Written Statement

of

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on behalf of

The National Hydropower Association

before the

U.S. House of Representatives Subcommittee on Energy
Committee on Energy and Commerce

regarding

A hearing on the "State of the Nation's Energy Infrastructure"

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Summary

1) Both the existing system and new hydropower infrastructure projects have a critical role to play in meeting our nation's future energy, environment, and economic development objectives. As Congress works to address our energy and infrastructure needs, including a national infrastructure package, policies that support the hydropower system must be included.

2) The existing hydropower fleet has stimulated an investment of tens of billions of dollars, created hundreds of thousands of good-paying jobs and local economic opportunities. U.S. hydropower also has the potential to grow by nearly 50 GW from 101 GW of capacity in 2015 to 150 GW by 2050, stimulating further job growth, economic investment, and environmental benefits.

3) However, the benefits of hydropower are under direct threat by a series of policy decisions (both at the federal and state levels) that undervalue and handicap our hydropower resources. These include: an outdated, complex regulatory process; tax policy that picks winners and losers; the need for reinvestment in the federal hydropower system; and the lack of market policies that adequately compensate hydropower and pumped storage projects for the grid benefits they provide.

4) Addressing the issues preventing the investment in hydropower, particularly the licensing process, is an immediate need. This Subcommittee has done tremendous work in a bipartisan fashion to advance several pieces of hydropower-related legislation through the House. These bills would promote a variety of regulatory improvements for new hydropower development and relicensing of existing projects.

5) These hydropower bills are necessary to build a stronger hydropower industry. NHA urges their inclusion in any infrastructure package under development. Enacting these bills and improving the hydropower regulatory process is a way to move investment in hydropower infrastructure forward without major cost to the U.S. government.

Introduction

Good morning Chairman Upton, Ranking Member Rush, and members of the Subcommittee. I am John Devine, a past president of the National Hydropower Association, and I appear before you today on behalf of NHA. I am a Senior Vice President with HDR, an employee-owned engineering, architectural, and consulting firm with more than 9,000 professionals in over 185 locations worldwide. HDR's hydropower group provides the full range of hydropower-related services, including engineering, regulatory, and environmental expertise.

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 230 companies from Fortune 500 corporations to family-owned small businesses. Our members include both public and investor-owned utilities, irrigation and water supply entities, independent power producers, developers, equipment manufacturers and other service providers.

I am pleased to be here to discuss the importance of hydropower infrastructure to the U.S. electric system as well as the economic and job growth opportunities further investment in that infrastructure can stimulate in local communities across the country. I also appreciate this opportunity to discuss the importance of addressing regulatory improvements and other policy measures that are needed to drive this re-investment in our nation's hydropower infrastructure.

In addition to my testimony today, I would refer the Committee to several previous statements submitted to the Subcommittee in the last year related to these issues. These statements include: 1) testimony of Ramya Swaminathan, CEO of Rye Development, at the March 13, 2017 hearing "Modernizing Energy Infrastructure: Challenges and Opportunities to Expanding Hydropower Generation"; 2) testimony of Jeffrey Leahey, NHA Deputy Executive Director, at the May 3, 2017 hearing "Legislation Addressing Pipeline and Hydropower Infrastructure Modernization"; and 3) testimony of Steven Wright, General

Manager of Chelan County Public Utility District No. 1, at the October 3, 2017 hearing "Part II: Powering America: Defining Reliability in a Transforming Electricity Industry".[1]

Over the last several years, this Subcommittee has done tremendous work in a bipartisan fashion to advance several pieces of hydropower-related legislation through the House. These bills would promote regulatory improvements for new hydropower development and relicensing of existing projects, as well as resource-specific bills including, adding generating facilities to existing non-powered dams, new closed-loop pumped storage, and small hydropower and conduit projects.

I commend and thank you for your leadership and believe your work on hydropower exemplifies the types of policy advancements that are needed to support infrastructure reinvestment in our country. These hydropower bills are necessary to build a stronger hydropower industry, which, in turn, will advance our economy and create new jobs. I support and urge their inclusion in any infrastructure package under development.

Background on Hydropower Infrastructure, including Jobs and Economic Impacts

Hydropower has provided clean, reliable, renewable power for our nation for over a century. Currently, the U.S. conventional hydropower fleet is made up of almost 2200 individual plants with a total capacity of over 80 GW. In the last two years, these plants provided approximately 6-7 percent of all U.S. electricity generation, making hydropower the single largest provider of renewable electric power in our country.[2] Looking over the long term, hydropower has supplied a cumulative 10 percent of U.S.

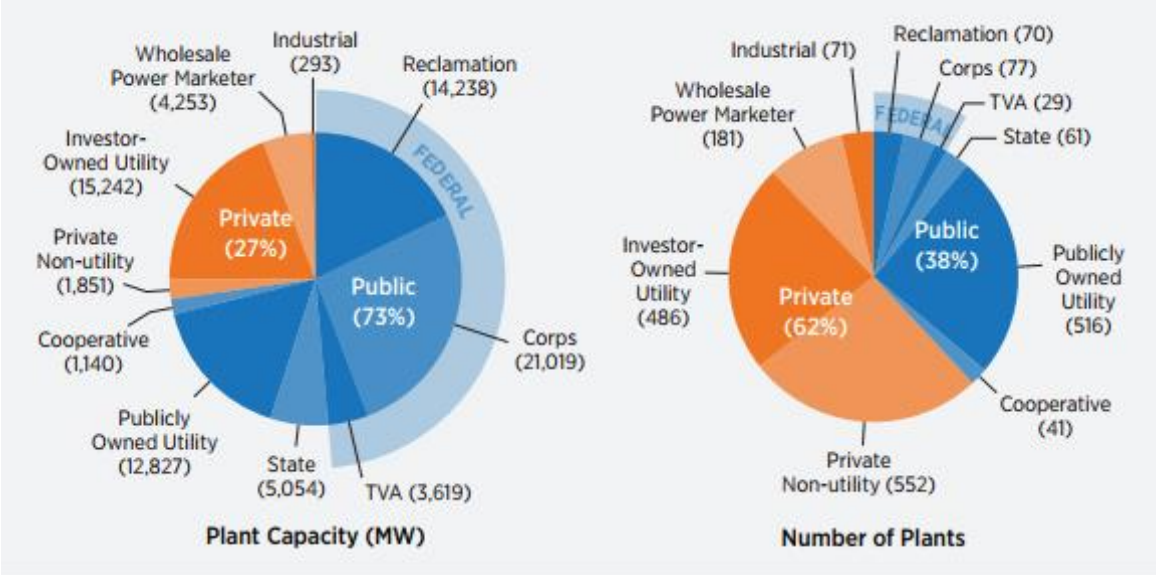
[1] http://docs.house.gov/meetings/IF/IF03/20170315/105702/HHRG-115-IF03-Wstate-SwaminathanR-20170315-U1.pdf
http://docs.house.gov/meetings/IF/IF03/20170503/105916/HHRG-115-IF03-Wstate-LeaheyJ-20170503.pdf
http://docs.house.gov/meetings/IF/IF03/20171003/106457/HHRG-115-IF03-Wstate-WrightS-20171003-U3.pdf

[2] Business Council for Sustainable Energy and Bloomberg New Energy Finance Sustainable Energy in America Factbook 2018, Slide 25. http://www.bcse.org/sustainableenergyfactbook/#

electricity generation over the past 65 years (1950-2015), and 85 percent of cumulative renewable power generation over the same time period. [3]

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.[4]

Additionally, the ownership of the hydropower fleet is unique in that nearly half of the capacity is owned by the federal government through the U.S. Army Corps of Engineers, Bureau of Reclamation, and the Tennessee Valley Authority. The figure below from the Department of Energy's 2016 Hydropower Vision Report illustrates the diverse ownership mix of projects.



Note: The region delineation is based on Federal Energy Regulatory Commission hydropower regions.

Source: Uría-Martínez et al. 2015[2]

Figure 2-7. U.S. hydropower plant ownership mix: capacity (left) and number of plants (right)

[3] 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/2018/02/f49/Hydropower-Vision-021518.pdf

[4] 2016 Hydropower Vision Report, Executive Summary P. 9.

Over its lifetime, the existing hydropower fleet has stimulated an investment of tens of billions of dollars and created hundreds of thousands of good-paying jobs and economic opportunities in localities across the country. Hydropower is a demonstrated economic driver, supporting jobs from engineering, environmental science, construction and operations and maintenance. The variety of jobs supported by hydropower infrastructure related work is expansive and includes: electricians, mechanics, engineers, biologists, hydrologists, construction workers, other contractors and equipment suppliers, project planners, administrative staff and information technology workers. And hydropower also offers other economic benefits and provides low-cost, reliable power to help businesses compete in a competitive environment.

In 2013, operations, construction, and upgrades at conventional hydropower plants supported in total approximately 143,000 jobs in the United States. Of this amount, hydropower O&M supports approximately 118,000 total ongoing full-time equivalent jobs nationwide. This translates into earnings of nearly $6 billion and economic activity or output of over $17 billion, as illustrated by the chart that follows.[5]

Table 2-8. Estimate of Employment, Earnings, and Output from the Operation of Hydropower Facilities (2013)

	Employment (FTE)	Earnings (Millions, $2004)	Average Annual FTE Earnings ($2004)	Output (Millions, $2004)
Onsite	23,000	$1,300	$56,000	$1,300
Supply Chain	54,000	$2,800	$52,000	$10,400
Induced	41,000	$1,800	$50,000	$5,400
Total	118,000	$5,900	$53,000	$17,100

Sources: Navigant [254] (for onsite employment data only); remainder of data from JEDI

[5] 2016 Hydropower Vision Report P. 202.

In addition to the jobs resulting from the operation of existing projects, an additional 25,000 jobs are supported nationally by hydropower construction and upgrades. These numbers translate into another $1.4 billion in earnings and nearly $3.3 billion in economic output.

These economic benefits are further amplified by the positive environmental attributes that affordable, reliable, renewable hydropower brings to the U.S. grid; such as cleaner, healthier air as well as lower carbon emissions.

Finally, hydropower infrastructure provides many other public benefits including: water supply; flood control; drought mitigation; irrigation; recreation; and navigation. Each of these uses can provide net economic benefits to the region surrounding a hydropower facility.

The benefits of the existing hydropower infrastructure are clear; however, the industry is also poised for significant growth. The Hydropower Vision analysis finds that U.S. hydropower could grow by nearly 50 GW, from 101 GW of capacity in 2015 to 150 GW by 2050. Growth would result from a combination of 13 GW of new hydropower capacity (upgrades to existing plants, adding power at existing dams and canals, and some development of new stream-reaches), and 36 GW of new pumped storage capacity.[6]

The additional energy, economic and environmental benefits resulting from this growth are substantial, including the addition of tens of billions of dollars in cumulative economic investment and an additional 76,000 hydropower related gross jobs spread across the nation in 2050.[7]

[6] 2016 Hydropower Vision Report, Executive Summary P. 1.
[7] 2016 Hydropower Vision Report, Executive Summary P. 24.

Undervaluing Hydropower Threatens Its Future

Because of all of the above, NHA believes energy project deployment and project reinvestment, in the hydropower, pumped storage and marine energy sectors, is a necessary part of the conversation in the infrastructure debate.

The numerous and broad-based benefits hydropower projects provide are under direct threat by a series of policy decisions (both at the federal and state levels) that undervalue and handicap our hydropower resources. These include: an outdated, complex regulatory process, which takes years longer than that of any other energy resource and does not result in any concomitant benefit; tax policy that picks winners and losers, often leaving hydropower at a competitive disadvantage, even while the resource helps to support other renewable technologies; the need for reinvestment in the federal hydropower system; the lack of market policies that adequately compensate hydropower and pumped storage projects for the grid benefits and ancillary services they provide; and more.

NHA reiterates our strong support for policies that address the regulatory inefficiencies and improve the coordination and the effectiveness of the overall hydropower project approval process. We call on Congress, as well as 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 also protecting environmental values.

Hydropower Licensing Reform is an Infrastructure Issue

Hydropower has the longest, most complex development timeline (for existing project relicensing or new project approvals) of any of the renewable energy technologies, with many projects taking 10 years or longer from the start of the licensing process through construction to being placed-in-service.

With over 400 existing projects coming up for relicensing by 2030, many of the project owners face a difficult economic decision of whether to continue operations or cease generation. Already, industry members are announcing project closures, particularly small hydropower projects. The impending cost and uncertainty of the relicensing process is enough to dissuade some owners from moving forward.[8]

And this environment also impacts new project development. While the U.S. hydropower industry, along with the nascent marine energy sector, has the capacity to grow significantly, project developers report many investors are choosing to invest in other forms of generation with far shorter process timelines, clearer risk assessments, and, as a result, earlier returns on their investment.

This Subcommittee has been focused and working diligently over the last 4 years to address one of the main obstacles for investment in hydropower – the licensing and relicensing approval process. We continue to support the work of the Subcommittee to implement commonsense improvements to the hydropower licensing scheme. Without addressing these regulatory challenges, hydropower will continue to struggle to compete versus other energy options, particular wind, solar and natural gas, that can be permitted in half the time.

Any debate on infrastructure should include a discussion of how regulatory improvements can be included to unlock the potential in the hydropower industry and move new projects and existing project reinvestment forward, which will create significant local economic and jobs opportunities.

An extensive record has been developed on these issues both by this Subcommittee and in the House Natural Resources Committee. In the past year alone, project owners and developers from across the

[8] http://www.hydroworld.com/articles/2017/02/pg-e-announces-it-will-not-relicense-26-4-mw-desabla-centerville-hydro-facility.html.
http://klpd.org/vertical/sites/%7B423355D4-5FDE-44B4-800E-06FA53C5BD4%7D/uploads/Notice_of_Intent.pdf

hydropower sector representing all parts of the country have shared their concerns and ongoing issues. NHA would like to highlight some of their experiences as discussed in their testimony below:

Testimony of Ramya Swaminathan, CEO of Rye Development, discussing project deployment on existing non-powered dams, submitted on behalf of NHA –

"The timeline for a new hydropower development project to reach commercial operation is between 10 and 13 years, which is almost unmatched in the power generation space.

This disparity of timelines to commercial operation presents a formidable challenge to new hydropower development. Private investors in the power generation space find the length and complexity of hydropower's timeline difficult to manage. As a result, hydropower development becomes expensive due to the compounding of interest costs over long periods coupled with the unclear risk profile. When faced with these factors, many investors choose to invest in other forms of generation with far shorter timelines and clearer risk assessments."[9]

Testimony of Herbie Johnson of Southern Company discussing relicensing of existing hydropower projects, submitted on behalf of NHA –

"In the coming years, there is a significant number of hydro projects with expiring licenses that will need to go through relicensing, but the rising cost and the continuing regulatory uncertainty of the relicensing process creates real doubt about the future of many projects.

NHA believes that more efficient regulation is necessary both to protect America's existing hydropower assets and to create an opportunity to develop additional hydropower infrastructure both in the Southeast and across the nation. We believe that it is possible to achieve the same or

[9] http://docs.house.gov/meetings/IF/IF03/20170315/105702/HHRG-115-IF03-Wstate-SwaminathanR-20170315-U1.pdf. House Energy Subcommittee hearing on March 15, 2017.

even improved hydro licensing outcomes more quickly and predictably while protecting the important environmental and natural resources of our country."[10]

Testimony of Bob Gallo, CEO of Voith Hydro, on the positive economic impact licensing and permitting reform can have on U.S. manufacturing –

"We hope the Committee will continue its strong work to streamline the licensing process, and look for ways to boost production on federally-owned dams. Expanding hydropower helps companies like Voith Hydro and those in the 2,500-company strong national hydropower supply chain that accounts for $17 billion in economic output. More importantly, it also helps the American worker.

Voith Hydro is a perfect example. Though our workforce in the U.S. is already over 600 strong, our plant in York could accommodate a significant increase in work volume. And the good paying jobs that would be created are highly-skilled engineering and union manufacturing jobs that are the backbone of America."[11]

Investment in hydropower is an investment in a critical piece of our nation's infrastructure**.** NHA maintains its strong support for hydropower licensing improvements as a critical step to unlocking growth in the industry. As such, we encourage the Subcommittee to consider an infrastructure bill as a pathway to achieve these licensing improvements and urge your active participation in its development.

[10] https://naturalresources.house.gov/uploadedfiles/testimony_johnson.pdf. House Water, Power and Oceans Subcommittee hearing on May 3, 2017.
[11] https://naturalresources.house.gov/uploadedfiles/testimony_gallo.pdf. House Subcommittee on Water, Power and Oceans hearing on May 3, 2017.

Infrastructure Reinvestment Opportunities in the Hydropower System

The existing United States fleet of hydropower plants is aging. As a result, there are many opportunities to reinvest in this infrastructure - investments that can add capacity, expand output, improve efficiencies and increase overall performance, including from an environmental perspective.

At the beginning of 2011, hydropower plants comprised 24 of the 25 oldest operating power facilities in the United States, with 72 percent of facilities older than 60 years. Looking specifically at the federal hydropower system, the Department of Energy has reported, as of 2014, the average age of Corps of Engineer's hydropower facilities was 49 years, and, as of 2015, the average age of Bureau of Reclamation hydropower facilities was 58 years.

In their Hydropower Market Report updated last year, the DOE estimates that 42 hydropower rehabilitation and upgrade (R&U) projects at 34 existing plants were started in 2016 with a total estimated value of $1.2 billion. Of these, the Corps of Engineers is the owner with the largest number of new projects (23) but they account for less than 10 percent of total investment value. DOE also estimates the value of tracked R&U investment since 2007 is $8.5 billion distributed among 143 plants, averaging $850 million/year in 2007-2016.[12]

NHA believes this data demonstrates the tremendous economic benefits waiting to be triggered by re-investment in the existing hydropower system. We also believe that even though the industry, both federal and non-federal, is making investments, that the opportunity exists to do even more, particularly on the federal system.

[12] https://www.energy.gov/sites/prod/files/2017/04/f34/US-Hydropower-Market-Report-2017-Update_20170403.pdf Slide 5.

Tax and Market Policy Changes Would Incentivize Development of Hydropower Infrastructure

With the recent passage of the Bipartisan Budget Act of 2018, NHA also wants to highlight the ongoing disparity of treatment of hydropower versus other renewable energy technologies. The Act included only a one-year retroactive extension of the hydropower and marine energy tax credits through 2017, which provides no certainty for project developers seeking to finance their projects right now. Coupled with the fact that the Congress has extended for several years the tax credits for other renewable resources (wind, solar, fuel cells, etc.), the hydropower industry is placed at a severe economic disadvantage.

At a time when we are seeking ways to strengthen grid reliability and resiliency, why would Congress seek to disadvantage the premier flexible and renewable technology like hydropower? This isn't just playing renewable energy favorites, it fundamentally misunderstands hydropower's role, and the benefits it brings, to our nation's electricity grid now and for the future.

Another issue impacting hydropower deployment is the lack of appropriate compensation for the benefits and services hydropower brings to the grid system, this includes the valuing of hydropower in power markets as well as environmental markets.

In fact, NHA recently commissioned an environmental markets study that puts a finer point on the economic disadvantage hydropower faces in the marketplace. The study analyzed federal and state policies that incentivize renewable energy technologies, such as federal tax credits as well as state Renewable Portfolio Standards. Not surprisingly, since the participation of hydropower is limited under these policies, the study conservatively identified a value gap of over $1.5 billion dollars annually that the hydropower industry could receive if supported similarly to other renewable technologies.

NHA believes the Department of Energy stated the market problem well in the Hydropower Vision Report:

> "Inherent market and regulatory challenges must be overcome to realize hydropower's potential to improve grid flexibility and facilitate integration of variable generation resources. The full valuation, optimization, and compensation for hydropower generation and ancillary services in power markets is difficult, and not all benefits and services provided by hydropower facilities are readily quantifiable or financially compensated in today's market framework. In traditional and restructured markets, as well as in emerging environmental markets, many hydropower services and contributions are not explicitly monetized. In some cases, market rules undervalue operational flexibility, which is important to maintaining grid reliability and is a prime attribute of hydropower."[13]

Hydropower is capable of the full range of services required by electricity transmission grid, including system regulation and balance of supply and demand, voltage and frequency support, stability, and black start capability. Hydropower's ability to rapidly ramp generation up and down in response to changes in the balance between electrical loads and generators facilitates integration of variable renewable generation, such as wind and solar.

NHA believes that better valuation and compensation of hydropower and pumped storage within power markets for its grid services, as well as hydropower's recognition and participation in renewable and clean energy markets, is needed.

[13] 2016 Hydropower Vision Report, Executive Summary P.12

Conclusion

Both the existing system and new hydropower projects have a critical role to play in meeting our nation's future energy, environment, and economic development objectives.

As the Congress works to address our energy and infrastructure needs, including work on a national infrastructure package, policies that support both the preservation of the existing hydropower system and investment in upgrades and new projects 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 Subcommittee for providing me this opportunity to testify and I look forward to answering your questions.