



American Rivers
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Testimony before the
Committee on Energy and Natural Resources
United States Senate

Opportunities and Challenges for Maintaining Existing Hydropower Capacity,
Expanding Hydropower at Non-powered Dams, and Increasing Pumped Storage
Hydropower

January 11, 2022

Chairman Manchin, Ranking Member Barrasso, and Members of the Committee:

Thank you for this opportunity to share the perspective of American Rivers and the Hydropower Reform Coalition on the topic of “Opportunities and Challenges for Maintaining Existing Hydropower Capacity, Expanding Hydropower at Non-powered Dams, and Increasing Pumped Storage Hydropower”. Our organizations have worked for decades on hydropower dams and the policies that affect them and we welcome the opportunity to share our expertise and perspectives with the committee.

American Rivers is a national non-profit organization working to protect and restore rivers and streams for the benefit of people, fish and wildlife. Since 1973, American Rivers has helped protect and restore more than 150,000 miles of rivers through advocacy, science and on-the-ground projects with local partners. We have deep expertise and dedicated programs focused on dams, hydropower, and river restoration.

Founded in 1992, the Hydropower Reform Coalition is a diverse consortium of more than 160 national, regional, and local conservation and recreation organizations dedicated to protecting and restoring rivers affected by hydropower dams, ensuring public access to these lands and waters, and reforming the federal licensing process to ensure public participation and to improve the quality of the resulting decisions. The Coalition’s combined membership represents more than 1.5 million people across the country. Working together, the Coalition has protected or restored thousands of river miles, thousands of acres of watershed land, and countless opportunities for boating, fishing, and other recreational experiences.

1. Maintaining Existing Hydropower Capacity Opportunities to Expand the Value of Hydropower

When exploring challenges and opportunities to maintaining existing hydropower, it is important to understand hydropower in the context of other new energy development. In 2020 alone, more than 19 GW of new solar power and 16 GW of wind power were brought online in the United States.¹ Solar installations were led by California, Texas, Florida, Virginia, and North Carolina, while the biggest increase in wind production occurred in Texas, Iowa, Oklahoma, Wyoming, and Illinois.² These states span the entire geographic and political spectrum of the United States. For context, the July 2016 U.S. Department of Energy *Hydropower Vision Report* evaluated the potential for increasing hydropower

¹ Solar Energy Industries Association. (n.d.) *Solar Market insight Report 2020 Year in Review*. <https://www.seia.org/research-resources/solar-market-insight-report-2020-year-review> (last visited January 5, 2022); and American Clean Power. (n.d.) *Clean Power Annual 2020*. Available at <https://cleanpower.org/wp-content/uploads/2021/07/ACP-CPA-2020-Public.pdf> (last visited January 6, 2022).

² *Id.*

production in the U.S.³ The Report stated that there is potential to add 1.7 GW of new hydropower capacity by 2050⁴ through constructing new dams.⁵ This is just a small fraction of the wind and solar installed in 2020 alone. In addition, the report stated that the United States could add 11.1 GW of new hydropower capacity by upgrading existing projects and retrofitting non-powered dams with hydropower capabilities by 2050.⁶ While there is certainly potential to retrofit existing dams, it is doubtful that these facilities will be able to compete in the emerging energy marketplace, unless they have grid-regulating capabilities.

In the past, many have focused on total energy production as the metric to consider when quantifying opportunities for expanding hydropower. However, simply calculating the gross number of electrons that a project can produce is no longer adequate. Instead, the future of hydropower should focus on the value it provides in the context of rapidly changing energy markets. As solar generation increases in California and other energy markets, there is an increasing risk of over-generating power in the middle of the day.⁷ This phenomenon, formally known as the “duck curve,” highlights the fact that bringing on more baseload generation in today’s marketplace is akin to bringing sand to the beach. Simply put, the projects that will have the most value in the immediate and foreseeable future are those that can provide complementary grid regulation as renewables like wind and solar continue to rapidly come online. To this end, FERC can improve their analysis of license applications by including an assessment of whether projects are capable of regulating the grid while maintaining or improving the integrity of the aquatic environment and recreational values of the waterway. This is something that is already happening. We have found that it is possible to actually increase the grid regulating capabilities of a project while providing additional flows to the river. It is this type of smart operation combined with efficient environmental protection that is the future of hydropower and not the construction of new projects on free-flowing rivers.

Lastly, a critically important finding of the Department of Energy’s 2016 *Hydropower Vision Report* is that building new dams will cost more in both investment dollars and negative impacts to clean water, wildlife, and rural economies than it is worth. The Report concluded that efforts to expand hydropower production should instead focus on promoting efficiency, retrofitting suitable non-powered dams, and upgrading the century-old technology that is present in far too many currently operating hydroelectric projects. We agree. As the near-catastrophic spillway failure of the Oroville Dam on the

³ U.S. Department of Energy, Wind and Water Power Technologies Office. *Hydropower Vision Report*. July 2016. Available at: <https://www.energy.gov/eere/water/new-vision-united-states-hydropower> (last visited January 6, 2022).

⁴ *Hydropower Vision Report* at p. 4.

⁵ See generally, *Hydropower Vision Report*.

⁶ *Id.* at 18.

⁷ Scottmadden Management Consultants, *Revisiting the California Duck Curve: An Exploration of Its Existence, Impact, and Migration Potential*, October 2016. Available at: <https://www.scottmadden.com/insight/revisiting-duck-curve-exploration-existence-impact-migration-potential/> (last visited January 6, 2022)

Feather River in 2017 demonstrates,⁸ the hydropower industry needs to be focused on maintaining their existing projects before considering any expansion. We oppose and strongly discourage any incentives or initiatives aimed at building new hydropower dams. The future of hydropower is in the smart and responsible operation of the existing system to better meet the needs of the grid, with modest additions to capacity at existing dams. The Committee should focus its attention there.

In considering how to increase the value of hydropower and the ancillary service benefits it provides for grid regulation and integration with other renewable energy sources, it is also important to recognize that not all currently operating projects can provide these benefits. In cases where projects are not optimized to meet 21st century energy needs and have significant environmental and social justice impacts, project decommissioning and removal should be considered.

1.1 Encourage ongoing investment during the life of a license.

Owners of hydropower projects sometimes decline to invest in upgrades or efficiency improvements due to the costs of the amendment process and risks of opening up their FERC license. This has prevented or delayed upgrades and capacity additions that could be beneficial to rivers.

The *21st Century Dams Act*, introduced by Rep. Kuster in the House with two companion bills introduced in the Senate by Senators Cantwell and Murkowski and Senator Feinstein, will help address this problem. These bills are focused on improving public safety, enhancing clean energy output, and restoring the health of our nation's rivers and are supported by a coalition of environmental NGOs, dam safety officials, the hydropower industry, and hydropower reform advocates. These common-sense solutions will incentivize dam owners to invest in dam safety, environmental improvements, and grid flexibility and will improve the safety and renewable energy generating capacity of federally-owned dams while reducing their environmental impacts.

1.2 Address sedimentation at BOR dams

Reclamation dams serve a wide array of purposes including hydropower, water supply, flood control, and recreation. Most were engineered to accommodate sedimentation throughout the first 100 years of operation. However, many Reclamation dams are now over 100 years old and the average age of all facilities is 67 years old. Sedimentation is and will continue to be a growing problem that threatens the longevity and usefulness of these facilities. As sediment builds up and fills in the reservoirs behind Reclamation dams, the hydropower generation potential decreases.

A proactive approach is necessary. With proper management, Reclamation facilities can continue to provide valuable services indefinitely. Failing to act, however, will eventually necessitate the retirement and removal of these facilities. We encourage the committee to support Reclamation in its efforts to assess and manage sedimentation at its 300-plus

⁸ The Oroville Dam 2017 Spillway Incident: Lessons from the Feather River.
<https://hydroreform.org/resource/the-oroville-dam-2017-spillway-incident-lessons-from-the-feather-river-basin-sept-2017/>

dams and reservoirs. Maintaining and properly managing the facilities that already exist is far less costly than removing facilities that have become obsolete and constructing new ones to replace them.

2. Expanding Hydropower at Non-Powered Dams Standards for Hydropower Development at Non-Powered Dams

Only 3% of the nation's approximately 90,000 dams generate power. As we look to expand renewable energy generation, we think that looking first to our existing infrastructure makes good sense. Adding power to the infrastructure we already have is cost-effective and can cut down on the time it takes to receive regulatory approvals.

Adding hydropower to non-powered dams is not without impact to the surrounding environment, though. We strongly advocate that any measures to promote or incentivize development of non-powered dams be paired with standards for such development that will ensure ecological impacts are minimized. We encourage the adoption of the following standards:

- Dams chosen for the addition of hydropower should not be FERC licensed or exempt.
- The non-power dam to which hydropower would be added was constructed before the date of enactment of any potential program,
- The non-power dam to which hydropower would be added meets current environmental and safety standards and is operated for some purpose other than hydropower (i.e flood control, navigation, water supply, etc.), and
- The project uses only existing releases, flows, or diversions from the dam to generate power and does not negatively change the operation, storage, or control functions of the dam or result in additional environmental impacts.

2.1 Improving the Process of Adding Hydropower to Existing Army Corps Dams

We have heard concerns from some in the hydropower industry that the FERC licensing process is duplicative of the process required by the U.S. Army Corps of Engineers (Corps) when installing hydropower at existing non-powered dams. However, given that Corps dams are taxpayer owned, authorized by Congress for specific purposes, and are generally considered critical infrastructure, it is essential that the Corps retain its authority to carefully consider the implications of alterations to their facilities when adding hydropower to their structures. Therefore, we agree with then-Director of the Office of Energy Projects at FERC, Ann Miles, when she testified before the Subcommittee in May 2015 that it might be advisable for the Committee to give the Corps the exclusive authority to regulate non-federal hydropower development at Corps infrastructure. To simplify the

process of adding hydropower to non-powered federal dams, the Committee should consider amending the Federal Power Act to remove these dams from FERC's jurisdiction.

3. Increasing Pumped Storage Hydropower

American Rivers and the Hydropower Reform Coalition recognize that pumped storage, batteries, and other emerging storage technologies have an important role to play in providing grid resiliency and helping to more deeply integrate intermittent resources such as solar and wind generation. As the nation builds more intermittent resources, the ability to store energy during periods of low demand and release it to the grid during periods of high demand will become increasingly important. Consistent with our recurring theme of using the infrastructure we already have, we believe that pairing storage with existing hydropower facilities may hold the greatest promise for increasing grid resilience while minimizing environmental impacts.

More thoroughly understanding how much storage the nation needs for grid resilience and how various existing and emerging technologies can efficiently and cost-effectively fill that role will be critically important in the coming years. More research from the Department of Energy and the National Labs is needed so that we can make informed decisions about how best to meet the demands of a clean energy future. We encourage the research and development of pumped storage at previously disturbed sites where the project will have minimal environmental and recreational impacts, such as: closed loop projects at abandoned mines,⁹ on reservoir systems with multiple storage impoundments, and on irrigation and navigation projects, where pumped storage reservoirs can provide additional public benefits such as stormwater management or flooding mitigation, and projects that operate with only one reservoir.

American Rivers and the Hydropower Reform Coalition recognize that newer technologies such as battery storage and fuel cell storage are emerging and may provide for equivalent grid benefits as pumped storage, with lower environmental, social, and recreational impacts to river systems. Battery storage technology is advancing rapidly and should be considered a viable alternative to pumped storage to stabilize the grid. Batteries are modular, have a smaller footprint and lower cost than pumped storage and can respond more quickly to rapid fluctuations in energy supply. Ultimately, the market will have the most significant role in determining which mix of energy storage solutions get us to the clean energy grid that we seek to develop. The key will be to develop those resources that have the lowest environmental footprint at the lowest cost.

There is no single “one-size fits all” solution to our nation's need for energy storage. Pumped storage hydropower will undoubtedly fill a niche in responding to that need, but we urge the committee to take a broad approach to storage technologies and to support research and development of a variety of storage technologies to meet the varied needs.

⁹ Closed loop pumped storage projects are not continuously connected to a naturally flowing water feature.

Conclusion

Thank you for the opportunity to share our thoughts and perspectives with you. American Rivers and the Hydropower Reform Coalition are eager to serve as a resource and stand ready to assist the committee in any way appropriate.

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