



Written Testimony of

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Deputy Executive Director**

On behalf of

The National Hydropower Association

Before the

**Senate Energy and Natural Resources Committee
Hearing to Receive Testimony on Opportunities to Improve American Energy
Infrastructure**

Regarding

An Overview of Hydropower, its Benefits, and Policy Issues

March 14, 2017

Executive Summary

1. In the last several years, hydropower has provided approximately 6 percent of all U.S. electricity generation and nearly half of renewable generation. By 2030, approximately 400 projects representing 18,000 MW of capacity of the existing system will be up for relicensing.
2. Hydropower has significant untapped growth potential, particularly at existing infrastructure and with low impact projects, such as capacity additions at current hydropower facilities, adding generation to non-powered dams, and closed-loop pumped storage, among others. The Department of Energy's recent Hydropower Vision Report estimates that close to 50 GW of new capacity is available by 2050, with the right conditions and policy support in place.
3. New hydropower project development, as well as the relicensing of existing projects, faces a variety of obstacles. These include: a regulatory process that can be modernized to increase coordination and reduce unnecessary duplication, delays and costs; a lack of valuation of grid security and reliability services; and inequitable treatment and recognition under renewable energy tax incentives and other renewable/clean energy programs, including federal R&D funding to support new technologies. Combined, these issues are impacting hydropower competitiveness and creating unnecessary challenges that hold back growth.
4. NHA supports policies to address regulatory inefficiencies and to improve coordination in the overall hydropower project approval process and calls on Congress and the Administration to address this and other energy and market policy issues that limit investment in hydropower infrastructure. And, we believe this can all be done in ways that promote the hydropower resource while protecting environmental values.
5. Hydropower has a critical role to play in meeting our nation's energy, environment, and economic objectives. The benefits from this resource are many – low-cost, reliable, base load renewable electricity, along with additional ancillary grid services (load following, frequency response, energy storage, etc.) – services that will allow our country to add significantly to our national portfolio of renewable, clean energy resources.
6. Finally, as the Congress works to address our energy and infrastructure needs, whether that be on a new national infrastructure program or further work on an energy bill, policies that support the preservation of the existing hydropower system and promote the deployment of new projects (for all categories of water power technologies) must be included. A greater recognition that our hydropower infrastructure is incredibly valuable is needed, and continued investment and re-investment in the system is critical to our energy future and national security.

Introduction

Good morning Chairman Murkowski, Ranking Member Cantwell, and members of the Committee. I am Jeffrey Leahey, Deputy Executive Director of the National Hydropower Association (NHA). I am pleased to be here to discuss the importance of hydropower to the U.S. electric system, the untapped growth potential across the various sectors of the industry, and the policy issues that need to be addressed to fully realize that growth.

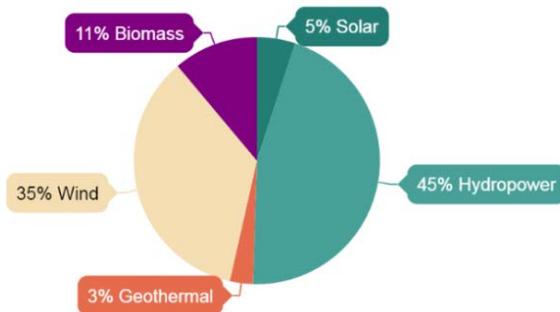
As background, NHA is a nonprofit national association dedicated to promoting clean, affordable, renewable U.S. hydropower – from conventional hydropower to pumped storage to marine energy to conduit power projects. NHA represents more than 220 companies, from Fortune 500 corporations to family-owned small businesses. Our members include both public and investor-owned utilities, independent power producers, developers, equipment manufacturers and other service providers, and academic professionals.

U.S. Hydropower Statistics

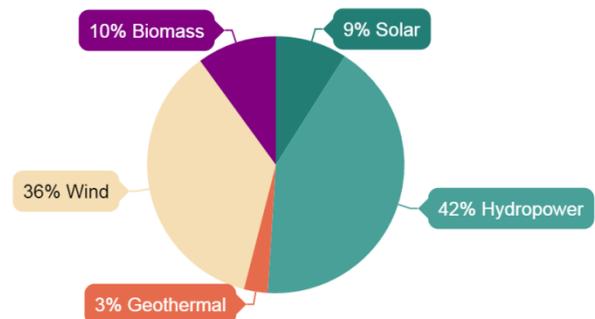
Currently, the U.S. conventional hydropower fleet is made up of almost **2200 individual plants** with a total capacity around **80 GW**. In the last two years, these plants provided approximately **6 percent** of all U.S. electricity generation and **almost half** of all renewable electricity generation – making hydropower the single largest provider of renewable electric power in our country. Looking over the long term, hydropower has supplied a cumulative 10 percent of U.S. electricity generation over the past 65 years (1950-2015), and 85 percent of cumulative renewable power generation over the same time period.

In addition to the conventional hydropower system there are an additional **42 hydropower pumped storage plants** with approximately **22 GW** of capacity – projects that make-up almost all, **97 percent**, of energy storage in the U.S. today.¹

2015 Sources of Renewable Electricity Generation



2016 Sources of Renewable Electricity Generation

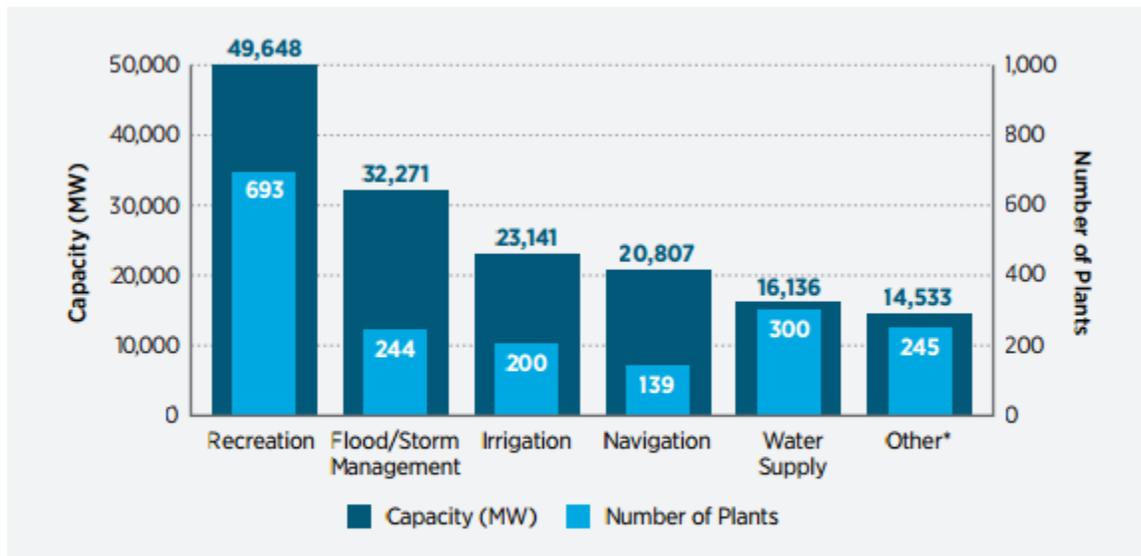


¹ 2016 Hydropower Vision Report, Department of Energy, Office of Energy Efficiency and Renewable Energy, Wind and Water Power Technologies Office, Executive Summary P. 9.

<https://energy.gov/sites/prod/files/2016/10/f33/Hydropower-Vision-Executive-Summary-10212016.pdf>

Hydropower generation is a clean air resource and avoids millions of metric tons of carbon emissions each year. In fact, regions that rely on hydropower as a primary energy source (like the Northwest) reap the benefits of significantly cleaner air with some of the lowest carbon intensity rates in the country.

In addition to this clean and renewable energy, hydropower infrastructure provides other important benefits, including managing river flow for aquatic species and habitat protection, flood control and drought management, water supply, irrigation and more, as the chart below illustrates.²



Note: The use categories are not mutually exclusive; a given dam can be included in more than one category. The data include only powered dams.
 Source: Uriá-Martínez et al. 2015 [2]

Figure 2-11. Total capacity and number of plants for six separate uses (illustrated by the blue bars) of existing hydropower dams and reservoirs

The next map below was developed by the Department of Energy (DOE) through Oak Ridge National Laboratory (ORNL) and provides a visual representation of the size and location of projects for both the federal and non-federal hydropower systems. Existing hydropower assets are located in all but two states (Delaware and Mississippi), though every state receives the benefit of the clean renewable generation that these projects provide.

² Hydropower Vision Report, Chapter 2, Page 83.



The contributions of the existing hydropower fleet to the electric grid are many (base load power, peaking generation, load-following, energy storage, reliability and more). With the need for more of these benefits and services, as the nation strives to become more energy independent, NHA has seen the hydropower industry grow and expand in recent years.

In fact, the United States experienced a net capacity increase of **1.4 GW³** from 2005 to 2013, enough to power over half a million homes⁴. FERC has reported an additional 260 MW of capacity being placed in service since then, with even more projects in licensing or in the construction phase today. And this number could significantly increase with a modernized regulatory approval process that currently takes years longer than that of other renewable resources – in some cases licensing can take 10 years or longer.

In addition, hydropower projects bring multiple economic benefits to the communities in which they are located and those that they serve. To start, the industry itself currently employs a sizable workforce. 143,000 jobs are created just from the continued operation and maintenance, as well

³ 2014 Hydropower Market Report, Executive Summary P. VI.

⁴ An Assessment of Energy Potential at Non-Powered Dams in the United States, Department of Energy, Office of Energy Efficiency and Renewable Energy, Wind and Water Power Technologies Office and Oak Ridge National Laboratory, April 2012, Executive Summary P.VII, Footnote 1.

http://nhaap.ornl.gov/sites/default/files/NHAAP_NPD_FY11_Final_Report.pdf

as upgrades, of the existing system, with additional employment opportunities gained in the pursuit of new project development and deployment.⁵

One recent example that demonstrates the jobs benefit is AMP Public Power Partners of Ohio. AMP is building 4 new hydropower projects on existing Corps of Engineers' dams on the Ohio River (3 are completed and 1 is still under construction). The company reports that approximately 1800 construction jobs were created over a 4 year construction window, with the operation of the projects providing an additional 50 permanent jobs. Another example is Missouri River Energy Service's Red Rock project on the Des Moines River near Pella, Iowa, currently under construction at a Corps of Engineers dam. The company estimates that 250 workers will be needed on site through 2017-2018.

On top of this, the access to low-cost, reliable clean power is attracting many companies to regions with hydropower. For example, major high-tech companies like Google, Facebook, and Yahoo require large, energy-intensive data centers to drive their businesses. Specifically, in September 2010, Yahoo opened a new facility in Lockport, New York to utilize hydropower provided by the New York Power Authority. And again, in 2013, New York officials cited the importance of low-cost hydropower in Yahoo's decision to expand the Lockport facility.⁶

Another example of hydropower supporting economic development and new job creation partnerships is BMW. Access to low-cost and reliable hydropower along with other renewables lured the company to Moses Lake, Washington. Breaking ground on its \$200 million manufacturing facility in July 2010, the plant, a joint venture with SGL Automotive Carbon Fibers, was built to supply parts for BMW's line of high performance cars. In fact, the company in 2014 announced it would fund a \$100 million expansion of the facility – again citing access to affordable hydropower along with other renewables.⁷

Growth Potential

One of the largest misconceptions of the hydropower industry is that any growth potential is “tapped out”. In its new report issued in 2016 titled, Hydropower Vision: A New Chapter for America's 1st Renewable Electricity Resource, the Department of Energy smashes that myth. The Vision analysis finds that U.S. hydropower could grow to nearly **150 GW by 2050**. This would represent close to a **50 percent** increase in capacity.

The report identifies opportunities for **13 GW** of new hydropower capacity by adding generating facilities to existing non-powered dams and canals, upgrades to existing hydropower facilities, and limited development of new stream reaches. It also finds the potential to add up to **36 GW** of new pumped storage capacity.

⁵ Vision Chapter 2, Page 203-204. <https://energy.gov/sites/prod/files/2016/10/f33/Hydropower-Vision-Chapter-2-10212016.pdf>

⁶ <http://www.nypa.gov/Press/2013/130322.pdf>

⁷ <http://www.seattletimes.com/business/bmw-plans-big-expansion-of-moses-lake-carbon-fiber-plant/>

Looking to the benefits of this potential, the report finds \$148 billion in cumulative economic investment. \$58 billion in savings in avoided mortality, morbidity and economic damages from air pollution. Cumulative 30 trillion gallons of water withdrawals avoided for the electric power sector. 5,600,000,000 metric tons of CO₂ emissions reductions with \$209 billion in avoided global damages. And over 195,000 hydropower-related gross jobs spread across the nation in 2050.⁸ Those are quite substantial benefits for our country.

Adding Generation to Non-powered Dams

One of the prime areas of growth in the hydropower industry is on existing infrastructure, such as non-powered dams and conduits. Of the approximately 80,000 dams in the U.S. today only **3 percent** have electric generating facilities. Put another way, **97 percent** of our dams do not produce power and were built for other purposes such as water supply, irrigation, navigation and recreation.

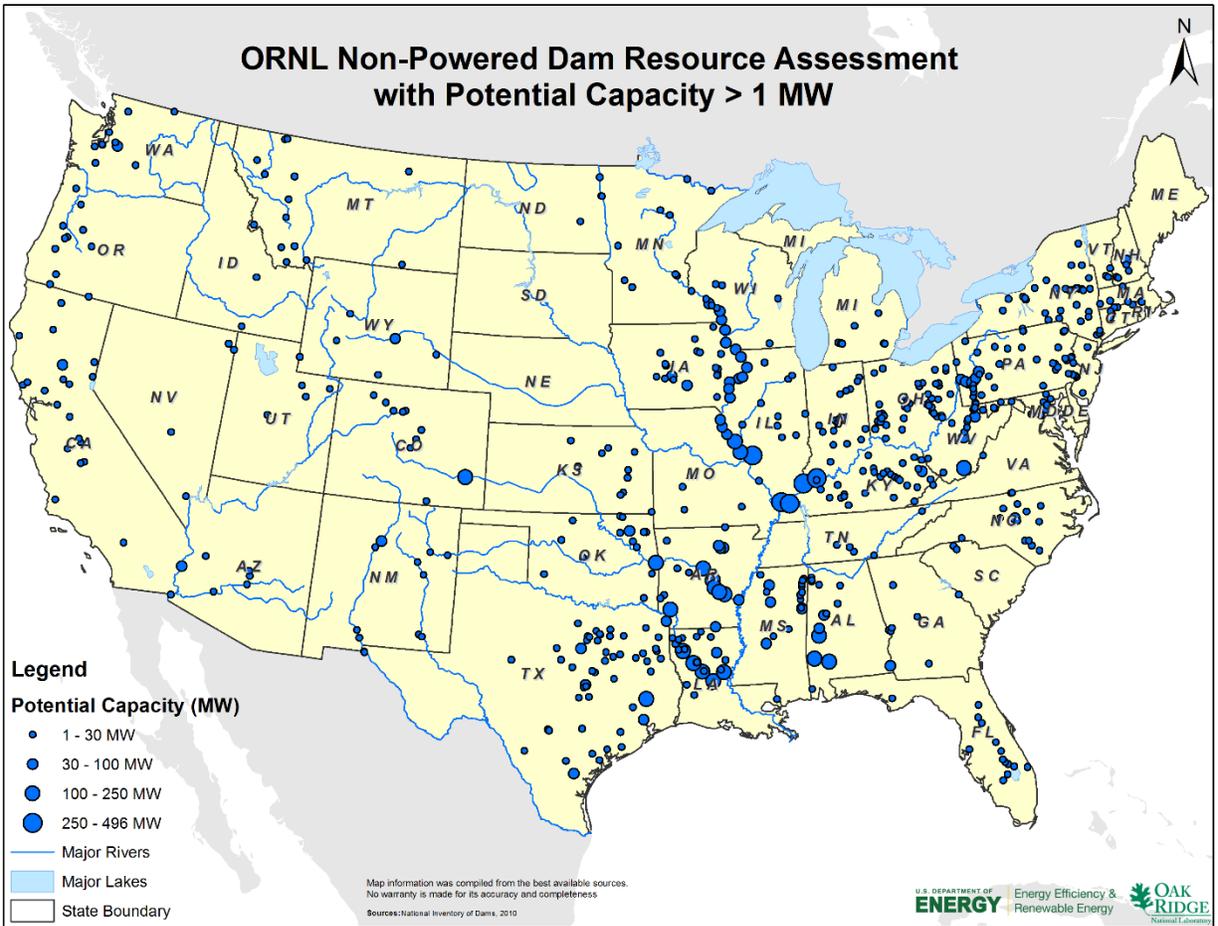
NHA recognizes that not every existing dam may be a suitable candidate to add power generating equipment, as many factors come into play in development decisions: project development costs and revenue opportunities; energy generation potential; natural resource considerations; transmission needs; dam safety; etc. However, what this statistic shows is the large untapped universe of potential opportunities that exist – and that are not being developed in significant part because of the concerns about the uncertain, duplicative and lengthy regulatory process.

Those dams that are candidates for hydropower development are infrastructure that will continue to exist, operate and release flows to meet water supply, irrigation, flood control, and other purposes for which they were originally constructed – regardless of whether hydropower facilities are installed. It is good public policy to take advantage of these existing releases to capture the energy currently untapped at these sites to add to our portfolio of renewable, carbon-free resources.

The U.S. Department of Energy recognized this opportunity and in 2012, through the Oak Ridge National Laboratory, released an assessment of potential capacity at non-powered dams for projects greater than 1MW. The map below on the following page depicts the size and location of the top projects of that survey with capacity greater than 1 MW.⁹

⁸ Hydropower Vision, Executive Summary P. 7 and 23.

⁹ <http://www.energy.gov/eere/water/hydropower-resource-assessment-and-characterization>



The results of the study show that over **12 GW** of potential exist across the existing system with **8 GW** of potential available at the top 100 sites.¹⁰ Also of interest, **81 of the top 100** sites were located on federal facilities, in particular, Army Corps of Engineers dams.¹¹

These types of projects are some of the lowest impact new developments in the energy sector. No new dams need to be built and the projects aim to utilize existing flows through the projects. This water is already moving through the system, what better way to maximize the benefits of this infrastructure by also generating clean, renewable power with them.

Capacity Additions/Efficiency Improvements at Existing Hydropower Infrastructure

The potential for new conventional hydropower generation is not only about adding new capacity at non-powered dams. Existing hydropower facilities are also expanding through upgrades and efficiency improvements.

¹⁰ 2012 Non-Powered Dams Report, Executive Summary P.VII and VIII.

¹¹ 2012 Non-Powered Dams Report, Executive Summary P.VIII.

In fact, since EPCRA of 2005 and the inclusion of hydropower as an eligible technology in the production tax credit (PTC), over **150 projects** have received certification. These projects have seen, on average, about a **9 percent** gain in generation.¹² These 150 projects represent a small fraction of the hydropower fleet, so there are even further gains to be had if more projects undertake these kinds of upgrades.

And in many instances with these upgrades, the project realizes not only an increase in capacity or generation, but also an increase in environmental performance. The Wanapum Dam Turbine Replacement Project by Grant County Public Utility District in the state of Washington illustrates this. The project includes replacing the original turbines and replacing or refurbishing generating equipment at the dam. The advanced equipment is designed to be 3 percent more efficient. It will also reduce wear on the equipment and improve passage of juvenile salmon.¹³

NHA also notes from an infrastructure perspective that there is tremendous opportunity for re-investment in the federal hydropower system. Almost half of the U.S. hydropower generation comes from the federal system, with the bulk owned and operated by the U.S. Army Corps of Engineers, the Bureau of Reclamation and the Tennessee Valley Authority. The median age for federal hydropower projects is 50 years.¹⁴ Turbine and other equipment refurbishments (including repairs, replacements and upgrades) are available and can improve the performance of these projects both from an energy and environmental perspective.

Hydropower Pumped Storage

Pumped storage is a modified use of conventional hydropower technology to store and manage electricity. As shown below, pumped storage projects store potential electricity by circulating water between an upper and lower reservoir.¹⁵

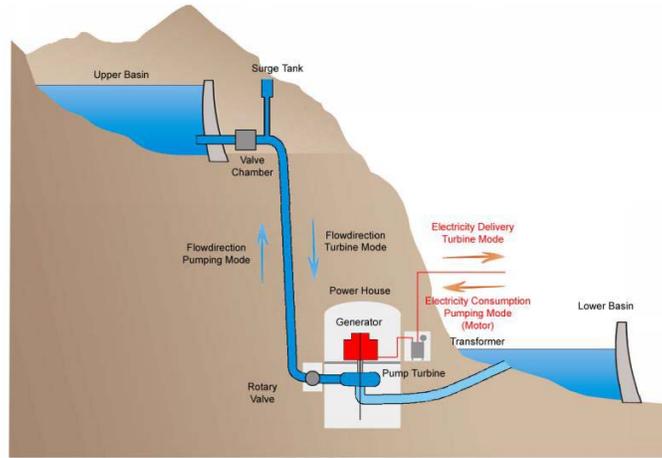
Electric energy is converted to potential energy and stored in the form of water at an upper elevation. Pumping the water uphill for temporary storage “recharges the water battery” and, during periods of high electricity demand, the stored water is released back through the turbines and converted back to electricity like a conventional hydropower station. See illustration below.

¹² Federal Energy Regulatory Commission data.

¹³ <http://www.grantpud.org/your-pud/projects/wanapum-dam-turbine-and-generator-replacement-project>

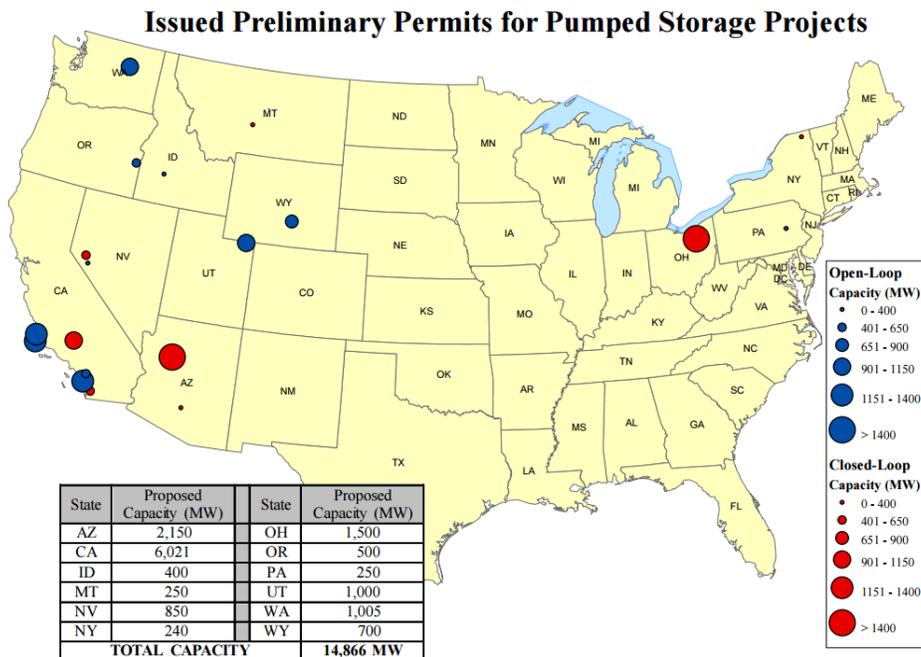
¹⁴ Hydropower Vision, Chapter 2, Page 147.

¹⁵ Illustration provided by GE Renewable Energy.



Pumped storage projects able to rapidly shift, store, and reuse energy generated until there is the corresponding system demand and for variable energy integration. This energy shifting can alleviate transmission congestion, which helps more efficiently manage the electric grid, and can reduce the need for costly new transmission projects, as well as to avoid potential interruptions to energy supply.

As more intermittent generation is added to the grid, particularly in the West, the need for the services that pumped storage provides is increasing. As a result, we are seeing a significant renewed interest in these projects, including closed-loop project proposals.¹⁶ As the map below shows, there are currently close to **15,000 MW** of proposed new pumped storage projects before FERC with preliminary permits right now.



Source: FERC Staff, January 12, 2017

Note: Preliminary determination of open- vs. closed-loop classification based on preliminary permit application.

¹⁶ Closed loop pumped storage projects are physically separated from existing river systems. They present minimal to no impact to existing river systems because after the initial filling of the reservoirs, the only additional water requirement is minimal operational make-up water required to offset evaporation or seepage losses.

Again, NHA recognizes that not all of these projects may be developed, however, they clearly rebut the proposition that hydropower is a “tapped out” resource.

Marine Energy and Hydrokinetics

With more than 50 percent of the U.S. population living within 50 miles of coastlines, there is vast potential to provide clean, renewable electricity to communities and cities across the United States using marine and hydrokinetic (MHK) technologies. MHK technologies extract energy from waves, tides, ocean currents, rivers, streams, and ocean thermal gradients. Though still in its early stages of development as a whole, the MHK industry continues to move forward with new technological innovations, test site developments, and demonstration projects.¹⁷ DOE assessments have estimated that the total marine resource potential represents up to 25 percent of projected U.S. electricity generation requirements by 2050.¹⁸



Conduits

Conduit projects utilize existing tunnels, canals, pipelines, aqueducts and other manmade structures that move water. These are fitted with electric generating equipment and are often small projects that are able to extract power from the water without the need for additional infrastructure or a reservoir.

One of the prime opportunities in this sector is at Bureau of Reclamation infrastructure. In a recent study, Reclamation identified 373 potential sites with a capacity of 103 MW, enough to power 33,000 homes.¹⁹

¹⁷ Photo below of technology demonstration of Columbia Power Technologies of Charlottesville, Virginia

¹⁸ <https://energy.gov/eere/water/marine-and-hydrokinetic-resource-assessment-and-characterization>

¹⁹ Site Inventory and Hydropower Energy Assessment of Reclamation Owned Conduits (Final Report - March 2012). <https://www.usbr.gov/power/CanalReport/>

In addition, as a result of the expedited review of non-federal conduit projects under the Hydropower Regulatory Efficiency Act of 2013, the Federal Energy Regulatory Commission (FERC) has approved dozens of small conduit projects across the country.²⁰²¹



Also, in 2013, legislation was passed focused on similar small conduit development at Bureau of Reclamation infrastructure and Reclamation has made changes to its lease of power privilege (LOPP) program. Reclamation continues to see increased interest in these project opportunities as well.²²

New Stream-Reach Development

Lastly, the DOE has also recently conducted a study of potential new greenfield projects. The assessment concluded that the technical resource potential is 85 GW of capacity. When federally protected lands—national parks, national wild and scenic rivers, and wilderness areas—are excluded, the potential is about 65 GW of capacity.²³ Not all of these new hydropower opportunities are likely to move forward once site-specific considerations are taken into account. Site selection will be an important factor. Additionally, the industry and the DOE are investigating innovative new technologies and operational regimes to see where some of this potential can be realized, while also minimizing potential impact.

Challenges for Hydropower and Policy Needs

To begin, hydropower has the longest, most complex development timeline (for project relicensing or new project approvals) of any of the renewable energy technologies, with some

²⁰ <https://www.ferc.gov/industries/hydropower/indus-act/efficiency-act/qua-conduit.asp>

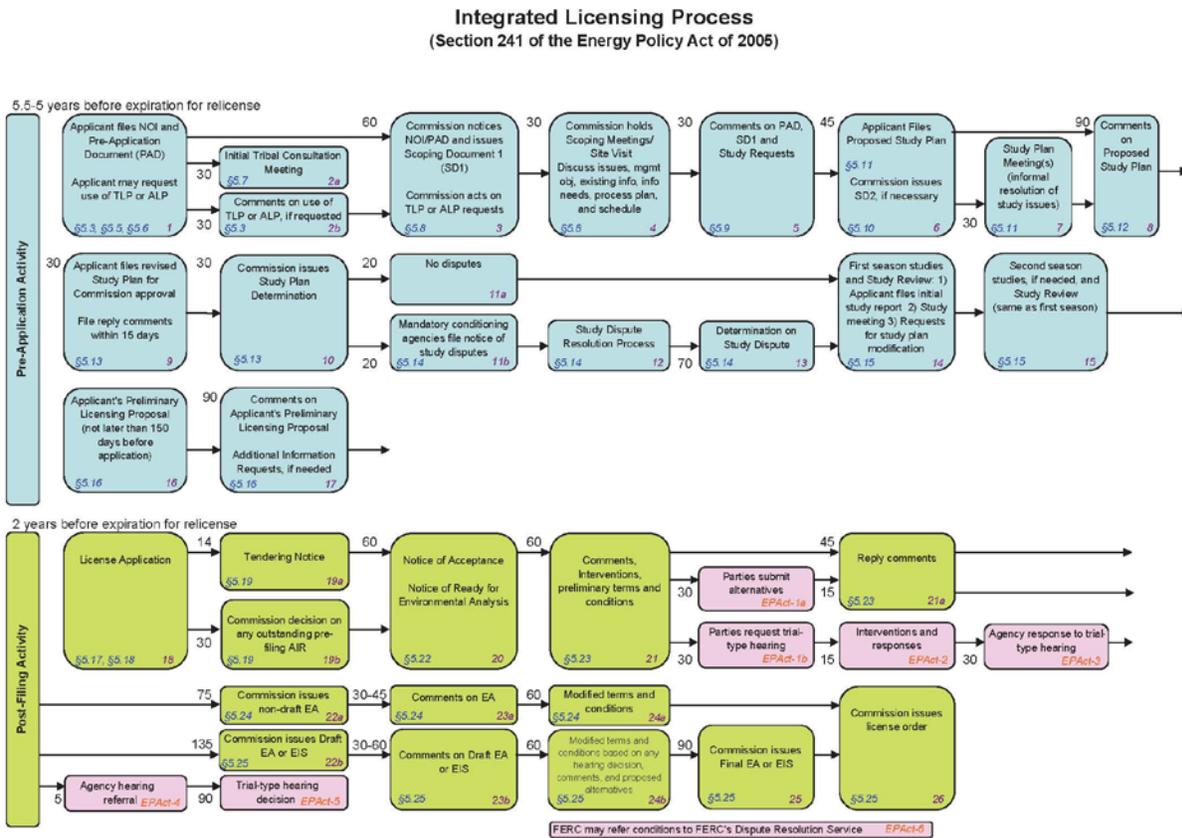
²¹ Picture of Natel Energy, Monroe Hydro Project, a 250 kw hydroelectric plant located in an irrigation canal, in partnership with Apple.

²² <https://www.usbr.gov/power/LOPP/index.html>

²³ <http://www.energy.gov/eere/water/downloads/new-stream-reach-hydropower-development-fact-sheet>

projects taking **10 years or longer** from the start of the licensing process through construction to being placed-in-service.

This process requires a considerable up-front financial commitment from the developer or asset owner to undertake the engineering and environmental studies required for various federal and state approvals. The chart below outlines the integrated licensing process or ILP, the default process, of several, for authorizing hydropower projects.



*Section 241 of the Energy Policy Act of 2005 in pink

A multitude of federal and state agencies, as well as the public and other stakeholders, play a major and important role in the process. And in the chart above, additional authorizations such as those required by federal dam owners if building on their infrastructure, are not included. These decisions and authorizations have tended to come at the end of the timeline after the FERC issuance of the license.

Water is a public resource and NHA and the industry recognize the necessity for and value of thorough review of project applications. However, redundancies and sequential reviews contained in the overall process are key reasons for delays. For example, for projects adding generating facilities to non-powered federal dams, FERC may issue a license, yet that project cannot commence construction until it has received additional approvals from the federal owner

of the dam (Corps of Engineers or Bureau of Reclamation). If there are unanticipated delays for those additional needed approvals, no work can commence. It is a similar case for state issuances of Clean Water Act Section 401 water quality certifications. A license cannot be issued, nor work commenced, until the certificate is approved.

NHA believes the time, cost and risks associated with licensing hydropower projects are not commensurate with the impacts, particularly when compared with other forms of generation – conventional or renewable. As former NHA President John Suloway testified before Congress in 2015²⁴, because of this, when faced with the choice of what type of generation to install, there is less risk in choosing a simple cycle turbine or a combined cycle plant that burns natural gas or low-sulfur oil, than building a hydropower plant.

While there is some variability with regard to size and location, the regulatory approval processes for simple cycle turbine or combined cycle plants are generally 1-2 years – even in urban areas like New York City. The FERC licensing process for hydro plants is generally 8 years or more, including both licensing and pre-filing activities. With regard to licensing costs, a combined cycle plant is approximately \$1 to \$2 million; whereas, some studies alone can cost multiples of that figure for a hydropower project. It is not uncommon for a hydropower license applicant to spend \$10 million or more on just the licensing process.

And this is not just an issue for new project deployment, but also for existing projects that are undergoing relicensing. In fact, by 2030, **approximately 400 projects**, representing **18,000 MW** of capacity, will be in or have gone through relicensing. NHA has already begun to hear from owners of smaller projects, particularly in the Northeast, but across the country, that the process costs for licensing may render projects uneconomic and result in the surrender of licenses. As states continue to press for more clean and renewable energy resources, it would be unfortunate to lose the many benefits these existing hydropower projects provide.

NHA believes that Congress and the Administration should seek to reduce uncertainties in the hydropower licensing and relicensing processes, eliminate unnecessary and/or duplicative studies or other requirements, create discipline in the schedule, and reduce the time for obtaining federal and state approvals. In doing so, policymakers would be recognizing the value of hydropower as a critical component in the nation's energy supply portfolio. In addition, NHA believes process improvements can maintain the substantive ability of federal and state regulators to appropriately protect, mitigate and enhance natural resources.

Another issue that holds back hydropower is its limited recognition, or the complete lack thereof, as a renewable and/or clean energy resource under federal or state programs/environmental markets. State renewable portfolio standards provide one good example, and often contain restrictions on the amount of hydropower that is eligible. These include: project capacity limitations (30 MWs or less); placed-in-service restrictions (no eligibility for existing generation); resource and technology limitations (i.e. existing infrastructure; no new dams; capacity uprates or efficiency improvements only); explicit operational or impact criteria (run-of-river; low-impact certified), among others.

²⁴ <https://energycommerce.house.gov/hearings-and-votes/hearings/discussion-drafts-addressing-hydropower-regulatory-modernization-and>

On the federal side, there are many recent examples of initiatives related to renewable energy development on public lands, federal renewable energy procurement policies, and government-wide sustainability goals that either excluded hydropower as an eligible renewable technology, or qualified hydropower in a way that significantly reduces (or effectively eliminates) its ability to participate.

For example, in 2015, Executive Order No. 13,693 utilized a definition of “renewable electric energy” that includes only new hydroelectric generation capacity achieved from increased efficiency or additions of new capacity at an existing hydroelectric project and yet excludes generation added to non-powered dams and others.²⁵ Another example is the 2012 U.S. Army Corps of Engineers proposal for “Large Scale Renewable Energy Production for Federal Installations”, which completely excluded hydropower as an eligible resource. And also, the EPA’s Green Power Partnership Program significantly limits the definition of qualifying hydropower. When hydropower is not included and recognized as a renewable resource on par with other resources like wind and solar, it creates a distinct economic and market disadvantage for the industry participants (existing asset owners and developers alike).

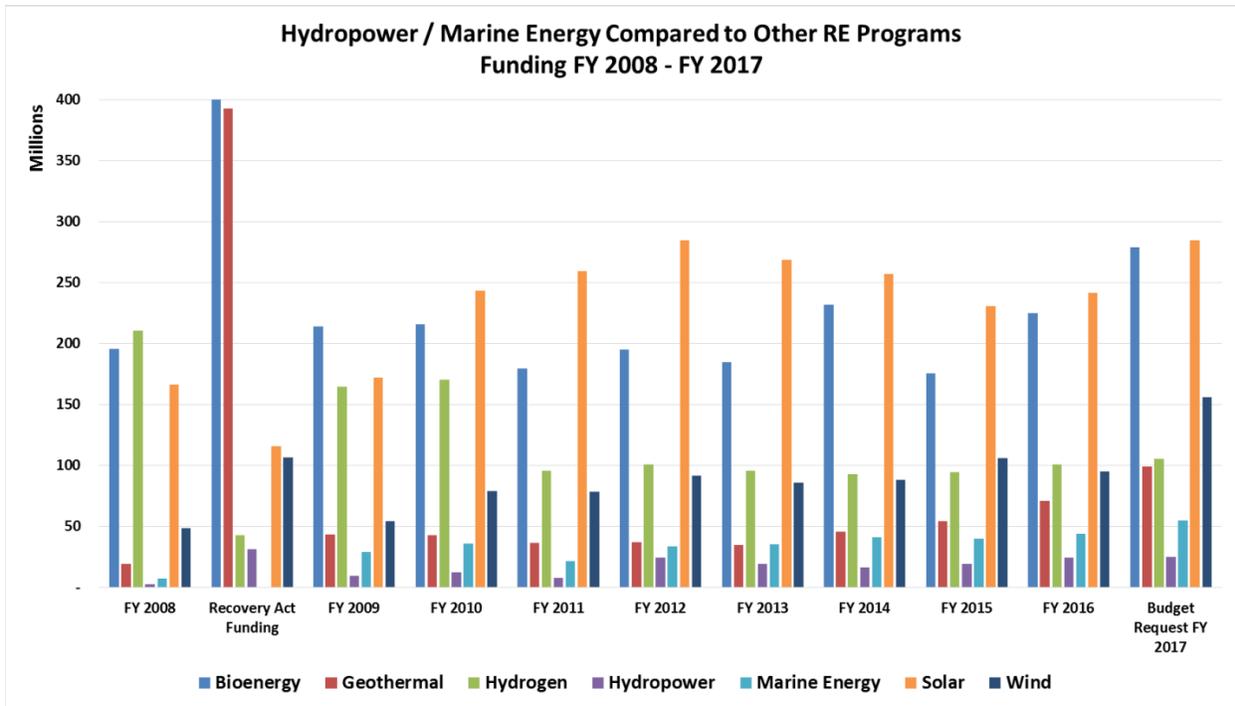
This disadvantage is no more clearly illustrated than in the context of the extension of the renewable energy tax incentives (Section 45 production tax credit (PTC) and Section 48 investment tax credit (ITC)). The PATH Act of 2015 created a competitive imbalance between incentives for wind and solar and other renewables, including hydropower. While the PTC and ITC for hydropower, MHK, and other technologies was extended through the end of 2016 (now lapsed), the credits for electricity produced from wind and solar facilities was extended for years longer. This on top of the fact that the hydropower industry, only receives, and has only ever received, half-credit under the PTC since becoming eligible years after the program was created for the wind industry.

As hydropower projects continue to compete for investment dollars, the policies adopted at the end of 2015 tipped the scales against investment in hydropower, putting the industry at a distinct disadvantage – a disadvantage that is magnified when you include the RPS policy treatment other renewable resources have as described above. NHA is working to fix this inequity to allow hydropower resources to better compete in the marketplace without the thumb on the scale tipped in favor of other renewable resources in the tax arena.

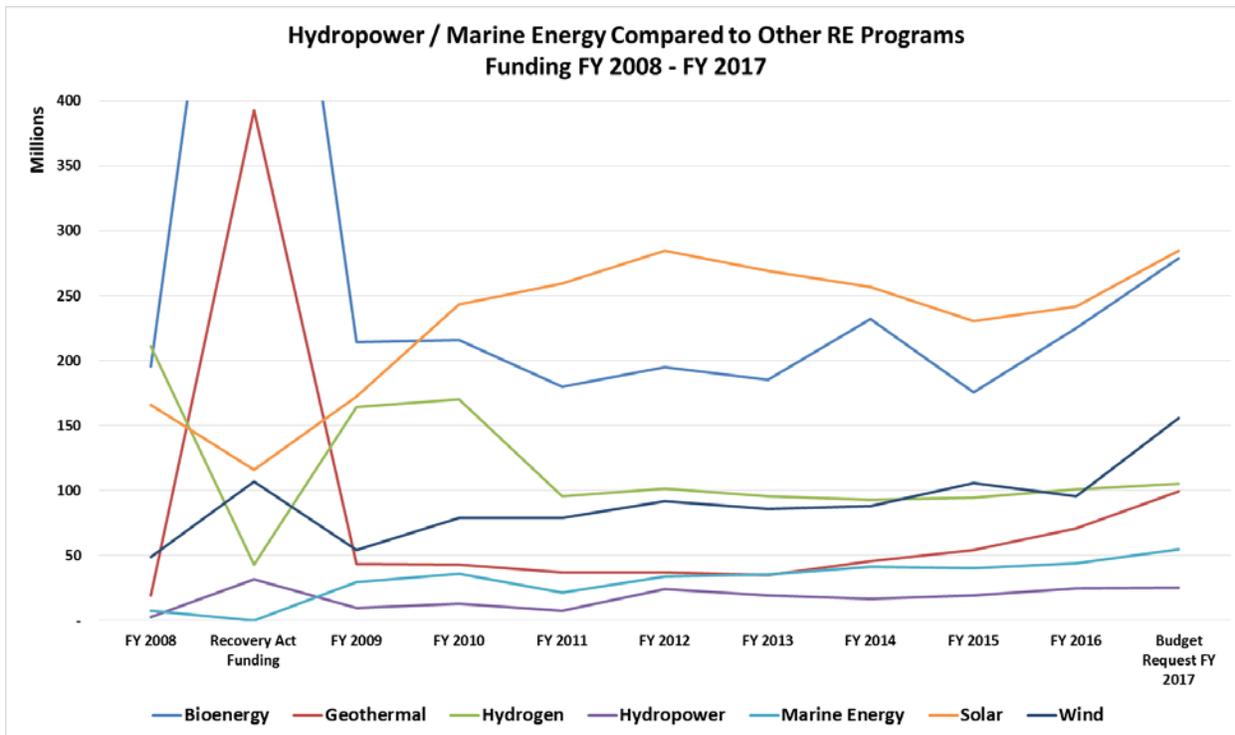
Lastly, on the federal policy front, NHA highlights investment in R&D for technology innovation. The DOE Water Power program, which represents the single largest source of renewable electricity in the United States today, still remains one of the smallest of the Office of Energy Efficiency and Renewable Energy (EERE), particularly when compared to the funding levels for other EERE programs.

The graph that follows charts the funding levels for the EERE programs from FY 2008 through the Administration’s FY 2017 funding request, including American Recovery and Reinvestment Act of 2009 (ARRA).

²⁵ Fixing America’s Surface Transportation Act (Pub. L. No. 114-94) Executive Order No. 13,693, Planning for Federal Sustainability in the Next Decade (2015)



The next graph below presents the same information, but more clearly shows the trend lines through time for each individual renewable energy technology program.



NHA appreciates and is encouraged by the growing investments by Congress in the DOE's Water Power program activities in recent years. However, as these charts clearly indicate, the

level is still substantially below that afforded other EERE programs, with the hydropower program receiving the least funding, followed by the MHK program receiving the next lowest level of funding. One of the factors for the tremendous growth in other renewables over the last several years is the sustained investment shown by the federal government in technology R&D and market acceleration initiatives in these sectors.

One final policy area that NHA would like to raise is that of regional electricity/power markets. Similar to what was discussed above on the state and federal energy policy front, oftentimes the various grid benefits both hydropower and pumped storage projects provide are not valued or compensated in our existing electricity markets. NHA, in 2015, filed comments with FERC on this issue that we believe are useful in this discussion and highlight the need to re-examine policies in order to promote hydropower deployment.²⁶

In its filing, NHA notes:

“While energy storage projects are eligible to participate in some markets, there are several attributes of energy storage and specifically pumped storage units that are not currently addressed by these tariffs. Pumped-storage plants can offer significantly more benefits to the electric system than those commonly recognized by ISOs and included in the comments previously received by the ISO commenters. Specifically pumped storage plants can offer real time system inertia [see FERC 755 reference to flywheel effect], generator droop setting that can respond to system conditions instantaneously, and Automatic Voltage Regulation Control (AVR) that can adjust rotor field strength in real time. All three of these services can be provided by traditional hydropower generators as well and pumped storage plants. These three services are critical services that allow instantaneous response to grid conditions that keep the voltage and frequency stable as other services like AGC respond in the ultrafast 1-4 second time frame. Markets are not currently available to compensate for these services.

Additionally, energy storage devices are able to provide grid services that offset the need for new transmission and or distribution infrastructure. Under the current regulatory environment, energy storage plants are classified as a generation resource and are not currently eligible for to get a transmission rate of return for these services.”

Conclusion

Both the existing system and new hydropower projects have a critical role to play in meeting our nation’s energy, environment, and economic development objectives and much is at stake for hydropower and the families, businesses and communities that rely on its low-cost, reliable, renewable generation.

²⁶ See: Electric Storage Participation in Regions with Organized Wholesale Electric Markets, FERC Docket No. AD16-20-000

NHA and the hydropower industry stand ready to help meet our common clean energy goals and we look forward to working further with Congress and the Administration to find pathways to address the important policy issues – federal, regional and state – to fully maximize and unlock the potential of the hydropower resource.

As the Congress works to address our energy and infrastructure needs, whether that be on a new national infrastructure program or further work on an energy bill, policies that support the preservation of the existing hydropower system and promote the deployment of new projects (for all categories of water power technologies) must be included. A greater recognition that our hydropower infrastructure is incredibly valuable is needed, and continued investment and re-investment in the system is critical to our energy future and national security.

I thank the Committee for providing me this opportunity to testify and I look forward to answering your questions.