

Submitter's Name/Affiliation: National Hydropower Association

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Executive Summary

Available in every region of the country, hydropower is America's largest source of clean, renewable electricity, accounting for approximately two thirds of domestic renewable electricity generation and 7 percent of total electricity generation. It is a reliable, proven, and domestic technology that has significant growth potential into the future.

In addition to clean electricity production, hydropower serves an essential purpose: stabilizing America's electric grid. Hydropower can adjust output rapidly to serve real-time electricity demand and hydro's "black start" capabilities helped restore power after the 1965, 1977, and 2003 blackouts. Hydropower and pumped hydropower storage also enables the integration of more variable renewable energy resources onto the U.S. electric grid, as is the case in Europe.

Today, U.S. hydropower capacity is about 100,000 MW and the industry has a goal to double its contribution to our national energy portfolio. In a 2009 study examining the hydropower industry's job-creation and growth potential, Navigant Consulting found the industry could add up to 60,000 MW of capacity by 2025, supporting the creation of approximately 1.4 million cumulative jobs. Currently, proposed projects totaling over 88,000 MW have license applications and preliminary permits filed with the Federal Energy Regulatory Commission (FERC). This spans every sector of the waterpower industry. While not every one may be built, the list of projects demonstrates the universe of untapped hydropower potential that exists.

In January, NHA sent a letter of support to President Obama on his Clean Energy Standard (CES) goal as outlined in the State of the Union, committing to meet 20 percent of the 80 percent target by 2035. NHA believes the CES goal will be difficult, if not impossible, to meet without including both existing and new hydropower generation as qualifying resources under the CES.

In the past, NHA has supported consensus definitions on the treatment of hydropower for the purposes of a Renewable Energy Standard (RES), specifically those contained in S.1462, the American Clean Energy and Leadership Act. However, a CES is a different policy paradigm than an RES. Therefore, NHA believes the treatment of hydropower under a CES must be re-examined.

As work continues on the CES policy, additional questions both on the treatment of various hydropower resources and the mechanics of the program will be raised. NHA commits to continued dialogue with you, other Members of Congress, the Administration and stakeholders on how to address these issues.

Lastly, NHA also references the submission of the "Ad-Hoc Energy Storage Coalition" ("Storage Coalition"). That submission contains additional details on the potential treatment of energy storage, including hydropower pumped storage, under the CES.

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- *How should a federal mandate interact with the 30 existing state electricity standards?*

As the white paper notes, 30 states have existing electricity standards with several more states adopting voluntary measures in support of increasing renewable/clean energy generation.

NHA points out that the question of how a federal standard interacts with the state standards is not only a question about the percentage and schedule for increasing renewable/clean energy generation, but is also a definitional issue.

Unlike other renewable energy resources, the definition of hydropower that qualifies under the state standards varies considerably from state to state. In some states, all hydropower generation is considered renewable (including generation from outside the United States, i.e. Canada), in other states the amount of hydropower that qualifies is minimal. Some restrictions include: whether generation is existing or new; MW size of project; operational characteristics; whether certified by an outside third-party as low-impact; etc.

The interaction between the federal and state programs, particularly for those clean technologies that are not recognized uniformly across the state programs, will be particularly critical for companies with hydropower assets. NHA does not offer a recommendation on this point for this response, but highlights the issue for further consideration as the Congress examines how these programs interface, particularly as the state standards have been established under an RES paradigm and not a CES policy paradigm.

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- *On what basis should qualifying “clean energy” resources be defined? Should the definition of “clean energy” account only for the greenhouse gas emissions of electric generation, or should other environmental issues be accounted for (e.g. particulate matter from biomass combustion, spent fuel from nuclear power, or land use changes for solar panels or wind, etc.)?*

Hydropower is a Clean Energy Resource

An essential part of the nation's energy mix, hydropower has an important role to play in meeting the goals of federal and state clean/renewable energy policies. NHA seeks to develop consensus on the broadest inclusion of hydropower resources that qualify under the CES.

The United States produces more electricity from hydropower than from any other renewable electricity resource — it accounted for 65.9 percent of renewable generation in 2009 and about 7 percent of the nation's overall electricity generation. Water, hydropower's “fuel”, is a clean resource constantly being renewed by the earth's water cycle. Hydropower taps into this cycle with little to no impact on air quality.

Hydropower generation avoids millions of metric tons of carbon emissions each year. In 2009, generation from the nation's existing hydropower fleet avoided almost 200 million metric tons of carbon emissions – equal to the output of over 38 million passenger cars (based on Energy Information Administration data and the Environmental Protection Agency's greenhouse gas equivalencies calculator). Satellite imagery has shown that the Pacific Northwest, home to the most hydropower in the United States, is an island of low carbon emissions.

As the CES discussion continues, NHA and the industry look forward to providing further input on the types of hydropower resources that qualify under the program. As stated in our response to Question 1, various categories and applications of hydropower resources exist. Broadly, these include:

- Conventional hydropower;
- Pumped storage;
- Marine and hydrokinetic; and
- Conduit power.

Within these categories, there are different applications such as: upgrades to existing hydropower facilities; adding generation to non-powered dams; new green field projects; ocean wave and tidal; in-stream hydrokinetic; small hydropower; etc. These applications

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can also vary on how they operate or are used by the owner (for example, run-of-river projects).

For illustration purposes, NHA highlights two particular examples where a re-examination of hydropower's recognition under a CES is needed – existing hydropower generation and pumped storage. If a CES policy provides for a substantial increase in the percentage of generation that will be required to come from clean resources, and if existing generation from other non-carbon or low carbon resources qualifies (wind, nuclear, etc.), then existing hydropower generation must also qualify. Hydropower should be treated equitably in comparison to other resources when it comes to existing generation.

Secondly, NHA believes that energy storage, specifically pumped hydropower storage, will play a critical role to firm and integrate to the electric grid variable energy resources such as wind and solar, increasing their contribution to the CES goal. As such, NHA believes a mechanism should be included in the policy to provide recognition of clean generation from pumped storage hydropower projects – both existing and new.

NHA reiterates that existing and new hydropower generation will play an indispensable role in meeting any CES goal and must be recognized as a qualifying resource under the policy. We look forward to working with you, other Members, the Administration and stakeholders to answer questions and work toward solutions on addressing hydropower's inclusion in a CES.

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- *Should the standard be focused solely on electricity generation, or is there a role for other clean energy technologies that could displace electricity, such as biomass-to-thermal energy?*

Following on the answer to Sub-Question 2.1 above, NHA believes a CES must incorporate recognition of energy storage opportunities, specifically pumped hydropower.

A proven, reliable and cost-effective energy storage method in use today, hydroelectric pumped-storage technology ensures a stable electricity grid and expands America's use of renewable energy.

Pumped storage is a type of hydroelectric power generation that stores energy in the form of water in an upper reservoir, pumped from a second reservoir at a lower elevation. During periods of high electricity demand, the stored water is released through turbines in the same manner as a conventional hydropower station. Excess energy refills the reservoir by pumping the water back to the upper reservoir, usually during nights and weekends when electricity demand is low.

The United States has more than 20,000 MW of pumped-storage capacity in use today, with facilities in every region. Developers have proposed an additional 31,000 MW, primarily in the West, to serve the rapid increase in variable energy resources coming online.

Why do we need grid storage? Grid energy storage balances electricity supply and demand and maximizes use of all generation resources. Having a balanced load on the grid ensures stability and reliability for all electricity consumers. Solving the issues of integrating variable generation energy sources will allow the nation to expand their use more quickly. The more grid energy storage the country has – using tested technologies like pumped storage – the more energy options we can use to increase clean, renewable energy resources.

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- *Should the standard's requirements be keyed to the year 2035 or some other timeframe?*

As stated in the Executive Summary, NHA, in January, sent a letter of support to President Obama on his Clean Energy Standard (CES) goal as outlined in the State of the Union. In the letter NHA committed to meet 20 percent of the 80 percent target by 2035.

In order to do that, however, NHA also highlighted policies, in addition to the CES, that are needed to support the potential growth in the industry to meet the CES goal, such as:

- Regulatory improvements that foster better intergovernmental cooperation in the licensing process;
- Tax policies that encourage more investment and hiring in the hydropower industry;
- Re-investment in the federal hydro system; and
- Continued commitment to hydro R&D initiatives.

NHA remains open to further discussion on the CES timetable, particularly as we look for Congressional action on the other policies that will be necessary in order to reach the CES goal by 2035.

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- *What are the tradeoffs between crediting all existing clean technologies versus only allowing new and incremental upgrades to qualify for credits? Is one methodology preferable to the other?*

In 2009, hydropower accounted for approximately 7 percent of all electricity generation in the United States. Several Administration officials have stated that the country is already at 40 percent of clean energy resources (counting existing nuclear, renewables and natural gas at half credit).

If the goal truly is to get to 80 percent clean energy by 2035, without counting all existing hydropower, NHA believes that goal cannot be met. Depending on the timeframes and percentages required, there may be a need to adjust how all existing resources are counted. The important point that NHA emphasizes is that existing hydropower resources must be treated on the same footing as other existing clean energy resources, such as wind and nuclear.

This would be a difference from the policy toward existing hydropower under RES proposals in the previous Congress. Under those proposals, such as S.1462 (which NHA supported) existing hydropower was backed out of the retailer's base to which the RES was then applied. This policy recognized that in some areas of the country hydropower makes up a significant portion of generation, enough so that a lower RES target would be easily met.

However, when moving to a significantly higher target, such as 80 percent, the contributions of the existing hydropower system need to be, and must be, recognized and included.

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Should partial credits be given for certain technologies, like efficient natural gas and clean coal, as the President has proposed? If partial credits are used, on what basis should the percentage of credit be awarded? Should this be made modifiable over the life of the program?

Partial credit may be appropriate in various circumstances. In particular, this may be a way to provide a mechanism for recognition of energy storage, pumped hydropower storage under the CES.

Other options for which energy storage may be qualified were also included in the Storage Group's response. NHA lists them below for reference:

1. Include energy storage as a qualifying CES technology. Make energy storage eligible as a qualifying CES resource on the same basis as other clean energy resources.
2. Include energy storage as a qualifying CES technology but in a separate tier. Make energy storage eligible in the CES but in a special tier or class of certain CES technologies, such as load management, demand response, distributed generation and/or energy efficiency.
3. Bonus credits for coupling with clean energy sources: If a CES-qualifying clean energy resource is coupled with qualifying energy storage the CES-qualifying resource would be given bonus clean energy credits as a multiplier on a kwh basis. The clean energy source should be integrated with the renewable generator either physically or electronically. (This can be tailored even further such as to give bonus credits for peak period delivery of clean energy resources.)
4. Clean Capacity Credit. Qualifying clean energy resources would receive additional credits for each MW they contribute to the reserve margin requirement. CCCs would supplement rather than replace CES credit payments and provide additional revenue for the reserve margin contribution.

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- *To what extent does a CES contribute to the overall climate change policy of the United States, and would enactment of a CES warrant changes to other, relevant statutes?*

The CES sends a long-term positive market signal in support of clean energy deployment; and like the RES before it, the CES can be seen as a down-payment on climate change policy goals.

However, as NHA outlined in our response to Sub-Question 3.1 earlier and Sub-Question 6.5 below, additional policies will be needed to fully realize the growth potential of the hydropower industry to meet the CES goal and achieve the climate benefits of increased clean energy generation. NHA refers to our responses in those areas for more details.

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- *What are the specific challenges facing individual technologies such as nuclear, natural gas, CCS, on- and offshore wind, solar, efficiency, biomass, and others?*

For hydropower, longer development lead times, substantial up-front costs of investment, and a lengthy regulatory process that can put hydropower at a disadvantage in comparison to other renewable energy projects, are some of the challenges facing growth in the industry.

Hydropower facilities are assets that have a long projects life. Some hydropower projects in the United States have been in operation for over 100 years. They are very cost-effective when evaluated over the life of the project. However, hydropower projects are also capital intensive, with significant up-front costs, and a lengthy licensing process that is not optimized to provide certainty to utilities looking to invest in new projects or developers seeking investment for their companies.

NHA has made several policy recommendations to address these issues, which are included in our response to Sub-Question 6.5 below.

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- *Will the enactment of a CES be sufficient for each technology to overcome its individual challenges?*

While the CES is an important program to support increased generation from clean and renewable energy resources, it alone is not the only policy that NHA believes is needed. For a more detailed discussion on those policies that NHA supports for hydropower, please see NHA's response to Sub-Question 6.5 below.

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- *Should there be an examination of energy-connected permitting?*

Yes, NHA has called for such a review of the hydropower permitting and licensing process. Today, hydropower developments face a comprehensive regulatory approval process that involves many participants including: the Federal Energy Regulatory Commission, federal and state resource agencies, local governments, tribes, NGOs and the public. The system strives to promote development while protecting important environmental values.

However, it can also contain redundancies and inefficiencies that unnecessarily slow the deployment of clean renewable hydropower and delay much-needed environmental enhancements and benefits. At a time when we need all the renewable, affordable and reliable energy we can get, the United States needs an updated regulatory process that gets projects off the drawing board, licensed, constructed and puts people to work in a more efficient way.

For additional details on regulatory improvements to the hydropower licensing process, please see NHA's response to Sub-Question 6.5 below.

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- *Are there specific supporting policy options that should be considered for coal, nuclear, natural gas, renewable energy, and efficiency?*

Expanding renewable energy production and manufacturing in the U.S. are among the NHA's top priorities. In order to ensure that the local job creation and economic benefits that will result from expanded renewable energy deployment move ahead, NHA supports these common-sense energy policies:

1) More Efficient Regulatory Process for Hydro

NHA and the industry appreciate the work of Congress, FERC, and other agencies and stakeholders on past improvements to the regulatory environment for hydropower development (for example, the consensus provisions contained in EPAct of 2005 and the 2003 integrated licensing process (ILP)). However, the hydropower regulatory process, in comparison to those for other energy resources such as wind or natural gas, remains considerably longer. The ILP is structured to be completed in 5 to 5.5 years followed by the time needed for construction, while the development timeline for wind and natural gas projects, for example, can be as short as 18-24 months.

At a time when project developers are competing for a limited pool of funding from investors, or when utilities are seeking the quickest return on investment for their customers and shareholders, hydropower project development is put at a competitive disadvantage. NHA seeks to address this disparity. NHA believes a 2-year process for certain hydropower projects is possible and improvements can be made while maintaining environmental standards and resource protection.

NHA supports several guideposts that would put the hydropower development process on equal footing with that of other renewable electricity technologies – while maintaining a responsible licensing scheme. These include:

- **Accelerated Licensing for Certain Hydro Projects.** NHA believes the clearest path to a more efficient regulatory process would be an expedited 2-year licensing for adding electric generation on existing dams and closed-looped pumped storage projects.
- **Facilitating Private Hydropower Development on Army Corps Facilities.** Along with FERC, the Corps should implement a systematic review of their facilities and operations to determine and pursue hydro growth opportunities, such as increasing capacity at existing facilities or converting existing non-powered dams to generating resources. Also, better integrating Corps reviews into the FERC process, as well as ensuring policy consistency across the Corps districts, will help alleviate delays and uncertainties currently experienced by developers that can affect project financing.

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- Facilitating Private Hydropower Development at Bureau of Reclamation Facilities. As with the Army Corps of Engineers, the Bureau should undergo a review of their facilities and operations to determine and implement growth opportunities. The Bureau, with its thousands of miles of canals and other man-made waterways, can be a leader in promoting the expansion of conduit power. Finally, the Bureau should investigate and address any issues that may inhibit private development on their infrastructure.

2) Tax Parity

The U.S. has long used targeted tax credit programs to incentivize investment and innovation in the energy sector. This is true for fossil and renewable projects resources alike – and the Investment and Production Tax Credits for renewable energy have been highly successful. Tens of thousands of jobs and billions of dollars in private investment across industries – not to mention gigawatts of affordable, reliable, and renewable power – have been driven by smart tax policies.

While NHA considers federal renewable energy tax policy a success, there remains a disparity between the incentives available to wind, solar and geothermal power and incentives for hydropower technologies. Given the extraordinary potential for expansion of hydro deployment and job creation, NHA supports two straightforward updates to existing renewable energy tax credit programs:

- Equalizing the production tax credit for hydropower. Currently hydropower and MHK technologies receive only half the credit available to other renewable energy sources.
- Allowing energy storage to qualify for the ITC and CREBs Program. Currently, there are no incentives for energy storage project development, including pumped storage, which hinders deployment and further innovation. NHA supports an Investment Tax Credit and CREBs eligibility for all energy storage technologies.

3) Further Incentives for Hydropower

Expanding renewable energy production and manufacturing in the United States are among NHA's top priorities. In order to ensure that the local job creation and economic opportunities that will result from expanded renewable energy deployment move ahead, NHA supports these common-sense energy incentive reforms:

- Expanding Clean Energy Manufacturing Tax Credits. NHA supports restoring funding for the Section 48C tax credit for the investments in manufacturing facilities for clean energy technologies.

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- Extending the Production Tax Credit for Renewable Energy. NHA supports extension of the PTC beyond its current expiration at the end of 2013 through 2018.
- Extending the Investment Tax Credit for Renewable Energy. Another important tax policy for the growth of America's renewable hydropower resources is the extension of the ITC through 2018. NHA also supports extension of the Section 1603 program and the inclusion of a mechanism for public power entities to utilize the program.
- Extending and Expanding the Clean Renewable Energy Bonds (CREBs) Program. NHA supports to the extension and expansion of the CREBs program for public power providers, electric cooperatives and state and local governments.

4) Research & Development

Unlocking the vast hydropower potential of our rivers, oceans, tides and conduits requires funding the research and development initiatives that make innovative ideas a reality. Continued investment in R&D, such as the work done by the DOE waterpower program, is crucial to ensuring that innovative new technologies come to market and are able to generate the clean electricity America needs.

Innovation in the hydropower industry also goes beyond creating new technologies. The DOE program plays an important role in gathering baseline industry data, developing updated resource assessments and new growth analyses, studying project operations for maximization of both energy and environmental values, as well as studying new issues that may affect the industry — from potential effects of climate change on plant operations to addressing the energy storage needs to maintain a secure and functioning electric grid.

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- *What is the current status of clean energy technology manufacturing, and is it reasonable to expect domestic economic growth in that sector as a result of a CES?*

For hydropower, NHA is seeing growth in the manufacturing and the consulting sectors. We expect this growth to continue into the future, particularly if the kinds of policies described in NHA's comments above are enacted.

Using one of our turbine and generator manufacturers as an example, Voith Hydro, based in York, Pennsylvania, employs 550 people nationwide and has added 126 jobs in the last three years, during the economic downturn.

Voith Hydro expects to continue to grow jobs and revenues in the coming years. The company has made over \$63 million in purchases from American suppliers in FY 2010 located in CA, GA, IL, KY, MD, MI, MS, NC, NY, OH, PA, SC, TN, VA, and WA. They have also recently opened a new facility in Hannibal, OH, that now employs 44 workers and directly affects job growth in OH, PA, WV.

Again, as the country has taken a second look at hydropower development, NHA has seen similar stories from other manufacturers and consulting groups – sectors that provide good-paying, family-supporting jobs to meet the uptick in demand.