

Testimony of Richard R. Miller

On behalf of

The National Hydropower Association

Before the

U.S. House of Representatives Committee on Natural Resources

Subcommittee on Water and Power

Regarding

Proposed Fiscal Year 2011 Budget Request for the Bureau of Reclamation

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INTRODUCTION

Good afternoon, I am Rick Miller, Senior Vice President, Renewable Resources of HDR Engineering, Inc. located in Charlotte, North Carolina. In particular, HDR is an acknowledged leader in the hydropower industry. My firm's experience encompasses conventional hydropower, pumped storage, low-head applications, and ocean wave and tidal technologies, and we firmly understand how flexible energy generation such as hydropower can enable even greater penetration of variable generation, such as wind and solar.

HDR is a long time member of the National Hydropower Association (NHA).¹ I served as NHA President in 2008-2009, and have been a member of the Board of Directors for the past five years. I appear before you today on behalf of NHA.

NHA appreciates the opportunity to discuss Reclamation's FY 2011 Budget and its ability to meet the water and power challenges our Nation faces today and in the future.

Today, hydropower development is experiencing a renaissance, with thousands of megawatts of projects either proposed or in the development pipeline. In fact, a new report conducted on behalf of NHA found at least 60,000 MW of additional hydropower capacity could be brought online by 2025 from all waterpower technologies (conventional hydropower, pumped storage,

¹ NHA is a non-profit national association dedicated exclusively to advancing the interests of the U.S. hydropower industry, including new waterpower technologies – ocean, tidal, conduit and instream hydrokinetic power. It seeks to secure hydropower's place as a climate-friendly, renewable, and reliable energy source that serves national environmental, energy and economic policy objectives. Its diverse membership consists of more than 170 organizations including: public utilities, investor owned utilities, independent power producers, equipment manufacturers, environmental and engineering consultants and attorneys.

and hydrokinetics) leading to the creation of 700,000 cumulative direct and indirect jobs.² The majority of this new capacity could be realized by maximizing existing infrastructure and without the need to build new impoundments.

As the federal system accounts for about one-half of U.S. hydropower generation, Reclamation's facilities, as well as those of the Corps of Engineers, will play a major role in realizing this growth. Upgrading existing projects and electrifying existing non-powered dams are two of the most cost effective means to bring new renewable energy online.

One important statistic demonstrates this potential. There are over 80,000 dams located throughout the country, yet only 3 percent have a power plant associated with them. Many of these dams were built for other purposes: drinking water supply, flood control and navigation. NHA believes existing non-powered dams, including those owned by Reclamation, are an under-utilized energy resource; and development at these sites will have minimal impacts, as much of the environmental footprint has already been established.

New power development at existing dams has the added benefit of job creation in a number of key industries with economic benefits flowing to local communities. The most recent example is the 350 MW power development by AMP Ohio at existing Corps of Engineers locks and dams on the Ohio River. These projects are resulting in hundreds of new manufacturing and construction jobs in a number of states, driving the expansion of manufacturing facilities in

² *Job Creation Opportunities in Hydropower* (September 20, 2009).
www.hydro.org/Jobs%20Study/NHA_JobsStudy_Final%20Report_Final_Sept%202020.pdf

Pennsylvania and the creation of new facilities in Ohio. And these are good paying, family friendly jobs that our country desperately needs right now.

In addition to developing capacity at existing non-power dams, a large portion of additional hydroelectric potential is available by increasing the unit capacity at existing hydropower facilities, including those of Reclamation. Adding new units, upgrading existing turbines and generators already in place with new advanced technology, and other efficiency improvements are not only cost-effective, but are some of the most readily deployable renewable energy resources.

EPAct of 2005 Section 1834 Report on Federal Development

The Energy Policy Act of 2005 was landmark legislation for the development of hydropower resources and we congratulate Congress, and in particular this Committee's Leadership, in establishing a new paradigm for the most proven and reliable of renewable energy technologies.

Included as part of EPAct 2005, the Section 1834 joint report assessed the potential for increasing electric power production at federally owned or operated water regulation, storage, and conveyance facilities. While this report was a useful exercise in examining the potential for future development, the industry and Reclamation believes there are a greater number of opportunities than what was originally identified.

Reclamation has over 500 projects with power as a designated use; however, not all of the projects have been completed or authorized for construction. As outlined in the Section 1834

report, of these 500 plus projects, Reclamation determined that only six sites satisfied the physical and economic screening criteria for possible development.

The first screen of the report eliminated all sites having less than 10-feet of head and a capacity of less than 1 MW. By eliminating these sites, which have been traditionally difficult to economically develop utilizing conventional technologies, the potential for small, low-head applications was not analyzed. The study also did not explore existing Reclamation sites for their pumped storage potential – a proven energy storage technology and ideal option for firming the variability of other renewable power sources, such as wind and solar.

The report also stated, “This study is only an inventory-level analyses and should not in any way be interpreted as equivalent to a feasibility analyses”. The study was based upon traditional economic conditions and made the distinction that while sites may have physical or hydrologic hydropower potential, the project may be not be economically feasible under these conditions.

NHA supports Reclamation’s initiatives to update the report with a more current, comprehensive energy and economic analysis including: new development incentives, such as tax credits, clean renewable energy bonds (CREBs), renewable energy credits (RECs), and a potential future price on carbon offsets; as well as costs, such as those for transmission interconnection. NHA also supports Reclamation’s initiatives to re-evaluate the universe of potential projects and explore the application of new small, low-head technologies.

One obstacle to developing the hydroelectric potential at Reclamation sites appears to be the lease of power privilege process. A lease of power privilege to a non-federal developer is an

alternative to Federal power development. Lease of power privilege applies to power development at Reclamation projects where power is an authorized project purpose. However, if a proposed power development project is located at a Reclamation project where power is not an authorized project purpose, such development is subject to FERC licensing and municipal preference. To date there have been only four lease of power privilege developments at Reclamation sites. In contrast to this, there are approximately 35 Federal Energy Regulatory Commission-licensed projects by non-federal developers at Reclamation sites.

NHA believes that there have been more power developments at Bureau projects under the FERC process than through lease of power privilege because of the cost allocation process as it applies to new power development at lease of power privilege facilities. Such cost allocation appears to render new development uneconomic in most cases. Many development sites would utilize low-head potential at Reclamation's canal drops and water supply structures. The limited amount of energy available to generate revenue and the assumption of additional costs through a cost allocation process, significantly and negatively affects the financial viability of these small projects. Therefore, NHA recommends that serious consideration be given to providing the Commissioner of Reclamation authority to remove power as a project purpose at a particular Reclamation Project in order to facilitate hydropower development using the FERC process at projects where such a step would be in the public interest.

HYDROPOWER'S ROLE IN ENABLING VARIABLE GENERATION

Hydropower should be encouraged and supported to play an important part in enabling the integration of variable generation such as wind and solar. Hydropower provides significant

benefits and potentially even greater benefits in the future, if properly supported. Beyond the fact that it is renewable, climate friendly, and domestic, hydropower offers some unique advantages over other resource options.

Hydropower provides significant generation, peaking capacity, and ancillary services to bolster the reliability, stability, and resilience of the nation's transmission system. This includes frequency control, regulation, load following, spinning reserve, supplemental reserve and black-start capability. The August 2003 blackout on the east coast was a testament to these benefits, where hydropower projects in New York and elsewhere remained online and were critical in restoring power to the entire region.

In addition, as the U.S. significantly increases the amount of renewable resources in its overall portfolio, hydropower offers one other significant advantage. Hydropower is one of the few resources suited to "firming" variable or non-dispatchable resources such as wind. As the development of utility-scale wind, solar and other variable resources grows, the need for "firming" resources will become even more important. Without these "firming" resources, the value of variable or non-dispatchable resources is greatly reduced.

Bulk energy storage in the form of pumped storage hydropower can be a significant 'firming' technology by providing several benefits including grid scale storage, load balancing, frequency control, and incremental and decremental reserves. It has historically been used to provide reserve capability to balance load on a system and allow large thermal generating sources to operate at optimum conditions. With the advent of variable speed technology pumped storage

units, load following in the pump mode can be an additional significant grid benefit to follow variable wind ramp rates.³

One clear example of how hydropower provides these ‘firming’ capabilities is in Denmark. The strong electrical interconnections between Denmark, Norway, and Sweden are the foundation of Denmark’s ability to absorb the wind penetration it has. More importantly, this ability has much to do with the extent to which both Sweden and Norway rely on hydropower—which supplies 50% and nearly 100% of their respective generating needs from flexible hydropower stations. Sweden’s and Norway’s conventional hydropower output can be adjusted very rapidly as the highly variable wind power flows through the interconnections. Norway and Sweden, with their hydropower supplied grids, are generally able to accommodate power surges during high wind periods and can send energy back to Denmark during low wind seasons. It works because it is an integrated system utilizing a variety of energy technologies, energy storage and strong transmission interconnections.

Reclamation, with its significant geographic diversity of powered and non-powered dams across the Western United States, is uniquely positioned to provide a leadership role in the integration of variable renewable generation technologies.

Reclamation Opportunities for Hydropower Growth

³ *Opportunities in Pumped Storage Hydropower: Supporting Attainment of Our Renewable Energy Goals* (HydroReview, July, 2009)
<http://www.hydro.org/Pumped%20Storage%20Paper%20April%202009.pdf>

As stated previously, a large amount of hydropower potential includes increases in capacity and efficiency improvements. As the second largest generator of hydropower in the United States, NHA commends Reclamation for its work to develop and manage its hydropower resources.

Reclamation's power uprating program has increased the generating capacity of about one-third of its hydroelectric generators. The uprate program, begun in 1978, was essentially complete by FY2000 and has increased capacity at their facilities by nearly 1,800 MW and increased its renewable energy capacity by 12 percent. Budgetary consideration should include provisions for Reclamation to accelerate its power uprating program for the remaining two-thirds of its hydroelectric generators where it is both economically prudent and water resource operations can support the added output.

In addition, Reclamation and the Bonneville Power Administration (BPA) are currently exploring the modernization of the John W. Keys III Pump/Generating station, which is part of the Grand Coulee power complex. An upgraded pumped storage station can potentially be a short term bridging strategy to assist BPA with the integration of significant amounts of variable wind energy that are forecasted to come online in the Northwest in the near future.

Reclamation also has 7,911 miles of canals throughout its system. Conduit power opportunities in constructed waterways throughout the country, including those of Reclamation, have yet to be adequately assessed. These certainly represent an energy resource that is under-utilized and primed for development, particularly considering their minimal impacts. Support within Reclamation's budget to tap these opportunities is needed.

Finally, Reclamation has expressed interest in supporting the development of new small, low-head and hydrokinetic hydropower technologies through the creation of a new technology hydropower park (similar to centers established for ocean and tidal technologies). Such a park would allow developers to test new technologies in real world circumstances, such as canal drops and micro-hydro stations.

This type of pre-approved and permitted testing facility would greatly assist developers of emerging generation technologies. Reclamation is in the distinctive position to host this intriguing opportunity due to the geographic concentration of a variety of existing facilities, the infrastructure required to support the installation of energy devices, and the technical expertise within Reclamation's Technical Service Center. Funding would be required to make this type of project viable and sustainable.

CONCLUSION

The nation's hydropower industry shares a unique partnership with Reclamation and the rest of the federal system. NHA and industry members look forward to further collaboration with Reclamation, and with Congress, to develop appropriate incentives and rate structures to encourage the better utilization of existing infrastructure, expand our domestic renewable energy supply, enable greater penetration of variable generation resources and provide the benefits of low-cost, reliable hydroelectricity to consumers. The hydropower industry congratulates the Water and Power Subcommittee in continuing to support Reclamation's efforts to modernize and expand their existing hydropower fleet in preparation for the changing grid of the future.