that the significant technological advances and competitive advantages are taking place in Europe.

The Water Power program facilitates R&D for internationally competitive systems approaching commercial viability. These investments are the key mechanism available to U.S. companies facing overseas competitors that receive significant support. Increased program investments will enable the U.S. to leverage its superiority in shipbuilding and related service sectors, create jobs and diversify these maritime industries toward developing new domestic energy supplies and capturing an emerging export market.

The establishment of a U.S.-based marine energy industry would secure our nation's place in developing offshore renewable energy systems, thereby ensuring that the United States is an exporter, not an importer, of these technologies.

Appropriations support for additional important federal programs

- **EPAct 2005 Section 242 hydropower production incentive** – In the FY 2014 and FY 2015 omnibus appropriations bills, report language included 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.¹³
- **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.¹⁴

Conclusion

NHA thanks the Committee for the increased level of support provided to the DOE Water Power Program over the past several years. For FY 2016, the association urges Congress to adopt this funding request of \$100 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 renewable power generation from water resources, but also the grid services needed to expand the use of other intermittent, variable energy resources, such as wind and solar, while also ensuring that American families and businesses continue to benefit from this low-cost, reliable source of clean power.

¹³ DOE issued Final Guidance for the Section 242 program in January 2015. Applications were due February 2015.

¹⁴ DOE and other studies show that 12 GW of new capacity exist at U.S. non-powered dams, including Army Corps of Engineers' dams, as well as significant growth potential at existing Bureau dams, canals and conduits.