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MODERNIZING ENERGY INFRASTRUCTURE:

CHALLENGES AND OPPORTUNITIES TO

EXPANDING HYDROPOWER GENERATION

WEDNESDAY, MARCH 15, 2017

House of Representatives,

Subcommittee on Energy,

Committee on Energy and Commerce,

Washington, D.C.

The subcommittee met, pursuant to call, at 1:13 p.m., in Room 2123, Rayburn House Office Building, Hon. Fred Upton [chairman of the subcommittee] presiding.

Present: Representatives Upton, Barton, Murphy, Harper, McKinley, Kinzinger, Griffith, Johnson, Long, Bucshon, Flores, Mullin, Hudson, Walberg, Walden (ex officio), Peters, Castor, Tonko, Schrader, Kennedy, and Pallone (ex officio).

Staff Present: Grace Appelbe, Staff Assistant; Elena Brennan,

Legislative Clerk, Oversight and Investigations; Jordan Davis, Director of Policy and External Affairs; Wyatt Ellertson, Research Associate, Energy and Environment; Adam Fromm, Director of Outreach and Coalitions; Tom Hassenboehler, Chief Counsel, Energy and Environment; Zach Hunter, Director of Communications; A.T. Johnson, Senior Policy Advisor/Professional Staff, Energy and Environment; Ben Lieberman, Senior Counsel, Energy; Brandon Mooney, Senior Policy Advisor, Energy; Mark Ratner, Policy Coordinator; Annelise Rickert, Counsel, Energy; Dan Schneider, Press Secretary; Hamlin Wade, Special Advisor, External Affairs; Everett Winnick, Director of Information Technology; Jeff Carroll, Minority Staff Director; Jean Fruci, Minority Energy and Environment Policy Advisor; Rick Kessler, Minority Senior Advisor and Staff Director, Energy and Environment; John Marshall, Minority Policy Coordinator; Dan Miller, Minority Staff Assistant; Alexander Ratner, Minority Policy Analyst; Tuley Wright, Minority Energy and Environment Policy Advisor; and C.J. Young, Minority Press Secretary.

Mr. Upton. Good afternoon, everyone.

I don't know if all members have heard, but our ranking subcommittee member's wife passed away this weekend, so why don't we have a brief moment of silence for her.

Thank you.

So today's hearing, "Modernizing Energy Infrastructure: Challenges and Opportunities to Expanding Hydropower Generation," continues this committee's efforts to examine what we need to do to keep our infrastructure the very best in the world.

I want to start certainly by thanking our witnesses for appearing before us today. Their testimony is going to continue to give us a better understanding of the current state of hydropower in the United States so that we can identify ways to improve the regulatory process, modernize our aging infrastructure, and ensure consumers continue to have access to reliable and affordable electricity produced from hydropower.

Our hydropower fleet is aging. Yes, it is. Hydropower plants are among the oldest power plants in the U.S. In fact, according to the Energy Information Administration, the average hydropower facility has been operating for 64 years -- I am 63 -- and the 50 oldest electric generating plants in the U.S. are all hydropower. Each has been in service since 1908. That was the last year until this year the Cubs won the World Series.

As a result, more than 500 projects, representing about 50 percent of non-Federal hydro licenses, will begin the relicensing

process before 2030.

The regulatory environment for hydropower has become increasingly challenging. Licensing new hydropower facilities and relicensing existing facilities requires extensive consultation with multiple Federal, State, and local government entities. The process takes years and costs often tens of millions of dollars, and as a result, needed investments are too often discouraged or unnecessarily delayed. And in some cases the cost to modernize or meet environmental objectives outweighs the potential economic benefits of continued operation and the plants have to be shut down.

In many ways, licensing challenges are limiting hydropower's potential. So, with sound policy and smarter regs, hydropower could have a very bright future.

Hydro is the Nation's number one renewable, producing electricity with negligible emissions. Today, it is responsible for providing 7 percent of the Nation's total energy needs, and with continued technological advancements and smarter regs, hydropower generation could expand by an additional 50 percent by the year 2025.

These are things that Congress could do to maximize hydropower's potential. This committee advanced legislation last Congress that would improve the licensing process, promote efficiency improvements, and encourage pump storage and development of nonpowered dams. While we were not able to agree on the hydropower reform package in the context of the larger energy bill, significant progress was made, and I am hopeful, I am encouraged, and I am optimistic that we are going to be

able to deliver this time around.

Hydro, as we know, is clean, affordable, reliable. Updating and modernizing the hydro infrastructure will incentivize economic development, create jobs, and strengthen our energy security. I look forward to working with all of my colleagues on both sides of the aisle to really see this happen in this Congress.

And I yield back my time and recognize the acting ranking member of the powerful Energy and Power Subcommittee, the gentleman from California, Mr. Peters, for 5 minutes.

[The prepared statement of Mr. Upton follows:]

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Mr. Peters. Thank you very much, Mr. Chairman.

It is an honor to stand in today for the ranking member of the Energy Subcommittee, my colleague, Bobby Rush. And I too want to acknowledge that he couldn't be here today because of the passing of his wife of 36 years, Carolyn. And I want him to know that my thoughts, and everyone in the room, are with him and his family during this difficult time.

This hearing on modernizing energy infrastructure, and specifically expanding hydropower generation, comes at a critical juncture in America's energy landscape. Our economy is undergoing a rapid transition, with decisive leaps in technology happening every day. And front and center in the changing economy of this decade is the fundamental shift in the way we power our world.

Transition to a clean economy is happening right now. America has an opportunity to diversify our energy sources and give our children a future with cleaner air, cleaner water, and greater economic opportunities, and hydropower plays an important role in that transition, because it is always on.

Hydropower provides zero-emission base load generation that can help our country meet our energy goals and commitments to the global community made in the Paris Agreement last year. Hydropower offsets over 190 million metric tons of CO2 each year, the equivalent of over 40 million cars on the road.

Yet America's aging infrastructure and onerous licensing processes are making it harder for States, local governments, and the

private sector to adopt and expand new forms of energy, like hydropower.

Just 5 days ago, the American Society of Civil Engineers report card gave the United States infrastructure a D-plus and gave dams a slightly higher grade of D. That is probably still not good enough. And this average age of the country's 90,000 dams, I have 56 years old, which is a little bit closer to my age than the chairman's, but still too old. And today, only about 3 percent are equipped to generate clean power.

So the first step forward is to provide sufficient funding to modernize our infrastructure. I would like to hear more from our witnesses about where they see the greatest need to make those long-term investments to expand hydropower generation.

Another critical step is regulatory reform. Hearing from industry, it takes on average 8 years and sometimes as long as 10 years or more to relicense an existing project. And if the time and cost of licensing these projects exceeds the point where the project can be profitable, we know that investment in this clean energy source will decrease.

So in these cases, our regulatory regime is incentivizing municipalities and the private sector not to invest in clean energy. That is not what any of us want.

So any kind of regulatory reform, we know, must maintain protections for fish, wildlife, natural resources, and water quality, and I am confident we can do that, but we can still eliminate duplicative processes and enhance interagency coordination. It is a false choice

that we can't have both a clean, safe environment and a regulatory process in place to ensure that investment in clean energy remains a cost-competitive option.

I look forward to hearing from our witnesses how Congress and this committee specifically can act in a bipartisan way to modernize our energy infrastructure and facilitate the expansion of hydropower energy generation in a way that is sustainable.

And I look forward to the testimony. And I yield back, Mr. Chairman. Thank you.

[The prepared statement of Mr. Peters follows:]

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Mr. Upton. Thank you.

The chair would recognize for an opening statement the chairman of the full committee, the wonderful gentleman from the good State of Oregon, Mr. Walden.

The Chairman. I thank the gentleman from Michigan. I want to stand up on his behalf. I was going to potentially move to have the gentleman from California's words taken down when he was taking the shot at you about age, that his dams were closer to your age than his.

Mr. Upton. The good thing is that I look younger still.

The Chairman. That is right.

I want to welcome our witnesses, and especially Kieran Connolly, who is with the Bonneville Power Administration. We are glad you are here. You all do a great job out in Oregon and for the Northwest.

One of the many challenges and advantages, frankly, the great advantage of living in Oregon is the plentiful supply of affordable, reliable, and clean hydropower. Hydropower is great for homeowners as well as job-creating businesses. We know that well in the Northwest. However, even in the Pacific Northwest, we have additional opportunities, as we do across the country, to take greater advantage of this valuable resource.

This hearing is a crucial step in the Energy Subcommittee's efforts to modernize our Nation's electricity infrastructure, and today we will focus on the challenges and opportunities in expanding hydropower generation.

For over a century, hydropower has provided electricity to

millions of Americans across our Nation. The United States and Canada led the way in hydropower engineering for the first half of the 20th century. In 1936, the Hoover Dam became the world's largest hydroelectric plant, generating 1,345 megawatts. Six years later, in 1942, the Grand Coulee Dam in Washington State surpassed the Hoover Dam in electricity-generation capacity.

As a footnote, when Richard Nixon came out to The Dalles, Oregon, to dedicate The Dalles Dam, my father was the master of ceremonies for those day's activities. And so this has gone on for generations.

And, obviously, in my home State of Oregon, hydropower is one of the largest sources of electricity generation and provides over half of Oregon's electricity-generation needs. In fact, Mr. Connolly, representing BPA, his organization is responsible for marketing the Northwest's wholesale electrical hydropower.

So I look forward to hearing more about Bonneville's balance, how you balance the various objectives while carrying out your mission of producing and delivering reliable, affordable power to consumers across the Pacific Northwest. You get kind of wrapped around the axle by governors and courts, and interest groups of all sides, so it is a challenge.

The electricity generated from hydropower allows for a diverse energy mix, which in turn increases our Nation's energy security and reliability. A recent DOE report found that U.S. hydropower production could grow by almost 50 percent by year 2050. I know a lot of that is up in Alaska. This potential increase in hydropower

production would boost job growth, increase economic investment, facilitate the use of wind and other intermittent renewables, and avoid harmful emissions from the electric power sector.

In reading through the various testimonies that you all submitted, I found it very interesting on the pump storage piece and the limits and opportunities on hydro and what is involved there, and it is important to get the right balance, and how we can harness all those to really work with the renewable energy resources as well, because getting that grid balanced right is very important. And I have seen the swings in the charts of wind energy a thousand megawatts up one hour and down the next, and somehow you make all that work.

Despite the numerous benefits of hydropower, the greatest impediment facing its growth is the regulatory process. Take the Bowman Dam in Crook County, Oregon, for example. For many years, I and some others in the delegation worked to pass legislation to help pave the way for future hydropower and jobs in central Oregon. Even after the bill was passed unanimously and signed into law in 2014, it took more than a year for that new law to be implemented.

But it is not just the delays. The licensing of new hydropower facilities and the relicensing of existing facilities is really costly and takes forever. The process often requires 7 to 10 years to complete and costs tens of millions of dollars. We would like to find a way to streamline that, frankly, but recognizing the importance of stakeholders having an opportunity to make their case.

As I have stated before, my objectives at the committee start with

the consumer. If we put the consumer first in our discussion, we will end up with really good public policy. A diverse energy mix empowers consumers by giving them choices in different energy sources. The electricity generated by hydropower is as clean and renewable it gets.

When it comes to improving our Nation's laws regarding hydropower development, we in Congress have the opportunity to reach across the aisle, and I think we can get some good things done for the environment, for reduction of carbon emissions, and for the economy.

And as this subcommittee continues its efforts to modernize our Nation's energy infrastructure through technology, neutral improvements, and expansion, we have to bring greater transparency, efficiency, and accountability to the regulatory process affecting hydropower and more.

So, again, thank you for your testimony. I am juggling between two subcommittees. You probably see other members doing that. We do the Nation's work here, and we really appreciate your contributing to our public policy debate and discussion.

With that, Mr. Chairman, I yield back the balance of my time.

[The prepared statement of The Chairman follows:]

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Mr. Upton. The gentleman yields back.

I would note that because of the weather issues yesterday, we have a good number of members that were stranded in their district and not able to get back, juggling flights to get in and out as well. So --

The Chairman. And, Mr. Chairman, just a point of personal privilege. I want to join in my colleagues about paying our respects to Bobby Rush at the loss of his wife.

Mr. Upton. And we had a moment of silence. She was a wonderful woman, great partner.

The Chairman. And, you know, I know he expressed -- well, he was afraid it was going to happen when we were having our markup. And that is one of the hardest things people go through, is loss of a spouse. So he is in all our thoughts and prayers.

Mr. Upton. Yes. Absolutely.

The chair would recognize the ranking member of the full committee, the gentleman from New Jersey, Mr. Pallone, for 5 minutes.

Mr. Pallone. Thank you, Mr. Chairman. And let me also express my sympathy for Bobby. I actually had the chance to talk to him after his wife passed away, and he seemed in pretty good shape. But as our full committee chairman said, it has got to be difficult. So I want to express my sympathy as well publicly.

Mr. Chairman, that is Chairman Upton, let me thank you for holding today's hearing on the challenges and opportunities of modernizing our hydroelectric power infrastructure. As I have said before, Democrats strongly support modernizing our energy infrastructure, much of which

is outdated or on the verge of disrepair or inadequate for today's needs.

Hydroelectric power is among the most mature generating technologies providing substantial, virtually carbon-free base load energy at low cost to our manufacturing sector and to residential and commercial consumers. It is an important asset that we need to maintain.

At the same time, it also has major impacts on fish and wildlife populations, water quality, water supply management, and other important physical and cultural resources if poorly operated or sited. For example, there are numerous examples of hydroelectric dams devastating lands and waters sacred to Native American tribes, and this should not happen. While hydroelectric power licenses depend on rivers for free fuel, those rivers belong to all Americans, not just those who sell or buy the power generated from it.

The Federal Power Act requires the Federal Energy Regulatory Commission, or FERC, to balance those competing interests in issuing a license. No interest, whether it be power, drinking water, irrigation, commercial fishery, recreation, or other use, should automatically take precedence in the licensing process.

The Power Act authorizes States and Federal natural resource agencies to place conditions on hydroelectric licenses to preserve water quality, protect public lands and Native American reservations, and ensure proper fish passage to preserve healthy ecosystems and fisheries.

If, for instance, a license might adversely impact a protected area, such as a National Park, or cause the release of toxic sediment into drinking or agricultural water supplies or flood a Native American reservation, the State or Federal agency responsible for managing these resources can place conditions on the license to ensure that those resources are protected.

And hydroelectric licenses have fixed conditions that generally remain unchanged during the 30 or 50 years that they are in force. Licenses also benefit from unlimited automatic annual extensions after the license has expired if a new license has not been issued. As a result, the impacts of these hydropower dams often go unaddressed for more than half a century.

For those facilities first licensed before enactment of the National Environmental Policy Act or the Clean Water Act and the Endangered Species Act, the licensing process certainly can be rather rigorous. Sometimes the necessity of addressing these complex issues also makes the process time-consuming and expensive, as new license conditions will require significant upgrades to old facilities to bring them in line with modern environmental laws and regulations.

Now, ironically, climate change has increased the need to license new capacity of this carbon-free generating technology at the same time it has caused record droughts that have made it more difficult to site new works or provide long-term relicensing of existing facilities. Climate-induced changes in hydrology, including the record drought in the West that just ended, are calling into question the reliability

of existing facilities, and these changes are also upending the economics of siting new hydropower capacity and increasing the challenges associated with addressing hydropower's environmental issues.

In addition to the unique challenges faced by the hydropower industry, the significant changes in electricity markets and relatively flat demand for electricity create a difficult financial environment for developing new base load generation in many areas of the country. Some of the unique benefits that hydropower and pump storage can offer cannot be fully compensated by current electricity rate structures.

So I am glad we are holding this hearing today, and I urge the chairman to hold more like this before we begin to discuss legislation. We must understand more fully the challenges facing the hydropower industry and the rivers the industry relies upon before we update our policies. Our goal should be to maintain the fundamental principles of balance in the process so that we maximize the benefits of hydroelectric power and expand it where it is most appropriate to do so.

I know we have an excellent panel here today to start this process, and I thank you for being here. I am sure you have been told that we are bouncing back and forth with the other subcommittees, so you may not see you us the whole time. But thank you.

Thank you, Mr. Chairman. I yield back.

[The prepared statement of Mr. Pallone follows:]

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Mr. Upton. The gentleman yields back.

Again we want to thank our witnesses for being here. I appreciate you submitting your testimony early so we had a chance to look at it prior to the hearing. And we would like each of you now to summarize your statement, taking no more than 5 minutes.

We are joined by Mr. Chuck Hookham, director of MBD Services for CMS Energies, on behalf of the American Society of Civil Engineers; Kieran Connolly, vice president of generation and asset management from the Bonneville Power Administration, as Chairman Walden indicated; Ramya Swaminathan, CEO of Rye Development, on behalf of the National Hydropower Association; and Dave Steindorf, California stewardship director of American Whitewater, on behalf of the Hydropower Reform Coalition.

And we will start in the order that you are at the table.

Mr. Connolly, welcome. Thank you for being here today.

STATEMENTS OF KIERAN CONNOLLY, VICE PRESIDENT OF GENERATION AND ASSET MANAGEMENT, BONNEVILLE POWER ADMINISTRATION; CHUCK HOOKHAM, P.E., DIRECTOR OF NBD SERVICES, CMS ENERGY, ON BEHALF OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS; DAVE STEINDORF, CALIFORNIA STEWARDSHIP DIRECTOR, AMERICAN WHITEWATER, ON BEHALF OF THE HYDROPOWER REFORM COALITION; AND RAMYA SWAMINATHAN, CEO, RYE DEVELOPMENT, ON BEHALF OF THE NATIONAL HYDROPOWER ASSOCIATION

STATEMENT OF KIERAN CONNOLLY

Mr. Connolly. Good afternoon, Mr. Chairman. My name is Kieran Connolly, and I am vice president for generation and asset management at Bonneville Power Administration. I appreciate the subcommittee's invitation to be here today, and I ask that my written remarks be entered into the record.

Bonneville is a Federal power marketing administration headquartered in Portland, Oregon, and is one of the largest providers of low-cost renewable energy in the Nation, marketing power generated primarily at 31 Federal hydroelectric dams. These dams are owned and operated by the U.S. Army Corps of Engineers and the Bureau of Reclamation.

Bonneville and our partners are able to maintain these projects through direct funding of the power portion of the costs at the dam. Direct funding allows Bonneville to fund operations and maintenance

as needed and appropriate. Bonneville also direct funds' substantial investments in the rehabilitation of the hydropower system as its components require replacement.

Bonneville provides this funding through power sales and borrowing from the U.S. Treasury that is fully recovered through power ratepayers. The interest on Bonneville's debt is at rates comparable to those for similar bonds issued by government corporations.

Bonneville's partnership with the Corps and Reclamation provides for a sound program of maintenance and modernization of Federal hydro generation assets. In 1999, Bonneville, the Corps and Reclamation produced the first asset management strategy for the FCRPS. Today, a collaborative team from the three agencies builds on that legacy through the use of industry-leading asset assessment tools and portfolio optimization to efficiently care for these facilities.

Bonneville and our partners rely on third-party vendors for much of our generation rehabilitation work. A promising initiative I would like to raise for the subcommittee's awareness is recent discussions between the Corps and the Federal PMAs to improve the acquisition and delivery process for major hydropower equipment.

Historically, because of its complexity, the acquisition process can be cumbersome, resulting in prolonged unit outages and cost overruns. These issues reduce generation, resulting in lost revenue and increased replacement power expenses for the PMAs. In turn, these circumstances contribute to rate increases that diminish the product value for power customers.

The Corps and the PMAs have established a work plan to address these challenges, and I appreciate the Corps' commitment to this effort.

The FCRPS is also unique in the extensive modifications and operational challenges made for the recovery of fish and wildlife. This is a responsibility we take seriously and are committed to. Since the 1980 Northwest Electric Power Planning and Conservation Act, hydro revenues have committed billions of dollars towards structures and revised operations of the dams, as well as offsite restoration efforts for watershed health, that have received broad regional support. The trend of salmon and steelhead survival is up, posting returns that by some measures approached those before Bonneville Dam was bill.

The Northwest as a whole has engaged in examining the science and is committed to long-term strategies. However, some parties to litigation of the Federal hydro system continue to call for additional spill, when fish are migrating, as a presumptive path, foregoing nonpolluting power generation. Bonneville believes the Federal hydro system is operating with carefully calibrated conditions for fish, defined and guided by scientific evidence.

In the same litigation, we are very concerned about motions to suspend specific maintenance and modernization projects at the dams. Poorly maintained equipment and the resulting risk to generating units is not a trivial matter to the reliability, safety, and environmental performance of the system. This issue is in litigation in the U.S. District Court in Oregon and was the subject of a hearing in that court

last week.

Finally, western electricity markets' design is evolving, responding to State mandates, Federal incentives, and the declining cost of technology. Much of the new resource development is in intermittent generation, particularly wind and solar. Hydropower offers flexibility to integrate these resources reliably, and Bonneville believes the value of hydropower for these types of services needs to be recognized in market design.

An additional development in the evolving electricity market is the impact of low natural gas prices and, to a lesser extent, renewable resource incentives on the wholesale market price for electricity. Under these conditions, Bonneville's surplus power sales have not generated the levels of revenue historically experienced. Consequently, the appropriate valuation of hydropower in the evolving market is important for sustaining funding for congressionally authorized programs while retaining competitive rates for Bonneville's customers.

Bonneville is proud of the tradition of collaboration with the Corps and Reclamation for operation and maintenance of the FCRPS and with numerous other regional partners for the sustainability of the Columbia River's Federal hydro system.

That concludes my testimony, Mr. Chairman. I would be happy to answer the subcommittee's questions.

[The prepared statement of Mr. Connolly follows:]

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Mr. Upton. Thank you very much.

Mr. Hookham.

STATEMENT OF CHUCK HOOKHAM

Mr. Hookham. Chairman Upton, Congressman Peters, members of the subcommittee, thanks for having me. I am a 36-year veteran professional engineer, worked on quite a few hydro projects, so I think I am pretty well qualified to talk about this. I am from Michigan. I apologize for the weather. I think I can talk on behalf of Congressman --

Mr. Upton. You should be happy, if you are from Michigan.

Mr. Hookham. I feel comfortable.

Mr. Upton. We will give you an extra 10 minutes.

Mr. Hookham. So I am speaking on behalf of the American Society of Civil Engineers. Last week we came out with the Infrastructure Report Card, which I hope you have all seen. It talks a lot about the infrastructure problems across 16 different categories, one of which is energy, and talks to the troubles we are having getting funding and doing the right things.

ASC is very active finding solutions. Believe me, we are not just reporting bad grades; we are trying to come up with strategies. And so I would implore on the committee, subcommittee to talk to us about strategies, priorities, and how to make sure we can correct these things.

Right now we are reporting about a $4.59 trillion infrastructure demand, about $2 trillion of which has been targeted, earmarked, some of which has not been appropriated. We still have a $2 trillion deficit over the next 10 years. This is really critical, that we start getting this right. We are hopeful. We hear of what President Trump has laid out. We need to make those statements turn into real action.

As far as hydropower goes, we have quite a few recommendations we would like to offer up. I represent a utility that has got 13 hydro plants as well as a pump storage facility, so we take advantage of that technology.

To talk about age, our dams are 99 years old. So we are talking about some pretty old infrastructure here that we care and maintain and have done so successfully. We do that under licensure with FERC that requires us to do inspections, so our power dams are fairly well taken care of. We need to continue that process and take advantage of technology.

Importantly, we need to fund, fully fund, dam safety programs. These are really critical to the operations of our facilities both at Federal and State levels. We need to continue that funding. We have got some activity going on to get that funding appropriated, both on hydropower and nonhydropower dams. That needs to continue forward. Our safety is really critical. Most of these dams now support or protect people downstream.

Whereas dams supporting hydropower are regularly inspected, like I mentioned, we still have this challenge of operating licensure, and

we have challenges with respect to relicensure that are, in our case, many times duplicate or sequential as opposed to being collaborative, and that is really causing trouble because of the timelines it takes for us to get projects approved.

In reality, since 1950, there have only really been four significant dam hydropower project issues that have taken place, most of which are dam-related and not hydropower-related. We need to continue our investment in economical, reliable, acceptable hydropower. It is critical to the Nation's infrastructure, as has been pointed out by others, and we need to continue looking at it from a visionary point of view.

There are technologies out there now that are enhancing fish/habitat survival, that maximize water use efficiency, and improve discharge water quality. We need to tap those and continue to protect our environment. We are really supportive of the sustainability concept here.

We also have technology, like lidar and drones and things like that, that can really be used to avoid problems going down in the future, and we think that successfully implemented will add to the base of the case to build more hydroelectric.

Research that directly supports reducing capital costs, improves efficiency and impact indication are important. Michigan State University is actually doing some work in our State to help in that regard, and HydroNEXT by the Department of Energy also defines some great things going on there.

We should look at prioritizing some federally owned dams. We think there are areas where that could be a benefit, where private-public relationships can be used to maximize the benefits and minimize the costs, and then also reduce the impacts on environment. Newer technologies like hydrokinetic are great as well. We need to keep focusing on that.

Legislation that purely focuses on improving hydropower licensing, it certainly is troublesome. And when we talk about the Hydropower Regulatory Efficiency Act of 2013, streamlining that, working on Order 2002, we need to look at that. We need to avoid having duplicative FERC and Army Corps of Engineer Section 408 permitting. It doesn't make sense. It just takes tremendous time.

Our best opportunities for hydropower are where you have existing nonpower dams, we have talked a lot about that, or closed loop pump storage, where it makes sense, where we can align with population mode centers, market pricing.

We are really driven as a utility to focus on what makes sense for our customers as well as being regulated by the State. It is a tough box to fit into, so it is a challenge.

We as consumers of energy support hydropower. We are also a very sustainable organization. We are trying to do our best for our ratepayers, and that is a real primary focus for us going forward, competing against other forms of renewables and fossil fuels.

Lastly, we need a national energy policy that works. We are really struggling making decisions that make sense from a corporate

point of view.

Thank you.

[The prepared statement of Mr. Hookham follows:]

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Mr. Upton. Thank you.

Mr. Steindorf.

STATEMENT OF DAVE STEINDORF

Mr. Steindorf. Thank you, Chairman Upton, Ranking Member Peters, and members of the committee. My name is Dave Steindorf and I am the special projects director for American Whitewater. I am testifying on behalf of --

Mr. Upton. You want to just make your mike is on?

Mr. Steindorf. There we go. How is that?

Mr. Upton. Much better.

Mr. Steindorf. Chairman Upton, Ranking Member Peters, and members of the committee, my name is Dave Steindorf, and I am the special projects director for American Whitewater. And I am testifying on behalf of the Hydropower Reform Coalition. The HRC is made up of more than 160 regional and local organizations with a combined membership of over 1 million people who work to restore rivers impacted by hydropower dams.

I have over 20 years of experience working on hydropower relicensing. During this time, I have been directly involved in the license implementation and relicensing of over 20 hydropower projects in California. My first relicensing was on PGE's Rock Creek and Cresta Project on the North Fork Feather River. At that time, I was teaching high school economics and long been an avid fly fisherman and had

recently taken up whitewater paddling. I didn't know anything about the process, but I knew that I wanted to help restore the river.

Before this project was built, the Feather was amongst the best cold water fisheries on the West Coast and a tourist destination for anglers around the country. Afterward, the river became a collection of stagnant ponds connected by a small trickle of water. The project's operations reduced the river's flows to just between 5 and 10 percent of what they had been, devastating the fishery and the local economy.

Through the relicensing process, we restored flows to 30 percent of their historical average. The result is that we are on our way to restoring this section of the North Fork Feather River as a robust recreational and economic resource.

The reduction in power production to make this happen was just 6 percent. From my perspective as a ratepayer and as a river enthusiast, the benefits gained are well worth the cost.

To be clear, getting to these types of positive outcomes is not easy. FERC relicensing requires collaboration and engagement from all stakeholders. Given that hydropower licenses last for 30 to 50 years, it makes sense to take the time to get it right.

There are two key elements that lead to positive outcomes in relicensing. First, start with a process by collaboratively developing studies about the river and the project. That is what the intent was behind FERC's integrated licensing process. The information collected informs stakeholders as they make challenging trade-offs between resource protection and power generation.

Federal, state, and tribal agencies request these studies in order to fulfill their statutory obligations, but often these are denied by FERC or the licensee. Often, studies are standard elements of successful relicensings. States in particular are then forced to wait until FERC has completed its process to request information they need to comply with State law, leading to delays that last years.

The HRC recommends two solutions for this problem. First, we recommend that at the beginning of the process, FERC include resource agency studies requested in its study plan. Second, we recommend that FERC and other agencies develop a memorandum of understanding to improve coordination throughout the process.

Second point. It is critical that resource agencies be engaged during the relicensing process and implementation. In my experience, when Federal agencies are involved with the design and construction of recreational infrastructure, these projects come in on budget and on time. When they aren't, the opposite is the case. Efficiencies are gained by having local land managing agencies that are fully engaged rather than projects being managed from D.C.

Additionally, FERC's mandate is in energy production and has limited expertise in fisheries, recreation needs, tribal concerns, or State water law.

Additionally, we request that Congress evaluate allowing licensees to pay a portion of their relicensing fees that they now pay to FERC to the land managing agencies for the direct cost of implementing their license conditions.

Finally, I want to make a quick point about the future of hydropower in the context of shifting energy markets. As renewable energy technologies continue to increase, it no longer makes sense just to focus on generating more electrons. As highlighted in DOE's Hydro Vision report from last year, hydropower's primary value is in its ability to regulate the grid. Often this can be done by maintaining or improving environmental or recreational values.

To this end, FERC can improve their analysis of license application to better quantify grid regulation capabilities. It is this type of smart operation, combined with environmental protection, that are the future of hydropower.

Thank you to the committee for this opportunity, and I will be happy to answer any questions.

[The prepared statement of Mr. Steindorf follows:]

******** INSERT 1-3 ********

Mr. Upton. Thank you very much.

Ms. Swaminathan.

STATEMENT OF RAMYA SWAMINATHAN

Ms. Swaminathan. Thank you, Chairman Upton, Congressman Peters, members of the subcommittee. Thank you for the opportunity to testify before you today on this important topic. My name is Ramya Swaminathan, and I am the CEO of Rye Development, a member of the National Hydropower Association.

NHA is a nonprofit national organization dedicated to promoting clean, affordable, renewable U.S. hydropower. NHA represents more than 220 companies, from Fortune 500 corporations to small family-owned businesses, and I plan to supplement this testimony with additional materials provided by NHA.

Rye Development is a member of NHA, and we are the developer of the largest portfolio of new hydro development projects on existing dams in the United States. We are also developing a 393-megawatt pumped hydro storage project in the State of Oregon with an affiliate of National Grid. Our conventional hydro projects are located in seven States: Pennsylvania, Ohio, West Virginia, Indiana, Kentucky, Mississippi, and Louisiana. All of these projects are on existing dams, and the environmental impacts are broadly acknowledged to be mitigable.

As this committee has recognized, hydroelectric generation is the

oldest and most reliable form of renewable generation. The headline number for the potential for new hydropower capacity on existing dams is compelling. There are more than 80,000 dams in the United States, and only 3 percent of them currently have hydropower.

The benefits of this form of hydropower development include meaningful job creation and all the associated economic activity, and importantly, private investment into our aging dam infrastructure, which provides structural and ongoing operational benefits to the dam owner.

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. Federal permitting can account for 8 to 10 years of that time. And most other energy projects can be built in less than half that time, which means that investors in the energy space are effectively discouraged from investing in new hydropower generation.

The Federal permitting regime for new hydropower on Army Corps dams -- and the Army Corps owns several of the best-suited dams for this kind of development -- has two major parts: the FERC process and the Army Corps process. In our substantial licensing experience, the FERC process takes 5 to 6 years, and FERC recently piloted a 2-year process, a 2-year licensing process. One of our projects on the Kentucky River, at Lock and Dam 11, was the only project selected for this pilot, and in May of last year received its license, marking the successful completion of this pilot process.

We believe that it is possible to shorten the FERC licensing process to 2 years for a precisely defined yet nationally significant set of projects, making this pilot process more broadly applicable.

Next, to the Army Corps process. The duplicative application of NEPA, first by the FERC during the licensing phase and then subsequently by the Army Corps triggered by the Section 404 permit, is a particular problem for a hydropower development, because it affects the water quality standard, which for a hydro developer determines the amount of water that is available for generation and, therefore, revenue, uncertain until the 7th or 8th year of a combined Federal permitting process.

Some ideas we have to address this duplication include requiring any Federal agency to adopt the NEPA analysis of another Federal agency if it has analyzed the same project within a certain number of years. Alternatively, we could require that the Army Corps adopt the prevailing State standards for water quality parameters applicable to that particular project.

The last substantive point I want to leave you with is the idea of public-private partnerships. These projects, new hydro on existing dams, are an avenue for the Federal Government to attract private capital to invest in its dam infrastructure, offering measurable benefit to the Federal Government. The benefits of the private investment are that it actually reinforces the portion of the dam structure with new construction, which is the part that the hydro developer builds, and takes over the maintenance obligations for that

portion of the dam and typically that side of the abutment.

The Federal Government could recognize the value that private capital brings in one of a few different ways. Some ideas we have are providing a 20-year standard offer for the purchase of power pursuant to published rates for these projects, or making them eligible for low-cost financing from programs such as the Rural Utility Service. Both of these actions would effectively lower the cost of electricity produced by the relevant hydroelectric project.

In conclusion, Rye Development thanks you for inviting our testimony on this vitally important subject, and we are ready to work with you further to resolve challenges and create opportunities. Thank you.

[The prepared statement of Ms. Swaminathan follows:]

******** INSERT 1-4 ********

Mr. Upton. Well, thank you all. Thank you all for your testimony.

I want to start off my 5 minutes. We are each going to do 5 minutes of questions, and bounce back and forth.

Ms. Swaminathan -- I don't quite have that right, but I am trying -- you referenced the 2-year process, the 2-year pilot program. And, of course, that was actually legislation that one of our colleagues, Mrs. McMorris Rodgers, on this committee introduced. It has worked, I think. Would you like to see it made permanent? Maybe have each of you comment on that.

Ms. Swaminathan. Absolutely. And, yes, I think it is our belief that the process worked very successfully, and we would like to see it adopted to a more broadly applicable set of projects, still with certain criteria that would separate them for projects that legitimately should be analyzed over a longer period of time.

Mr. Upton. Right. And when you talk about the average is 10 to 13 years to get a project from start to finish, that includes the 2-year pilot project, right?

Ms. Swaminathan. No. So our experience has been that FERC licensing typically takes 5 to 6 years. So when I say 10 to 13 years, I am including our average, not our exceptional 2-year licensing experience.

Mr. Upton. You also talked about the NEPA changes that would be helpful. Have you found in your seven States that you are working on that the Corps of Engineers is sort of interested -- I have a meeting

with my Corps of Engineers later this afternoon in Michigan -- have you found that the Corps of Engineers has been particularly helpful in working with FERC as relates to relicensing dam applications?

Ms. Swaminathan. Right. So our experience is in licensing new projects. And the Corps and the FERC have recently entered into an MOU, which is a step in the direction of constructive engagement. We welcome that.

However, from our perspective, the combined Federal permitting process is still not right sized, even accounting for legislative and administrative changes such as the MOU, and the water quality standard in particular is a particular point of pressure for hydro developers on new dams.

Mr. Upton. Mr. Steindorf, do you have a comment?

Mr. Steindorf. Yeah. So one thing that is interesting about this, if they are reviewing the 2-year process, it also seems to me that, what I have heard from a number of developers, is the big challenge here is actually hooking their projects up to the grid. There is a pump storage project in California from Sacramento Municipal Utility District, they had an approved pump storage project that they were ready to build, but our understanding in talking to SMUD was that it was the $100 million price tag of hooking that project up to existing transmission.

So some type of process whereby those hookup charges are consistent across utilities would be a great place to start, because in our discussions with developers, that is probably the biggest

impediment to bringing those projects online.

Mr. Upton. Wow.

Mr. Hookham.

Mr. Hookham. To counter that concept, we develop a lot of projects nationally, and infrastructure like transmission is important. We factor it in every decision we make.

To reiterate some comments that were made earlier as well, we are doing duplicative permitting. And simply, we can't afford to be out there 8, 10 years permitting projects. That just can't happen. I can build a gas plant probably in 4 -- 3, 4 years tops.

Mr. Upton. Two.

Mr. Hookham. So I am competing with this.

And from a rate point of view, we have to keep our rates low, this is really critical, or it is just not going to fly. Then I have to marry that up against regulatory pressures that are involved with all of our decisionmaking these days.

So it is really a tough process that we really want to look at permitting to make sure it is in the right light and we are protecting the human life, we are protecting our aquatic life, but we are also moving forward in doing renewable technologies that make sense.

Mr. Upton. And the renewable issue is something that is important to both sides of the aisle.

Mr. Connolly, you cited in your testimony the competitive rates that you have got to have, particularly with natural gas. So in your view, I would imagine making this 2-year pilot project permanent would

be a good thing.

Mr. Connolly. Well, for Bonneville, we are not subject to the same licensing process that my comrades here are.

I would say on the transmission piece, we do interconnect and provide transmission service to folks in our service territory, and there are well-established processes for folks to get in queue and line up for that and understand what their costs and impacts will be.

Mr. Upton. Thank you.

I will yield to the acting ranking member of the subcommittee, Mr. Peters.

Mr. Peters. Thank you, Mr. Chairman.

Ms. Swaminathan, I wanted to follow up on this 2-year process. First of all, you described limiting projects that qualify for the expedited treatment to objective predetermined set of criteria applicable to a large number of projects in the pilot solicitation. So what kind of projects didn't meet the criteria that you think we should expand to have this 2-year process cover?

Ms. Swaminathan. In particular, the pilot project solicitation included a requirement that there be a letter from the dam owner saying that the project was feasible, and there were a number of dam owners, including Federal dam owners, who did not want to provide such a letter so early in the process.

So our view is that the kind of criteria, objective criteria that could be applied that would be useful in limiting the projects to appropriate ones and yet opening them to a nationally significant

number would be criteria such as projects on existing dams, no change in storage, no material change in hydraulic regimes, that all studies should be able to be performed in one season, and that it be accompanied by some off-ramps, because sometimes it does happen that you start a project and something unexpected is either found or experienced in the process of studying the project.

Mr. Peters. Is feasibility generally an objective determination?

Ms. Swaminathan. I think there was some uncertainty about the intent behind the word "feasibility."

Mr. Peters. You mentioned also that NEPA is triggered by a water quality issue. Can you explain that to me, a second NEPA process?

Ms. Swaminathan. Yeah, absolutely.

So the developer, when you are developing a new hydro project, first goes through the FERC licensing process, by which FERC staff applies NEPA, and there is a water quality element to that analysis. In addition to the FERC's analysis, the developer is also simultaneously going through a State 401 water quality certification, without which the license cannot be granted.

Subsequent to that, the developer will have to apply for a 404 permit, which is for dredge and fill activities, and that triggers NEPA again, this time by the Army Corps.

Mr. Peters. But we could require that the previous document cover -- or studies cover the 404 permit.

Ms. Swaminathan. I think there are a number of ways to get at

the same result. From a developer's perspective, the issue is the duplication and the potentially different result you get from a second process.

Mr. Peters. Different participants, different commenters, yeah.

Ms. Swaminathan. Potentially different studies being required, and therefore more money, more time, and more uncertainty.

From a developer's perspective, when you are leveraging private capital, a short, certain process is best; a long and certain process is financeable; a long and uncertain process is really not attractive.

Mr. Peters. I have a sense that Mr. Steindorf is on to something when he says get everyone in at the same time and conduct an upfront assessment of what the issues are. You are suggesting that the FERC process could be condensed to 2 years. Is there any way you could see that the entire process for the Army Corps could also be concurrent to that, or does that have to follow?

Ms. Swaminathan. I think the primary barrier to concurrent processes at the FERC and the Army Corps is a commercial barrier, which is that typically the Army Corps analysis happens at a higher level of engineering design, at 60 percent and 90 percent, which in the case of a hydro project is extremely expensive. Licensing is expensive, but final design, which includes the ordering of equipment, major equipment, and final engineering design, is even more expensive.

So typically an investor will want to have the certainty of knowing that a FERC license is either attainable or has been attained

before committing to invest to get to the 60 percent design or 90 percent design mark.

Mr. Peters. So you have given us some important testimony, all of you, with respect to the obstacles to developing new hydro, and those of us who would like to see more clean power should take this as a challenge. And it is bad news for us if a gas plant can be comparably permitted in a 2-year period and we are looking at this being 10 years, the power that we want is at a disadvantage.

So I would like to -- I am not going to be able to do it in my 5 minutes -- but I would like to work with you all to see what we can do to achieve high standards in regulation to make sure that we cover the issues like the ones that Mr. Steindorf raised with respect to resources, but that we get these decisions made quickly. And that will also help attract more private capital to these projects as well. So consider me on that team, and I will look forward to working with you. Thank you very much for you being here today.

And, Mr. Chairman, I will yield back.

Mr. Upton. Thank you.

The chair will recognize Mr. Long for 5 minutes.

Mr. Long. Thank you, Mr. Chairman.

And, Ms. Swaminathan, you mentioned earlier that there are 87,000 dams in the United States, but only -- or I think your number was 80,000 -- but only 3 percent of the dams are fitted to generate hydroelectric power. I have a couple in my district.

On the 2016 report from the Department of Energy, they recommended

that we look at utilizing these nonpower dams for hydropower generation, which sounds like what you do. What are some of the challenges to this approach? Is it technology driven, is it cost, is it licensing process? What are your challenges?

Ms. Swaminathan. Thank you for asking that question. It is very important.

I think we approach it from the perspective of how do we attract capital to the field of developing new hydropower in existing dams. And from an investor's perspective, as a number of participants have said today, the choices effectively disfavor hydropower, and it is because of a variety of things when you look at the entire playing field. It is partly because of the FERC licensing process, it is partly because of the Army Corps and the duplicative action of NEPA, which lends itself to a combined Federal permitting cycle that is difficult and uncertain in terms of its financial challenges.

And then the last part of what I wanted to leave you with was the substantive point I made at the end, which is the recognition of the public-private partnership, where there is a benefit being added to Federal infrastructure that could be recognized and supported by the Federal Government.

Mr. Long. Okay. Thank you.

And Mr. Hookham, could you discuss the complexity of the licensing and relicensing process for hydropower dams, and how long does the process take?

Mr. Hookham. Yeah. It is really dependent on lots of factors.

If it is a high hazard dam and it is in an area that needs to be revisited in a more detailed fashion, it may take longer. And if there is more interest in a particular habitat, like if we find something that is living in the reservoir upstream that is a protected species, it may take a different strategy.

Effectively, we have repermitted our hydros as a group, and it was more effective for us to do this in a singular step, but it still took a long time, and it is a difficult process.

I don't have a definitive timeline for you. I will say that since we have a built asset that is existing, generating electricity, it only makes sense for us to try to preserve it if we can. It is an economical decision, it makes sense to us. It is an existing resource that is renewable. So we look at that very strongly against other alternatives.

At the same time, we are very market driven, and so if that cost to relicense that dam is just not effective, or if there is a sustainability issue, if there is an environmental impact that we don't like, we are going to turn our heads and go a different direction.

It is a simple investment decision. If it is more certain and more schedule certain to build something different, we will build it. And if it is better for our ratepayers and better for our citizens in Michigan or wherever we are building, that makes a lot of sense.

Mr. Long. This question I can ask of either of you, Ms. Swaminathan or Mr. Hookham. The American Society of Civil Engineers' 2017 Infrastructure Report Card notes that many dam owners,

especially private dam owners, find it difficult to finance rehabilitation projects, as you were talking a minute ago. Could you discuss how the Federal grant program can be utilized to address dam deficiencies? And that is d-a-m on dam deficiencies.

Mr. Hookham. So probably the simple answer is, because we are a private investor looking at investing in building hydropower at that dam, we can come in and revisit all the maintenance needs, its age, its risks, its perspectives, and invest. When we build the hydropower, typically we will work with that private owner. Whether it is a Corps dam or Bureau of Reclamation, whatever it is, if we are building infrastructure at that dam, we can reconstitute it effectively back up to today's standards.

It is a strong benefit for everybody. Everybody wins in that scenario, the risks are reduced, the people that live downstream will have higher confidence that that infrastructure will last longer, and everybody, theoretically, even the ratepayers win, because it is a cost-effective addition.

Ms. Swaminathan. I agree with that.

Mr. Long. You are okay with that?

The report also states that innovative approaches to risk management have the potential for seeing the cost of rehabilitation go down. Could either of you expand on what these approaches are and the extent to which they could lower rehabilitation costs?

Tag. You are it.

Ms. Swaminathan. I am not a dam safety expert.

Mr. Hookham. Yeah. So dam safety, emergency action planning, all those things are benefited by that process. And so investments through grants and things of that nature --

Mr. Long. Okay. And, Ms. Swaminathan, how many of these have you done where you convert them to hydropower?

Ms. Swaminathan. We are pursuing 23 projects.

Mr. Long. Twenty-three. And, again, 80,000 to 87,000, depending on who is counting, dams, only 3 percent now are fitted to generate hydropower power.

Ms. Swaminathan. Yeah.

Mr. Long. And you are doing how many again?

Ms. Swaminathan. Twenty-three.

Mr. Long. What is the world out there? How many do you think could be converted?

Ms. Swaminathan. Even discounting half of the 80,000 to 87,000, that is essentially an unbounded supply set.

Mr. Long. Isn't it extremely difficult to go in and take a dam that is not -- wasn't hydropower in the first place? Is that what we are talking about?

Ms. Swaminathan. Yes. So a nonpower dam that was built for another essential purpose, navigation, drinking water.

Mr. Long. Right, yeah, but you think half of them could.

Ms. Swaminathan. We haven't looked in the detail to support that, but, you know, I think there --

Mr. Long. I know, but --

Ms. Swaminathan. -- is a significant universe of --

Mr. Long. This is Washington. We are doing ballpark guesses here.

Ms. Swaminathan. Yeah.

Mr. Long. Okay. Okay. If I had any time, I would yield it back, but I don't.

Mr. Murphy. [Presiding.] Thank you. I recognize Mr. Pallone for 5 minutes.

Mr. Pallone. Thank you, Mr. Chairman.

Based on what I have heard from our witnesses today, it seems that many of us can agree that there is room for improvement in the hydropower relicensing process. The licensing landscape has drastically changed in the time since many of our Nation's hydropower dams were first constructed, and landmark environmental laws have since been passed altering the framework by which these projects are licensed.

I don't want to see this process drag out unnecessarily, but I do feel that there are important natural resource considerations that must be reviewed and adequately satisfied before a dam is given the stamp of approval to operate for another several decades. And one of my main concerns during the licensing and relicensing process is ensuring appropriate consultation with Native American tribes. Hydropower dams have a legacy of great impact on tribal communities, and it is critical that tribes have a voice in the licensing and relicensing process.

So, Mr. Steindorf, I wanted to issue a couple questions. You

discussed a proposal to grant tribes conditioning authority whereby tribes themselves would protect their resources rather than the Department of Interior. I understand this model is used under the Clean Water Act. Can you give us more detail about how it would work and why it would speed up the relicensing process?

Mr. Steindorf. Well, in our opinion, we think that tribes having direct knowledge about the lands that they have out there, they can provide an important voice within the relicensing process. And it really only makes sense to give them the same statutory authority that other agencies have, given their particular knowledge and interest in those lands.

Mr. Pallone. Right. And then you -- well, let me mention this. The integrated licensing process, or ILP, was created by FERC as a reform to address problems resulting from lack of communication and coordination amongst various State, Federal, and Tribal organizations involved in the licensing and relicensing process. However, my understanding is that most licenses, as many as 90 percent, according to FERC, continue to choose the traditional license process.

So, in your opinion, why hasn't the creation of this process, the ILP, been more successful? Why have licensees continued to prefer the traditional process? What can be done to improve the ILP?

Mr. Steindorf. I can't really speak to the reasons why licensees are choosing to use the traditional licensing process. That would be a question for them. I do think that the ILP has offered significant improvements in the licensing process by setting a set schedule that

all the stakeholders know when their homework is due and how they have to get it done.

But let's be clear about licensing and why it takes a while. A project that I recently completed covered an area 30 percent larger than the State of Rhode Island. These are huge projects covering multiple stream reaches, multiple dams. Getting the information that you need necessary to evaluate what should happen in each of those individual stream reaches takes a significant amount of time. It is important to get it right. And the idea that we are somehow not using our time effectively is simply not accurate.

I also think that I would like to reiterate some things that were said up here about other projects, particularly Corps projects.

We support, as our other witnesses did, having the Corps deal with their own process and really getting FERC out of that jurisdiction. Ann Miles also said that from FERC last year in her testimony, and that is certainly something that we support.

And the last thing is I think we do need to look at power production, particularly renewable power production as a whole and how hydro fits into that. Last year alone -- or I just read a report yesterday -- wind power this last year surpassed hydropower in terms of its total installed capacity. In the last 6 months of last year, more wind and solar was brought online than what the DOE Hydro Vision report said is potentially capable of coming online by 2050.

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[1:14 p.m.]

Mr. Steindorf. So let's put the additional hydropower development perspective in line with what is actually coming online and being permitted. And that is happening largely because those projects can be done with lower impacts than what we are looking at with most hydro operations.

Mr. Pallone. All right. Ms. Swaminathan, did you want to comment on any of this with regard to Native Americans or this ILP process?

Ms. Swaminathan. Well, what I can say is that for our projects we have chosen the traditional licensing process. All our projects are original licenses, meaning they are not relicensings, they are for new projects on existing dams. And our choice of the traditional licensing process reflects the fact that they were generally and broadly acknowledged to have mitigable impacts and generally low controversy, which is one of the criteria for choosing the TLP.

Mr. Pallone. I see. All right. Well thank you. It certainly sounds, Mr. Chairman, like there are ways we can increase collaboration. And I would like to talk to the Republicans more about that. So thank you all.

I yield back.

Mr. Murphy. Thank you. I now recognize the gentleman from Ohio,

Mr. Johnson, for 5 minutes.

Mr. Johnson. Thank you, Mr. Chairman. And thanks for this hearing, a really important hearing.

And let me start with Mr. Hookham and Ms. Swaminathan. You know, the Federal Power Act allows FERC to issue a preliminary permit to maintain priority of an application for a license. The preliminary permit does not allow construction, but it allows the applicant to study the site as they prepare to apply for their license. While FERC has some discretion to grant extensions for applicants acting in good faith to obtain the necessary permits and commence construction of a hydropower project, Congress often has to step in and waive the strict Federal Power Act time limits. In fact, there were nine separate hydropower extension bills that were included in the energy conference last Congress. Unfortunately, these bills were never signed into law.

So my question to both of you, and you can choose who goes in what order, should Congress amend the Federal Power Act to give FERC more discretion to extend the period of preliminary permits and time limits for construction of a project so they don't have to come back for congressional approval?

Ms. Swaminathan. I think the incidence of projects and developers needing additional extensions is actually supportive of the overall point that we are making, which is that looking at any particular point in this process as being the problem is probably not going to solely result in more investment in hydropower. It is because there are multiple pain points for a developer along the way.

So somebody gets through the rather extensive FERC process, but then there are still challenges to face through the Army Corps process, and then ultimately in the commercialization of the project. And without knowing the circumstances of the specific projects that are asking for extension, I would surmise that one of the reasons, one of the common reasons that further extensions are needed is because the subsequent parts of the process are not falling into place with ease. Because when you look at the overall process, we are not caught in a virtuous cycle.

As to the specifics of modification of the Federal Power Act, we would have to study that. I don't have a position on it at the moment. But I think it supports the underlying problem which ripples through the entire process of developing hydropower.

Mr. Johnson. Well, let me rephrase it then. I mean disregard the modifying the Federal Power Act. If Congress didn't have to come back and approve the extensions, things would move a lot faster, wouldn't they? Especially if you reach a time limit and you wind up in a partisan situation like we so often see here in the Capitol where you can't get the legislation through and signed into law. Then it might be a problem.

Mr. Hookham, do you have an opinion?

Mr. Hookham. Yeah. I think maybe just to add to that, I have heard other people mention this too, having precise understanding going into a project, which the preliminary permitting lets us do, lets us screen out projects that don't make sense. And it will help us make

a decision that will help shorten the timeline.

We really need to focus on the timeline from the time we think a project is real to the time it can get permitted to have clarity, because that uncertainty is impossible to finance, it is impossible to really put the resources together to make a project like that work.

Mr. Johnson. Okay. Along the same lines, FERC is generally okay with congressional approval to relicense a hydro project that did not begin construction within FERC's specified construction time, assuming that the congressional relicensing occurs within 10 years of the original license issued by FERC. So a follow-on question. In your opinion, should FERC or Congress allow that 10-year window to be extended? And why or why not?

Ms. Swaminathan. I would answer it by saying anything that allows private capital to not perceive a cliff coming, and that essentially is the problem, which is that you might have a project which gets through its licensing, still has some fairly sticky permitting to go through with the Army Corps or other processes, and as the begin construction window end comes closer and closer, that project becomes more and more difficult to finance even though there may be nothing particularly wrong with it. But from a capital perspective, that itself becomes a constraint.

Mr. Johnson. I get it. And my time is about to expire. So let me just say this and see if you agree, and it is a short answer. Really what we need is efficiency in the entire front end of the project. The 10-year window would be less of an issue if we had efficiency in the

permitting and the development up front.

Ms. Swaminathan. Yes.

Mr. Johnson. Thank you. I yield back.

Mr. Murphy. The gentleman's time has expired.

Now Mr. Tonko, you are recognized for 5 minutes.

Mr. Tonko. Thank you, Mr. Chair. And welcome to our panelists.

I believe we all want to see more emission-free base load energy generation added to our mix, especially if it complements intermittent resources. But it must be done in a way that is also respectful of other resources, ecological and recreational.

So Mr. Hookham, your testimony states active hydroelectric plants have a median age over 55 years old. It seems that there is a great opportunity to upgrade performance of existing hydro generation. Since the construction of many of these sites decades ago, what types of advancements in technology have been developed to most improve efficiency?

Mr. Hookham. So Consumers Energy is in the process of relicensing and repermitting and investing in Ludington, which is a huge asset to this country. It is a 1,900-megawatt plant that is going to over 2,000 megawatts of pumped storage, which gives us that energy and storage capacity.

The efficiencies we are getting are basically to push the limits of how much water we can fit through the turbine section to generate electricity. There are thermal limits and mechanical limits that we are up against. But we have worked with the OEMs, and we are working

with OEMS virtually every time we relicense a dam to see if we can get more out of that hydro engine.

Mr. Tonko. And what is the process for putting the newest technologies on these old sites?

Mr. Hookham. It really varies. And we try to work with the original OEM, if they are still in business, to see what technologies they brought to the table, using different materials like permanent magnets or different seal materials that can allow more efficient generation. But we will work with whoever.

Mr. Tonko. And is there anyone estimating how much capacity could be added by upgrading and retrofitting these older sites?

Mr. Hookham. So there is always a transmission limit that we have to worry about. But generally speaking, if we can generate more electricity efficiently out of a specific site, we will do that.

Mr. Tonko. And what are the regulatory challenges to doing these upgrades?

Mr. Hookham. So I mentioned it earlier. It is an economic challenge for the most part, where we -- if we invested a dollar today in a new hydro addition or a retrofitted hydropower plant, is that worth spending that dollar for our ratepayers and our shareholders versus spending that dollar on something else. We have to weigh that every time.

Mr. Tonko. Are there sufficient incentives in place to make these investments economically worthwhile?

Mr. Hookham. It is a long answer, unfortunately, but yes.

Mr. Tonko. Okay.

And Mr. Steindorf, generally speaking, do retrofits have a smaller environmental impact than new constructions?

Mr. Steindorf. We typically support retrofits on existing projects, certainly as opposed to building new ones.

I personally have been involved in a number of retrofits on some existing licenses that I have worked on. And we have worked with various utilities, including Pacific Gas and Electric Company and others, to not only see that those projects get retrofitted, but also to see that they are eligible for a renewable energy credit.

Mr. Tonko. Thank you.

And Ms. Swaminathan, when you put power generation on an Army Corps dam, what responsibilities do you inherit? In other words, do you pay, for instance, for dam inspections or maintenance? What are some of those responsibilities?

Ms. Swaminathan. So the Army Corps maintains responsibility for dam safety, and they have a fairly developed program. We of course participate in that program and are subject to all its conditions.

The developer typically will take maintenance responsibility for the portion of the dam that is the new construction up to the point of tie-in. Maintenance responsibility including for erosion, sedimentation control on the abutment side that adjoins the new construction. A lot of debris and trash handling is handled through the hydro project and its trash racks and debris handling mechanisms. And of course there are upgrades to existing facilities or potentially

new facilities, typically recreation, that are associated with projects.

The last point I will make is the applicant or the developer also typically will provide electricity to the dam facility itself.

Mr. Tonko. Okay. And I take it that partnership works rather well?

Ms. Swaminathan. Yes.

Mr. Tonko. Great.

And for the 2-year licensing process to work as intended, how important was it to provide all the necessary info and study requests at the beginning of the process?

Ms. Swaminathan. It is important for all sides to have a clear understanding of what both is needed, the characteristics of the existing condition, the characteristics of the proposed condition, and to adhere to timelines that are clear to all involved. So we would be supportive of a process that included all that.

Mr. Tonko. Okay.

Mr. Chair, I will yield back.

Mr. Murphy. Thank you. The gentleman yields back.

And I will recognize myself for 5 minutes.

So I wanted to ask you about your project because you have one near my district. In Charleroi, Pennsylvania, a lock and dam is being rebuilt. These dams are over a century old. As I watch it being rebuilt early on, we would note that the lock was so old that when water went in and out the concrete shifted a little bit. So it is much more

stable.

And so Rye Development is developing this conventional hydropower plant in Monongahela Lock & Dam number four in North Charleroi, Washington County. I was just reading over some of the list of permitting. It is pretty massive, as it should be. This is a big project.

But I am curious here, the timeline for hydropower licensing, how does that compare to acquiring permits for example for other renewable energy projects like wind and solar? And what benefits does hydropower have to offer that may be complementary to other renewable energy resources.

Ms. Swaminathan. That is an important question.

So, relative to other renewable resources, and even relative to other fossil resources, hydropower generation's permitting cycle is almost unmatched. So you can put up a solar project in 9 to 12 months, a wind project in maybe 2 to 3 years, a gas plant in probably a similar timeline, 2 to 3 years. And a combined permitting process for non-Federal hydropower on Federal facilities is close to 10 years. It is between 8 and 10 years. So that disparity in timelines effectively discourages investment into non-Federal hydropower development.

And to answer the second part of your question, the importance of hydropower, certainly it is a clean, renewable form of generation, it has associated job creation and associated economic impact. And we talked about public-private partnerships and the potential for these projects to bring benefits to the dam owner.

But in addition to that, and I believe a number of parties here have spoken about it today, hydropower adds a significant amount of reliability and stability to the grid, which actually also benefits intermittent sources of power such as wind and solar. And that needs to be recognized.

Mr. Murphy. Let me read over some of these things with this permitting process. I am reading here from the Pennsylvania bulletin alone, is that we are dealing with discharge permits, erosion and sediment control permits, water obstruction encroachment permits, submerged land license agreements, water resources planning and registration, limited power permits, water quality monitoring, preparedness prevention and contingency plans, operations inspections, transfer projects, correspondence, they even tell you who you have to write to. Quite a few things there with that. And you said in your testimony that there are redundancies -- that was just some of the State ones, too -- between the processes that happen with FERC, Army Corps of Engineers permitting. And you suggested NEPA should only be applied once during the construction.

So can you get at some details of this as to how on an Army Corps of engineered-owned dam, how would that Federal permitting process benefit with less duplication?

Ms. Swaminathan. I think it could be streamlined and increase coordination among all the participants. It would certainly benefit the overall timeline and bring investors to the table to invest in this sector. But I think it also would benefit some of the stakeholders

who are going through some of the these duplicative processes and going through multiple permitting processes for the same project in having to review, comment, and provide studies and study requests multiple times along the process.

Mr. Murphy. It is fascinating to me because through that lock and dam passes millions of tons of coal. There is a barge manufacturing company just upriver that sends barges downriver. We have natural gas. And so the supplies for fracking go through there, so it is really quite an energy hub.

Do any of the panelists, perhaps I will let you speak on this, but given many of American dams have exceeded their design life, where do you see modernization fitting in with regard to the President's plan and discussing infrastructure development and the private sector? Anybody want to comment on that?

Mr. Steindorf, go ahead.

Mr. Steindorf. Again, I think it is really important to recognize the importance that we have seen with hydropower, which is its grid-regulating capability. So increasingly, we are in a situation where, believe it or not, we are awash in electrons out there. Curtailment of wind and solar projects in California is becoming a reality. And those developments, again, are happening across the United States, with Texas and Oklahoma leading the way in wind, and places like California leading the way in solar.

It is not a question of enough energy out there, it is how do we regulate the grid. So really specifying and using hydro to its highest

potential, rather than really specifying that we want to have more base load generation, I don't think that is what we actually need at this point.

Mr. Murphy. I know many in that area who think the EPA's regulations, they shut down two power plants within a few miles of this one being proposed down there. Put a lot of people out of work. But you are right, we need to find out how we modernize the grid and be more efficient with that.

But I see my time is up. And next is Mr. Schrader. You are recognized for 5 minutes.

Mr. Schrader. Thank you very much, Mr. Chairman. I appreciate the panelists for being here. A great group to get some insight from.

Mr. Connolly, I want to thank you and BPA for doing such a great job of providing low cost power to the entire Pacific Northwest, and a great regional compact that I think other areas of our great country would like to emulate. We are very, very fortunate. And I want to thank you for the great work that you do.

We spend a lot of money making sure that we meet our requirement to make sure there is equal consideration to fish, wildlife habitat preservation on our dams. You guys spend a lot of money. How much money do you spend for fish protection and restoration right now in the Bonneville footprint?

Mr. Connolly. Thank you, Mr. Schrader. About 30 percent of our rates go into our fish and wildlife mitigation program. And then there is also another fraction of the Corps and Bureaus's O and M costs that

is tougher to break out. You could say probably over a third of our costs are related to fish and wildlife.

Mr. Schrader. Wow that seems like a pretty high number. Is that common through most utilities and power generating facilities, they spend that much on mitigation of habitat and wildlife?

Mr. Connolly. I would have to defer to the other folks here about fish and wildlife costs that they face. We do believe that we have one of the largest programs in the country, if not the world.

Mr. Schrader. Is the ratepayer aware of how much of their rates go toward -- 30 percent of the rates they pay go towards that?

Mr. Connolly. I know certainly our power customers are aware, and I believe they talk to their ratepayers about it.

Mr. Schrader. I don't see it on my bill. I guess I would like to see it on my bill. Some would like that. Maybe that is a huge success that you are spending that much money. And we are getting some success, aren't we, as I recollect. Fish passages, especially downriver, what is it now?

Mr. Connolly. Certainly we feel like we have made significant progress under the programs we have in place to have survival of juvenile fish moving past the dams and returning. Just last week, the Federal agencies released a comprehensive evaluation on our progress for salmon and steelhead that we think shows significant progress that we are making in the area.

Mr. Schrader. I heard some figures, at least the fry going downriver are some 90-plus percent survival rate. Is that accurate?

Mr. Connolly. That is right. It depends on the species, but yes.

Mr. Schrader. Sure. I would call that a success. I am surprised that we are having problems getting our biological opinion through a certain judicial group here in the great Pacific Northwest. That would seem like an unqualified success. Wouldn't you agree, Mr. Steindorf, having that sort of passage downriver is pretty good for an anadromous stream of that caliber.

Mr. Steindorf. Anadromous fish passage is good. I believe we support that. But let me give an example from my testimony. The Rock Creek-Cresta Project that I first started working on, back in 1947 the U.S. Fish and Wildlife Service recommended a minimum instream flow of about 400 CFS on that project. Because there wasn't the equal protection clause in the Federal Power Act, the ultimate flow that they ended up deciding on was 50 CFS for one project, 100 CFS for the other. As I said in my testimony, it completely devastated that river and that recreation economy.

Mr. Schrader. I have short time. I am sorry. You also said you were able to restore a lot of that. It adds to your credit and the work you did. And I think Bonneville and many others are working along that line.

Can I switch to Ms. Swaminathan? I am sorry. I had to step out. You talked, I am sure, about your pilot project and the success you had. What agencies objected to the shorter timeline? What outside groups were upset with what you did?

Ms. Swaminathan. It is good to see you again, Congressman. Actually, we had no objections. So I think one of the successes of the 2-year process was that the stakeholder agencies bought in. And it was an extremely collaborative process.

Mr. Schrader. So for certain projects that are very contained, that don't have the fish passage issues maybe that we were maybe just talking about, there certainly seems like there is an opportunity, if no one objects, to a shorter, clearer, nonduplicative timeline.

Ms. Swaminathan. That has been our experience.

Mr. Schrader. Very good. Very good.

Back to Mr. Connolly. In your testimony, you talk about concerns with regard to scheduled investments and not being able to recoup opportunities in those areas. Could you elaborate a little bit on that?

Mr. Connolly. Well, certainly with the litigation that we face currently, there are motions for injunctive relief to stop investments in a number of the dams. And we are concerned about those from a reliability, safety, and in fact environmental performance of the facilities. Loss of generating equipment in an uncontrolled manner presents all kinds of --

Mr. Schrader. What would that do the ratepayers potentially?

Mr. Connolly. Well, certainly stopping that work would have -- needing to cease capital projects would force us more than likely to have to expense those costs. So that would be an immediate hit to ratepayers, in addition to the lost generation that would occur

from having units out of service.

Mr. Schrader. Great. Thank you all very much.

And I yield back.

Mr. Upton. [Presiding.] Thank you. Mr. McKinley.

Mr. McKinley. Thank you very much, Mr. Chairman. I am sorry, I missed a lot of the testimony because I was upstairs in another one, another meeting on this. I heard some of the comments. And when I read Ms. Swaminathan -- am I close?

Ms. Swaminathan. Yes.

Mr. McKinley. And since I arrived here, there have been several other questions along this idea of this timeline of approvals. And I thought I was just confused because of the last response you made that perhaps some hydro can be shorter.

Ms. Swaminathan. Right. So I think the last question that Congressman Schrader was asking me was about a pilot process that FERC set up pursuant to the HREA passed in 2013, where they were directed to have a 2-year licensing process as a model, as a pilot to see if it was possible. There was a solicitation, and our project on Kentucky Lock and Dam 11 was the only project chosen nationwide to be in that pilot process.

Mr. McKinley. So have the projects that you have in mind in Morgantown, Cumberland, and --

Ms. Swaminathan. Opekiska.

Mr. McKinley. Opekiska. How long have they been in the pipeline?

Ms. Swaminathan. So we are awaiting licensure on Opekiska and Morgantown, and we have been working on those projects since 2010 to 2011.

Mr. McKinley. So it has been 5 to 6 years.

Ms. Swaminathan. Yes.

Mr. McKinley. It just begs the question. Everyone in Washington is interested in renewables. Why something like hydro would go 7 to 10 years or longer, as compared to solar and wind? I don't think you kill any birds, do you? Okay. And I don't think you create any sound problems that people have with wind. Personally, I love wind. And I am fascinated with the solar panels. But I don't know why the hydro facility would take so long.

So can you give me some perspective on why you think government -- why you think government drags out the permitting for hydro facilities? Because surely they understand the impact they have on -- eventually they are going to approve them, and they have an impact on people's economy in those communities. Look at what is happening to Martinsville. They were able to build a new courthouse and school building down there. Why is this?

Ms. Swaminathan. Absolutely. We couldn't agree with your question more. I think it points to the need to modernize a process that is potentially antiquated and does not distinguish between projects that have potentially legitimate issues or need analysis that spans many years.

But the kinds of projects that we work on, including Morgantown

and Opekiska, by and large have relatively limited impacts, both hydraulic and terrestrial. The physical footprint is very small, and the hydraulic impacts are very limited. And I think that is fairly broadly acknowledged, as evidenced by the fact that typically stakeholders in our licensing process don't generate a lot of controversy. I think there is a fair amount of collaborativeness in the process. However, it does stretch out for a very long time.

Mr. McKinley. Joe Barton and I are the only two licensed engineers in Congress. So this is something that I have been fretting with for 40-some years in my practice in engineering. And that was why our dams, our low head dams, why we are not using low head turbines on every one of them.

So is it bureaucracy that is holding it up? Why don't we have more?

Ms. Swaminathan. Well, we don't have more of these across the board because when you look at the entire playing field for new hydro development on existing dams relative to other generation sources, investors look at this playing field and the timeline and the fact that the risks are not sequentially taken off the table effectively discourage investors from investing in hydropower.

Mr. McKinley. So in the 50-some seconds, what would be the first step you would take to shorten the timeframe?

Ms. Swaminathan. So I think in terms of the FERC licensing process it is possible to adopt that pilot 2-year process, with some cleanups and tweaks, to be more applicable to a precisely defined but

nationally significant group of projects and make that more applicable.

All of these projects, including Morgantown and Opekiska, on Federal facilities, on Army Corps facilities go through additional permitting by the Federal Government at the Army Corps. And some part of that is absolutely essential. But there are parts of that process that are duplicative, and importantly, from private capital's point of view, leave unresolved very important parameters until very late in a combined permitting cycle.

And finally, I think there is space for the Federal Government to recognize the value of public-private partnerships, because these projects are ways to bring private capital to invest in our aging dam infrastructure.

Mr. McKinley. Thank you very much. I yield back.

Mr. Upton. The gentleman's time has expired. The chair will recognize the gentlelady from Florida, Ms. Castor.

Ms. Castor. Well thank you, Mr. Chairman. Thank you for calling this hearing. And thank you to our hydropower experts for being here and being willing to share your expertise with us.

Very interesting, because hydropower continues to be an important component of how we generate electricity in America. And I think you have heard from a number of our colleagues here that we have got to do more to incentivize clean energy. And it is not so simple sometimes as saying, boy, let's put all of our eggs in one basket or not. We can't do that. We have got to continue to be as diversified as possible.

Coming from the State of Florida, where we really don't have hydro, we don't have a lot of dams, I am still very interested in how we incentivize clean energy, including hydro. Because my State, as most communities in the country, we are facing significant rising costs due to the changing climate. And we know we have got to do more in the clean energy sector, including hydro.

So I have heard you all mention a number of challenges here today, how we modernize the grid across the country and get these clean power sources connected to the grid. I have heard you talk about incentives and some regulatory relief as well. Mr. Steindorf, California is often the national leader when it comes to clean energy. You have a very bold renewable portfolio standard. You have a wide mix of energy sources. Can you help us prioritize a few of these from the -- knowing that at the Federal level we can put certain incentives, whether it is tax incentives or regulatory relief or funds into modernizing the grid from the Federal perspective, help us prioritize how we bring more clean energy projects, including hydro, to the benefit of consumers.

Mr. Steindorf. Well, believe it or not, you know, some of the things that need to be done aren't actually at the Federal level. You know, again in the hydro vision report that was put out by DOE last year said that one of the issues is that utilities are not properly compensated for their grid-regulating services that they provide. Might surprise my colleagues that I am actually advocating for the fact that they get paid more for the services that they do provide out there. But I think that is significant.

So if you want to incentivize those types of projects that actually provide those important services that allow you to bring wind and solar onboard, which is coming onboard at, again, ever-increasing rates, that is important, with the caveat that we are able to do that in ways that are environmentally protective.

I am working on a project right now in Northern California where we have actually done that. We have done the analysis, which again isn't an analysis that FERC typically does, where we have shown that we can actually increase the grid-regulating services that the project provides while increasing stream flows. Now, that is a win-win that we should all be pursuing out there. And there are a number of different ways we can do that by looking at existing facilities and find ways to give them more flexibility.

Also in my backyard is another project that PG & E, after spending $30 million during relicensing, has just said that they would like to hand over that project to anybody who wants to take it. Now, part of the problem there is that that project just doesn't have that grid-regulating capabilities.

And but the other part is that because of community preference aggregation, utilities can no longer pass along the cost of noneconomic projects to the ratepayer. So part of this discussion really needs to be about what are we going to do with those projects that are no longer economic, some of these projects that are a hundred years old and they just don't fit in today's energy mix? That is going to be a big situation that we need to grapple with. Because the last thing

we want is to have a bunch of outdated unused energy infrastructure sitting the on the landscape.

Ms. Castor. So Mr. Hookham, how would you answer my question on priorities from the Federal level on grid modernization, incentives, tax incentives included in regulatory relief?

Mr. Hookham. We have talked a lot about wind and solar. They are great attributes, clean energy sources, but they are intermittent. They don't operate all the time. And a lot of times, as was pointed out earlier, they fluctuate quickly. We need to have storage capability. That is a huge component. PGM has proven that that has worked for them in their ISO grid section that they have introduced fast frequency regulation. That is great, because we can then ramp up quickly resources that exist so we can bring in more renewables.

And if you look at countries like Germany, they research they have done in other countries where they ramped up their clean energy, they really have some stability issues going on. And part of that is just that, there is no storage. There is no ability to offset those penetrating intermittent renewables that exist.

So, you know, I hesitate against saying an RPS from a national point of view because one size fits all doesn't work with me personally. And I think we need to look at what incents us as a utility to build more clean energy, as opposed to market conditions which may incent me to build more gas.

Ms. Castor. Thank you. I yield back.

Mr. Upton. The chair would recognize the senior Mr. Barton

versus the good looking Barton junior.

Mr. Barton. Well, I have to admit, Mr. Chairman, that he is a lot better looking than I am, and he is a lot smarter than I am, and he is also a lot more attentive than I am. Although as soon as he got here he asked how long it was going to last.

Mr. Upton. The gentleman is recognized for 5 minutes.

Mr. Barton. I appreciate that. I do want to point out Mr. McKinley indicated that he and I are both registered professional engineers. I was at one time a registered professional engineer, but I am not currently licensed. I don't want to get the Texas State Board of Professional Engineers all upset.

Mr. Upton. Your $125 would be good, though.

Mr. Barton. I should get on the stick and get relicensed, I admit to that.

I appreciate Mr. Chairman holding this hearing on our hydropower sector of the energy sector of our economy.

I have got two basic questions. My first question, do we have the capability still in this country to build brand new hydropower projects given all the complexity of the environmental regulations that are now in place? Anybody. Ms. Swaminathan?

Ms. Swaminathan. Thank you.

Mr. Barton. How close was I? Not at all?

Ms. Swaminathan. Very close.

Mr. Barton. She is going to go far.

Ms. Swaminathan. I think we certainly have the technical

capability. I think what holds us back from having more hydropower development on existing dams, the kind of development that Rye Development does, is really when investors look at the entire landscape, what they see is a pretty forbidding chain of an extremely long process that leaves risks open until relatively late in the process.

And then combined with a number of things that my fellow witnesses have talked about, the prevailing price of electricity, the lack of recognition for the qualities that hydropower brings in terms of grid reliability and stability. Those all make for a challenging business environment. But I think when you put both of those together, if you are an investor you have choices. And I think the collective challenge here is to make this as an investment proposition more attractive relative to what investors could otherwise invest in.

Mr. Barton. I guess I will ask a more general question, and everybody just give a brief yes or no answer. Will we ever build another major hydropower project in the United States? Mr. Connolly?

Mr. Connolly. That would be tough. Perhaps. Storage has value, but it is going to be a long climb.

Mr. Hookham. There are opportunities, but it is a long proposition, and I can build a battery storage project that can inject faster than I can build some hydro projects, so probably not. As an investment point of view, I don't have that incentive.

Mr. Steindorf. And I would say with the exception of there is some potential with pumped hydro, and as I said earlier with the

increase in wind power, which this year exceeded the entire installed capacity for hydro, with your State leading the way, the short answer is no.

Ms. Swaminathan. Our average project size in our portfolio is 12 megawatts. And there are 23 projects. But obviously from an energy perspective, those are small projects. So in terms of major projects, the way we get to scale is to accumulate projects in clusters.

Mr. Barton. These big wind turbines, aren't they about 12 megawatts?

Ms. Swaminathan. One turbine.

Mr. Barton. Yeah. In the 2005 Energy Policy Act that passed this committee, we, at some point in the process, tried to make the FERC the lead agency for hydropower. We weren't able to make that happen. But this is a new Congress.

We have a new subcommittee chairman who is very experienced, a new full committee chairman who is a proponent of hydropower, and a few old goats like me that are still around. Is that something we ought to make another run at?

And again, we will just start with Mr. Connolly.

Mr. Connolly. As a Federal PMA, we are not as exposed to FERC, so I am going to defer to the rest of the panel.

Ms. Swaminathan. So, you know, the majority of our projects are on Army Corps dams, so we are subject to FERC licensing and then the Army Corps processes. I think each part of the process has some virtues and essentiality, and each part of the process has some real challenges.

So, the virtues of the FERC process, setting aside for a moment that it is very long, are that it is clear, it is set up as a process with clearly defined steps. FERC has some open dockets, so you can look at other dockets and refine your game as a developer or potentially as a stakeholder. The Army Corps's process's virtues are, for one, for projects on Army Corps dams it is absolutely essential, to make sure that the hydropower project doesn't interfere with the dam structure.

However, I think the Army Corps process comes with its own challenges. It is duplicative when it comes to NEPA, it can become opaque. It is variable across different regions of the country and districts. And so what we would like to see is a solution that addresses all parts of that chain with respect to regulatory modernization.

Mr. Barton. My time has expired, Mr. Chairman. Thank you.

Mr. Upton. Thank you, Mr. Barton and Mr. Barton. The chair will recognize the gentleman from the great State of Michigan, Mr. Walberg.

Mr. Walberg. Thank you, Mr. Chairman, from the great State of Michigan.

And Mr. Hookham, good to see you here. We are proud of CMS Energy in Jackson, Michigan, and appreciate what you provide. In fact, I stepped out to meet with the mayor of Jackson for a little bit here and one of his city council members.

I spent a lot of wonderful time below hydro project dams fly fishing myself. Either Tippy dam in Michigan or the Bull Shoals dam

and hydro project in Arkansas on the White River. And some of the greatest fish stories of my life have developed from those spots at the end of my fly rod. But I also know that there is a significant power potential.

And so Mr. Hookham, I would like to ask you what reforms could the Congress undertake to help ensure that this clean source of energy remains cost competitive in today's markets?

Mr. Hookham. I think the short answer is we need less governance. We need maybe a more concise approach. So if you could find out a way to reduce or collaborate between State and Federal and reduce the number of parties that are involved in the process and focus it so that the parties to a license are clearer, and they have clear objectives, and we understand where they are headed, it will add a lot of clarity to us to invest. Because right now the uncertainty is really a problem.

Mr. Walberg. That is the key. Anything else?

Mr. Hookham. No.

Mr. Walberg. Give me hope. Talk about getting government at all levels to work together, that is a challenge. But I am delighted you said that. At least it tells us where the bottleneck is.

Mr. Hookham. The other part is the market side of it. Because we are in a situation as a regulated utility where we buy and sell power through an ISO that was set up through FERC. So we have an opportunity to make revenues through cost efficient generation, but also to have to buy that power back for our constituents. So it is a very tight market in terms of making profits as an investor-owned utility, and

at the same time keeping our rates down, because that is really what we are all about.

And also managing the sustainable piece of being an environmentally friendly company. So we live in a really difficult world. So the less wires or nooses around our neck the better off we are going to have a path forward.

Mr. Walberg. Good admonition. Any of the rest of you want to add to that?

Ms. Swaminathan. I would just like to chime in on the commercial aspects of this. We are in a different position because we are funded by private capital, which is a different source of capital and a different pool with different constraints and different return thresholds than a regulated utility.

So certainly we support regulatory modernization across the whole range of regulation that we face. But low cost financing through some of the Federal instruments that can do that, as well as potentially a Federal standard offer that would provide certainty pursuant to published rates would be measures that the Federal Government could adopt that would significantly galvanize private investment because they would provide certainty on the market side.

Mr. Walberg. Yes.

Mr. Steindorf. One thing I was going to recommend that we put in our testimony and that our coalition has been actively supporting is the developing of MOUs between FERC and State water agencies, particularly those with section 401 authority.

What we worked on and what I personally worked on in California was an MOU that made that process happen in conjunction with the ILP process rather than happen in series. And this is something that we really learned after going through a round of relicensings, where after the ROP would finish, then the State board would take up their process.

Having those both happen concurrently is a great idea, and really it is the way to ensure that these happen in a timely manner. And it is a far better answer than having FERC undertake -- taking over State water law, which is something that is not supported by the National Governors Association.

Mr. Walberg. Right. Or many of us in Congress as well. Mr. Connolly, did you have -- I saw your hand reaching out.

Mr. Connolly. I guess the only thing I was going to say is the investment projects that we look at on behalf of our customers tend to be very economic in the long haul. But I would echo the comments about the current market conditions and the ability for hydro to be compensated for the services it does provide to the grid.

For Bonneville being a not-for-profit entity, those benefits where they compensated, those would go back into driving down the rates of our customers and to enable us to continue to provide the services that Congress has asked us to provide to the region. And so both of those are of course very important to us.

Mr. Walberg. Thank you.

Mr. Upton. Thank you. The chair will recognize Mr. Griffith for 5 minutes.

Mr. Griffith. Thank you very much, Mr. Chairman. Thank you all for being here today.

Mr. Hookham, in your testimony you discuss the great potential for additional development of pumped storage hydroelectric generation on pages six and seven. In particular, you note opportunities for these facilities at abandoned mine sites. Representing a district in gold country in southwest Virginia, this is welcome news.

And so we are looking for ways that we can promote economic development in our communities and help out, particularly when we can reuse some of our abandoned mine locations. In fact, the Virginia Department of Mines, Minerals, and Energy had put forward such a proposal for the Department of Energy's HydroNEXT grant, which funds innovative projects such as this. In particular, the sites that are being considered in southwest Virginia are especially attractive since they use clean, nonacidic water for use in the system. While they were not chosen for this round of grants, I am hopeful that DOE and other agencies will see the importance of supporting these types of projects.

So here is my question to you. And others may want to jump in. Can you expand on what you see as the potential for pumped storage hydro, particularly for abandoned mine sites, and discuss what regulatory barriers you think we need to address to streamline these sorts of projects?

Mr. Hookham. So we are always looking to take advantage of what we call brownfield sites, sites that were used for something else that we can reuse for a better use. So like landfills with solar caps makes

perfect since to us, so we can cap over and protect the environment and at the same time generate electricity.

A mine site is a classic example where we can create vertical head, where we have got an opportunity to use a pool that potentially is underground, contained, not contaminating groundwater, with a good clean source of water, and then be able to pump that back up and reuse that power on both sides. It makes a total amount of sense, particularly where we can align that with demand and where the grid infrastructure supports it.

So in an opportunity where there is a mine site where we have power lines and everything else aligned, I think we need to really take a close look at this.

Mr. Griffith. Regulatory burdens or barriers that we may need to move aside?

Mr. Hookham. I would say it is the old first of a kind mind-set. We have to be careful what we are doing. So environmentally, we have to look and see if there is any impacts, because we don't have a lot of those investments right now.

So I think we have to do a little homework. We have to do that prescreen to make sure it is a viable approach. But I think it should be done right away as part of this research mind-set we need to take on.

Mr. Griffith. Okay. Anybody else want to touch on that subject?

Mr. Steindorf. One thing that I think again looking at the perspective of the energy landscape, a lot has been said today about

if an investor looks at a project like this, they have to look at what are the other alternatives. To be honest, we have been somewhat surprised that there hasn't been more interest in pumped storage given the need for good regulation, et cetera.

However, it needs to be said that if you are an investor looking at other storage technologies that are being developed right now, do you want to spend a billion dollars on a pumped storage project that could easily be leapfrogged by some new battery storage technology that is in the near future? I think that is the question.

And in terms of pumped storage, we think it is possible to site them correctly. But I think you need to acknowledge the reality that that are other technologies that are being developed that may be better answers.

Mr. Griffith. And then you -- yes Ms. Swaminathan.

Ms. Swaminathan. If I can chime in on that, we are developing a project in the State of Oregon, which is a sizable pumped storage project. The challenge on pumped storage has been on the market side, on the commercial side, which is that, you know, the conventional wisdom is that you can arbitrage on-peak and off-peak power.

In an environment of very depressed prices, that is very difficult. And the capital costs of pumped storage are very high, because they tend to be sizable projects. And so what we would like to see is movement on the market side. How do you pay for pumped storage in recognition of all the grid benefits that it gets? Not just the generation.

Mr. Griffith. I appreciate that. And then we had some conversation earlier about the length of time in getting these projects approved, and we do note need to cut that.

I have two dams proposed already in my district for some -- small dams, small projects, but it is taking a long time to get everything done. And we need more time to do it. I also should bring up that I have got a little bill coming in, because a lot of these larger projects were sold to the public as you also have recreational facilities. And yet FERC has been very aggressive in some of our lakes in our areas in telling the property owners on the size of the lakes what they can and cannot do.

I do not know the laws of other States, but as a trained Virginia lawyer, although like my friend Mr. Barton, I am no longer practicing, but I think there are also some taking issues. But one of the things I think we need to work on is making sure that FERC considers that usage and considers the property owners on the size of the lakes as well.

My time is up, so I am going to have to yield back. But we will keep that in mind. Thank you so much for your time today. And I yield back, Mr. Chairman.

Mr. Upton. The gentleman yields back. The chair would recognize the senior Mr. Mullin for 5 minutes.

Mr. Mullin. Thank you. And thank you for allowing me to have my oldest son sit up here with me. It is his spring break. I don't know why he would rather come here than Disney World, because his other siblings went to Disney World. You didn't know that, did you? No,

I am kidding.

As we are wrapping up this hearing, and I appreciate the chairman for bringing it to our attention, hydropower is extremely important to our State. In the eastern part of the State where I represent, we have a tremendous amount of water and hydropower. And forgive me, ma'am, if I mess your name up, but is it Ms. Swaminathan?

Ms. Swaminathan. That is right.

Mr. Mullin. I said that right? Wow. That is a first. Anyway, I appreciate you being here. I have a couple questions. One, your company has the largest portfolio of hydropower, right?

Ms. Swaminathan. Of development projects.

Mr. Mullin. Of development projects. Right. So why aren't there more companies like yours?

Ms. Swaminathan. That is a question we ask ourselves all the time. I think that when you are looking at companies like ours who leverage private capital, investors in the energy space have lots of choices. They can invest in hydropower, they can invest in wind, solar, fossil fuels, potentially geothermal, et cetera.

So what is important to look at from an investors' point of view is the totality of the attractiveness of that investment proposition. And what they see in general terms when they look at hydropower is a very long process that not only is long, but leaves unresolved many important parameters until very late in the process, which is difficult.

Mr. Mullin. What is a long process?

Ms. Swaminathan. So the combined Federal permitting process for non-Federal hydropower development on Army Corps dams can extend as far as 10 years.

Mr. Mullin. For just the permitting process. That is before you even start the project?

Ms. Swaminathan. Yes.

Mr. Mullin. And then the project length is?

Ms. Swaminathan. The construction cycle, our average construction time for a project on an existing dam is anywhere from 12 months to 2, 2 and half years, depending on the size and the complexity of the project.

Mr. Mullin. So you are talking about 11, 12 years before an investor would even be able to start seeing a return?

Ms. Swaminathan. Yes.

Mr. Mullin. How do you even raise capital? I am serious. I mean I used to invest quite a bit. We kind of have restraints now that we are in office. There is no way. That is a long way. So, how do you do that?

Do you have a certain group that you go after? Because hydropower is something that it is sustainable for us. It is clean. It is one thing that you can see both sides, Republicans and Democrats, both agree on when it generates -- when we are talking about generating power. And it is reliable to the point that it can help bring the grid back up too in certain circumstances.

I mean we have GRDA in my district that we are constantly working

close with them. So if we are not developing, then we are behind.

Ms. Swaminathan. Right. Absolutely. And you are right, access to capital is a real challenge in hydropower development. And hydropower construction and projects being what they are, capital cost is everything.

Mr. Mullin. What does it cost just to go through the permitting process, the regulatory process before you start your project? What is the cost on that?

Ms. Swaminathan. It can cost about a million dollars a project to get through the FERC licensing process.

Mr. Mullin. Is that from the research you have to do or is that just the cost of the permits?

Ms. Swaminathan. It is not the cost of the permit itself or the license itself. It is the cost of the studies, the cost of maintaining a technical staff to develop the application, the cost of the engineering work, the environmental studies, the field work, assembling all of that into a license application, as well as the ancillary permits that need to be put together, again supported by study work such as the 401 water quality.

Mr. Mullin. When you are just beginning a project, before you even can get clear to start building it, you have to have a million dollar investment?

Ms. Swaminathan. Right. That is not even to start building it. That is just to get the FERC license.

Mr. Mullin. That is what I am talking about.

Ms. Swaminathan. And then if the project is located on an Army Corps dam, there is more process, more Federal permitting to go through, which is actually significantly more expensive than the environmental studies because it includes the final engineering --

Mr. Mullin. So what does that cost?

Ms. Swaminathan. That is on the order of several million dollars more. It depends on the size and complexity of the project. And every project is a little different. It can be up to $8 million.

Mr. Mullin. Eight million dollars just to go through the process to begin the project.

Ms. Swaminathan. It can be, yes.

Mr. Mullin. And see, that is where I think we can do a better job here in Congress. Because we in Congress should be creating an environment for entrepreneurs like yourself and your company to be able to thrive and be able to get through that process. And when we create hurdles like that, it can be as expensive as $8 million just to go through the regulations we put in place, and we can do better than that.

So thank you so much. I appreciate it.

Ms. Swaminathan. I appreciate it.

Mr. Upton. The gentleman's time has expired.

Seeing that there are no further members wishing to ask questions, I want to thank you all very much for appearing with us today, sharing your testimony.

I am going to ask unanimous consent to submit the following documents for the record: Testimony of the American Rivers, testimony

of Outdoor Alliance, testimony of Sacramento Municipal Utility District.

[The information follows:]

******** COMMITTEE INSERT ********

Mr. Upton. Pursuant to committee rules, I remind members that they have 10 business days to submit additional questions for the record, and would ask the witnesses submit their response within 10 business days upon receipt of the questions.

And without objection, the subcommittee is adjourned.

[Whereupon, at 2:10 p.m., the subcommittee was adjourned.]