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**House Appropriations Energy and Water Subcommittee**  
**Department of Energy (Water Power Program) FY 2013 Appropriations**

The National Hydropower Association (NHA)<sup>1</sup> appreciates the opportunity to submit this statement on the Association's priority programs within the Energy and Water Appropriations bill. The statement focuses on NHA's support of \$59 million for the Department of Energy's Water Power Program and its research and development (R&D) FY 2013 initiatives. The Water Power Program dedicates its efforts to research, test, and develop breakthrough technologies and other sector innovations to increase generation of renewable, reliable and affordable electricity from water resources.

This statement also provides support for two other areas: 1) additional funding to increase hydropower generation on the federal system (Army Corps of Engineers and Bureau of Reclamation facilities); and 2) funding for the Energy Policy Act of 2005 (EPAAct 2005) hydropower incentives.

**I. NHA requests \$59 million in FY 2013 funding for the DOE Water Power Program**

Funds should be directed with continued support of initiatives across all hydropower technology sectors. The types of technologies covered – conventional hydropower, pumped storage, marine and hydrokinetic (MHK), and conduit technologies – unlock clean energy from our country's rivers, oceans, tides and water conveyances.

In recognition of the tremendous constraints on the federal budget, NHA's proposed FY 2013 level of \$59 million represents no increase over the congressionally adopted FY 2012 level and is a significant reduction from recent NHA requests. The Association also supports the FY 2012 funding breakdown of \$25 million directed to hydropower and \$34 million directed to MHK.

**II. Making the case for federal R&D support**

Over the last 30 years, the Department of Energy's R&D budget for all energy technologies (renewable, fossil, and nuclear) has declined precipitously.<sup>2</sup> For the Water Power Program, the numbers are even more discouraging. Always one of the smallest of the Office of Energy Efficiency and Renewable Energy programs, in 2007-2008 the Water Power Program was zeroed out. The Administration's FY 2013 budget request would now cut funding by 66 percent.

Federal government R&D support is needed to promote hydropower development nationwide. Conducting business as usual will not provide the opportunity to fully realize the untapped potential available throughout the country.

For MHK technologies, the R&D need is easy to demonstrate. The United States lags far behind Europe in its investment to harness ocean energy potential. While strides are being made, there are few actual U.S. MHK projects, and those in existence are at early-stage commercialization and deployment.

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<sup>1</sup> NHA is a non-profit, national trade association dedicated to promoting the nation's largest renewable electricity resource and advancing the interests of the hydropower, pumped storage and new ocean, tidal, conduit and in-stream hydrokinetics industries.

<sup>2</sup> 2006 GAO Report: "Key Challenges Remain for Developing and Deploying Advanced Energy Technologies to Meet Future Needs" (GAO-07-106)

However, for conventional hydropower technologies, the R&D case is no less strong and the need no less urgent. Some argue hydropower is a “mature” technology and not a candidate for R&D support particularly in a constrained budgetary environment. This is a false choice.

Though a proven, reliable technology, hydropower owners and operators are always seeking ways to increase generating efficiencies, improve water use, enhance environmental performance, and develop better operating regimes. And now the industry looks to address new issues resulting from the ever-changing electricity market and the challenges posed by integration issues and grid reliability concerns.

Hydropower, like the automobile, is a technology that has transformed over the course of a century. No one argues that the government should stop investing in auto R&D – improving fuel efficiency and economy, safety, incorporating new materials, etc. The same holds true for continuing advancements in the hydropower sector. Since the re-establishment of the Water Power Program in 2008, the Department of Energy has begun several initiatives across the sector. These include:

- Assessing resource potential (MHK, non-powered dams, conduits)
- Reducing the cost of energy
- Advancing technology readiness (new turbine designs for conventional, MHK and conduit applications, as well as other equipment and operational improvements)
- Ensuring environmental responsibility (technology advancement to analyze and mitigate potential impacts)
- Quantifying hydropower’s value to the grid (determining how to increase the use of wind and solar through greater grid flexibility and stability utilizing hydropower for integration)
- Advancing hydropower upgrades (analyze, assess and maximize generation at existing facilities)

It is these types of initiatives and strategies that will propel the hydropower and MHK industries forward, enhancing their contribution to the nation’s electricity portfolio.

### **III. DOE Water Power Program goal: 15 percent of electricity from water resources**

NHA commends and supports the DOE Water Power Program’s new vision for water power technologies to provide 15% of the nation’s energy by 2030.<sup>3</sup> Like the goal established to support increased wind generation, this is a fitting goal and one that recognizes hydropower’s role in achieving our country’s push to substantially increase clean energy generation over the next 20 to 30 years.

Ultimately, for clean energy policies to succeed, support for increasing generation from all water power resources, conventional, pumped storage and MHK, is critical.

Not only does increasing hydropower generation provide more clean energy megawatts to the grid, but it also increases the amount of grid reliability, stability and integrations services that hydropower provides in order to enhance the penetration of variable energy resources.

This is yet another area where Europe leads the United States. Experience on the continent has clearly shown that increasing variable energy generation requires access to energy storage. And

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<sup>3</sup> DOE Wind and Water Power program brochure: “Water Power for a Clean Energy Future” (P.2)  
[http://www1.eere.energy.gov/water/pdfs/wp\\_accomplishments\\_brochure.pdf](http://www1.eere.energy.gov/water/pdfs/wp_accomplishments_brochure.pdf)

that demand in Europe is being met with storage from both conventional hydropower and pumped storage projects.

NHA believes the hydropower industry is primed for growth to provide these services; and this leads to an important R&D discussion. While hydropower and pumped storage projects can provide regional and grid-scale energy storage and other ancillary services, doing so will require projects to operate in new ways and modes, and in some cases, utilize new technologies.

As such, several R&D questions (ones that the DOE is positioned to help answer) include:

- What is the impact of wear and tear on existing technologies due to new operational regimes to provide the needed ramping rates and other integration services?
- Does the United States have the technology in place to meet this challenge?
- Is there new technology better suited for this purpose? If so, where? If not, what innovations are needed in components, equipment, facilities to improve performance?

As more is asked of the hydropower system to provide the ancillary services needed to meet clean energy goals, more questions and R&D needs are sure to come into focus. The DOE Water Power Program will fulfill a crucial role in collaborating with the industry to make this transformation a reality.

#### **IV. Other specific R&D needs**

Over the last several years, NHA, the Electric Power Research Institute (EPRI) and individual industry members have provided many recommendations for needed data, analyses, research initiatives, and other activities that would help to realize the full potential of the water power sector.

While the following section briefly touches on some of those recommendations, the larger point is that a robust DOE Water Power R&D program is needed. With an industry consisting of facilities owned by: federal agencies; investor owned utilities; municipalities and other public power entities; independent power producers; along with new technology developers; the DOE plays an important role in gathering national baseline industry data and serving as a clearinghouse for this information.

Past R&D recommendations included, but are not limited to:

- Advanced materials testing/science for turbines, generators and other components
- Meteorological forecasting and optimal dispatch of energy/water systems
- New turbine designs (including distributed generation applications) and operational regimes
- Enhanced water quality mitigation technology; fish passage bioengineering and mitigation
- Study on potential effects of climate change on operations
- Updated resource assessments

#### **V. Support for increased hydropower development at federal facilities**

NHA also supports funding efforts within the Army Corps of Engineers Civil Works Programs as well as at the Bureau of Reclamation to operate, maintain and upgrade their existing hydropower projects and build on their existing non-powered infrastructure.

NHA specifically supports the work of the Corps on its Hydropower Modernization Initiative (HMI) to develop a long-term capital investment strategy. NHA also hopes that both federal agencies will continue to dedicate resources and staff time to standardize and streamline their permitting

responsibilities. Projects that can be developed on federal facilities are often too-longed delayed to realize the significant energy potential due to the inconsistent support of hydropower development and approaches to working with industry members by agency staff at the local level.

## **VI. Support for the federal hydropower incentives of the Energy Policy Act of 2005**

In EAct 2005, Congress established incentive payments – subject to Congressional appropriations – for the development of new hydropower at existing dams or conduits as well as to increase efficiency of existing hydropower facilities. To date these provisions have not received funding.

NHA supports the provisions, and notes that at the time of passage, new projects in the hydropower industry were rare. Since EAct 2005, the industry has seen a dramatic increase in interest and support for new development. In 2011 alone, the Federal Energy Regulatory Commission (FERC) issued 135 MW of project approvals and saw over 1600 MW of projects file for approval.<sup>4</sup> These incentives could help bring projects like these online in the coming years.

## **VII. Hydropower's role in America's energy portfolio and growth potential**

Hydropower is America's leading source of domestic renewable electricity, providing clean, affordable generation in every region of the country. This reliable and underutilized resource accounted for about 8 percent of total electricity generation and two-thirds of renewable electricity generation in 2011.

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

While a proven renewable energy resource, hydropower is also an energy resource for our future with tremendous growth potential. One of the many myths about hydropower is that there are no new opportunities for growth in our industry. In fact, the opposite is the case. In addition to the numbers cited above, there are proposed projects totaling over 82,000 MW before FERC today across all technologies in the waterpower sector.<sup>5</sup>

## **VIII. Conclusion**

Unlocking the vast hydropower potential of our rivers, oceans, tides and conduits requires federal R&D initiatives that make innovative ideas a reality. Continued investment in the DOE Water Power Program will ensure that innovative new technologies and operational advancements come to market, increasing America's clean energy portfolio and providing the economic benefits and jobs the country needs. With the potential to develop new projects on hundreds of potential sites, hundreds of thousands of jobs will be created through the manufacturing and installation of these projects.

NHA appreciates and strongly supports the work of the Water Power Program and opposes the proposed 66 percent reduction in funding in the FY 2013 budget request. NHA calls upon Congress to champion R&D investment in hydropower – the nation's most widely used renewable energy resource that, if properly supported, can provide the foundation of America's clean energy future.

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<sup>4</sup> <http://hydro.org/wp-content/uploads/2012/01/OEP-Energy-Infrastructure-Update-Dec-2011.pdf>

<sup>5</sup> <http://www.ferc.gov/industries/hydropower/gen-info/licensing.asp>