

STATE OF THE NATION'S ENERGY
INFRASTRUCTURE

HEARING
BEFORE THE
SUBCOMMITTEE ON ENERGY
OF THE
COMMITTEE ON ENERGY AND
COMMERCE
HOUSE OF REPRESENTATIVES
ONE HUNDRED FIFTEENTH CONGRESS
SECOND SESSION

—
FEBRUARY 27, 2018
—

Serial No. 115–102



Printed for the use of the Committee on Energy and Commerce
energycommerce.house.gov

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U.S. GOVERNMENT PUBLISHING OFFICE

30–215

WASHINGTON : 2019

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¹ The committee did not receive a response to Mr. Ross’s submitted questions for the record by the time of printing.

STATE OF THE NATION'S ENERGY INFRASTRUCTURE

TUESDAY, FEBRUARY 27, 2018

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON ENERGY,
COMMITTEE ON ENERGY AND COMMERCE,
Washington, DC.

The subcommittee met, pursuant to call, at 10:00 a.m., in room 2322 Rayburn House Office Building, Hon. Fred Upton (chairman of the subcommittee) presiding.

Members present: Representatives Upton, Olson, Barton, Shimkus, Latta, Harper, McKinley, Kinzinger, Griffith, Johnson, Bucshon, Flores, Mullin, Hudson, Walberg, Duncan, Walden (ex officio), Rush, McNerney, Peters, Green, Castor, Sarbanes, Tonko, Loeb sack, Schrader, Kennedy, and Pallone (ex officio).

Staff present: Mike Bloomquist, Staff Director; Daniel Butler, Staff Assistant; Kelly Collins, Legislative Clerk, Energy/Environment; Jordan Davis, Director of Policy and External Affairs; Wyatt Ellertson, Professional Staff, Energy/Environment; Margaret Tucker Fogarty, Staff Assistant; Adam Fromm, Director of Outreach and Coalitions; Jordan Haverly, Policy Coordinator, Environment; Ben Lieberman, Senior Counsel, Energy; Milly Lothian, Press Assistant & Digital Coordinator; Mary Martin, Chief Counsel, Energy/Environment; Brandon Mooney, Deputy Chief Counsel, Energy; Mark Ratner, Policy Coordinator; Annelise Rickert, Counsel, Energy; Dan Schneider, Press Secretary; Austin Stonebreaker, Press Assistant; Madeline Vey, Policy Coordinator, DCCP; Hamlin Wade, Special Advisor, External Affairs; Priscilla Barbour, Minority Energy Fellow; Evan Gilbert, Minority Press Assistant; Tiffany Guarascio, Minority Deputy Staff Director and Chief Health Advisor; Caitlin Haberman, Minority Professional Staff Member; Rick Kessler, Minority Senior Advisor and Staff Director, Energy and Environment; John Marshall, Minority Policy Coordinator; Alexander Ratner, Minority Policy Analyst; and Andrew Souvall, Minority Director of Communications, Outreach and Member Services.

OPENING STATEMENT OF HON. FRED UPTON, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF MICHIGAN

Mr. UPTON. Today's hearing, the "State of the Nation's Energy Infrastructure" will provide members with the opportunity to explore the challenges and the opportunities related to the maintenance, modernization, and development of energy infrastructure. Two weeks ago, the White House unveiled its framework for rebuilding infrastructure across the country. Citing the need to main-

tain our country's global competitiveness and improve our citizens' quality of life, the President's plan seeks to stimulate at least \$1.5 trillion in new investment over the next decade.

And while the President's plan touches all sectors, from roads and bridges to airports and hospitals and dams, this hearing will focus on the state of the Nation's energy infrastructure and how we can make meaningful improvements. Joining us today is a panel of witnesses who can speak to the needs and challenges of a changing energy landscape.

Since the start of the 115th Congress, this committee has held dozens of hearings related to infrastructure and the House has already passed legislation on interstate pipeline siting, hydropower licensing, and the development of cross-border energy infrastructure. That being said, this committee's infrastructure efforts are ongoing as there is no question that more needs to get done and more projects need to get built, for to deliver our nation's abundant energy resources to consumers in a reliable, efficient, and cost-effective manner, new electric transmission lines and natural gas pipelines have got to be constructed.

And as we have heard during our series of Powering America hearings, the Nation's electrical grid faces enormous challenges as needed infrastructure is not getting built fast enough in some areas of the country. Additionally, we have got to face the fact that much of our existing infrastructure is in fact aging. The average age of a coal-fired power plant in the U.S. is 40 years old and the country's fleet of nuclear reactors isn't much younger. Many of these power plants are now facing retirement due to their inability to compete economically in a market-based environment. Notably, the Oyster Creek Nuclear Station in New Jersey, which is the oldest reactor in the country, recently announced that it will retire later this year after nearly 50 years of service.

So we can't afford to have the energy infrastructure that does not meet America's needs or reflect the evolution of our energy markets. Instead, we have got to modernize our outdated system by encouraging innovative developments and state-of-the-art technology such as battery storage and advanced transmission devices. I should recognize that much is already being done on this front with private capital largely funding these improvements. In fact, electric utilities and independent transmission developers spent an estimated \$23 billion in 2017 on new transmission infrastructure alone; while the natural gas utilities invested a record \$25 billion last year across its industry.

Though these private sector investments are critical in a highly capital-intensive industry, we should be mindful that none of it will get built if we don't have a trained workforce that is capable of innovating, designing, and constructing this new infrastructure. Not only do we need skilled linesmen and women and pipefitters but we also need the engineers to power systems in nuclear technologies in many other trades. The challenge associated with developing a skilled workforce may be greater than the challenge of siting and constructing infrastructure projects. So that's an important part of this conversation.

I am glad we have some of the folks who can speak to us on that issue, and with that, I want to welcome our panel for sure and yield the balance of my time to Mr. Olson.

[The prepared statement of Mr. Upton follows:]

PREPARED STATEMENT OF HON. FRED UPTON

Today's hearing, the "State of the Nation's Energy Infrastructure" will provide members with the opportunity to explore the challenges and opportunities related to the maintenance, modernization, and development of energy infrastructure. Two weeks ago, the White House unveiled its framework for rebuilding infrastructure in America. Citing the need to maintain our country's global competitiveness and improve our citizens' quality of life, the President's plan seeks to stimulate at least \$1.5 trillion in new investment over the next 10 years.

While the President's plan touches all sectors, from roads and bridges to airports and hospitals, this hearing will focus on the state of the Nation's energy infrastructure and how we can make meaningful improvements. Joining us today is a panel of witnesses who can speak to the needs and challenges of a changing energy landscape.

Since the start of the 115th Congress, this committee has held dozens of hearings relating to infrastructure, and the House has already passed legislation on interstate pipeline siting, hydropower licensing, and the development of cross-border energy infrastructure. That being said, this committee's infrastructure efforts are ongoing as there is no question that more needs to get done and more projects need to be built. If we are to deliver our nation's abundant energy resources to consumers in a reliable, efficient, and cost-effective manner, new electric transmission lines and natural gas pipelines must be constructed.

As we've heard during our series of Powering America hearings, the Nation's electrical grid faces enormous challenges as needed infrastructure is not getting built fast enough in some areas. Additionally, we must face the fact that much of our existing infrastructure is aging—the average age of a coal-fired power plant in the U.S. is 40 years old and the country's fleet of nuclear reactors isn't much younger. Many of these power plants are now facing retirement due to their inability to compete economically in a market-based environment. Notably, the nuclear station in New Jersey, which is the oldest reactor in the country, recently announced that it will retire later this year after nearly 50 years of service.

We cannot afford to have energy infrastructure that does not meet America's needs or reflect the evolution of our energy markets. Instead, we must modernize outdated systems by encouraging innovative developments in state-of-the-art technologies such as battery storage and advanced transmission devices. I should recognize that much is already being done on this front with private capital largely funding these improvements. In fact, electric utilities and independent transmission developers spent an estimated \$23 billion in 2017 on new transmission infrastructure alone; while the natural gas utilities invested a record \$25 billion last year across its industry.

While these private-sector investments are critical in a highly capital-intensive industry, we should be mindful that none of it will get built if we don't have a trained workforce that is capable of innovating, designing, and constructing this new infrastructure. Not only do we need skilled linemen and pipefitters, but we also need engineers in power systems and nuclear technologies, and in many other trades. The challenge associated with developing a skilled workforce may be greater than the challenge of siting and constructing infrastructure projects. This is an important point in this conversation, so I'm glad that we have some folks with us who can speak to this issue.

With that, I'd like to thank this entire panel of distinguished witnesses for appearing today and I look forward to your testimony.

Mr. OLSON. I thank the chair, and welcome to our six witnesses.

Having a Texan on the panel gives me a chance to do what Texans love to do and that's to brag about my home state. The greater Houston region has some of the best technical colleges in the country and Texas-22, who I worked for, has the best of the best. Schools like Houston Community College, Texas State Technical College, Alvin Community College, Wharton County Junior College, who actually built a new campus in Matagorda County to meet the

needs of retiring workers at the South Texas Power Plant. But the top gun at home is San Jacinto College and that's because of their chancellor, Brenda Hellyer. We are honored to have you here, Chancellor Hellyer.

When America's largest petrochemical complex has a need, they turn to Dr. Hellyer and San Jac. One example is their new maritime technological training center. It simulates all 51 miles of the Port of Houston Ship Channel and it's so real. I was down there a year ago right by the Harbor Bridge. It snowed heavy snow—blizzard. The waves started rocking my little tugboat. I got seasick in a simulator. It's real, and that's San Jacinto Junior—San Jacinto College. Welcome, Dr. Hellyer. Glad to have you.

I yield back.

Mr. UPTON. Gentleman's time has expired.

The chair recognizes the ranking member of the subcommittee, the gentleman from Illinois, Mr. Rush.

OPENING STATEMENT OF HON. BOBBY L. RUSH, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF ILLINOIS

Mr. RUSH. Mr. Chairman, I am at a loss for words on that. But I want to thank you, Mr. Chairman, for holding this important hearing today on the energy infrastructure.

As you know, investing in the Nation's aging infrastructure is a top priority for members on both sides of the aisle and it is my hope that we can address this issue in a bipartisan manner.

Unfortunately, Mr. Chairman, the proposal put forth by the Trump administration leaves a lot to be desired and, frankly, is a poor starting point, from my perspective. The President's infrastructure plan fails to provide adequate Federal investment in the Nation's antiquated energy infrastructure. But, rather, it attempts to short circuit environmental regulations and it places the vast majority of the funding burden on cash-strapped states and local municipalities. In fact, under the administration's proposal, states will be prohibited from receiving more than 10 percent of the total grant fund and 80 percent of new investment must come from non-federal sources.

Mr. Chairman, this proposal resembles less of a national infrastructure plan and instead will simply pick winners and losers where only a limited number of states, localities, and affluent communities will actually benefit from the president's plan.

Instead, Mr. Chairman, I want to urge this subcommittee to look at a more serious alternative outlined in H.R. 2479, the Leading Infrastructure for Tomorrow's America, or LIFT America, Act introduced by Ranking Member Pallone, myself, and the rest of the minority members of the Energy and Commerce Committee back in May 2017. This bill offers thoughtful recommendations that will surely benefit all Americans including providing provisions that would invest in cleaner water infrastructure, clean energy infrastructure, more resilient broadband, brownfields redevelopment and, last but not least, health care infrastructure.

Additionally, Mr. Chairman, I have also sponsored a bill that would strengthen the Nation's workforce by investing in initiatives to train minority women and unemployed coal workers to compete for good-paying energy and manufacturing jobs and careers. Mr.

Chairman, it is not enough to simply curtail an environmental protection and pass the funding for immersion onto the same.

I look forward to hearing from our esteemed witnesses and I look forward to working with the majority.

Mr. Chairman, with that, I yield my time to my good friend, also from the great State of Texas, Mr. Green.

Mr. GREEN. Mr. Chairman, members, I thank you Ranking Member for yielding to me today.

First of all, I want to say that this is the first committee hearing we have had that Pete Olson hasn't talked about the Astros. So Pete, I want to tell you how proud we are on this side about the Castros.

Mr. OLSON. It's coming. It's coming.

Mr. GREEN. But, more importantly, I want to welcome our panel and particularly our chancellor from San Jac North. I've worked for many years with San Jacinto College in training.

In East Harris County, we could have every union electrician in the country come to Houston and we'd still need more electricians because the expansion of our industries in East Harris County because of the Eagle Ford and now with Permian Basin. So we have refineries, chemical plants, and things like that.

But I am a native Houstonian and you all have heard a lot of times I've never not lived on a pipeline easement in Houston, Texas. No matter where I've lived, I have a pipeline easement there and I get all these nice letters during the year making sure I know what happens if there is an accident.

But our infrastructure is so important. It's not just highways and rails and airports but it's also pipelines, and because of the success we are having in some of the states, I think we need to have that infrastructure on energy pipelines, too.

And with that, I'll thank my colleague. I know I've used up the time he yielded to me.

Thank you.

Mr. UPTON. Gentleman's time has expired.

The chair will recognize the chairman of the full committee, the gentleman from the good state of Oregon, Mr. Walden.

OPENING STATEMENT OF HON. GREG WALDEN, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF OREGON

Mr. WALDEN. I thank the gentleman, and we are having a lot of talk about aging infrastructure and I don't think that's fair to Adam Kinzinger just because it's his 40th birthday today, speaking of aging infrastructure.

[Laughter.]

Happy birthday. Today's hearing explores the state of the nation's energy infrastructure. It's another important step in our commitment to putting the needs of consumers first. Energy, truly the driving force in our economy and our country, and our hearing today is focused on ways to expand and improve and modernize our infrastructure so we can deliver energy to consumers more safely, reliably, and cost-effectively.

So this morning we have an excellent panel of witnesses who are going to share with us some challenges and opportunities that the country faces and you all face to modernize our infrastructure in

the energy realm. We will gather your perspectives and we will learn more about what we need to do in public policy. Just for the record, our committee has been very active in this area. A lot of work has gone into our legislative initiatives on the nation's infrastructure.

We know there is a lot more that needs to be done. This hearing marks our forty-seventh hearing on infrastructure just in this session of Congress alone. We have 24 energy bills and environmental bills that have passed the House already and have gone over to the Senate. They address pipeline infrastructure, hydropower relicensing, brownfields, air quality standards, energy efficiency, drinking water improvement, and nuclear waste storage. All this work is incredibly important for my district. These bills will have a direct positive impact for our local economies and our communities both in Oregon and across the country, and now we look forward to continuing our work with the United States Senate and the White House to get these measures signed into law.

I applaud President Trump for not only recognizing the need to improve all facets of our nation's infrastructure but also for demonstrating the leadership needed to push forward this major initiative for our country.

While there are many difficult details to work out, I believe there is support for a broad infrastructure bill. Just the other week I participated in a bipartisan, bicameral infrastructure meeting hosted by the President at the White House where we talked about our shared priorities for rebuilding our nation's infrastructure from roads and bridges to pipelines and for broadband in our unserved and underserved areas of the country.

While much of the conversation around infrastructure has focused on ways to increase federal spending, we should be mindful that most of the nation's energy infrastructure is privately owned and operated.

We all know that financing is a crucial aspect of any infrastructure plan so we are thinking outside the box to see where we can make the most progress with the limited federal money that is available. We are focused on fixing the regulatory environment, encouraging public-private partnerships, and strengthening our workforce.

Our nation's energy infrastructure—the traditional base load power plants, windmills, solar panels, hydroelectric dams, pipelines, power lines, fossil fuel production facilities, and import-export terminals, they make up the real backbone of America's economy. With innovation and technological advancements driving change at a rapid pace it's our responsibility as members of this committee to understand the challenges and the opportunities associated with keeping these energy systems operating safely and reliably.

So we have got a lot of work to do but we are moving in the right direction, and with that, I want to thank our witnesses for appearing before us today.

I look forward to your testimony and the work going forward in this matter under Chairman Upton's leadership.

So with that, Mr. Chairman, unless anyone else wants the remainder of my time, I'd be happy to yield back and hear from our witnesses.

[The prepared statement of Mr. Walden follows:]

PREPARED STATEMENT OF HON. GREG WALDEN

Today's hearing exploring the "State of the Nation's Energy Infrastructure" is another important step in our commitment to put the needs of consumers first. Energy is truly the driving force powering our economy. Our hearing today is focused on ways to expand, improve, and modernize our infrastructure, so that we can deliver energy to consumers more safely, reliably, and cost-effectively.

This morning, we have an excellent panel of witnesses who will testify on the challenges and opportunities to modernizing our nation's energy infrastructure. We'll gather perspectives from the people on the front lines—those who train our workers and design, build, and operate our energy infrastructure. My hope is that their stories can help us identify policy gaps and propose solutions to attract investments to update and build new energy infrastructure.

This committee has been hard at work on ways to modernize our nation's infrastructure, but there's more work to be done. This hearing marks our forty-seventh hearing on infrastructure this Congress alone. Twenty-four energy and environment bills have passed the House already, addressing pipeline infrastructure, hydropower licensing, Brownfields, air quality standards, energy efficiency, drinking water, and nuclear waste storage. All of this work is incredibly important for my district in Oregon. These bills will have a direct, positive impact for local economies and communities in my state and across the country. Now that these bills are with the Senate, we're working with our colleagues and the administration to get them moving and signed into law.

I applaud President Trump for not only recognizing the need to improve all facets of our nation's infrastructure, but for also demonstrating the leadership needed to push forward this major initiative.

While there are many difficult details to work out, I believe there is support for a broad infrastructure bill. Just the other week, I participated in a bipartisan, bicameral infrastructure meeting hosted by President Trump at the White House to discuss our shared priorities for rebuilding our nation's infrastructure.

While much of the conversation around infrastructure has focused on ways to increase federal spending, we should be mindful that most of the nation's energy infrastructure is privately owned and operated.

We all know that financing is a crucial aspect of any infrastructure plan, so we're thinking outside the box to see where we can make the most progress with limited federal funds. We're focused on fixing the regulatory environment, encouraging public-private partnerships, and strengthening our workforce.

Our nation's energy infrastructure—the traditional baseload power plants, wind-mills, solar panels, hydroelectric dams, pipelines, power lines, fossil fuel production facilities, and import/export terminals—make up the backbone of our economy. With innovation and technological advancements driving change at a rapid pace, it's our responsibility as members of this committee to understand the challenges and opportunities associated with keeping these energy systems operating safely and efficiently.

We've got a lot of work to do, but we're moving in the right direction. With that, I want to thank the witnesses for appearing before us today and I look forward to their testimony.

Mr. UPTON. Gentleman yields back.

The chair recognizes the ranking member of the full committee, the gentleman from New Jersey, Mr. Pallone, for an opening statement.

OPENING STATEMENT OF HON. FRANK PALLONE, JR., A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NEW JERSEY

Mr. PALLONE. Thank you, Chairman Upton.

Revitalizing and modernizing our nation's crumbling infrastructure should be an area where Democrats and Republicans can find

common ground. Unfortunately, the plan President Trump unveiled 2 weeks ago barely mentions energy and, as a whole, represents another cynical bait and switch. After promising for more than a year to invest over a trillion dollars in America's infrastructure, the President's plan does not offer any new funding for infrastructure.

This anemic proposal calls for \$250 billion in federal spending but even that is offset by \$200 billion in cuts to vital existing programs. Worse yet, the 80 percent match requirement will do little to help towns, cities, and counties all across this country that simply cannot afford this kind of spending. In fact, the Wharton School at the University of Pennsylvania where President Trump attended college provides a withering criticism of his so-called infrastructure plan, stating that it really won't leverage funds and that "There will be little to no impact on the economy."

To call the Trump plan worthless isn't partisan. It's the reality. In stark contrast, Democrats actually have a real plan, a better deal for investing and rebuilding America. This plan includes important parts of the committee Democrats' bill, the LIFT America Act. This legislation would create jobs and boost the economy by putting real money towards infrastructure like replacing drinking water pipes, cleaning up brown field sites, supporting energy efficiency and clean energy, extending broadband service and revitalizing our hospitals and health care infrastructure.

Democrats are committed to delivering a better deal for Americans, providing cheap clean energy for consumers and modernizing our aging energy infrastructure so that it's secure, efficient, and resilient. We will make key investments that will transport our energy infrastructure into the 21st century energy economy while creating jobs of the future that lessen our carbon footprint. We do this by expanding renewable energy and by investing in energy efficiency programs that will lower Americans' monthly bills and these programs are good for the environment and good for consumers.

The Democrats' LIFT America Act is a bold proposal that will revitalize our infrastructure, grow our economy, and create new jobs, and to ensure good family-sustaining wages for workers we are committed to maintaining Davis-Bacon community-based wage standards and other worker protections. We will invest in workers through robust training, provide job opportunities for veterans, and level the playing field for small businesses including women and minority-owned businesses. And what we won't do is buy into the false choice between a strong economy and a healthy environment. President and Republicans keep pushing this outdated false narrative, but the reality is that a clean and safe environment supports a strong economy.

Environmental safeguards are not the obstacle to infrastructure improvements. The real obstacle is the lack of funds. President Trump spared no expense and required no offsets for tax breaks to fuel profits on Wall Street, but when it comes to helping Main Street all he's offering is Monopoly money. And we can and must do better. I hope my colleagues on the other side of the aisle agree and will work with us to invest in America and truly make our infrastructure great again.

And I yield the balance of my time to the gentleman from New York, Mr. Tonko.

Mr. TONKO. And I thank the ranking member of the standing committee for yielding.

It's my pleasure to thank Chair Upton and Ranker Rush for hosting this hearing, which is going to enable us to better understand the full range of possibilities of energy infrastructure that should be considered.

So I welcome the panel here this morning and in particular want to offer my welcome to one of the mayors of the communities that I represent in the 20th Congressional District of New York, the Honorable Gary McCarthy, mayor of the great city of Schenectady, New York, in the 20th District. And I thank the mayor for being here. He's a great friend, a super colleague, and a very thoughtful leader, a progressive leader, and one who has brought great vision to leading the city of Schenectady, which is dubbed the electric city, as it opened its gates to Thomas Alva Edison at one time, and we have great heritage as it relates to energy development.

But I want to bring attention to the city of Schenectady's report under the tutelage of Mayor McCarthy, the 2017 Smart City Report, which is just filled with all sorts of wonderful ideas and has enabled Gary McCarthy to be a national leader in Smart City demonstration projects. I encourage members to check out this report. It offers many opportunities that, when proven, could be replicable around the country and will hold a number of type of projects that are possible to improve energy efficiency, public safety, and internet access. It's a tremendous report. I thank the mayor for his leadership and I thank him for being here with the rest of the panel here this morning.

So thank you, Mayor McCarthy, and welcome.

Mr. UPTON. Well, we are grateful for all the witnesses today.

We are joined by Brian Slocum, the VP of operations for ITC Holdings, Jim Ross, the Director of International Brotherhood of Electrical Workers, Brenda Hellyer, Chancellor of San Jacinto College, John Devine, Senior VP for HDR, Inc., Jennifer Chen—I think—is that right, Chen—Sustainable FERC Project Attorney, Natural Resources Development Council, and the Honorable Mr. McCarthy, Mayor of Schenectady, New York.

We welcome you all. Your statements are made part of the record in their entirety. Thank you for submitting them early, and each of you will be given 5 minutes to summarize that testimony.

And Mr. Mayor, we will start with you. Welcome.

STATEMENTS OF THE HONORABLE GARY MCCARTHY, MAYOR, CITY OF SCHENECTADY; JOHN DEVINE, SENIOR VICE PRESIDENT, HDR INC.; BRIAN SLOCUM, VICE PRESIDENT, OPERATIONS, ITC HOLDINGS CORPORATION; JIM ROSS, DIRECTOR, INTERNATIONAL BROTHERHOOD OF ELECTRICAL WORKERS CONSTRUCTION AND MAINTENANCE DEPARTMENT; JENNIFER CHEN, ATTORNEY, SUSTAINABLE FERC PROJECT CLIMATE & CLEAN ENERGY, NATURAL RESOURCES DEFENSE COUNCIL; BRENDA HELLYER, CHANCELLOR, SAN JACINTO COLLEGE

STATEMENT OF GARY MCCARTHY

Mr. MCCARTHY. Chairman Upton, Ranking Member Rush, distinguished members of the committee and, of course, New York's 20th District Congressman Tonko, thank you for the opportunity to appear before you today.

While I am the mayor of the city of Schenectady and serve in the leadership of the New York Conference of Mayors, I want to make available to you the resources and staff of the U.S. Conference of Mayors.

Under the capable leadership of Conference President New Orleans' mayor, Mitch Landrieu and Executive Director Tom Cochran, the conference team is ready and able to assist you in research, identifying problems and opportunities in the adoption of a national energy infrastructure policy and the appropriate budgetary support to ensure the successful implementation of that policy.

We live in an exciting time, one of rapid change, a time of disruptive technologies, a time of great opportunity. The city of Schenectady has a long and proud history of innovation in the creative use of technologies. Congressman Tonko pointed out Thomas Edison founded the General Electric Company in our city over 125 years ago. The x-ray was developed in Schenectady. The first television broadcast occurred in the city of Schenectady. Many of the world-changing products and technologies we use today have their roots in Schenectady.

Today, some of the most valuable real estate in Schenectady and communities across the country are our light poles. The conversion of conventional street lights to LED fixtures is happening everywhere. It makes sense. There is an immediate savings of over 50 percent in electrical costs. But what we are doing in Schenectady and in some communities across the country is looking at the opportunity to add additional features. Sensor-based technologies to the light pole when the conversion to LED fixtures is happening, environmental sensors measure temperature and precipitation, device-based utility-grade meters that will allow different owners to place devices in a light pole and pay for the electricity that's used just by their device, optical sensor providing deterrence and documentation for policing, traffic and pedestrian analytics, dimming controls for additional electrical savings, acoustical sensors, Wi-Fi, and cellular communication protocols are just a few of the possible additions to a standard light pole. These devices will better enable a more cost-effective delivery of municipal services, the valuable exchange of data and information, improved educational opportuni-

ties within our city school district, and help with cost containment in providing health care.

Schenectady is partnering with National Grid, our local utility, in implementing a REV demonstration project in our city. REV is reforming the energy vision, a program with New York Governor Cuomo's comprehensive energy strategy to build a clean and more resilient affordable energy system. We are working with National Grid, GE, AT&T, Cisco, Presidio, CIMCON Lighting, and other local partners to do a citywide deployment of Smart City technology as we do the conversion to LED lights. We hope the National Grid project in Schenectady will create a replicable model for utilities in other communities across the state and, hopefully, the country.

The ongoing efforts of Schenectady to further invest in infrastructure by leveraging convergent technologies including distributive generation resources, intelligence services, buildings in the electrification of transport will not only make the city more energy productive, economically and environmentally sustainable, but will assist New York State in its individually adopted economy wide target of an 80 percent reduction in greenhouse gas emissions by 2050, commonly referred to as the 80x50 Program.

The 80x50 challenge is a significant goal and will require fundamental changes, which means that the early cost savings and sustainable applications of Schenectady and National Grid's initiatives could serve as a model for other communities and utilities. This type of project has the potential to transform communities and has clear implications for the global competitiveness of this country. But it's based on a stable and an adaptable electrical grid. There are many components of the Smart City or Smart Grid projects that are self-financing. Conversion to LED light fixtures is a clear example. Some lend themselves to partnerships between utilities, communities, and companies—public Wi-Fi in commercial areas is an example. Others, like the upgrading of utility resiliency to deal with physical and cyber-attacks, the possibility of electromagnetic pulses, economic warfare, or proof of concept for emerging or yet to be developed concepts or technologies will likely require 100 percent funding from the federal government.

Mr. Chairman, again, I thank you for the opportunity to be here and look forward to the committee's questions.

[The prepared statement of Mr. McCarthy follows:]

Mayor Gary R. McCarthy
City of Schenectady, New York

Testimony - February 27, 2018
10:00a.m. - 2123 Rayburn House Office Building
State of the Nation's Energy Infrastructure
Subcommittee on Energy
U.S. House of Representatives
Committee on Energy and Commerce

Chairman Upton, Ranking Member Rush, distinguished Members of the Committee and NY-20th District Congressman Tonko. I thank you for the opportunity to appear before you today.

While I'm the Mayor of the City of Schenectady and serve in the leadership of the New York Conference of Mayors, I want to make available to you the resources and staff of the US Conference of Mayors under the capable leadership of the Conference President, New Orleans Mayor Mitch Landrieu and Executive Director Tom Cochran. The Conference team is ready and able to assist you in research, identifying problems and opportunities, in adoption of a national energy infrastructure policy and the appropriate budgetary support to ensure the successful implementation of that policy.

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Today some of the most valuable real estate in Schenectady and communities across the country are our light poles. The conversion of conventional street lights to LED fixtures is happening everywhere. It makes sense, there is an immediate savings of over 50% in electrical costs. But what we are doing in Schenectady and in some communities across the country is looking at the opportunity to add additional features, sensor based technologies, to the light pole when the conversion to LED fixtures is happening.

Environmental Sensors - temperature - precipitation, device based utility grade meters - this will allow different owners to place devices on a light pole and pay for the electricity used by just their device, Optical Sensors - deterrence & documentation for policing - traffic & pedestrian analytics - dimming controls for additional electricity savings, Acoustic Sensors, Wi-Fi and cellular communication protocols are just a few of the possible additions to a standard light pole. These devices will enable better and more cost effective delivery of municipal services, valuable exchange of data & information, improved educational opportunities within our city school district and help with cost containment in providing health care.

Schenectady is partnering with National Grid, our local utility, in implementing a REV demonstration project in our city. REV is Reforming the Energy Vision a program of New York Governor Cuomo's comprehensive energy strategy to build a clean, more resilient and affordable energy system.

We are working with National Grid, GE, AT&T, Cisco, Presidio, Cimcon Lighting and other local partners to do a city wide deployment of 'Smart City' technology as we do the conversion to LED lights.

We hope the National Grid project in Schenectady will create a replicable model for utilities and other communities across New York State and hopefully the country.

The ongoing efforts of Schenectady to further invest in infrastructure by leveraging convergent technologies: including distributed generation resources, intelligent services, buildings and the electrification of transport. Will not only make the City more energy productive, economically & environmentally sustainable, but will assist in New York State its individually adopted economy-wide target of 80% greenhouse gas emission reduction by 2050, 80 x 50 (from a 1990 baseline).

The 80 x 50 challenge is a significant goal and will require fundamental changes, which means that the early cost savings and sustainable applications of Schenectady & National Grid's initiatives could serve as a model for other communities and utilities.

This type of project has the potential to transform communities and has clear implications for the global competitiveness of this country. But it is based on a stable and adaptable electric grid.

There are many components of 'Smart City' or Smart Grid projects that are self financing.... the conversion to LED light fixtures is a clear example. Some lend themselves to partnerships between utilities, communities and companies public WiFi in commercial areas. Others like upgrading utility resiliency to deal with physical and cyber attacks, electromagnetic pulses, economic warfare or proof of concept for emerging or yet to be developed concepts or technologies will likely require 100% funding from the federal government.

Mr. Chairman I again thank you for the opportunity to be here and look forward to the committees questions.

US Conference of Mayors: 'The New Bedford Principals'

Adopted last year at the conclusion of the Mayors' Summit

Washington, DC—Today as part of a two-day national mayors' summit on smart cities and new energy technologies, sponsored by The United States Conference of Mayors (USCM) and hosted by USCM's Energy Chair New Bedford Mayor Jon Mitchell, mayors developed "The New Bedford Principles," a six-point energy recommendation to be included in the USCM National Infrastructure plan that will be presented to the nation by USCM President New Orleans Mayor Mitch Landrieu later this year.

The six principles include recommendations for tax reform and tax laws as well as infrastructure legislation.

The principles are:

1. Seek an energy-friendly tax reform package that doesn't undermine current progress:
 - Keep tax-exemption on municipal bonds
 - Keep state and local tax deductibility
 - Preserve and extend tax credits and other incentives to support renewable energy
2. Authorize additional tax and other incentives to promote more investment in microgrids, distributed generation, and storage systems.
3. Direct funding to support the development of local energy assurance plans to advance local resiliency efforts, especially those to combat climatic events.
4. Direct funding to municipal utilities or tax incentives to investor-owned utilities to modernize local grids, including microgrids, to increase resilience to climatic events.
5. Direct funding to support local energy block grants to support city energy independence goals
6. Restore federal challenge grants to incentivize smart grid efforts.

Mr. UPTON. Thank you very much.

Mr. Devine, welcome.

STATEMENT OF JOHN DEVINE

Mr. DEVINE. Good morning, Chairman Upton, Ranking Member Rush, and members of the subcommittee.

I am John Devine, a past president of the National Hydropower Association, and I am here today on behalf of NHA to share my thoughts about the value and needs of hydropower's part of this nation's infrastructure.

My engineering career spans 45 years focused on water resources and hydropower, working both in the public and the private sector. That also makes me part of the aging infrastructure, I might say.

I was also a founding member of a hydropower consulting firm that started with two people in Portland, Maine, and grew into a practice with over 250 professionals with offices in six states. I hope this provides a small example of the jobs that hydropower can create.

I will emphasize three points today. First, investment in new and existing hydropower projects produces economic benefits and creates jobs. Second, policies that support hydropower deserve to be part of any infrastructure package Congress develops, and third, in order to preserve investment in hydropower, I believe changes in federal policy, particularly in the licensing process, will be necessary.

So to my point one, investment in hydropower infrastructure doesn't just create jobs. It creates the kind of jobs that require skill and education and are therefore valued, meaning in demand and well paid. We are talking about many field technicians, electricians, highly-skilled mechanics, biologist, hydrologists, computer modelers, suppliers of all kind in virtually every field of engineering.

Hydropower is also often a cornerstone part of multipurpose projects that provide water for irrigation and natural resource protection, water supply for millions of people, drought mitigation, flood control, and other benefits. Which leads me to my second point. Ensuring more investment in hydropower should be a piece of any national infrastructure plan. Hydropower is a key part of the national infrastructure. Just consider the role played by hydropower in pulling the Northeast and the upper Midwest out of the 2003 blackout that affected 45 million people in the U.S. Hydropower's black start capability did that, and isn't that the very definition of important infrastructure?

Consider our federal hydropower system. The average federal hydropower facility is over 50 years old. While this demonstrates reliability and durability, it also highlights the potential to increase efficiency and add capacity, therefore, more renewable energy from the same plant and more jobs. This leads me to my third point. I report to you today as a practitioner in the field of federal hydropower licensing. Here is what I can report to you from the field.

First, the federal licensing and relicensing process is broken but maybe not for the reasons that you're thinking. It's not because of Congress passing the EP Act of 2005. Congress took a significant step to bring efficiency, transparency, and accountability to agency

decision making. This committee in particular has done yeoman's service in support of hydropower. It's not because of FERC. In its promulgation of the integrated licensing process, FERC made a bold attempt to bring order, efficiency and better fact-based decision making to the process.

In general, in my opinion, FERC is performing its role as a neutral arbiter of the facts. So how is it broken? It is broken today because many federal and state resource agencies do not adhere to the basic ground rules of the federal licensing process.

Here are three examples that I can share with you. First, what I am seeing is that all too frequently the scientific studies conducted as part of the licensing process are being ignored by resource agencies when the study results do not comport with the agency's notions of a project's environmental impacts. This is despite the fact that these studies are performed for the express purpose of informing development of license conditions. Such disregard can lead to agency conditions which are not considered with the available and therefore are likely not to be effective.

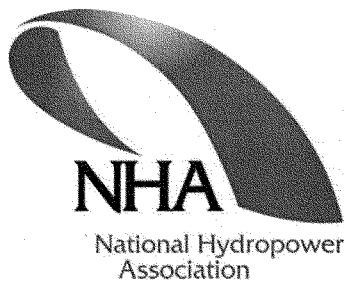
Second, state and federal resource agencies' recommendations for license conditions including mandatory conditions which FERC cannot balance are often made without due consideration of their full impacts and are only focused on narrow agency goals.

Third, in many cases, the federal licensing process can drag on for years, even a decade or more after the filing of a complete application, while the applicant waits for the various federal and state agency decision making processes to be completed. Together, these provide a very chilling effect on investment.

To conclude, hydropower offers many benefits to society. IT supports the grid and, as I mentioned, literally keeps lights on. It integrates other renewable generation. It supports clean air for our communities. These values are being eroded and U.S. hydropower has much more to offer, but only if it is given the policy support to unlock its potential.

I thank the subcommittee for allowing me to testify and I look forward to answering your questions.

[The prepared statement of Mr. Devine follows:]



Written Statement

of

John Devine, P.E.

on behalf of

The National Hydropower Association

before the

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

regarding

A hearing on the “State of the Nation’s Energy Infrastructure”

February 27, 2018

Summary

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

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

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

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

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

Introduction

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

NHA is a nonprofit national association dedicated to promoting clean, affordable, renewable U.S. hydropower – from conventional hydropower to pumped storage to marine energy to conduit power projects. NHA represents more than 230 companies from Fortune 500 corporations to family-owned small businesses. Our members include both public and investor-owned utilities, irrigation and water supply entities, independent power producers, developers, equipment manufacturers and other service providers.

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

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

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

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

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

Background on Hydropower Infrastructure, including Jobs and Economic Impacts

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

¹ <http://docs.house.gov/meetings/IF/IF03/20170315/105702/HHRG-115-IF03-Wstate-SwaminathanR-20170315-U1.pdf>

<http://docs.house.gov/meetings/IF/IF03/20170503/105916/HHRG-115-IF03-Wstate-LeaheyJ-20170503.pdf>
<http://docs.house.gov/meetings/IF/IF03/20171003/106457/HHRG-115-IF03-Wstate-WrightS-20171003-U3.pdf>

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

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

In addition to the conventional hydropower system there are an additional 42 hydropower pumped storage plants with approximately 22 GW of capacity – projects that make-up almost all, 97 percent, of energy storage in the U.S. today.⁴

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

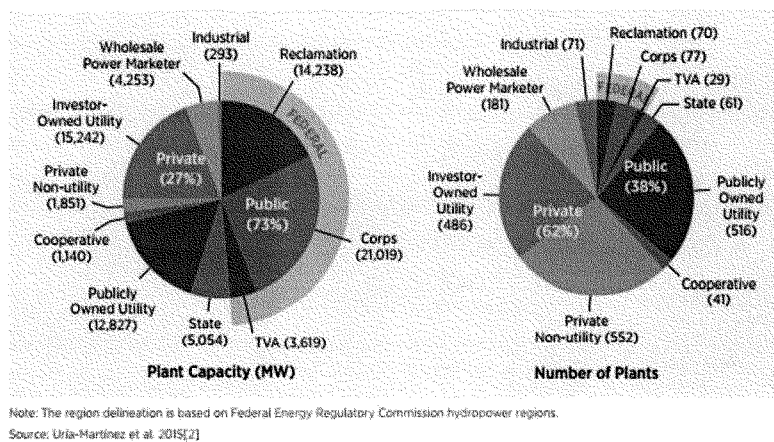


Figure 2-7. U.S. hydropower plant ownership mix: capacity (left) and number of plants (right)

³ 2016 Hydropower Vision Report, Department of Energy, Office of Energy Efficiency and Renewable Energy, Wind and Water Power Technologies Office, Executive Summary P.9
<https://energy.gov/sites/prod/files/2018/02/f49/Hydropower-Vision-021518.pdf>

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

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

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

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

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

Sources: Navigant (2014) (for onsite employment data only); remainder of data from JEDI

⁵ 2016 Hydropower Vision Report P. 202.

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

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

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

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

The additional energy, economic and environmental benefits resulting from this growth are substantial, including the addition of tens of billions of dollars in cumulative economic investment and an additional 76,000 hydropower related gross jobs spread across the nation in 2050.⁷

⁶ 2016 Hydropower Vision Report, Executive Summary P. 1.

⁷ 2016 Hydropower Vision Report, Executive Summary P. 24.

Undervaluing Hydropower Threatens Its Future

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

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

NHA reiterates our strong support for policies that address the regulatory inefficiencies and improve the coordination and the effectiveness of the overall hydropower project approval process. We call on Congress, as well as the Administration, to address this and other energy and market policy issues that limit investment in hydropower infrastructure. And, we believe this can all be done in ways that promote the hydropower resource while also protecting environmental values.

Hydropower Licensing Reform is an Infrastructure Issue

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Infrastructure Reinvestment Opportunities in the Hydropower System

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

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

In their Hydropower Market Report updated last year, the DOE estimates that 42 hydropower rehabilitation and upgrade (R&U) projects at 34 existing plants were started in 2016 with a total estimated value of \$1.2 billion. Of these, the Corps of Engineers is the owner with the largest number of new projects (23) but they account for less than 10 percent of total investment value. DOE also estimates the value of tracked R&U investment since 2007 is \$8.5 billion distributed among 143 plants, averaging \$850 million/year in 2007-2016.¹²

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

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

Tax and Market Policy Changes Would Incentivize Development of Hydropower Infrastructure

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

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

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

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

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

Report:

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

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

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

¹³ 2016 Hydropower Vision Report, Executive Summary P.12

Conclusion

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

As the Congress works to address our energy and infrastructure needs, including work on a national infrastructure package, policies that support both the preservation of the existing hydropower system and investment in upgrades and new projects must be included. A greater recognition that our hydropower infrastructure is incredibly valuable is needed, and continued investment and re-investment in the system is critical to our energy future and national security.

I thank the Subcommittee for providing me this opportunity to testify and I look forward to answering your questions.

Mr. UPTON. Thank you very much.
Mr. Slocum, welcome.

STATEMENT OF BRIAN SLOCUM

Mr. SLOCUM. Thank you, Chairman Upton, Ranking Member Rush, and the distinguished members of the subcommittee.

As you know, my name is Brian Slocum. I am the Vice President of Operations for ITC Holdings, Corp., and I appreciate the opportunity to speak before you today.

ITC is the largest independent electricity transmission company in the country and we own and operate electric transmission assets that has a footprint that expands to eight Midwest and Great Plains states. We have no geographic constraints and we invest in the grid and we do that to improve reliability, to expand access to markets, and lower the cost of delivered energy to our customers.

We also allow for diverse and new generating resources to interconnect to our transmission systems. At the conclusion of today's hearings, I hope to leave the Committee with two very clear takeaways—first, that investment in the transmission grid is needed now, and secondly, the private sector utility industry, which we are a part of, are ready to make these investments if we are provided with the right regulatory and planning environment.

While there have been some efforts made by the Trump administration and Congress to reform the existing regulatory process for electric transmission, additional reforms in federal permitting and environmental review processes are needed. We also need to continue to take proactive steps to reform procedures for planning the transmission system to ensure that we are examining the full value of the transmission investments.

I would like to highlight the growing importance of transmission infrastructure to our economy. In the earliest incarnations of the grid, the transmission lines were built for a single purpose and that was just to move electricity from generating plants to homes and businesses. It was usually within a single utility footprint.

Things have certainly evolved as FERC and individual states have opened up electricity markets to competition and transmission lines became more than just a one-way delivery system for individual utilities. Today, the transmission grid serves as a non-discriminatory regional platform for connecting consumers to energy markets. As customer expectations have increased, so too have the drivers for new investment in transmission infrastructure.

Whatever the energy future may bring, let's be clear that we need a modern transmission system to provide the optionality to facilitate that future. Moving forward, the story is clear as well. Our economy is becoming more and more dependent on reliable and affordable access to electricity and the transmission grid becomes more stressed as that occurs. Planning the grid to address these demands requires consideration of many complex factors including potential threats to the system.

We now understand that the redundancy that we planned into the transmission system—in other words, the different ways and pathways that we can connect to consumers—that offers a pretty strong protection against adverse events that can impact generation resources or the transmission system itself. Investing now will

ensure the resilience of the grid and the resource diversity while keeping electricity prices low for consumers and for businesses.

I would like to emphasize that, theoretically, no federal dollars are needed to strengthen the grid, increase resilience, and create jobs. The private sector which we are a part of is ready to make these investments, provided that regulatory and planning environment is conducive to the investment.

We applaud the efforts by Congress to streamline the permitting process for new infrastructure. Even still today, permitting for a major transmission line can take nearly a decade to secure a range of federal, state, and local permits.

In order to ensure that the NEPA process can be completed in a reasonable amount of time while maintaining the strong commitment that we have to environmental stewardship that we all share this commitment, then Congress could consider a number of options including requiring concurrent NEPA analysis and environmental reviews by all the permitting agencies involved, requiring those agencies to use the information that's already contained in the lead agency's NEPA document as the basis for their reviews, and then, finally, setting some firm deadlines for the NEPA process.

To make the necessary investments in transmission infrastructure that we are ready to do, we need a supportive regulatory environment and to use the latest and most comprehensive methodologies to plan and approve new transmission lines. Planning the grid proactively requires that benefits of a potential investment be viewed more comprehensively by integrating a range of project benefits and planning drivers into criteria for approving projects.

Finally, we need also to support the construction of new transmission lines that connect RTOs and ISOs in various regions which, as of today, are still highly separated.

More interregional connections will increase system flexibility and resilience against potential threats while still allowing regional flexibility and approaches to joint planning.

Thank you again for the opportunity to testify before the committee and I look forward to answering any questions you might have.

[The prepared statement of Mr. Slocum follows:]

Statement of

**Brian Slocum
Vice President of Operations
ITC Holdings Corporation**

**Hearing on
The State of the Nation's Energy Infrastructure**

**Committee on Energy and Commerce, Subcommittee on Energy
United States House of Representatives
February 27, 2017**

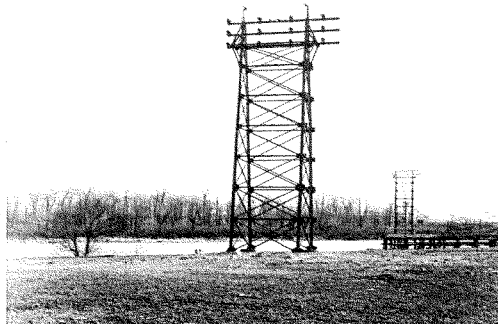
Chairman Upton, Ranking Member Rush, and distinguished members of the Subcommittee, I am Brian Slocum, Vice President of Operations, ITC Holdings Corp. (ITC), and I greatly appreciate the opportunity to speak before you today. As the largest independent electricity transmission company in the country, ITC owns and operates electric transmission assets in Michigan's Lower Peninsula and portions of Iowa, Minnesota, Illinois, Missouri, Kansas, and Oklahoma. As we have no geographic constraints, ITC also focuses on new areas where significant transmission system improvements are needed. ITC is proud of our record of investing in the grid to improve reliability, expand access to markets, lower the costs of delivered energy, and allow diverse new generating resources to interconnect to our transmission systems.

We are standing at the gateway to a modernized electric grid that will play an integral role in powering America. A modernized grid will create opportunities to increase system resilience and deliver more cost effective energy, including increased utilization of wind and solar energy that will create more

than 150,000 jobs and save consumers billions annually. However, there are regulatory hurdles that must be overcome to help us achieve these objectives.

At the conclusion of today's hearing, I hope to leave the Committee with two very clear takeaways: (1) investment in the transmission grid is needed now to grow, sustain, and protect our 21st century economy, and (2) with a supportive regulatory approval environment, the private sector stands ready to make these vital investments in our nation's infrastructure.

While there have been efforts by the Trump Administration to reform the existing regulatory process for siting electric transmission, additional reforms in federal permitting and environmental review processes are needed. New development is delayed, and sometimes thwarted by unnecessarily complex and burdensome requirements. In addition, we need to take proactive steps to reform our procedures for planning and approving new transmission lines. Regulatory reforms to planning and siting processes for new infrastructure can help ensure that the right investments to strengthen our grid and our economy are realized.



To begin, I would like to highlight the growing importance of transmission infrastructure to our economy by briefly reviewing its origins. In the earliest incarnations of the grid, transmission lines were typically built for a single purpose: to move electricity from generating plants to local utilities, which would then distribute power to homes and businesses, usually within a single utility footprint. Then, as FERC and individual states opened wholesale and some retail electricity markets to competition, the grid became more than just a one-way delivery system for individual utilities. Today, the transmission grid needs to serve as a non-discriminatory regional platform for connecting consumers to energy markets. In many areas, Regional Transmission Organizations (RTOs) and Independent System Operators (ISOs) have been formed to develop the transmission grid on a regional basis, achieving substantial new investments and benefits for customers. The transmission system is expected to not only be reliable and economic, but also to support state-level public policy goals, provide us with access to diverse generation resources across the country, and remain resilient in the face of shifting natural and man-made threats. As our expectations of the grid have increased, so too have the drivers for new investments in transmission infrastructure.

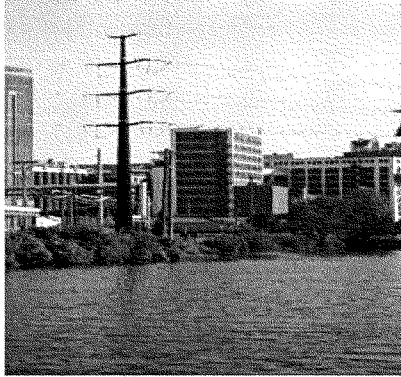
While it is important to understand today's needs, the continued success of our nation's economy requires understanding the energy needs of tomorrow. Transmission lines are long-lived assets, usually remaining in service for 40 years or more, and major lines often take nearly a decade to plan and develop. As a result, much of our time is spent thinking about the future to guide today's investment decisions. Here, the story is clear: as our economy becomes more and more dependent on reliable and affordable access to electricity, the demands we place on the transmission grid will only increase. First, we expect to see a continued shift in the nation's generation fleet as aging traditional plants retire and new resources seek to interconnect to the transmission system. Second, we expect consumer and policy demands drive the economy to become more electrified, which is likely to dramatically change how much electricity is needed, how it is produced, and where it used. Finally, the grid will need to become a reliable integrator

of new technologies, including storage and distributed generation sources. Clearly, to ensure we are ready for the future economy, we need to make smart, proactive investments in the grid today.

Planning a grid that will serve our future demands requires us to consider many scenarios, while also preparing for potential threats to our vital infrastructure. The range of threats to the grid has grown and now includes cyber and physical attacks in addition to extreme weather and geomagnetic storms. Because the grid is so integral to economic growth and security, there is a growing recognition that we need to make sure it is both reliable for everyday use and resilient against things that we may not expect. We now understand that *redundancy* in the transmission system (in other words, the existence of multiple pathways to connect electricity to consumers) offers perhaps the strongest protection against adverse events that can impact generation resources or the transmission system itself. Whatever the future may bring, we need a modern transmission system to provide us with optionality to respond to unexpected challenges.

To support and protect the 21st century economy, we need a stronger, more regionally integrated transmission grid. Investing in this grid now will help protect the resilience of our electric system and economy, and allow us to take advantage of resource diversity across the nation, all while keeping electricity prices low for consumers and businesses. And, like other forms of critical infrastructure, investments in transmission can create and support thousands of well-paying jobs, both directly during construction and through increased economic growth along the path and over the life of the system. Indeed, according to a recent report on transmission benefits released by the WIRES coalition and London Economics, job creation and economic benefits achieved through transmission development can be substantial and long lasting¹.

¹ Frayer, J., Wand, E., Yang, R., Leslie, J., Duan, J., & Lan, T. How Does Electric Transmission Benefit You? Identifying and measuring the life-cycle benefits of electric transmission. 2017.



I would also like to emphasize that theoretically, an investment of zero federal dollars is fully capable of resulting in a strengthened grid, lower energy prices, increased resilience, and significant job creation in our local communities. As noted earlier, the private sector is ready to make these investments in the future grid, provided the regulatory environment is conducive to investment.

But that certainly doesn't mean the federal government has no role in this electrified future. Congress is positioned to play a pivotal role in enabling the transmission industry to create a 21st century grid for America.

- First, we applaud efforts by Congress to streamline the permitting process for new infrastructure. We also applaud recently-passed legislation to provide regulatory certainty surrounding the acquisition of transmission assets.

Today, permitting for a major interstate transmission line can take nearly a decade due to the need to secure a range of federal, state and local permits. On the federal side, the National Environmental Policy Act (NEPA) approval process has historically suffered from a lack of coordination between participating agencies and uncertainty surrounding completion timelines.

Although progress has been made through the adoption of title 41 of the FAST Act (FAST-41), we believe there may be additional opportunities to gain efficiencies in the permitting process.

As an example, ITC is currently developing a major transmission project connecting Iowa and Wisconsin that will help to relieve congestion and deliver clean energy to load centers in the Midwest. For this project, ITC initiated the multi-agency NEPA process in 2016 and submitted its notice as a covered project under FAST-41 in 2017, a framework which includes oversight and coordination by OMB, as well as other Federal agencies and entities. Despite efficiencies gained through the application of FAST-41 requirements for agency coordination, we still do not expect the process to conclude until late 2019 or 2020. Based on this timeline, we expect to place the completed line in service in 2023.

In order to ensure the NEPA process can be completed in a reasonable amount of time, while also maintaining the strong commitment to environmental stewardship we all share, Congress could consider a number of options, including: requiring concurrent NEPA analysis and environmental reviews by all permitting agencies; requiring cooperating agencies to use the information already contained in the lead agency's NEPA document as the basis for their permit related reviews; and setting a firm deadline on the NEPA process. We believe these are best practices that can expedite permitting without weakening NEPA or the environmental review process. Achieving greater efficiency could in fact improve environmental outcomes by expediting the integration of renewable resources and storage solutions.

ITC believes that states should continue to have a strong role in the regulatory process, and ITC continues to work through the siting processes in states in which it does business. At the same

time, federal regulators should be empowered to assume responsibility to route a project if a state process fails to move forward. One example of the need for a new approach is the recently proposed Northern Pass transmission project in New Hampshire and Massachusetts. Without commenting on the merits of the specific project, it is clear that the process was long, arduous, and ultimately unsuccessful. Another approach could be to refine DOE's ability to designate federal siting corridors by addressing concerns that made backstop siting provisions in the Energy Policy Act of 2005 ineffective.

- Second, we need to be able to use the latest and most comprehensive methodologies to plan and approve new transmission lines, to ensure we are making the right investment in our future economy. Transmission planners at utilities and RTOs and ISOs need to be given the ability to use "Full Value Analysis" when they are evaluating regional transmission projects and determining how to share their costs. Planning the grid based on Full Value Analysis would require that the benefits of a potential investment are examined comprehensively, by integrating a range of project benefits and planning drivers, including fuel diversity, system resilience, and proactive planning for new interconnections, into criteria for approving projects. To implement this, Congress could consider asking FERC to initiate a rulemaking to adjust its regulations to encourage RTOs, ISOs and utilities to implement a Full Value Analysis process in their regional planning and cost allocation procedures.

We also need to support the construction of new transmission lines that connect RTOs and ISOs, which today are still highly separated. More interregional connections will increase system flexibility and resilience against potential threats. A "Full Value Analysis" rulemaking process

implemented by FERC for projects that connect regions would help to us to identify and promote these opportunities, while still allowing for regionally flexible approaches to joint planning.

Thank you again for the opportunity to testify before the Committee. I look forward to answering any questions you may have.

Mr. UPTON. Thank you very much.
Mr. Ross.

STATEMENT OF JIM ROSS

Mr. ROSS. Thank you.

Chairman Upton, Ranking Member Rush, and the Members of the Committee, on behalf of our president, Lonnie Stephenson, thank you for inviting me here today to participate in this important discussion.

Energy generation and power distribution is an \$800 billion a year business. With 775,000 active members and retirees, the International Brotherhood of Electrical Workers—the IBEW—represents approximately 400,000 workers employed in generation, transmission, distribution, construction, and rail jobs all in some way related to the electrical grid. The IBEW supports a diverse balance and resilient energy portfolio that includes renewables like wind, solar, and hydro while preserving key base load energy's sources like natural gas, coal, nuclear power. These base load power sources are extremely important to the United States security and vital to future planning. The need to upgrade is getting its rightful attention these days.

But left out of the recent conversation is that the United States has not made meaningful upgrades to its energy infrastructure since the 1970s. Unfortunately, our current electric distribution system, which functions on a regional or localized basis, is outdated and inefficient and the permitting and approval process for large-scale transmission projects is more than burdensome. It's an outright barrier to construction.

The large-scale solar installation in the desert of California, a massive new hydropower generation project in eastern Canada, and a wind farm in the plains—these are major renewable energy development projects the members of the IBEW have been proud to help construct in recent years.

But these generation projects of the future are only as good as the transmission network they will rely on. Their value is diminished if there is no infrastructure to take power from the source to the demand for electricity.

New investment in the transmission network is a necessary component of these renewable energy projects and the good news is that plans exist and, in some cases, are years into the necessary permitting and approval stages. In fact, approximately \$140 billion in private capital is awaiting permit approvals for aging transmission system overhauls and development of new clean lines to move more renewable sources to market.

One important method of financing infrastructure projects is through bonds and regulatory decisions can dramatically impact the bond market. Congress can also play a key role in project financing by expanding access to private activity bonds. Your support for legislation that encourages market predictability and stability will foster job creation.

It is also important to support legislation that would streamline permitting and siting processes. There are plenty of energy infrastructure projects across the United States that have been involved in the permitting process for years.

An example of a project pending approval is the 192-mile Northern Pass project which will build high-voltage transmission lines through New Hampshire, carrying clean hydropower from Canada to New England. It would create 2,600 jobs during peak construction and many of these would be skilled IBEW construction linemen. Recent storms and frigid temperatures have challenged the ability to the region to meet demand for heating and electric generation. As a result, wholesale gas prices spiked more than 10 times the 2017 average price and oil-fueled turbines were employed, triggering a release of greenhouse gases and pollutants into the atmosphere.

Northern Pass will relieve the massive imbalance of supply and demand in New England and introduce necessary renewable diversity into its energy portfolio. Another 750-mile high-voltage clean line project will deliver 4,000 megawatts of wind-generated power to major load centers in the Midwest and the East Coast, enough to power 720,000 homes. Both of these projects bring economic and job growth, preserve local communities, and grow the tax base. A regulatory resistance from state and local jurisdictions has effectively stopped them before they could get off the ground. For this reason, we need to empower federal authorities to approve large-scale projects of national importance that cross state lines and local government jurisdictions.

With all due respect to local authorities, we need a new approach that trims unnecessary red tape and streamlines the rules created by numerous regulatory authorities. Additionally, the Federal Government should take responsibility for right sizing by incentivizing development of capacity in excess of current market demands.

Accounting for future demand avoids the possibility of under building and encourages future development renewable electricity sources because there will be a market case to make to investors, providing that they can move their generation to major markets.

Lastly, we are encouraged by recent one-agency one-decision proposals which will reduce the time line for federal environmental reviews and permitting processes. We do not support efforts to diminish current environmental protections. We simply need an efficient process. We cannot afford to continue postponing the necessary upgrades.

The United States lags behind China and Brazil, Germany, and many other countries in transmission infrastructure investment. With the Federal Government taking a decision making lead, market predictability will improve as well as the IBEW's ability to plan for training the next generation of construction linemen. It takes 3 years to train a journeyman lineman to perform transmission line construction and maintenance, and we anticipate the need for approximately 50,000 new power linemen over the next 10 years.

While projects are held up, we are losing valuable training time. By the way, our privately-operated apprenticeship training programs invest approximately \$200 million annually to equip students with the skills the markets demand. For more than 70 years, the IBEW and our employer partners, the National Electrical Contractors Association, have been the largest private sector trainer of electrical workers in the Nation.

Together, the IBEW and NECA operate hundreds of training centers in communities across the country. Our training programs guarantee a steady stream of skilled electrical workers necessary for the important work of modernizing and expanding our grid.

We ask for your leadership on making our modern electrical grid a reality. We remain a ready partner with our employers and elected officials from both sides of the aisle.

Thank you for the opportunity to testify here before you today.

[The prepared statement of Mr. Ross follows:]

Testimony of Jim Ross

Director

International Brotherhood of Electrical Workers
Construction and Maintenance Department

Before the Subcommittee on Energy, House Committee on Energy and Commerce

U.S. House of Representatives

February 27, 2018

Chairman Upton, Ranking Member Rush, and the members of the Committee. On behalf of our president, Lonnie Stephenson, thank you for inviting me here today to participate in this important discussion.

Energy generation and power distribution is an \$800 billion a year business. With 775,000 active members and retirees, the International Brotherhood of Electrical Workers – the IBEW – represents approximately 400,000 workers employed in generation, transmission, distribution, construction and rail jobs, all in some way related to the electrical grid.

The IBEW supports a diverse, balanced and resilient energy portfolio that includes renewables like wind, solar and hydro, while preserving key baseload energy sources like natural gas, coal and nuclear power. These baseload power sources are extremely important to the United States' security and vital to future planning.

The need to upgrade the nation's infrastructure is getting its rightful attention these days. But left out of the recent conversation is that the United States has not made meaningful upgrades to its energy infrastructure since the 1970s.

Unfortunately, our current electric distribution system, which functions on a regional or localized basis, is outdated and inefficient. And the permitting and approval process for large-scale transmission projects is more than burdensome. It's an outright barrier to construction.

A large-scale solar installation in the desert of California. A massive new hydropower generation project in eastern Canada. And a wind farm in the Plains.

These are major renewable energy development projects the members of the IBEW have been proud to help construct in recent years.

But these generation projects of the future are only as good as the transmission network they will rely on. Their value is diminished if there is no infrastructure to take power from the source to the demand for electricity.

New investment in the transmission network is a necessary component of these renewable energy projects. And the good news is that plans exist and in some cases, are years into the necessary permitting and approval stages. In fact, approximately \$140 billion in private capital is awaiting permit approvals for aging transmission system overhauls and development of new clean lines to move more renewable sources to market.

One important method of financing infrastructure projects is through bonds and regulatory decisions can dramatically impact the bond market. Congress can also play a key role in project financing by expanding access to private activity bonds. Your support for legislation that encourages market predictability and stability will foster job creation.

It is also important to support legislation that would streamline permitting and siting processes. There are plenty of energy infrastructure projects across the U.S. that have been involved in permitting processes for years.

An example of a project pending approval is the 192-mile Northern Pass project, which will build high voltage transmission lines through New Hampshire, carrying clean hydropower from Canada to New England. It would create 2,600 jobs during peak construction and many of these would be skilled IBEW construction linemen.

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Another, the 750-mile high-voltage Clean Line project will deliver 4,000 megawatts of wind-generated power to major load centers in the Midwest and the East Coast, enough to power 720,000 homes.

Both of these projects promote economic development and job growth, preserve local communities and grow the tax base. But regulatory resistance from state and local jurisdictions has effectively stopped them before they could get off the ground.

For this reason, we need to empower federal authorities to approve large-scale projects of national importance that cross state lines and local government jurisdictions. With all due respect to local authorities, we need a new approach that trims unnecessary red tape and streamlines the rules created by numerous regulatory authorities.

Additionally, the federal government should take responsibility for “right-sizing” by incentivizing development of capacity in excess of current market demands. Accounting for future demand avoids the possibility of underbuilding and encourages future development of renewable electricity sources because there will be a market case to make to investors, proving they can move their generation to major markets.

Lastly, we are encouraged by recent “one-agency, one-decision” proposals which will reduce the timeline for federal environmental reviews and permitting processes. We do not support efforts to diminish current environmental protections; we simply need an efficient process.

We cannot afford to continue postponing these necessary upgrades. The United States lags behind China, Brazil, Germany and many other countries in transmission infrastructure investment.

With the federal government taking the decision-making lead, market predictability will improve, as will the IBEW’s ability to plan for training the next generation of construction linemen. It takes three years to train a journeyman lineman to perform transmission line construction and maintenance, and we anticipate the need for approximately 50,000 new powerlinemen over the next 10 years. While projects are held up, we are losing valuable training time.

By the way, our privately-operated apprenticeship training programs invest approximately \$200 million annually to equip students with the skills the market demands. For more than 70 years, the IBEW and our employer partners in the National Electrical Contractors Association have been the largest private-sector trainer of electrical workers in the nation. Together, the IBEW and NECA operate hundreds of training centers in communities across the country.

Our training programs guarantee a steady stream of skilled electrical workers necessary for the important work of modernizing and expanding our grid.

We ask for your leadership on making our modern electrical grid a reality. We remain a ready partner with our employers and elected officials from both sides of the aisle. Thank you for the opportunity to testify before you today.

Mr. UPTON. Thank you.
Dr. Chen.

STATEMENT OF JENNIFER CHEN

Ms. CHEN. Good morning, Chairman Upton, Ranking Member Rush, and members of the Committee.

Thank you for the opportunity to testify. I am Jennifer Chen, an attorney with the NRDC. I am also a board member with the Americans for a Clean Energy Grid, a coalition including transmission owners and developers. We are jointly working to achieve a modern, efficient, and clean consumer-friendly transmission grid.

NRDC supports a range of infrastructure modernization projects that deliver economic, social, and environmental benefits. We support programs promoting energy efficiency and distributed energy resources, and we need to ensure that transmission planning counts for them to avoid overbuilding.

Today, I will focus my comments on the main barrier to transmission infrastructure improvements most needed to modernize the electric grid—a severely fragmented transmission planning process and how we can overcome that barrier.

But first, I want to emphasize that environmental laws are not driving a delay in modernizing our grid and President Trump’s infrastructure plan that would severely undermine these protections is not the solution. As DOE noted in its quadrennial energy review on energy infrastructure, the environmental review and permitting requirements are accomplished effectively and efficiently. This is due in large part to progress made by Congress in the Energy Policy Act of 2005 as well as by the last two administrations.

NEPA is only triggered if there is a federal nexus like when a project receives federal funding. NEPA and federal permitting requirements are important components for smart from the start planning. They disclose a project’s impact to the public and provide opportunities for input including alternate solutions. Early robust public engagement is also key through reducing conflicts and mitigating impacts. Such input has resulted in better outcomes and stakeholder engagement helps avoid protracted legal battles, bad publicity, and protests.

On the other hand, President Trump’s plan to short circuit environmental projections and public processes would be counterproductive because experience has shown that insufficient public engagement breeds local opposition that can delay projects. It’s far better to fix the disjointed planning process we can all agree is a barrier to something a wide range of stakeholders wants. We want our nation’s transmission backbone to be able to deliver clean low-cost electricity from the windy heartland and sunny states to more densely populated regions. Importantly, that kind of grid modernization effort will create jobs, improve the efficiency of our electricity markets, promotes emissions-free electrification of our economy that is key to addressing climate change, and produce billions of dollars in benefits to electricity consumers.

The problem is our transmission planning process is too small scale to produce a robust transmission backbone needed to accomplish these goals. Currently, interregional transmission planning proposals are dying on the vine, if proposed at all, far in advance

of the environmental review stage. This is largely due to mismatched planning between neighboring regions.

Smaller regional projects, on the other hand, have seen more success. FERC tried to facilitate interregional project development by requiring neighboring grid planners to coordinate with each other. But that's not the same as requiring them to jointly plan for transmission because neighboring regions use different methods in their planning. Asking them to simply coordinate has not facilitated these interregional projects. FERC sought public input in June of 2016 to revisit this issue but it has not acted on it since. Interregional transmission planning, not just coordination between regions, must be FERC's next priority.

As a next step, Congress could encourage FERC to use existing authority to implement a rule on interregional transmission planning and to truly modernize the grid, Congress could encourage FERC to require planning that anticipates the impact of public policies and the falling costs of wind and solar power.

FERC should also require planning that accounts for technologies that facilitate environmentally responsible siting, reduces energy loss along the wires, and maximizes the use of existing transmission lines and other infrastructure. Infrastructure is long lived and expensive, but it's an investment and it's important to get it right. And to do so, it's critical to take steps now to improve the planning process. President Trump's plan to circumvent environmental protections would encourage rushing to solve the wrong problem.

Thank you, and I look forward to answering your questions.
[The prepared statement of Ms. Chen follows:]

TESTIMONY BY

JENNIFER CHEN

ATTORNEY, SUSTAINABLE FERC PROJECT

OF THE

NATURAL RESOURCES DEFENSE COUNCIL

Subcommittee on Energy

Committee on Energy and Commerce

United States House of Representatives

February 27, 2018

Mr. Chairman and members of the committee – thank you for the opportunity to testify. I’m Jennifer Chen, an attorney with the Natural Resources Defense Council (NRDC). NRDC is a nonprofit organization of scientists, lawyers, and environmental specialists dedicated to protecting public health and the environment. Founded in 1970, NRDC has more than 3 million members and online activists nationwide, served from our offices in New York, Washington, Los Angeles, San Francisco, Chicago, and Beijing. Under the Sustainable FERC Project, I lead a coalition of environmental groups to jointly advocate before the Federal Energy Regulatory Commission (FERC) and PJM Interconnection, Inc. I’m also a board member of the Americans for a Clean Energy Grid, a coalition representing industry, trade groups, and environmental organizations seeking to broaden stakeholder support for modernizing our transmission grid in a way that is efficient, consumer-friendly, and sensitively sited.¹

NRDC’s general position on energy infrastructure

NRDC supports 21st century infrastructure investment that prioritizes performance-based projects that deliver economic, social and environmental benefits – such as jobs, clean energy and water, improved mobility and climate resilience. Technological innovations like smart meters and energy storage as well as upgrading the nation’s power infrastructure will enable us to take advantage of clean, reliable, and cost-effective energy resources. Deploying information technology like broadband and wireless will help get us the data to run our cities and towns more efficiently. We also support preparing Americans for the future with clean energy jobs. Infrastructure projects are an opportunity for good jobs beyond construction, but we cannot afford to invest federal funding in constructing fossil fuel pipelines and refineries that lock us into unnecessary and outdated infrastructure that will burden generations to come.²

I will focus my comments on how we can address the real barriers to transmission infrastructure improvements most needed to modernize the grid³ – the severely fragmented

¹ Americans for a Clean Energy Grid works with utilities, environmental advocates, transmission owners and developers, renewable energy companies, technology manufacturers, labor unions, and public-interest groups to educate the public and policy makers about the importance of modernizing America’s high-voltage transmission system. <https://cleanenergygrid.org/>.

² Natural Resources Defense Council. March 2017. Infrastructure That Works for America—Not Just Wall Street. Retrieved from <https://www.nrdc.org/experts/shelley-poticha/infrastructure-works-america-not-just-wall-street>.

³ Note that grid modernization importantly also includes updating existing infrastructure to reduce waste and emissions, and modernizing home, buildings, end-use appliances and processes to be more efficient – and including this efficiency in planning so that we do not over-build transmission and generation. Many aspects of H.R. 2479, the “Leading Infrastructure for Tomorrow’s America Act,” (LIFT America) introduced by Ranking Member Frank Pallone, Jr. and

planning process. But first, I want to emphasize that environmental laws are not driving the delay in modernizing our grid. And President Trump's infrastructure plan⁴ that will cut corners in complying with them will not solve delay issues.

Environmental review is important and not a driver of delay

Claims that project delays are caused by federal environmental review or permitting requirements⁵ are based on unsound logic and inaccurate and unsubstantiated assumptions. Studies have disproved these claims and have shown that it is not federal rules that are causing the delays.⁶ For most types of infrastructure, the primary factor is lack of funding.⁷

As the U.S. Department of Energy (DOE) noted in its Quadrennial Energy Review on energy transmission, storage, and distribution infrastructure, "the environmental review and permitting requirements are accomplished effectively and efficiently."⁸ The statistics DOE provides in support are impressive -- according to a partial inventory, between 2009 and early 2015:

- The Bureau of Land Management (BLM) has approved 90 major electric transmission line projects, spanning about 3,000 total miles and authorized more than nine major pipeline projects for oil, water, and natural gas.
- FERC has authorized about 4,500 miles of pipeline.
- The Rural Utilities Service has financed 5,591 total miles of transmission line.

the Democratic members of the Energy and Commerce Committee on May 17, 2017 would further important grid modernizations efforts along these lines.

⁴ The White House, Legislative Outline for Rebuilding Infrastructure in America, www.whitehouse.gov/wp-content/uploads/2018/02/INFRASTRUCTURE-211.pdf.

⁵ Philip K. Howard, "Two Years Not Ten: Redesigning Infrastructure Approvals" (New York: Common Good, 2015), http://commongood.3cdn.net/c613b4cfda258a5fcb_e8m6b5t3x.pdf.

⁶ Center for American Progress, *Debunking the False Claims of Environmental Review Opponents* (May 3, 2017), cdn.americanprogress.org/content/uploads/2017/05/02115452/DebunkingEnvironmentalReviewFalseClaims-brief1.pdf; Congressional Research Service, Memo to House Committee on Transportation and Infrastructure on *Questions regarding the report Two Years Not Ten Years: Redesigning Infrastructure Approvals* (Jun. 7, 2017). <https://fas.org/sgp/crs/misc/twonot.pdf>.

⁷ House Committee on Energy and Commerce, *Hearing on Closing the Digital Divide: Broadband Infrastructure Solutions*, Testimony of Natural Resources Defense Council Legislative Director Scott Slesinger, 115th Cong. (Jan. 30, 2018).

⁸ U.S. Department of Energy, Chapter IX: Siting and Permitting of TS&D Infrastructure, Quadrennial Energy Review (April 2015) <https://energy.gov/sites/prod/files/2015/08/f25/QUER%20Chapter%20IX%20Siting%20and%20Permitting%20April%202015.pdf>.

- The Forest Service has approved and reauthorized 4,921 power line projects covering 31,678 miles, 2,160 natural gas and oil pipelines covering 12,907 miles, and 158 water transmission projects covering 847 miles.⁹

FERC, too, has said it has been efficient in reviewing and approving proposed gas pipeline and LNG facilities:

FERC's "natural gas project review processes are thorough, efficient, and have resulted in the timely approval of interstate natural gas pipelines, LNG facilities, and facilities at our international borders for the import or export of natural gas. Since 2000, the Commission has authorized nearly 18,000 miles of interstate natural gas transmission pipeline totaling more than 159 billion cubic feet per day of transportation capacity, over one trillion cubic feet of interstate storage capacity, and 23 facility sites for the import and export of LNG. . . . Since August when the Commission gained a quorum, the agency has authorized more than 12 billion cubic feet per day of additional pipeline capacity and more than 1,300 miles of pipeline."¹⁰

Gas pipeline projects have been routinely approved by FERC under its current guidelines for project review, adopted in 1999.¹¹ Since that time, FERC has rejected only two of the approximately 400 pipeline applications filed.¹² As FERC continues to approve nearly every pipeline proposal it reviews and in light of underutilized existing pipelines (at a little above 50 percent utilization),¹³ there are concerns that gas infrastructure is being overbuilt.

Permitting and siting of the majority of transmission, storage, and distribution infrastructure projects depends on state and local decisions. Federal agencies have siting authority over proposed infrastructure projects that cross Federal land or water, interstate natural gas pipelines, and, to a limited extent, interstate electricity transmission projects.

⁹ *Id.*

¹⁰ Testimony of Terry L. Turpin, Director, Office of Energy Projects, Federal Energy Regulatory Commission, Hearing Before the U.S. Senate Energy and Natural Resources Committee at 4 (Dec. 12, 2017).

¹¹ Congress in the Energy Policy Act of 2005 already made changes to FERC's authority to address concerns of delay of pipeline approvals, including placing FERC in charge of coordinating NEPA reviews and federal approvals needed for pipeline certification. Paul W. Parfomak, Congressional Research Service, *Interstate Natural Gas Pipelines: Process and Timing of FERC Permit Application Review*, Summary (Jan. 16, 2015).

¹² Susan Tierney, Analysis Group, *Natural Gas Pipeline Certification: Policy Considerations for a Changing Industry* at 1 (Nov. 6, 2017).

¹³ The average utilization rate from 1998-2013 was only 54 percent. U.S. Department of Energy, *Natural Gas Infrastructure Implications of Increased Demand from the Electric Power Sector* at 22 (2015).

In general, the National Environmental Policy Act, or NEPA, is triggered if a transmission project is on federal land, if the project receives federal funding or support, or if a federal permit is required for projects that would fill wetlands, might impact our nation's waters, or potentially harm threatened or endangered species. NEPA and federal permitting requirements are important components of "smart from the start" planning, which enables developers to anticipate potential issues with prospective construction sites, and consider alternatives and engage affected communities early in the process.¹⁴

One important way that federal agencies are advancing regional planning for infrastructure development in the west is through Regional Reviews of the West-wide Energy Corridors designated under Section 368 of Energy Policy Act 2005.¹⁵ These reviews are being led by the Bureau of Land Management, U.S. Forest Service, and Department of Energy (the Agencies) and are scheduled to be completed in 2019; the reviews will result in recommendations for improvements to the corridors to better facilitate infrastructure development while limiting impacts to the environment. The Agencies are making good progress and it is crucial that they continue to improve their approach and ensure the reviews are completed in a way that helps us plan for smart transmission line and pipeline development on federal lands across the west.

For multistate transmission projects, the involvement of multiple jurisdictions adds time to siting, permitting, and review of infrastructure projects. As major infrastructure projects are proposed, Federal, state, local, and tribal governments must work to consider and minimize potential impacts on safety and security, as well as environmental and community resources. Close collaboration with tribal, state, and local governments is critical, and robust public engagement is essential for the credibility of the siting, permitting, and review process.

Major infrastructure projects may trigger conflicting stakeholder interests and have the potential to produce significant impacts on local communities and the environment. Early and robust stakeholder engagement is necessary to encourage compromise, minimize conflict, and

¹⁴ Smart from the Start siting refers the following principles. Consult stakeholders early and involve them in planning, zoning and siting. Use geospatial information to categorize the risk of resource conflicts. Avoid land and wildlife conservation and cultural resource conflicts and prioritize development in previously disturbed areas. Incentivize resource zone development with priority approvals and access to transmission. Consider renewable energy zones or development sites that optimize the use of the grid. Maximize the use of existing infrastructure. Where zoning is not feasible (as in much of the Eastern Interconnection), use siting criteria based on these principles. Carl Zichella and Johnathan Hladik, Siting: Finding a Home for Renewable Energy and Transmission. <http://americaspowerplan.com/siting/>.

¹⁵ <http://corridoreis.anl.gov/>.

mitigate these potential impacts – and is likely to reduce delays in reaching a decision.¹⁶ And by disclosing a project's impacts and allowing for consideration of alternative solutions, we have saved money, lives, historical sites, endangered species, and public lands while encouraging compromise and found alternatives that were not previously considered, resulting in better projects with more public support.

A great example of the importance of public input is the Hoover Dam Bypass, an award-winning project led by HDR Inc. The Federal Highway Administration (FHWA) developed the 3.5-mile Hoover Dam Bypass project to address congestion at the Hoover Dam crossing. However, the environmental impact statement for the project failed to explore an adequate variety of options. Project manager Dave Zanetell and his team more thoroughly researched an alternative proposed by environmental groups and added features to the project in response to public comments. In its final form, the bypass runs closer to developed areas instead of cutting through pristine corridors and includes sidewalks, pedestrian facilities, and parking to enable pedestrian access. "Oftentimes the public is a huge influence on the project. NEPA is certainly the foundation for public participation," said Zanetell. "We don't look at it as a burden; it is something we relish," he added.¹⁷ Zanetell went on to win the 2018 The ASCE OPAL award honoring outstanding civil engineering leaders for their lifetime accomplishments.¹⁸ The Hoover Dam Bypass won the American Council of Engineering Companies' Grand Conceptor Award, given to the nation's best overall engineering achievement.¹⁹

Finally, it's worth noting that environmental review processes are not a beacon for litigation. Each year, about 50,000 major federal actions require an environmental assessment,²⁰ and another roughly 500 projects require full environmental impact statements. Yet only around

¹⁶ U.S. Department of Energy, Siting and Permitting of TS&D Infrastructure; Federal Permitting Improvement Steering Council, Recommended Best Practices for Environmental Reviews and Authorizations for Infrastructure Projects for Fiscal Year 2018 (2017) (issued as a key part of Title 41 of the Fixing America's Surface Transportation Act), <https://www.permits.performance.gov/sites/permits.performance.gov/files/docs/documentaton/40856/fast-41fy-2018best-practices-report.pdf>.

¹⁷ <https://www.nrdc.org/resources/never-eliminate-public-advice-nepa-success-stories>.

¹⁸ <http://news.asce.org/engineer-who-managed-hoover-dam-bypass-project-earns-2018-opal/>.

¹⁹ <https://www.businesswire.com/news/home/20110404006891/en/Hoover-Dam-Bypass-2nd-HDR-Project-Win>.

²⁰ Council on Environmental Quality, Environmental Quality: The Twenty-fifth Anniversary Report of the Council on Environmental Quality (Executive Office of the President, 1996), <https://ceq.doe.gov/docs/ceq-reports/ceq-25th-annual-report.pdf>.

100 NEPA cases are filed.²¹ This means that only one-fifth of 1 percent of federal actions triggering NEPA are subject to litigation.²²

President Trump's infrastructure plan would short-circuit environmental protections, agency requirements to consider project alternatives, and public processes. And doing so would be counterproductive because experience has shown that insufficient public engagement breeds local opposition that can delay projects. In contrast, early stakeholder engagement can help the project approval process run smoothly, result in a more informed outcome, and avoid protracted legal battles, bad publicity, and protests.

Further, additional amendments to the environmental review and permitting process are unnecessary and counterproductive. Congress has given the administration tools to expedite the permitting process without sacrificing environmental protections – tools that the administration has yet to take advantage of. In October 2015, the Fixing America's Surface Transportation Act (FAST Act) set up the Federal Permitting Improvement Steering Council, which is tasked with coordinating and expediting federal permit reviews. The House, however, appropriated only \$1 million to the steering council, and the Trump Administration has not appointed its Executive Director.²³ Layering on new inconsistent or contradictory changes to the environmental review and permitting process would create new conflicts and delay.

A key issue impeding transmission grid modernization is a weak transmission backbone

It is far better to fix what we can all agree is a barrier to something a wide range of stakeholders want. We want our nation's transmission backbone to be able to deliver low-cost renewable electricity from the wind-rich heartland and sun-soaked states to more heavily populated regions. Importantly, that kind of grid modernization effort will create good, stable jobs,²⁴

²¹ Government Accountability Office, "National Environmental Policy Act: Little Information Exists on NEPA Analyses."

²² Center for American Progress, <https://www.americanprogress.org/issues/economy/reports/2017/05/03/431651/debunking-false-claims-environmental-review-opponents/#fn-431651-33>.

²³ Center for American Progress, *President Trump's Infrastructure Proposal Recklessly Undermines Environmental Laws* (Feb. 16, 2018), www.americanprogress.org/issues/green/news/2018/02/16/446914/president-trumps-infrastructure-proposal-recklessly-undermines-environmental-laws.

²⁴ <https://mjbradley.com/sites/default/files/PoweringAmerica.pdf>.

improve the efficiency of our electricity markets,²⁵ promote clean, emissions-free electrification of our economy, and produce billions of dollars in benefits to electricity customers.²⁶

The problem is that we need to fix a disjointed transmission planning process that does not plan on a geographic scale to produce long-line transmission projects. The contiguous United States has three separate interconnections – the eastern, western and Texas interconnections, with limited links between them. Not only is there no transmission planning between the interconnections, the transmission infrastructure planning is performed in even smaller regions within interconnections.

Currently, interregional transmission proposals are dying on the vine, if they are proposed at all – far in advance of the environmental review stage. This is due to mismatches in assumptions, models, definitions, determinations of need, valuation of benefits, and allocation of costs across neighboring planning regions.²⁷ Smaller, regional projects, on the other hand, have seen more success – about \$77 billion was spent on regional transmission projects between 2008 and 2015 in North America, largely in Texas,²⁸ the Great Plains, New England, the West, and the Midwest.²⁹

²⁵ Edison Electric Institute, Transmission Projects: At A Glance (December 2016) http://www.eei.org/issuesandpolicy/transmission/Documents/Trans_Project_lowres_bookmarked.pdf.

²⁶ Well-planned transmission investments reduce total costs. For example, SPP analyzed the costs and benefits of transmission projects from 2012–2014 and found that the planned \$3.4 billion investment in transmission was expected to reduce customer cost by \$12 billion. <https://democrats-energycommerce.house.gov/sites/democrats.energycommerce.house.gov/files/documents/T testimony-Kiernan-EP-Hrg-on-Part-II-Powering-America-Defining-Reliability-in-a-Transforming-Electricity-Industry-2017-10.pdf>.

²⁷ Two neighboring regional grid operators, the Midcontinent Independent System Operator and Southwest Power Pool, have conducted two coordinated system plan studies that have failed to produce an approved interregional project, although they have studied several candidate projects. MISO Plans Interregional Improvements with SPP, (February 14, 2018) <https://www.rtoinsider.com/miso-spp-interregional-process-86374/>. A guiding principle of FERC’s landmark order on transmission planning, Order No. 1000, is that the costs of transmission should be allocated roughly commensurately with the benefits accrued. But “benefits” was never defined – it was left to individual regional grid operators. The result has been a wide variance in regional compliance plans. <https://scholarship.law.berkeley.edu/cgi/viewcontent.cgi?article=2064&context=elq>.

²⁸ Texas pioneered renewable energy resource zoning to develop transmission for remote wind energy projects. The Texas grid operator has estimated that up to 3,500 miles of new lines are needed to bring new wind capacity to the state’s load centers.

²⁹ <https://www.ferc.gov/legal/staff-reports/2017/transmission-investment-metrics.pdf>.

FERC, in its landmark Order No. 1000 on transmission planning, tried to facilitate interregional project development by requiring neighboring regional grid planners to coordinate with each other, which falls short of requiring them to jointly plan. The neighboring regions plan separately – with different ways of modeling, determining the need for a project, valuing benefits, and allocating costs. Thus, simply asking them to coordinate has not sufficiently facilitated interregional transmission.³⁰ FERC revisited this issue by hosting a technical conference on Order No. 1000, including interregional coordination issues, on June 28 and 29, 2016, and solicited public comments (Docket No. AD16-18-000), but FERC has not acted in response to the comments since then.

While there are many successes to FERC's order on transmission planning, it can be improved. Integrated interregional transmission planning – not just coordination between regions – must be the next priority for FERC. As a next step, Congress today could encourage FERC to implement a rule, using its existing authority, requiring interregional transmission planning and encourage FERC to require planning that includes the following important factors:

- First, planning should be anticipatory – transmission is a long-lived investment, and it would be prudent to account for public policies that drive changes in the energy resources we use to power the grid,³¹ the falling costs of wind and solar power, and growing corporate demand for renewable energy.³²
- Second, planning should be holistic.
 - Planning should account for modern transmission technologies and other ways to increase the capacity on the system, reduce energy loss, and maximize the use of existing lines and rights of way. We need to stop building new transmission infrastructure with old, inefficient technology, a common practice today. Technological advancements can increase capacity on existing towers, reduce

³⁰ Stakeholders See Shortcomings in Western Interregional Tx Planning, <https://www.rtoinsider.com/western-interregional-transmission-planning-39424/>. Even though this article was published a year ago, very little has changed and the same issues remain.

³¹ According to a Brattle Group study, a more proactive and immediate approach to building a strong transmission grid will yield net savings in total generation and transmission investment costs ranging from \$30-70 billion through 2030 for compliance with current regulations, up to almost \$50 billion in savings annually on consumers' bills in an even more environmentally constrained future. Brattle Group, Well-Planned Electric Transmission Saves Customer Costs: Improved Transmission Planning is Key to the Transition to a Carbon-Constrained Future (May 2016) http://wiresgroup.com/docs/reports/WIRES%20Brattle%20Report_TransmissionPlanning_June2016.pdf.

³² <http://windenergyfoundation.org/2018/01/16/report-transmission-needed-to-meet-corporate-americas-growing-demand-for-renewable-power/>.

line losses and emissions, control power flows, reduce visual and land-use impacts, improve reliability, enhance security, and lower net costs.

- Planning should account for the growing penetration of behind-the-meter resources and energy efficient appliances and buildings, and the willingness of customers to reduce electricity consumption during peak electricity demand.
- Planning should account for non-transmission alternatives. States like New York have successfully incentivized non-wires solutions to defer or avoid unnecessary distribution system upgrades. FERC and regional grid planners should learn from their experiences to make rule changes at the federal level to ensure technologies that could provide transmission services, like storage, demand response, and energy efficiency, can do so and be fairly compensated for it.
- Planning should account for all benefits of transmission. Transmission planners only provide estimates of short-term cost savings under simplified system conditions.³³ These estimates undervalue transmission investments, because they miss a significant portion of transmission's total production cost savings and its overall economy-wide benefits. FERC should require a full accounting of transmissions benefits, including:
 - Additional savings from reduced line losses and mitigation of extreme weather.
 - Improved reliability and resource adequacy benefits, such as reduced reserve margins.
 - Generation capacity savings, including reduced peak energy losses, deferred generation capacity investments, and access to lower-cost generation resources.
 - Electricity market benefits, such as increased competition.
 - Environmental benefits, such as reduced emissions.
 - The benefits of meeting adopted public policy goals.
- The transmission planning and generation interconnection process should be combined. Project-by-project interconnection requirements are often costly, especially for smaller resources, and efficiencies of coordinating many projects in a sub-region are missed.
- Planning should include proactive consideration of impacts to lands, wildlife, cultural resources, recreation opportunities and other resources on federal and non-federal lands. Planning should emphasize avoiding and minimizing these impacts, which will facilitate infrastructure development by reducing conflicts and associated delays.
- Third, planning should employ modern modeling techniques that can simultaneously account for wind and solar generation patterns and peak electricity demand to

³³ WIRES Brattle Group Study, 2013.

determine transmission needs.³⁴ And planning should take advantage of new mapping tools that identify environmentally or culturally sensitive sites.³⁵

- Fourth, and not least, planning should use consistent definitions, modeling, assumptions, and metrics across planning regions.

To conclude, infrastructure is a decades-long – if not century-long – investment, and it’s expensive. It’s important to build it right, and to do so, it’s critical to take steps now to improve the planning process. We must be diligent but also patient. President Trump’s plan to circumvent environmental protections would encourage rushing to solve the wrong problem.

Thank you for the opportunity to testify, and I look forward to your questions.

³⁴ <http://www.noaanews.noaa.gov/stories2016/012516-rapid-affordable-energy-transformation-possible.html>.

³⁵ Argonne National Laboratory’s mapping effort could be used to identify more optimal, lower-conflict sites for renewable energy and transmission development. The Eastern Interconnection Planning Collaborative is completing a planning initiative that may include a tool that uses geospatial information to suggest the location of potential renewable energy development zones.

Mr. UPTON. Thank you.
Dr. Hellyer.

STATEMENT OF BRENDA HELLYER

Ms. HELLYER. Good morning, Chairman Upton, Ranking Member Rush, and Vice Chair Olson and members of the subcommittee.

My name is Dr. Brenda Hellyer and I am Chancellor of San Jacinto College, and I am pleased to testify this morning on the role that community colleges and San Jacinto College specifically can play in contributing to the Nation's energy infrastructure and developing the workforce and the talent pipeline that's necessary to support that infrastructure.

San Jacinto College is located in East Harris County, the Gulf Coast region of Texas, and serves approximately 45,000 credit and non-credit students each year. Last year, the college was recognized as an Aspen Rising Star Award, representing as one of the top five community colleges in the country for community college excellence.

We are located in the heart of an energy industry. Our service area incorporates the Houston Ship Channel, home to the Nation's largest petrochemical complex, and we also support the NASA Johnson Space Center, Ellington Airport, and the Port of Houston, which is ranked number one in U.S. ports for foreign tonnage.

In my written testimony, I outline some of the workforce challenges in the Houston region. Briefly, Houston's skills gap has reached critical proportions among the middle skilled jobs—those that require more education and training than a high school diploma but less than a four-year degree. Of the 3.6 million jobs in Houston, 1.4 million, or approximately 40 percent, are middle skills jobs. The best way to address this need is through collaboration and partnership.

We have taken a national state and regional approach. No one entity or group can fix this challenge alone. From a regional standpoint, we engage area economic development corporations, our school districts, our universities, and our industries to build the pipeline for future workers.

We are at the table together, addressing this issue from multiple angles. I am going to give you some examples of that—San Jacinto College invites 6,000 sixth graders each year to gain hands-on experience in STEM experiments. This is through an event called Mind Trekkers. It's supported and it's sponsored by industry partners.

We offer summer camps to kickstart students so they understand the jobs that are available in STEM, petrochemical, and maritime. We also have a speakers' bureau that's a grassroots effort—community colleges, our economic development group, and our industry partners going in to our high schools and our eighth graders talking about the careers and the jobs in our area. Last year, 12,000 students and their parents were contacted and spoken with about these jobs.

We partner with industry to understand the types of employees they need, the skill sets required, and we adjust our curriculum to meet those needs. To that end, we are building a 145,000 square foot center for petrochemical energy and technology. This facility is

being built based on the input from industry. It's for industry by industry and it's funded from taxpayer dollars and also private donations.

More than a dozen industry leaders serve on a petrochem advisory council working directly with me to guide the project. This facility will house an exterior glycol unit. It'll have programs in process technology, instrumentation, electrical, non-destructive testing, the craft trades, and it'll also build on our construction management program. All of the programs will emphasize and build on a safety culture. The program will replicate a day in the life of plant operators and technicians. The programs are designed not only for the new worker coming into the field but also to upgrade the skills of the incumbent worker.

Our partnership in providing a skilled energy workforce is enhanced through our work with you, the Federal Government. We understand that a well-educated technically trained energy workforce is essential to advancing the President's America First energy plan and growing the Nation's energy infrastructure. To that end, community colleges have been working on the development of new legislation for energy workforce training Centers of Excellence. Two bills have passed and we encourage the enactment on funding of this type of legislation. We also encourage Congress to continue investing in America's labor force through grants with the Departments of Labor, Education, and Energy.

San Jacinto College is working with the Federal Government to provide workforce training programs through the Ready to Act workforce grant, the Carl Perkins Grant, the Trade Adjustment Act. All of these are designed around building that workforce and they're critical to the citizens of my region but they're also critical to the 1,100 community colleges throughout the country that provide the critical workforce training.

While this committee doesn't oversee Pell, I would be remiss if I didn't mention the impact of Pell and how that really can define how we are going to continue to feed the workforce and make sure that we build that workforce. There's 2.7 million community college students using the Pell system, which is building our workforce.

In conclusion, San Jacinto is working collaboratively in the Gulf Coast region to increase the number of students looking to go into these careers and workforce training, STEM, and the fields that really build this infrastructure. These programs improve the lives across our region. In the Gulf Coast region we are actually driving the economy of the Nation also.

And so I can tell you from San Jacinto's perspective this program, how we really are going to help support the infrastructure is critical. But it's also critical that we have the support for all community colleges.

Thank you.

[The prepared statement of Ms. Hellyer follows:]

**Prepared Testimony of
Dr. Brenda Hellyer, Chancellor
San Jacinto Community College District
Pasadena, Texas**

**House Energy and Commerce Committee
Subcommittee on Energy and Power**

Hearing: "State of the Nation's Energy Infrastructure"

February 27, 2018

Chairman Upton, Ranking Member Rush, and Members of the Subcommittee, Chancellor Brenda Hellyer of the San Jacinto Community College District, located in Pasadena, Texas is pleased to present this testimony to you regarding the nation's energy infrastructure and the role that community colleges, and San Jacinto College specifically, plays in contributing to the workforce needs related to it.

Describing San Jacinto College

Surrounded by monuments of history, industry and maritime enterprises of today, and the space age of tomorrow, San Jacinto College has been serving the citizens of East Harris County, Texas, since 1961. The College District incorporates the cities of Houston (east side), Pasadena, La Porte, Deer Park, Galena Park, Jacinto City, Channelview, Shoreacres, Morgan's Point, South Houston, Seabrook, El Lago, Taylor Lake Village, Nassau Bay, Webster, and portions of Humble and Pearland. A fiscally sound institution, the College currently holds bond ratings of AA and Aa2 by Standard & Poor's and Moody's, respectively. San Jacinto College was awarded the 2017 Aspen Prize Rising Star Award for Community College Excellence, making it a top five community college in the country out of 1,108 community and technical colleges. Approximately 45,000 credit and non-credit students each year benefit from a support system that maps out a pathway for success. More than three fourths of the students who attend San

Jacinto College do so part-time while working, and / or raising a family. More than 85 percent of the students intend to achieve an associate degree, or general academic credits, and either transfer to a university, or move directly into the workforce, or improve their job skills. Five percent attend for other reasons such as personal enrichment.

San Jacinto College is diverse and has been designated as a Hispanic Serving Institution. The ethnicity of the College student body is 56.9 percent Hispanic, 23.5 percent Caucasian, 10.1 percent African American, 5.6 percent Asian, and 2 percent other or did not report. The remaining 1.9 percent of the enrollment is comprised of international students.

The average age of the San Jacinto College student body is 23 years old, down from 26 years old 10 years ago. This is due to enrollment growth in the area of dual credit, a classification for high school students who are concurrently enrolled in high school and college courses. The College collaborates with eight early college high school programs, designed so that high school students in the region may take College courses on campus while in high school. This program enables participants to earn an associate's degree while earning their high school diploma. Additionally, The College works with 11 area school districts to offer dual credit programs, separate from the early college high schools. The College offers eight career pathways that prepare students to transfer to a four-year college or university or directly enter the workforce with the skills needed to support the growing industries along the Texas Gulf Coast. San Jacinto College graduates contribute nearly \$690 million each year to the Texas workforce.

San Jacinto College is focused on student success and making college education affordable and attainable to the citizens in our service area. Some relevant points include:

- 167.4 percent increase in the number of degrees and certificates awarded since 2007
- 30,941 credentials awarded over the last five years
- Ranked as the #6 community college for Hispanic students by *Hispanic Outlook on Education Magazine*
- Process technology program is ranked #1 by Texas Association of College Technical Educators
- The only maritime technology associate degree in the State of Texas
- Ranked 15th overall by the Brookings Institute for the number of degrees and certificates awarded
- Ranked in the top 5 of all community and technical colleges for excellence by the Aspen Institute for Community College Excellence
- Open Educational Resources – have saved students \$1.2 million over the last year in textbook costs.

San Jacinto College is one of nine community colleges serving the Gulf Coast region. The College's service area, defined by Texas legislation, incorporates the Houston Ship Channel; home to the nation's largest petrochemical complex, which is expected to surpass Rotterdam in production by 2020, thus becoming the largest in the world. The area also includes the NASA-Johnson Space Center and Port Houston, the first ranked U.S. port in foreign tonnage. The Gulf Coast region also hosts one of the largest medical centers in the world, the Texas Medical

Center. Currently, there are 11 health care facilities along the I-45 corridor on the south side of Houston.

In Texas, community colleges fund buildings by requesting permission from taxpayers to issue tax-backed bonds to build and renovate college facilities. San Jacinto College is currently in a building program after successfully passing a \$425 million bond referendum by 68 percent in 2015. The last bond referendum of \$295 million was passed in 2008. With these building projects, the College continues to update facilities, some of which are 50 to 55 years old, to meet the educational needs of today's students. San Jacinto College is also partnering with petrochemical and maritime companies, and the NASA-Johnson Space Center to create facilities that specifically meet the workforce needs of the community.

San Jacinto College's Maritime Training and Technology Center opened in 2016 as a premier maritime training center on the Gulf Coast. Both the maritime program and the new facility were created and constructed at the request of the maritime industry. Port Houston and the businesses directly supporting and working on the Houston ship channel saw that the state and federal maritime academies trained the unlimited tonnage officers for commercial sailing as well as Military Sealift Command. However, the lack of entry-level workers, 100 and 200-ton masters, and engineers created a gap in the workforce. Maritime industry partners along the Houston Ship Channel requested workforce training assistance to build a pipeline of workers due to pending retirements for tugs, push-boats, and barges.

Similarly, the first project in the 2015 bond referendum building program is a Center for Petrochemical, Energy, and Technology. The 145,000-square foot facility is being constructed in partnership with the nearly 130 chemical plants within the 10-mile radius of the facility. As the College was forming plans for this facility, the Chancellor created the Chancellor's Petrochemical Advisory Council with a membership of nearly 20 plant managers and major construction contractors in the area. This Advisory Council provides input on the curriculum, equipment, and image of the industry in the aesthetics of the building. The facility is scheduled to open in Fall 2019. This is a facility created to replicate a day in the life of an operator in the industry; it was designed by industry for industry.

In both projects, industry did more than just advise and counsel. They also contributed funding through millions of dollars of equipment donations, monetary donations to the facilities and scholarships; and provided their valuable time to meet with faculty and College administration in all stages of the facilities development.

Understanding the Workforce Challenge

Throughout the Gulf Coast region, there are a number of economic development, education, businesses and municipalities working together to address the region's skills gap. The Houston region has experienced incredible growth over the last several years. Led by a resurgence in energy, petrochemicals, manufacturing, life sciences and construction, the region's economy has been widely acclaimed as one of opportunity. However, leaders from across the business community have identified one of the region's most pressing issues — finding qualified workers for good jobs.

Houston's skills gap has reached critical proportions among middle-skill jobs — those that require more education and training than a high school diploma but less than a four-year degree. Of Houston's 3.6 million jobs, 1.4 million — or approximately 40 percent — are considered middle-skill positions.

The Greater Houston Partnership formed a program called “UpSkill Houston.” This initiative pulls business and education leaders and partners together to identify and address the sectors of our region where workers are retiring, expansion is happening, and the workforce pipeline is not robust enough to fill existing and future jobs. The Greater Houston Partnership has identified seven industry sectors, widely considered drivers of the regional economy, that are experiencing steady expansion. The sectors are:

- Port and Maritime
- Industrial and Commercial Construction
- Health care
- Petrochemical
- Manufacturing
- Oil and Gas
- Utilities

Quick Facts about workforce in the region and across the nation:

- Beyond than the Houston area, 46 percent of U.S. employers report difficulty filling jobs.
- Of all U.S. jobs, 53 percent require some training beyond high school but less than a four-year college degree.

- By 2020, two out of every three jobs in the U.S. will require meaningful post-secondary education and training.
- Affordable natural gas and natural gas liquids have created a competitive advantage for U.S. chemical manufacturers leading to greater investment, industry growth and new jobs.
- According to the American Chemical Council, as of December 2017, 317 projects cumulatively valued at \$185 billion in capital investment have been announced.
- Much of the investment is geared toward export markets for chemical and plastics products.
- The American Chemical Council believes the \$185 billion in capital investments will lead to \$26 billion in permanent new federal, state and local tax revenues by 2025.
- 63 percent of the announced investment is by firms based outside the U.S.
- Middle-skill petrochemical jobs in Houston can pay a median wage of \$30.61 per hour.
- Starting salaries for middle-skills careers in the Gulf Coast region are as high as \$60,000 per year and have the potential to go higher with overtime.
- Houston area community colleges have experienced a 42 percent increase in the completion of degrees as well as credit-bearing and non-credit continuing education certificates for technical (workforce) programs since June 2014.
- The Houston Ship Channel is home to the nation's largest petrochemical complex, and second largest in the world, second only to Rotterdam. The American Chemical Council believes the Texas Gulf Coast will surpass Rotterdam production by 2020.
- The Economic Alliance Houston Port Region is tracking 28 projects (of the 317) totaling \$6.1 billion in capital investment in the upper Houston Ship Channel area.

- One out of every eight jobs in the Houston region is in health care.
- More than 7,000 new construction jobs open per year in Houston.
- Houston is the nation's 6th best city for engineers.
- Houston is ranked 2nd for maritime jobs in the United States.
- Houston is the 8th best metro area for STEM professionals.
- More than 145 languages are spoken in Houston.

Leveraging the Strength of Community Colleges in Energy Workforce Development

Community and technical colleges can help secure the talent pipeline for our nation's energy workforce. Energy sector jobs require well-trained, skilled technicians – yet, many of those workforce positions do not require a baccalaureate degree.

Two-year, public community and technical colleges offering robust and affordable programs in energy workforce training prepare students for workforce positions that are open today, and also serve as the “on-ramp” to further degrees.

Since taking office on January 20, 2017, President Donald J. Trump has identified an “America First Energy Plan” as a top White House priority. In order to advance that goal and grow the nation's energy infrastructure, a well educated, technically trained energy workforce is essential. San Jacinto College is uniquely positioned to produce a technically trained energy workforce in the Houston Port region, in collaboration with petrochemical and other energy industry partners. We partner with other colleges and universities along the Texas Gulf Coast, and throughout the

nation. All San Jacinto College energy workforce programs are designed based on energy industry input.

Community and technical colleges in the shale play regions of the United States also play an important role in oil and gas industry workforce development. This includes colleges in the Marcellus and Utica shale play areas of in the Appalachian Basin, the San Juan shale play in northern New Mexico, the Permian Basin shale play in western Texas, and the Bakken shale play in North Dakota, as examples. In each of these regions, colleges have used investments by government and industry to expand their capabilities to educate and train workers for upstream, midstream and downstream energy workforce positions.

During the 114th Congress significant progress was made in developing a new program of federal investments in energy industry workforce development. A House-Senate conference committee came to agreement on comprehensive energy modernization and workforce legislation, combining provisions developed by the House Energy and Commerce Committee and the Senate Energy and Natural Resources Committee. The North American Energy Security and Infrastructure Act (H.R. 8/S. 2012) nearly became law during the fourth quarter of 2016. That legislation would have authorized new investments in community and technical college energy workforce training “centers of excellence.” We encourage the enactment and funding of this key legislation.

It would be beneficial for American energy production if the Committee would work with the White House and the Department of Energy to focus on new opportunities for energy workforce

development and training, and consider harnessing the power of community and technical colleges in energy workforce development.

Addressing the Challenge are Community Colleges, America's Partner

San Jacinto College takes seriously its mission to ensure student success, create seamless transitions and enrich the quality of life in the communities it serves. To do this, San Jacinto College, like most community colleges, serves as a hub of collaboration. The College collaborates with its students, with K-12 educators and students, four-year colleges and universities, business and industry, economic development groups, municipalities and non-profits.

Partnering with Students: First, the College collaborates with its own students. The philosophy of the San Jacinto College Board of Trustees and reaching throughout the organization is the concept that when students succeed, the College succeeds. For that reason, San Jacinto College has gone through transformational change in the last 10 years. Initiatives that focus employees on a strategic plan with student success as the focal point vary, from performance-based differentiated compensation for employees to faculty-led open educational resources to reduce the cost of textbooks. The College has initiated several student success best practices such as prohibiting students from registering for a class after it has started; mandating student orientation before the student can register; requiring a learning frameworks course so students understand the time commitment, accountability, and ownership they must possess to succeed; and even creating welcome week activities that showcase resources in tutoring, student groups and other assistance available to foster student success.

The San Jacinto College Board of Trustees charged faculty with solving the problem of escalating book costs. The College entered into a grant to implement Open Educational Resources (OER). The faculty labeled the initiative “Open Books” and the program is catching on. From spring 2017 to spring 2018, the number of Open Books courses increased from 185 courses to 307 or by 923 percent. The number of students taking those courses to save on the cost of textbooks increased from 768 students to 7,166 or 833 percent. In this same time period, students saved more than \$1.2 million in textbook costs.

San Jacinto College also entered into a grant to evaluate financial aid distribution. In this grant, the College offered multiple disbursements of financial aid, similar to how one might receive a paycheck. After payment of the tuition, fees and books, the remaining aid is disbursed in multiple payments, rather than one payment after the 12th class day. The results included less student debt at the end of the semester and higher retention in the following term. In addition, the College offers financial literacy seminars and coaching for students receiving loans. This resulted in a three-year reduction in student loan default rates from 17.3 percent to 9.1 percent.

Finally, to ensure students complete their educational goals, the College maps out pathways to complete a degree or certificate. Mapping includes removing courses that will not transfer to a four-year degree or fit into the needs of the region’s workforce. This allows alignment between what in Texas is called “Endorsement Tracks” at K-12 institutions, and with the main transfer universities for students. The College implemented this work into the computer systems (Banner is the ERP) and called it “My San Jac GPS” so students understand their academic pathway and have a guided pathway system to get them there. Through this student success focused

transformation, the College has seen an increase of 167.4 percent in the number of degrees and certificates awarded since 2007. San Jacinto College has issued 30,941 credentials in the last five years.

Partnering with K-12 Education: Part of San Jacinto College's mission is to begin science, technology, engineering, and math (STEM); and maritime and petrochemical education outreach early, by partnering with industry and education institutions.

For seven years, the San Jacinto College maritime program has hosted the Maritime Youth Expo, most recently at the College's Maritime Campus. This event invites K-12 students for a day of interactive displays featuring equipment used in the industry, such as trucks, forklifts, cranes, response trailers, small boats and diving equipment. Past sponsors have included the Houston Pilots, the U.S. Coast Guard Auxiliary, Harris County Precinct 2 and Port Houston. The 2017 Maritime Youth Expo saw more than 400 K-12 student visitors.

The College established a STEM Council to increase awareness of education and career opportunities related to the STEM fields. Each year the STEM Council partners with colleges and universities, local and national organizations, and K-12 schools to bring science, technology, engineering and mathematics (STEM) to more people. This also provides San Jacinto College students opportunities to apply what they've learned in the classroom.

Outreach STEM events have exposed more than 18,000 pre-college age students to the world of STEM by partnering with MindTrekks from Michigan Technological University for a two-day

STEM festival that brings experiments to local elementary schools and the community, and invites students to serve as judges for local school science fairs. The festival is sponsored by numerous industry partners including Dow Chemical Company, INEOS, Chevron Phillips, Austin Industries, LyondellBasell and PetrochemWorks. Dow has also donated \$10,000 for San Jacinto College to create STEM kits for area schools that lost classrooms due to Hurricane Harvey.

The College hosts STEM Expos at its Central, North and South Campuses for Communities in Schools' Afterschool Centers on Education participants in addition to hosting the Pasadena Independent School District's annual regional science fair each year.

Due to collaborative efforts, San Jacinto College students have been accepted to prestigious university internship programs for undergraduate research. These include the Research Experience for Undergraduates (REU) program at Rice University, the University of Iowa's Continuing Umbrella of Research Experiences (CURE) program, and NASA.

The College invites special guest STEM speakers from industry and universities each semester to provide internship information and insight on trending topics to students. San Jacinto College faculty and students serve a large role in bringing robotics and virtual reality activities to the community and participating in research with the University of Houston-Clear Lake and assisting with the FIRST Robotics Competition Championship in Houston. The College will soon introduce a drone training course through the its Aerospace Academy.

To introduce K-12 students to the petrochemical industry, San Jacinto Colleges hosts the Energy Venture camp each summer for kids ages 12-15. Approaching its 10th year, the camp is sponsored by Shell and has hosted 1,600 students to date, many of whom attend free of charge due to the Shell sponsorship. The College also hosts Energize Your Destiny, sponsored by Shell, for high school and college women and serves as a sponsor for the Women in Industry conference through the Community College Petrochemical Initiative.

Partnering with business and industry: San Jacinto College collaborates with business and industry partners to ensure students are receiving the exact training they need to move into these middle-skills jobs. The College has established programs in nearly every industry sector addressed by the Greater Houston Partnership “UpSkill Houston” initiative. However, below are three specific industry sectors that are driving the East Harris County workforce need.

Petrochemical –

San Jacinto College's upcoming Center for Petrochemical, Energy, and Technology (CPET) will lead the way in training for a more advanced workforce to meet the growing demands of the industry. From a 2011 research study conducted by the East Harris County Manufacturer’s Association, it was determined that the petrochemical industry in our region needs approximately 11,000 skilled workers.

San Jacinto College has served as the training leader for the petrochemical, energy and technology workforce in the greater Houston area for more than 50 years. The College is a training hub to the largest petrochemical manufacturing complex in the United States, and

second largest in the world, with 90 industries and 130 plants – all within a 10-mile radius from the College's Central Campus.

The College broke ground on the \$60 million Center for Petrochemical, Energy, and Technology in September 2017 with plans for completion in 2019. The College relies on industry partner feedback in many of its training programs, and invited leaders from the petrochemical industry, along with plant managers, to be a part of its Petrochemical Advisory Council. The Council is tasked with assessing the curriculum, equipment and planning for the Center. The technologically advanced Center will house skills labs in process technology, instrumentation and analyzer technology, and non-destructive testing and electrical technology; a craft training center; a control room; a process simulator lab; a glass pilot plant lab; an exterior glycol distillation unit; and corporate training and event space.

In October 2017, Jim Griffin joined San Jacinto College as associate vice chancellor / senior vice president for the petrochemical training division. In his new position, Griffin oversees the curriculum and instruction of the College's petrochemical-related training programs, as well as the development of the Center for Petrochemical, Energy, and Technology. It was important to industry partners to invite someone of Griffin's caliber and experience in plant leadership -- more than 30 years -- to lead the College's petrochemical training division.

Currently, more than 3,600 students train annually in multiple programs that support the petrochemical industry, including electrical technology, non-destructive training, instrumentation, analyzer technician, process technology and other craft trades. Each of the programs are experiencing increases in enrollment. The new facility will allow the College to expand capacity in these needed areas, create a "day in the life" environment so students

understand what the job entails, and will allow the College to focus on the continuing education of current workers in the craft trades. Each program will have a renewed focus on the safety culture, which is critical to the success of any industry. The facility will also expand laboratory capabilities to provide students with more hands-on training. Industry partners are requesting this so students will leave the program with a greater ability to problem solve.

As with the maritime program, industry partners are investing in the Center for Petrochemical, Energy, and Technology. In addition to working with the College on curriculum updates and career pathways, industry is also looking at what are called “externships,” where faculty members spend time at the plants to see new processes, new technology, and experience the same “day in the life” so that they may teach it to students. Already, several million dollars of donations – both monetary and in equipment -- have been given and pledged to the College. The equipment donations will ensure that students are training on the same equipment they will encounter when leaving the College with their degree. The monetary donations give naming opportunities in the Center to industry partners and further aligns the program with industry leaders.

The College has an apprenticeship partnership with Dow, in which Dow selects students for process operator and instrumentation apprenticeships. In the program’s first year, the students work about 10 hours per week in the plant while they attend classes at San Jacinto College full time. In the second year the work week is increased while class time decreases. At the end of the fourth year, students have completed an associate degree and have four years experience in their

skilled trade. The College will continue to seek these types of partnerships through internships or other apprenticeships.

Maritime –

The Port of Houston is a 25-mile-long complex of 150-plus private and public industrial terminals along the 52-mile-long Houston Ship Channel. Each year, more than 241 million tons of cargo move through the greater Port of Houston, carried by more than 8,200 vessels and 223,000 barges. The port is consistently ranked 1st in the United States in foreign waterborne tonnage; 1st in U.S. imports; 1st in U.S. export tonnage and 2nd in the U.S. in total tonnage. It is also the nation's leading breakbulk port, handling 41 percent of project cargo at Gulf Coast ports.

With this activity combined with a retiring workforce, San Jacinto College partnered with maritime businesses, starting with continuing education to offer U.S. Coast Guard-approved certified courses for mariners who were needing to maintain their maritime license or to train to move into the next level in their mariner pathway. In working with Port Houston and other maritime industry partners, the College was asked to develop a certificate and associate degree program. As vessels in the Port Houston region have become more advanced, businesses need a more skilled workforce that included training that emphasizes the soft skills of arriving to work on time, collaboration and team work, and consistently passing routine drug screenings. The College introduced the state of Texas's first associate degree in maritime transportation, housed in the 45,000-square foot Maritime Technology and Training Center that is prominently and strategically positioned on the Houston Ship Channel so as to best serve the mariners working in the industry.

The program currently offers more than 75 U.S. Coast Guard (USCG)-approved deck and engine courses ranging from entry-level training for new mariners, to management-level training for Unlimited Tonnage Master and Unlimited Horsepower Chief Engineers on the world's largest ships, and everything in between. The College has issued approximately 6,000 USCG certificates to professional mariners since the 2010-2011 academic year. The 60-credit hour associate degree program merges math, science and English classes with USCG-approved training allowing students to be more prepared for a maritime career. Currently, there are more than 70 students in the associate degree program which is in its fifth year of existence. To date, 38 students have graduated with an Associate of Applied Science in Maritime Transportation.

To ensure program success, the Houston Pilots donated a state-of-the-art full-mission bridge simulation system. The simulator houses a main vessel and also incorporates simulation of the bridge of a tug boat and a barge. The three simulators can interact as if they are working together on the waterways of our region. The simulation is realistic and has been used by the Houston Pilots and the Corps of Engineers to study the impacts of Hurricane Harvey along Port Houston. The College invested in an engine room simulator to satisfy new regulations that have been implemented for existing mariners. The engine room and bridge simulators are fully integrated to provide a realistic shipboard training experience.

The San Jacinto College Maritime Center is also equipped with a training pool, lifeboat, firefighting equipment and life rafts which are all used to reinforce learning by doing. All

students enrolled in the associate degree program are required to participate in at-sea internships working on commercial vessels to gain actual work experience in the maritime industry.

To further ensure success of the program, the College hired a consultant in RADM William Pickavance, Jr. (Ret. Navy). RADM Pickavance is a graduate of Texas A&M Galveston's Maritime Academy and had served as the Superintendent of the Academy. After getting the facility completed and partnerships in place, RADM Pickavance assisted with the hiring of John Stauffer (Ret. Army) who ran the Army's maritime program at Ft. Lee.

Health care –

The supply of nurses in Texas is low compared to national numbers, according to the Texas Department of State Health Services. Currently, more than 135,000 Texas nurses hold a Bachelor of Science in Nursing (BSN), accounting for about half of all licensed Registered Nurses (RN) in the state. Many of the nation's hospitals have moved – or are moving - to require that all nurse managers and nurse leaders hold baccalaureate or graduate degrees in nursing. They are also requiring that 80 percent of staff nurses hold a BSN. With the world's largest medical center in the heart of Houston, and expansion of hospitals on the southeast side of Houston where San Jacinto College is located, the need is evident.

In collaboration with hospital administrators in our region, the College listened to the needs being described and the focus of area hospitals to achieve the 80 percent threshold of all RNs holding a BSN.

San Jacinto College has a robust training program for many areas of health care and is known for its quality nursing program. To help meet this workforce need for the BSN, the College sought authorization from the Texas Legislature to offer bachelor degrees in nursing and applied technology. The authorization was created in Texas' 85th Legislative Session. Once the authorization was issued, this gave the College the go-ahead to start the application process and, if approved, seek accreditation from its regional accreditor to offer baccalaureate degree programs to address the workforce needs of the region.

The San Jacinto College Certified Nursing Assistant (CNA)-to-BSN pathway provides an entry level program that can lead to a Licensed Vocational Nurse (LVN) and RN progressing quickly through to the BSN program. Community college CNA-to-BSN pathways allow students to complete the core course work for the BSN at a lower cost, providing a more affordable option for meeting the BSN workforce need in Texas. It also allows students to earn a license and work while continually upgrading their licenses to stay current in the field. In many cases, the hospital will pay for the courses for the students.



Working with the Federal Government:

San Jacinto College is working with the federal government to provide workforce training through grants with federal agencies. Grants include:

- Department of Labor Ready to Work Grant. The H-1B Ready to Work Petrochem Grant program is designed to provide education, training, and job placement assistance in the occupations and industries for which employers are using H-1B visas to hire foreign

workers, and the related activities necessary to support such training. The program is intended to raise the technical skill levels of American workers so they can obtain or upgrade employment in high growth industries and occupations as well as help businesses reduce their use of skilled foreign professionals permitted to work in the U.S on a temporary basis under the H-1B visa program.

- Carl D. Perkins grant. The Department of Education Carl D. Perkins grant program supports awarded applicants in educating students who enroll in CTE (Career and Technical Education) courses and programs in preparation for high-skill, high-wage, or high-demand occupations.
- Department of Labor Trade Adjustment Assistance Community College and Career Training (TAACCCT) grant. The purpose of this Department of Labor grant is to use LINCS (Leveraging, Integrating, Networking and Coordinating Supplies) consortium to develop and deliver an innovative, latticed and laddered supply chain education and training program for entry and middle-level workers, enabling upward mobility from entry-level certifications all the way to the PhD with SCM specialization.
- National Science Foundation STEM Talent Expansion Program – Bridges to STEM grant. The purpose of the National Science Foundation (NSF) STEP (STEM Talent Expansion Program) project is to increase attainment of science, technology, engineering, and math (STEM) associate and baccalaureate degrees, as well as to facilitate and increase transfer of STEM students across institutions.

- Department of Education TRIO Upward Bound for Math and Science grant. The Upward Bound Math and Science program is designed to strengthen the math and science skills of participating students. The goal of the program is to help students recognize and develop their potential to excel in math and science and to encourage them to acquire postsecondary degrees in these areas, ultimately pursuing careers in the math and science profession. This grant is part of the federal TRIO programs that are federal outreach and student services programs designed to identify and provide services for individuals from disadvantaged backgrounds.

- Department of Education TRIO Upward Bound grant. The purpose of the Upward Bound program is to generate in program participants the skills and motivation necessary to complete a program of secondary education and to enter and succeed in a program of postsecondary education. This grant is part of the federal TRIO programs which are federal outreach and student services programs designed to identify and provide services for individuals from disadvantaged backgrounds.

- Department of Education TRIO Talent Search grant. The Talent Search program identifies and assists individuals from disadvantaged backgrounds who have the potential to succeed in higher education. The program provides academic, career and financial counseling to its participants, and encourages them to graduate from high school and continue on to complete their postsecondary education. This grant is part of the federal

TRIO programs, which are federal outreach and student services programs designed to identify and provide services for individuals from disadvantaged backgrounds.

To continue to meet the needs of East Harris County citizens, these grants are critical to provide the College with resources to meet the students in our area high schools. The majority of the school districts in the San Jacinto College District are minority majority, as is San Jacinto College. These programs provide access to a high-quality education, with industry support, and leads to the solution of the middle-skills gap in our region.

Another way in which San Jacinto College partners with the federal government is through the Department of Education Pell grant program. Roughly one-third of San Jacinto College students receive Pell grants to help pay for college expenses totaling just under \$30 million. Over the last five years, nearly 50,000 students have received PELL awards totaling more than \$155 million. San Jacinto College distributes financial aid like a paycheck and has seen significant decreases in its Return to Title IV requirement. In addition, financial counseling with students taking out loans has decreased the default rate from 16.8 percent to 9.1 percent. While the College is aware that there is still work to do, this is a definite step in the right direction.

In conclusion, San Jacinto College is working collaboratively in the Gulf Coast region to increase the number of students in workforce training and STEM education. Communities and businesses across the nation will benefit from continued partnership with the federal government through the funding of these important programs. These programs change the lives of constituents in the Gulf Coast region. They also benefit the diversity of workforce needs in every

region in the country where community colleges are working as hard as San Jacinto College to meet the needs of the communities they serve.

Energy Subcommittee Hearing: State of the Nation's Energy Infrastructure, Feb. 27, 2018
Summary of Testimony by Dr. Brenda Hellyer, Chancellor, San Jacinto College

Throughout the Gulf Coast region, there are a number of economic development agencies, schools, businesses and municipalities working together to address a critical skills gap. Houston's skills gap has reached unprecedented proportions among middle-skill jobs – those that require more education and training than a high school diploma, but less than a bachelor's degree. Of Houston's 3.6 million jobs, 1.4 million – or approximately 40 percent – are considered middle-skill positions.

America's community colleges are uniquely positioned to address these needs due to the nature of our shared mission. San Jacinto College, specifically, is located in an area of the country where energy and commerce are a part of the fabric of the local community. Situated near the heart of the petrochemical complex along the Houston Ship Channel, Port Houston; which serves as the transportation partner for energy production, and the NASA-Johnson Space Center, San Jacinto College is able to work collaboratively with industry in truly exceptional ways. Whether supporting NASA's efforts to help K-12 students understand the importance of science, technology, engineering, and math, commonly known as "STEM;" or engaging industry partners in the creation of curriculum, the College is making every effort to support its communities through active listening, collaboration and partnership.

However, this workforce gap cannot be addressed by one institution alone. Closing the gap will require that multiple entities begin working together to understand the needs and ensure that applicable, highly-sought after skills are being taught to students. Through these partnerships, we can create a talent pipeline to enable graduates to move into rewarding careers, and also provide industry with a knowledgeable workforce.

The attached testimony defines the region, the opportunities, and the challenges of addressing the skills gap. It also shows how San Jacinto College is bringing partners to the table to help address specific workforce needs, and to encourage the younger generations to become interested in and excited about STEM. The College is also working with colleagues throughout the nation to address workforce needs by region and to find ways to collaborate with the Federal Government to help meet those needs.

San Jacinto College believes it would be beneficial for the American energy industry to have the Committee on Energy and Commerce would work with the White House and the Departments of Energy, Labor, and Education to focus on new opportunities for energy workforce development, and consider harnessing the power of the nation's community and technical colleges. San Jacinto College, and other two-year public colleges, would support the development of legislation authorizing investments in community and technical college energy workforce training "centers of excellence."

Mr. UPTON. Thank you all for your testimony. At this point, we'll move to questions from our subcommittee.

Mr. Devine, I appreciate you being here for sure and from my perspective I want you to keep your job. I believe in an all-of-the-above strategy.

Renewables are a big part of that. In Michigan, we've got a minimum mandate. Hydro is part of that. Not as much in Michigan as it is particularly in the Northwest, but as you may know, we have passed with a number of Democrats a hydropower licensing bill that moved through this committee and has passed in the House now and is waiting for action in the Senate.

You talked about a number of hydropower facilities that are more than 50 years old. We need to add capacity. This is a renewable piece that most Americans would like but with, obviously, no carbon emissions, basically, from that source of power. If our legislation became law, went to the President's desk, how would this help the hydropower industry in terms of dollars invested in kilowatts generated?

Mr. DEVINE. Well, Chairman Upton, I think that improving the timelines involved in the licensing process will reduce some of the perception of the risk in the process.

Risk is anathema to investment. So I think that aligns very well with increasing investment in hydropower. There are many opportunities for upgrades and improvements and increasing energy at existing hydropower facilities and at non-power dams, and I think it's viewed as from these have to be financed and the financing is susceptible to risk and reward effects. So the proposals that increase the efficiency of the process and will help in terms of improving the overall investment opportunity.

Mr. UPTON. So I am one who believes that there ought to be an energy title within the infrastructure bill that, hopefully, moves through the Congress this year.

Dr. Hellyer, as you know, the President had many of the Nation's governors here for the last couple days. A whole number of different issues were discussed. One of them was infrastructure.

I had the opportunity last night to have dinner with my Michigan governor, Rick Snyder. He told me, he said, "You know, if there's one thing you can really do to help create jobs and move on infrastructure is to expand Pell to make sure that it's involved in community colleges and job training."

In my district, we've got two nuclear plants. We've got a new LNG plant that they're almost ready to break ground on, which will, as I am told, double the tax base for that particular community. It's a couple years away from being complete but they're ready to break ground, I believe, this spring.

As I meet with my IBEW folks, they have a very active group in Michiana, as we say—Indiana and Michigan. I've been to a number of their events over the years and they are very proud, rightly so, of the work that they do creating the jobs, the internships.

I am fascinated with what's happened in Houston and the leading role that you play because I do believe that that skills gap and worker training out of be part, again, perhaps, of an infrastructure bill creating the jobs that we want, knowing that we are going to improve the infrastructure across the country.

How do you both see perhaps an expanded role as it relates to worker training, working through our community colleges which, again, in my view, is so important?

Maybe Mr. Ross, start with you and come back to Dr. Hellyer.

Mr. ROSS. We are always looking for skilled craftsmen or top-rated individuals that come out of the community colleges because we love getting those individuals directly out of the community college because that makes our job easier—transition them right into our apprenticeship program. At least for linemen it's a 3-year program—our inside program for a journeyman wireman like myself is a 5-year program. So any advanced training they get it gives them a leg up on someone trying to apply for our program and get in our program.

So we work directly with community colleges. I know where I am from, from West Virginia, we work directly with our community colleges there to get those individuals. I would go out and visit those community colleges, encourage them to take an application for our program. I know throughout the country IBEW always works with the community colleges.

Mr. UPTON. And Dr. Hellyer, I would just say we've got a lot of really great community colleges in my district.

One of them is Kalamazoo Valley—KVCC. They actually have a wind turbine school training folks and they have jobs right away as they graduate.

Ms. HELLYER. So there are a couple of things I think could be done. Right now, the Higher Education Reauthorization Act is being looked at.

There are some talks about making it where Pell can be used for short-term programs. For us, that could be very helpful, especially with programs like commercial truck driving that don't qualify right now.

As far as working with IBEW, apprenticeship, programs, we do that quite often. I was in Austin yesterday for a meeting around a new program in trying to take high school students and move them into apprenticeship and going into licensing for plumbing, electrical, and one of the comments came up how do they use their Pell dollars for that.

So I think there needs to be some more flexibility built into the program and because some of these programs are going to take longer than what you have Pell dollars available and so how do you leverage that.

So you need short-term but then you also need some of the long term where students are going out and working and then coming back.

Mr. UPTON. I know Virginia Foxx would like me to say that that looks like additional jurisdiction for this committee.

With that, I yield to the ranking member of the subcommittee, Mr. Rush.

Mr. RUSH. I want to thank you, Mr. Chairman.

Mr. Ross, I really want to commend the IBEW Local 134 in my city and my state. They're doing a remarkable job rebuilding the—in terms of a grammar school—a closed grammar school and they're turning that into a union hall—really, really nice—right next to another of our vocational high schools. And so they're in the

forefront of really taking CTE students and giving them skills and training and I really want to commend your union for that. They're wonderful people.

Dr. Hellyer, the city of Houston has a number of comprehensive workforce development strategies that includes training and in K to 12 levels, community college levels, university, and vocational educational levels. This decision allows candidates to be trained and developed throughout all stages of the educational spectrum.

My workforce development bill attempts to run this model to a national level and is aimed at training minorities, women, veterans, and unemployed energy workers for good-paying jobs and careers.

First of all, I want to commend you on your leadership in San Jacinto College and I hope that you will work with my office to help make my bill a reality as part of a broader infrastructure package. I think that you have shown tremendous insight into the needs of our nation by what you're doing at San Jacinto and I also want to commend you. I think that your leadership is surely and truly inspirational, notwithstanding the comments of my friend Chairman Upton's subcommittee.

Mayor McCarthy, you are on the forefront on trying to reconcile the needs and priorities of your constituents with the budgetary restraints so many of our states and cities are facing. What are your thoughts on the administration's proposal asking states and local municipalities to cover 80 percent of new funding for infrastructure projects?

Is this realistic, in your view? Are you concerned with the Federal Government's attempt to shirk its responsibility of investing in a serious and meaningful way in our nation's aging energy infrastructure?

Mr. MCCARTHY. Thank you, sir.

I approach it that the 80/20 funding formula that's proposed is really oversimplistic. There are, again, many components that could be financed within the revenue streams that exist today. But some of the emerging technologies are new. You have to do the proof of concept. They're going to happen. They're happening in other countries. You're seeing things in South Korea. You're seeing things in the Mideast where they're developing and deploying technologies faster than we are doing here in the United States.

And so how do you build that resiliency into the grid and at the same time create a platform that really positions not only our communities but the country as a whole to take advantage of it and go forward so that you're creating jobs, you're creating economic opportunities, and you're improving just the quality of life and, hopefully, in your deliberations that you will look at those formulas and create the regulatory environment that allows things that are self-financing to go forward but at the same time look at those things that are new and emerging that we need assistance and are going to need some subsidy or large amount of financing from the federal government to ensure that they're developed, deployed, and continue to allow this country to lead in a global environment.

Mr. RUSH. My second question to you, Mayor, is the administration—under this administration the agencies that had been previously preparing plans to increase resilience to climatic events for

access under their purview are now forbidden from even uttering the phrase “climate change,” much less preparing for its consequences and its symptoms.

Do you see the need for significant federal investment in local energy assurance plans to advance resiliency efforts including proposals to combat climatic events? Do you—

Mr. MCCARTHY. I am sorry. Directed to me again?

Mr. RUSH. Yes, sir.

Mr. MCCARTHY. Climate change is happening. There’s debate in terms of what’s causing that but it’s happening. And so we have to take that into account in terms of public policy and how do you look to reduce greenhouse gases.

Most of the scenarios that are out there also allow for cost savings, improved efficiencies, and job creation when you do the reduction in greenhouse gases so that you’re improving the environment at the same time creating opportunities for some of these emerging technologies and emerging skill sets where we have to have a work force—and some of the other panelists have talked about—that are able to provide these skill sets that we need for services that people demand.

Mr. RUSH. I yield back, Mr. Chairman.

Mr. OLSON [presiding]. The gentleman’s time has expired. The chair now calls upon the chairman of the full committee from the Beaver State, Mr. Walden, for 5 minutes.

Mr. WALDEN. I thank the gentleman. As an Oregon Duck, I don’t always refer to it as the Beaver State, although that is our mascot. [Laughter.]

So, Mr. Ross, thank you for being here. To all of our panelists, again, thank you for your testimony on this very important set of issues.

I know I’ve worked closely with IBEW out in Oregon—Local 48 and 659, I think—and toured the apprentice operation there. It’s very impressive. Where’s the gap? What do we need to be doing? I know we don’t directly have that jurisdiction but this is important because we can help streamline projects without diminishing the environmental piece of this.

We can do a lot of work here to get pipelines and power lines and broadband going. But if we don’t have the skilled workforce necessary to do the work, we got a problem.

So can you talk about your apprenticeship programs and where you’re at and what we need to be thinking about?

Mr. ROSS. Well, we need a lot more, quite frankly. We are doing our level best to try to attract individuals into our programs. For our outside program we have approximately 4,600 registered apprentices for the line side and around 32,000 for our inside program and we certainly could use a lot more. But what you run into, we are unique in construction and for most people it is familiar—we work ourselves out of a job. So we are always looking for the next one.

So good steady work forecasts certainly helps our apprenticeship programs, certainly attract individuals into our programs but also keeps them working. So it’s hard for a local union to accept a bunch of apprentices if they don’t have a place for them to work.

Mr. WALDEN. Right. Right.

Mr. ROSS. So that's our dilemma. It's kind of a catch-22. So we are always looking at the next job, and we certainly went through a major recession in 2007 and '08.

Mr. WALDEN. Yes, sir.

Mr. ROSS. We would call it depression for our industry.

Mr. WALDEN. I would, too.

Mr. ROSS. We had tremendous unemployment. Most of the locals weren't taking apprentices in because they couldn't keep them working.

So we are trying to get caught up because we are in an economic boom for construction right. We are having some skills shortage. That's why we are working with community colleges and different groups trying to get those individuals help.

Mr. WALDEN. Yes. I know in the town of my birth, The Dalles, there's Columbia Gorge Community College, actually, in both Hood River and The Dalles and they started a wind energy program a long time ago, teaching safety and some of the electrical skills as well.

I would like to touch on too when I did a series of town halls last spring we got some development underway or proposed in Oregon and some who tried to block this sort of development ridicule these jobs as temporary jobs. I heard it a lot at the meeting, and it kind of perplexed me because while my wife and I have never constructed our own house, I think if we ever did when the carpenters were done I wouldn't want them to move into one of the bedrooms. I would want them to move on to the next house. But this is an argument and it's an argument on the left, and I heard it a lot. Can you speak to those temporary jobs and are they not worthy? That's a rhetorical question.

Mr. ROSS. It is rhetorical, yes. Like I said, we are always looking for the next project no matter how short. I am an electrician by trade, OK. I just happen to be working in Washington, D.C. now. But I've taken projects that were only supposed to last 3 weeks and be there 2 1/2 years.

So I think it's a pretty sad state of affairs, because all our jobs are temporary in construction. Quite frankly, if you didn't work yourself out of a job you wouldn't get the next job—

Mr. WALDEN. That's right.

Mr. ROSS. Because the idea is to get the job done on time and on budget. So—

Mr. WALDEN. As you know, we are spending a lot of time here trying to streamline the permitting process. Again, we get criticized that somehow we are diminishing the environmental nature of it. But that's not what we are up to.

I have a tiny little community in central Oregon that I think spent years trying to get four power poles on Bureau of Land Management land to go through the permitting process, and I know others say, "Oh, it never slows you down." It does.

Half of my district—more than that—is federal land. So we encounter this everywhere we go, and it took them 3 or 4 years to get these four power poles sited so that they could get three-phase power into Mitchell, Oregon for the first time.

Do you run into—these permitting delays?

Mr. ROSS. Well, I kind of addressed that in my testimony. But yes, we will run into those issues all the time. Unfortunately, some of these projects would put a lot of people to work. Most of them have been through the siting permitting process and are just sitting there basically to get done but being held up through someone on the other side doesn't want, I get where people don't want a power line in their back yard. I get that.

Mr. WALDEN. Sure.

Mr. ROSS. But in some cases—

Mr. WALDEN. They do want the power to come on when the switch is thrown, though.

Mr. ROSS. Exactly. When people's lights go out they want their power back on. They don't really care what they look like.

Mr. WALDEN. Well, I thank you and I thank all our witnesses for your input.

And Mr. Chairman, I yield back.

Mr. OLSON. Gentleman's time has expired.

The chair now calls upon the gentleman from the thirteenth largest city in California—Stockton, California—Mr. McNerney, 5 minutes, sir.

Mr. MCNERNEY. Well, thank you for that little statistic, Mr. Chairman, and I thank the panel for coming and testifying this morning.

The U.S. clearly needs to modernize our electrical infrastructure. The technology exists today to do that. We can make our grid resilient and responsive. We can meet consumer demands that are changing by the day. We can meet the demands of intermittent resources, physical and cyber-attacks, and the changing weather patterns that are brought on by climate change that have brought down the grid in Puerto Rico, in Texas, in New York, New Jersey, and in California.

So we have the capabilities to do that and, fortunately, my good friend, Bob Latta, and I have formed a Grid Innovation Caucus to make people aware of what's available and the need to move forward on that. So I just wanted to make that clear.

Mr. Devine, I worked on the Hydropower Modernization Act and one of the things that struck me was definitely how long it took to get permits, how expensive it was to get permits.

Could you say a little bit about how much hydropower we could expect if that was improved?

Mr. DEVINE. I would hate to guess in terms of the total amount of capacity involved but it's thousands of megawatts. It's very significant.

As I mentioned to Chairman Upton, the view of the risk in the amount of time it takes to improve even somewhat straightforward projects is very difficult for investors to accept. So I think there is a considerable amount of available upgrade potential and power to be added to existing dams that have no power and I think it's in the thousands of megawatts.

I am working on a project right now where we have an upgrade potential of something on the order, of an existing station, something on the order of 20 or 30 megawatts. Now, that may not seem large but that's just one station in location. That's a significant amount. We are now in our seventh or eighth year of licensing. It's

not the only issue, of course, but the licensing process can hold up these upgrades and these improvements for a considerable amount of time.

It's very difficult for the investors to wait that long in order to realize a return on that.

Mr. MCNERNEY. Thank you.

Mr. ROSS, you mentioned private activity bonds. Could you expand on that a little bit? I've done some legislative work on that. How important would that be in terms of municipal bonds and other tools?

Mr. ROSS. I am going to have to take a pass on that one and get our political department or someone get you an answer to that, OK?

Mr. MCNERNEY. Dr. Chen, you mentioned pretty pointedly that we would require regions to coordinate transmission planning. Could you go into that a little bit? How would that work? How would that speed up our process? How would it make it more easy to put in transmission?

Ms. CHEN. All right. So there are two parts to that and I appreciate that question.

So first, in the transmission planning process, the different ISOs and RTOs plan separately and they're required to coordinate by FERC for interregional projects. But, unfortunately, that's not really producing any projects. So what we really need to see is a full joint interregional planning process. FERC can use its existing authority to extend order number 1000 to require this and Congress could write letters to FERC, hold a hearing for FERC to ask how they can move forward in that process.

Separately, in terms of siting, especially some of these long lines, coordinating between state and federal processes as well as locals and other stakeholders—landowners—would be greatly helpful. We've seen great success and, for example, in the Department of Energy and Department of Interior working together with the State of California to site 9 megawatts of solar in just 9 months by coordinating together, doing as much of the environmental review concurrently and jointly, and that sped things up a lot.

There is a great example about a Midwestern project, CapX2020, that I can go into further. But a University of Minnesota report highlighted a lot of successes that arose out of the coordination there as well.

Mr. MCNERNEY. Very briefly, does anyone have anything to say about ARPA-E? Would the elimination of ARPA-E, is that going to set us back in terms of our electrical infrastructure development? Anybody on the panel.

Mr. DEVINE. In terms of the, Congressman McNerney, the renewable portfolio standards that you're referring to?

Mr. MCNERNEY. No, ARPA—that's the advanced renewable energy or advanced energy research based on DARPA.

Ms. CHEN. Very briefly, I think that would set us back.

Mr. OLSON. The gentleman's time has expired. The chair now calls upon the gentleman who was the former chairman of the full committee, the current vice chairman of the full committee and a proud Texas Aggie, Mr. Barton.

Mr. BARTON. Well, we thank you, Mr. Chairman. Thank you for that introduction.

This is a difficult hearing for me to get my arms around because we are trying to put a government spin, apparently, on private sector investment in infrastructure.

I do believe there's a legitimate public interest certainly in the permitting and licensing part of these big infrastructure projects. We certainly need to protect our environment.

And I think you could argue that if you look at public sector infrastructure—highways, bridges, ports—compare it to private sector infrastructure—pipelines, refineries, transmission lines—the private sector has done a better job.

We seem to be more up to date in our private sector infrastructure than our public sector infrastructure. So, I think while it's important to look at permitting reforms and things like that, if it's not broke don't fix it.

I guess one question I have to the mayor of Schenectady—it's always good to have local officials here—you're closer to the problems.

There's been an ongoing problem for decades in the Midwest and the Northeast. When you need power, electricity, natural gas it's hard to get the permits for the transmission lines or the pipelines to get that power or that product to your part of the country.

Do you have the solution on how to balance the legitimate needs of the state and local government against the public good and interstate commerce of getting the product from point A to point B if it cross state lines?

Mr. MCCARTHY. I don't, Congressman.

Mr. BARTON. That's an honest answer.

[Laughter.]

Mr. MCCARTHY. Even though I think the opportunity is out there, as you see some of the emerging technologies where you had centralized points of generation and the distribution network was, clearly, in one direction that is changing.

So where you have solar and wind that are being added to it that can provide supplemental points of generation and the ability to balance the load so that you don't get the peak demand anymore, those will take some of the pressure off the need to have the central points of generation at the same time will hopefully be able to allow it to be done in a cost-effective manner for the consumers who will take advantage of some of the newer concepts and products that are out there.

Mr. BARTON. That's actually a very good answer. If you eliminate the need to cross the state line, you have solved the problem and so more of these alternative energy projects that are on site. Those eliminate that need. But I think you're still going to need to somehow figure out a way to move natural gas or oil from Texas to New York or Chicago. There are going to be occasions where you still need to cross state lines. But your solution is—

Mr. MCCARTHY. And I agree with that. I don't have a solution, though, for the regulatory environment or the ability to make sure that adequate capacity is there.

Mr. BARTON. This last question is a little bit off subject but it is infrastructure related and that's who should be the lead and who

should pay to protect our infrastructure, our power plants and things like that against cyber-attacks? So OK, Mr. Slocum, just—

Mr. SLOCUM. Yes. We own quite a bit of that infrastructure and we certainly do a lot to protect especially our most critical facilities and our critical systems that we use to operate the bulk electric system from cyber-attacks. So we cover those costs and ultimately those go to our ratepayers today. But I do think there is a need for a discussion about at what point does that stop for private industry and what point does the government help to do that in areas where we are getting into even acts of war and things of that nature.

So I have a concern that private industry not have to be burdened with those costs. But we are certainly ready to work together with government to meet those needs and make sure their infrastructure is protected.

Mr. BARTON. I see my time has expired.

Final question—are you any kin to the former football coach who's my great friend, R.C. Slocum of Texas A&M?

Mr. SLOCUM. I can't say that I am but it's not the first Slocum I've been asked if I am related to. So thanks.

Mr. BARTON. OK. Thank you, Mr. Chairman.

Mr. OLSON. Gentleman's time has expired.

The chair now calls upon a friend who rooted against the L.A. Dodgers in the World Series and for our Houston Astros, Mr. Peters, for 5 minutes.

Mr. PETERS. Thank you. I always enjoy hearing what my introduction is going to be, Mr. Chairman. So thank you very much. Thanks for being here. I want to ask Dr. Chen a couple questions.

Dr. Chen, I have to say I read your testimony and we hear all the time from businesses and investors that regulatory system can cause uncertainty and the length of delay can cause projects not to get built or be more expensive or result in investors not wanting to take these risks. The citations in your testimony to the Department of Energy's own statistics, the Center for American Progress, I understand that people argue that it isn't a problem. But we hear from people who are actually doing the investing that it is a problem and I just don't think that we do ourselves any favors on this side of the aisle by not thinking about what we could do to improve the process to achieve high standards and yet do it more quickly in a way that's more certain for people.

What happens, I think, when we don't do that is that we get the kinds of things that President Trump has proposed, which is an evisceration of the regulatory system that doesn't get us high standards.

So I wanted to just ask you about a couple things that Mr. Slocum suggested which seem, to me, reasonable and see if you have an issue with them.

Could Congress require concurrent NEPA analysis and environmental reviews by all permitting agencies? Is there an issue you have with that?

Ms. CHEN. No. So, certainly, there are a lot of provisions in place that enable a joint review so—

Mr. PETERS. Could it be required?

Ms. CHEN. It could be. I haven't—

Mr. PETERS. OK. How about requiring concurrent NEPA analysis—well, that's the same thing—requiring cooperating agencies to use the information already contained in the lead agency's NEPA document as the basis for their permit-related reviews?

Ms. CHEN. I think it's something to consider. I think there are a lot of efficiencies that can be explored. But our main issue is eliminating or curtailing environmental protections.

Mr. PETERS. I understand, too, and I think that's not where I want to get to. The other thing is whether we should set a deadline, and I got to tell you I was shocked when I got on this committee and heard that hydropower which is, basically, clean base load energy—takes 10 years to get a permit for.

And the thing that we learned is something you suggested, too, in your references to success stories. In the success stories you have these people who are remarkably talented and well-motivated to work together and they get it done in 9 months. That's a really ad hoc kind of cross-your-fingers approach to permitting, I think, because you might not get people who are so willing to work together. You might get opponents who are more vociferous.

And for me, it would be much more comfortable if we could find a way to get these decisions made in the right way, in a way that protects the environment but also gives an answer. I've always said no is the second best answer. Let people know. And I was just actually looking at Twitter because there is some downtime in these hearings, believe it or not, and NRDC is opposing a pipeline very vociferously right now on Twitter, and that's fine. But I just don't think there's any excuse for not getting this done in a quicker way. And so I would like to work with you.

By the way, you went to the finest law school in the United States of America. I would like to work with you, as a former alum of the same school, to see if we can't come up with better responses to the concern that we are hearing from the economy that this permitting process is in the way. It's too inefficient. I think we can do it in a way that's useful.

Mr. Devine, I wanted to ask you, just in case we haven't covered it, you said in your testimony that you didn't think that Congress was at fault for the length of time it takes to do hydropower.

So you tell me if there's anything Congress should do to address the situation out there.

Mr. DEVINE. Yes. Thank you, Congressman Peters.

I think there is, definitely. Let me do it by example, possibly. So I think what FERC tried to do with the integrated licensing process was try to bring some order and some efficiency to that process. It was a collaborative rulemaking process, which meant that all of the agencies and all conservation groups and the industry was involved in coming up with that process. And yes, it's still a long process but it's very structured and you go through the process and FERC, I think, has brought some efficiency in their effort to bring to the federal hydropower licensing process.

The difficulty that we have in the process is you get to a certain point and there are other federal and state licensing processes that then interact with that process and they don't have any sort of schedule particularly and I think the courts have actually said—I am not an attorney—that FERC is not in a position to force those

agencies to meet any particular deadlines. So that means there is no deadline.

Mr. PETERS. So we should look at action-forcing, perhaps?

Mr. DEVINE. Yes, I think so.

Mr. PETERS. All right. Thank you. My time has expired. I really to appreciate all the witnesses being here.

I yield back.

Mr. OLSON. Gentleman yields back.

The chair now calls upon himself for 5 minutes.

My first question is for you, Dr. Hellyer, and again, it's so great to have you here this afternoon. You are the best of the best.

As we both know, incredibly, I think kids these days still think they have to get a 4-year Bachelor's degree to be successful in America. But as San Jac shows, there are incredible opportunities and jobs related to American energy and infrastructure for kids without a B.A.

Can you please tell me a little about what draws your students to your programs and how you're actively in the community to raise the profile of energy industry courses?

Ms. HELLYER. Excuse me. I think it comes down to our relationship across all the sectors—with our K through 12 partners, with our university partners, but mostly with our industry partners—and we tackle that together.

As I mentioned, we bring 6,000 sixth graders onto campus. That is based on hands-on experiments so that they can be working with industry partners at the table, seeing what happens in our petrochem facility, seeing what's happening in the maritime industry. Then we also reconnect with them again as they're going through eighth grade and we give those teachers experiments so they can refresh that in the classes. And in ninth grade, there is the speakers' bureau where we are going out into the high schools with, again, industry partners talking about the jobs.

We had had many years where we weren't really focusing on the jobs in our region, and when you can become a process operator making \$100,000 a year with an Associate degree, you start to look at that differently when you can be a welder and making \$75,000 a year.

And so we are really putting that marketing campaign together but that marketing campaign is for students, it's for parents, and it's also for teachers and counselors in our high schools because they don't necessarily understand all the pieces of our region. But then having industry really engaged in our programs, having internships, having apprenticeships where they can get hands-on training and then being involved in that interview process. So it's across the board partnerships.

Mr. OLSON. I would just ask you to brag. Can you talk about how you work with employers and local high schools to help students transition into industry?

We've heard some confirm this—one day in May every year some young men and women walks across the stage, gets his high school diploma, spins around, puts on a different cap and gown and walks by and gets an AA from San Jacinto.

Please explain that success you had with merging the education sector with your work there at San Jacinto College.

Ms. HELLYER. So we have eight early college high schools and these are early college high schools designed for high school students to be earning an Associate degree at the same time as they're getting their high school diploma.

So they will actually earn an Associate degree 2 weeks before they graduate from high school, and it's a great program. It's an intense program and people say, "Well, how are those kids ready?" It's because of the screening process. It's because of support systems. And where do those go to? I can tell you I've had students going to Princeton, UT, Penn State—just all across the country they're going to the top colleges after they graduate from us. But we also have a similar program for career and technical education. So, again, they're getting their career and technical process tech degree or a welding degree so they can go into the workforce right away.

So at our graduation the youngest graduate can be 17 earning an Associate degree and in December the oldest was 72. So we serve everybody.

Mr. OLSON. That includes my alma mater Rice, Mr. Flores' alma mater Texas A&M, along those litany of UT and other schools?

Ms. HELLYER. Yes. Our top five transfer universities, A&M and UT, are right there, and then all the University of Houston universities.

Mr. OLSON. Thank you.

One question for you, Mr. Slocum. We know that building a new transmission line, especially longer ones across the state lines or electricity markets is remarkably complex. You said a decade, in some cases, in your opening statement.

What is the largest driver for these delays? Is there anything Congress can do to make this move faster?

Mr. SLOCUM. Yes. I would say the largest delays that we have—we have an example of a project between Iowa and Wisconsin that we got approval for I believe back in 2011, if I have my date correct, and we don't expect to complete that project until 2023.

So we plan the project and we stand ready to build the project. But it's getting that permitting process done in the middle. And so I agree with a lot of what's been said today, that there are ways that we can more efficiently move through that process such that we can get to the point where we are building the lines, building the projects and those benefits are flowing to consumers rather than waiting and going through a serial permitting process.

Mr. OLSON. Thank you.

One final question for you, Dr. Hellyer. My dear colleague, Mr. Green, in his opening statement mentioned I've not talked about the Houston Astros, and that's true. I didn't do that because I knew you could talk about the Houston Astros for me.

[Laughter.]

They went to the World Series in 2005 for the first time in the Astros' history. Two star players were on that team—Hall of Famers—Roger Clemens, Andy Pettitte.

Where did they start playing there all beyond high school? What school was that?

Ms. HELLYER. San Jacinto College.

[Laughter.]

Mr. OLSON. Thank you. I yield back and yield to the gentleman from Texas, Mr. Green, for 5 minutes.

Mr. GREEN. Thank you, Mr. Chairman, and I thank you for allowing me to testify or to ask questions, rather.

I was shocked because one of the successes of San Jacinto College, Andy Pettitte—a great baseball player but he comes back every year and has a great golf tournament that supports San Jacinto College. And I am not a very good golfer. I haven't had a chance to play but I will at least go to the reception.

So thank you, and thank all our witnesses for being here. I have a very urban district in Houston and one of the campuses of San Jacinto College is there and I have students from our district who go to the other two campuses. And I just want to thank Dr. Hellyer and the leadership both of the board of trustees but over the years at San Jacinto College because I was a state senator before I got to Congress I saw San Jacinto College doing some of the things that are so important today.

Dr. Hellyer, can you elaborate on the partnership with local industry—the college heads and the Center for Petroleum Energy and Technology?

I am interested in sharing more about how the industry guidance towards the curriculum is getting students ready for those real jobs today and not just generalized certificates, because I've been there and seen that partnership between the industry—the people who hire our constituents and the college.

Ms. HELLYER. So one of the things with industry we have 90 petrochemical plants right there around us and it really is how do you partner. And so I make it very clear I want the good, bad, and the ugly around our programs and we are going to fix the bad and the ugly, and that's what the conversations are.

And so, for example, our electrical program, as we've dug into that, it was too focused on residential. We have redesigned it where it has a commercial and industrial phase. Industry has come to the table and gotten us almost \$2 million in donations so that we can really have the program that they need. We have built in the kind of testing they want, the kind of components they feel are so critical, the safety components, and we are just constantly revising our programs.

One of the things that we needed to do was hire somebody from industry to run the program and so we have hired a man named Jim Griffin who has been a plant manager or in the industry for about 30 years and he's retired to work with us. He has the respect of industry and he is working with us on how we continue to develop and develop our faculty around that. It's the same approach we took with our maritime programs.

But it really is creating the environment where you're having the conversations and then you're responding and you're bringing the resources to the table as partners.

Mr. GREEN. I want to ask a question of Mr. Ross.

Mr. Ross, when I was going to college I didn't play football well enough to get a scholarship so I did my apprenticeship as a printer while I was going to school.

Can the IBEW or other trades partner with programs like San Jacinto College? How hard is it to get college credit, for example,

for what may be the standard apprentice program for IBEW or plumbers or pipefitters or anything like that?

Mr. ROSS. Well, as I stated earlier we certainly work with community colleges in an attempt to try to steal their graduates and to get them into our program, definitely. Second, our 5-year inside apprenticeship program we work with community colleges for those individuals once they complete our program to get an Associate's degree. So once they graduate they work with the community colleges to get their Associate's degree. So they—our program is accredited for—toward an Associate's degree. So that's what we do.

Mr. GREEN. And I think that's important because most folks getting out of high school want to earn a living and they may not be able to afford a college and go to college and they also may not want to take out loans so they could actually both get a job and do an apprenticeship. And I always remember my third year in my apprenticeship I actually started making decent money and I was able to get a business degree. And, so that's why I would like to see if we could structure that with our trades and also our community colleges. That's really important in my area in Houston and San Jac is part of it.

And I know you're getting competition from some of our other community colleges. I am trying to get them to realize that trades skills are really important and, frankly, I remember when I was graduating from college I had an offer of \$600 a month—1971 dollars, by the way—and I explained to those companies that offered me that—I said, "Well, I am making \$850 now and so I think I will stay in Houston and help manage this printing business."

So that can be done but mine was just lucky. I would like to see it structuralized so whether they be in our district or anywhere else they can get that training and if they want to go on and get an electrical engineer's degree, that's great. But they can at least support their families.

So Mr. Chairman, I want to thank you and you and I both are Astros fans and I know we'll be at the White House next week.

Mr. OLSON. Yes, we will. Gentleman yields back.

The chair now calls upon the gentleman from the Commonwealth of Virginia, Mr. Griffith, for 5 minutes.

Mr. GRIFFITH. Thank you very much, Mr. Chairman, and since you always like to talk about sports I would be remiss, coming from the Commonwealth of Virginia, if I didn't mention the number-one basketball team in the country is UVA. But we are particularly proud in my district of the fact that our Virginia Tech Hokies beat the number-one team a couple week back and last night dispatched with the number five Duke team. So we are very proud of that.

The district is one that has a lot of assets. We are a coal mining district. We have natural gas. Last week, I attended a meeting with a solar company in district. But, Mr. Devine, we also have a lot of water and hydropower is an essential component of an all-of-the-above strategy, which I have always supported, and I believe should be included in any infrastructure package that passes through this committee.

I had a bill earlier or last fall—earlier in the session—H.R. 2880, which streamlines the licensing process for the construction of closed-loop pump storage hydropower projects. I see those as giant

batteries that are very energy efficient. I enjoyed reading your testimony where it talks about how hydro is the number-one “clean energy source in the country,” and I was wondering if you could explain to folks exactly how closed-loop pump storage hydro projects provide to our grid.

Mr. DEVINE. Thank you. Be a pleasure to do so.

So one of the aspects about pump storage is that it does help to bring in other renewable energy sources. It helps to regulate the grid in being able to incorporate those other renewable energy sources. The closed-loop part of pump—basically, what pump storage is is that during periods—historically, during periods of high demand an upper reservoir would throw water down to the lower reservoir and generate electricity in doing that. And then during periods of lower demand, base load stations like nuclear or coal would use energy to pump that water back up to use it at a more peak time.

I think the role of pump storage is now changing. It’s changing significantly, because it’s now very critical to bring stability to the grid during the—and incorporating the other renewable energy generation opportunities into the grid and keeping stability to the grid.

So the closed-loop part of this would be that while some pump storage projects are using water from, say, a river system that—in flowing by that would pump up water to the upper reservoir and then release it back to the river. A closed-loop system basically brings water into the system for one time and then is just constantly moving that water back and forth between the upper and lower reservoir. It only takes a little bit of water then to make up for some evaporation losses. So that closed-loop system, once built, basically operates by itself alone without any additional water flow or impact to the environment once built.

Mr. GRIFFITH. And as a result of that, do you agree that that warrants expedited consideration by FERC and with some relaxed regulations because we are using the same water over and over again so that we don’t have as much impact on the environment?

Mr. DEVINE. I do, and one of the main reasons is because often-times what’s indicated to be the primary issue with respect to those is the effect of the river, where the water is being flowing into and pumping out of—fishery impacts, sediment impacts, other related potential impacts. With a closed-loop system, once you have built and filled these reservoirs and take care of that in the original licensing, you don’t have that potential issue any further.

So I do believe that it deserves that more efficient process and expedited licensing process.

Mr. GRIFFITH. And we’ve been interested in—because we hear all the time from folks who oppose coal that you all need to transition, we’ve been interested in maybe putting one of these inside an abandoned coal mine because then there’s really virtually no impact to the environment. Would you agree with that?

Mr. DEVINE. Yes. I think there’s opportunities with a lower reservoir potentially to be inside old mining facilities. I think there have been several of those in the past proposed and some actually moved through the—back in the ’80s I think it was, or early ’90s, move through the processing and were not able to get the financ-

ing, not able to get built at that point but moved through the whole process of permitting and were closed-loop systems and using old mines for the lower reservoir.

Mr. GRIFFITH. We have a lot of people who are very interested in this and anybody that is interested in investing in the 9th Congressional District for doing one of these we've got plenty of water to put into the system.

Mr. SLOCUM. I will just quickly mention ITC may be interested in that and we do have a project just as—exactly what you just mentioned in northwest Arizona that we've proposed and we've submitted that to FERC. And so I agree with everything that was just said. Thanks.

Mr. GRIFFITH. Thank you, and appreciate it and yield back, Mr. Chairman.

Mr. OLSON. Gentleman yields back.

The chair now calls upon the gentlelady from Florida, who is a huge fan of the chancellor of University of Houston—Dr. Renu Khator, just like Dr. Hellyer and myself, Ms. Castor, has 5 minutes.

Ms. CASTOR. Well, thank you, Mr. Chairman.

I do have great respect for the University of Houston Chancellor Dr. Khator and I am sure she was as excited as you that her old alma mater, the University of South Florida, defeated the University of Houston in women's basketball last week.

But thank you for giving me time to be ready with that one. I want to thank the witnesses for being here today. Many of you have cited in your testimony the importance of modernizing America's electrical grid and how that would be a very important piece of an infrastructure plan for the country, and I agree.

Many of you have cited benefits of modernizing our grid. There is creating higher-paying jobs, building in greater grid resiliency, greater efficiency for our businesses and electric utilities and so much more. Many of you know that the Democratic colleagues on this committee have drafted a piece of legislation called the LIFT America Act. My contribution to the LIFT America Act has been to promote a modern grid that includes clean energy distribution and really trying to bring the most modern technology that we have developed to bear in an infrastructure plan. I think it's clear that if we were to make a real investment in clean, reliable, and cost-effective energy resources, the country would reap huge benefits.

Ms. Chen, in your testimony you highlight the importance of technological innovations like expanded grid technology, smart meters, energy storage as part of upgrading the nation's power infrastructure. Can you elaborate on your vision for a more modern electrical grid with expanded distribution and greater technology and what would we need to build that?

Ms. CHEN. Sure. That response—I probably don't have enough time to fully flesh that out. But I think the number-one thing to think about here, especially when we talk about more clean innovative technologies on the distribution system is being able to integrate it with the larger bulk transmission grid so that that way whatever savings in electricity that you don't have to purchase from the bulk electricity system you can reap through fewer re-

quirements on the transmission grid infrastructure, lower requirements on generation infrastructure that could be very costly for your consumers. But at the same time, if you integrate these distributed energy resources like storage, demand response, energy efficiency, solar panels, you can also allow them to recover revenues from the wholesale electricity markets.

So one of the great things that FERC recently did was finalize the storage rule that enables storage, at least, to compete in the wholesale electricity markets. What it left behind is the distributed energy resources. There's a component to that rule that would have enabled those resources to also participate in the wholesale electricity markets.

So FERC is going to convene a proceeding to investigate it further and we would love to see distributed energy resources to be able to participate in the bulk electric transmission system. So that kind of integrated system would be the overall large framework picture that we have for the modern grid.

Ms. CASTOR. So you would encourage the Committee to urge FERC to move forward on that along with greater planning in advance across regions to help save money and become more efficient and put all those technological tools to use?

Ms. CHEN. Right. Absolutely.

So this all goes hand in hand in the transmission planning process and the regional operators' load forecasting process. They have a lot of planning that goes on. Sometimes it's not holistic enough to account for everything that's on the distribution system.

So, certainly, including these distributed energy resources in those plans would ensure that we don't overbuild and, again, it would ensure that if they can participate in the markets they could reap some of those revenues.

Ms. CASTOR. And I just want to close by saying that I think there was bipartisan concern that President Trump's infrastructure plan, when it was released, included nothing in regard to modernizing America's electrical grid, just simply no mention, and I think that was a real absence of vision. Just like the plan included no mention of broadband expansion across the country, and I think this committee has a responsibility to take up that charge on a bipartisan basis with the matters that are in our jurisdiction and help lead the way.

We can't do infrastructure and create these high-paying jobs and take our country to the next level unless infrastructure also means a modern electrical grid and greater broadband.

So I yield back my time. Thank you.

Mr. OLSON. The gentlelady yields back and the chair wishes to inform the gentle lady that she publicly called Dr. Khator—her new home getting defeated by her old home. I've sent her a text message about the statement so be prepared for a response if it hasn't come already.

The chair now calls upon the gentleman from Indiana, the Hoosier State, Mr. Bucshon, for 5 minutes.

Mr. BUCSHON. Thank you, Mr. Chairman.

Earlier this Congress, the House unanimously passed my bill, H.R. 2872, the Promoting Hydropower Development at Existing Non-powered Dams Act. H.R. 2872 would promote hydropower de-

velopment at existing non-powered dams by establishing an expedited licensing process for qualifying facilities that will result in a decision on an application in 2 years or less. The bill also requires FERC, the U.S. Army Corps of Engineers, and the Department of the Interior to develop a list of existing non-powered federal dams that have the greatest potential for non-federal hydropower development.

Developing hydropower generation at over 50,000 suitable dams across the country has the potential to have 12 gigawatts of clean energy to the grid, create good-paying jobs, and bring billions of dollars of investment. In fact, in the 8th District of Indiana, which I represent, there are six suitable dams that can benefit from this expedited permitting process. This legislation modernizes our existing infrastructure and I believe should be included in any infrastructure package passed out of Congress.

So Mr. Devine, in your testimony you state that enacting legislation like this, and you quote, "in a way to move investments in hydropower infrastructure forward without major cost to the U.S. government." Can you speak to the impact H.R. 72 and other hydropower legislation but specifically this would have on hydropower development across the country as well as its role in our country's infrastructure?

Mr. DEVINE. Yes. Thank you, Congressman Bucshon.

I think it's an excellent example of trying to improve the investment picture for small hydropower and hydropower in the country.

It's also an example of moving forward hydropower at existing dams recognizes that the main aspect of these dams are usually run-of-river dams. Run-of-river dams are known to have very minor impacts, generally, to the water resources of the river. Therefore, a 2-year expedited process in this is not incongruent with protecting environmental resources.

I think it's also an example of an expedited process which also continues to protect the environment because these environmental analyses will be done and completed in a reasonable time frame and fully evaluated from the scientific perspective.

I think it also combines the expedited time frame for the licensing process and is a good example of not trying to rescind any environmental laws or regulations.

I think it's a fine example of encouraging new investments in hydropower and recognizing that some of these projects have minimal environmental effects and could move forward expeditiously.

Mr. BUCSHON. Thank you very much.

I just want to point out this bill was passed unanimously out of the House with bipartisan support. We worked with both parties to develop language that people were comfortable with and, again, I want to reiterate that the environmental review process is still there in place.

We are just getting federal agencies to move the process more quickly rather than 10 years or 12 years to a process that would be over a 2-year period, which the potential for expanding this form of clean energy is tremendous.

And I look forward to our Senate colleagues taking this up and I do think there's a lot of interest over there and I think in a bipar-

tisan way. I am hoping to get this type of legislation to the president's desk.

So thank you very much, Mr. Chairman. I yield back.

Mr. OLSON. The gentleman yields back.

The chair now calls upon the pride of Schenectady, New York, right behind Thomas Edison, as we learned this morning—Mr. Tonko, for 5 minutes.

Mr. TONKO. Thank you, Mr. Chair. I think the pride may be the mayor of Schenectady. But that's up for discussion.

Mayor, again, I want to thank you for a very comprehensive report. It is so innovative and it allows us to go into the next stage of energy resources, and I thank you, again, for the vision that, obviously, will lead many people down a path of sound energy policy.

Schenectady has, I believe, over 5,000 street lights and what is considered when a city decides to make a major infrastructure investment such as converting to LED streetlights?

Mr. MCCARTHY. Again, there's approximately 5,000 street lights in the city of Schenectady, 500 of which the city owns. Forty-five hundred, approximately, are owned by the utility. So the 500 that the city owns are fairly easy to deal with.

Where you get utility-owned streetlights it becomes a more complicated process to either buy those or purchase the residual value of the fixtures that had been installed and that's why we are trying to work with New York Public Service Commission to come up with a model that would allow that transition to the LED lights. When you're doing that it's not to miss the opportunity to put some of the other available technology on the light pole, which will, again hopefully help the utility, help the city, then help the residents and businesses within the community take advantage of some of the emerging and wireless and sensor-based technologies.

Mr. TONKO. So as you convert to LED, what are the potential savings for the city when adopting a smart lighting system?

Mr. MCCARTHY. The initial savings—our number is just under \$400,000—about half of our electrical costs.

Also, when you put the optical sensors on the poles that you can then pick up additional savings when you dim the lights further when there's less activity on the street.

When you put either a Wi-Fi or cellular communication protocol on the pole it might be able to extend that savings to residents or businesses so that your control is on the sensor on the street but you would enable homeowners or businesses to be able to dim their either porch lights or advertising on their buildings or other fixtures that they might have when there's no activity—you could dim that.

When there is activity you'd be able to turn them up. So it becomes really an integrated deployment where, hopefully, everybody will benefit from it.

Mr. TONKO. Tremendous. In addition to lighting, Schenectady has developed other clean energy and efficiency projects. Among them a few years ago the city installed a CHP system—a combined heat and power system—at the wastewater treatment facility and more recently installed a solar array, I believe, at that facility.

Mr. MCCARTHY. Yes.

Mr. TONKO. What are the benefits of these types of projects?

Mr. MCCARTHY. Our wastewater treatment plant, the co-gen facility there, saves us approximately \$30,000 a month in utility costs, capturing the methane gas and burning it on site and then our solar deployment at the time was the largest municipal solar array in New York State. It's done on top of an enclosed reservoir. The Bevis Hill Reservoir supplies hydrostatic pressure for the water system within the city.

Mr. TONKO. So there's, obviously, long-term benefits there to the city with these projects?

Mr. MCCARTHY. Correct. It was just really unused land and so now we get 711 kilowatts of electricity generated there that we use a remote metering package to offset the costs of some of our higher utility bills of the municipal—primarily city hall and some of our fire stations.

Mr. TONKO. Right.

Just make mention here for the record that the city established a smart city advisory commission chaired by Mark Little, the former chief technology officer and director of GE Global Research, which includes businesses and important institutions from around the area. So it's really pulling in the private sector-public sector partnership.

Back to those public sector partnerships, are there—earlier you were quizzed about the 80/20 match with Ranker Rush. But are there opportunities for public partnerships at the state and federal level that you would encourage?

Mr. MCCARTHY. I believe everybody has to look at the emerging technologies. Things are changing so fast. I was here at a NIST event 3 weeks ago and they talked about that 90 percent of the data that exists in the world today had been created in the last 36 months. I went back and used that statistic at an event at our community college. Somebody came up to me and corrected me. He said, "Mr. Mayor, that's wrong. Ninety percent of the data that exists in the world today has been created in, roughly, the last 24 months."

So there is so much information out there that, if properly managed, it will allow us to do predictive analytics. It will enable us to drive better outcomes, whether it's government services, products that are produced in business, and educational opportunities within our communities.

But, again, it's happening so fast that we have to have policy standards and an environment that allow those things to be fully utilized and taken advantage of in a rapid manner. Again, it's really our global competitiveness is a key component of that because other countries are moving faster in some areas.

Mr. TONKO. Thank you very much, again, for the vision. And I agree, the challenge to us now is to determine how we utilize the great compilation of data that we acquire.

And with that, Mr. Chair, I yield back.

Mr. OLSON. Gentleman's time has expired.

The chair now calls upon the Motorcycle Riders Foundation 2017 Legislator of the Year, Mr. Walberg, for 5 minutes.

Mr. WALBERG. Wow.

[Laughter.]

Tell you what, always wondering what in the world you do to get all of the research done with all of our members here. It's impressive, Mr. Chairman. Impressive.

Thanks to the panel for being here. Mr. Ross, I certainly appreciate the work the Brotherhood does in training people to do jobs whether it's at my Fermi plant—the DTE Fermi plant—or down Lake Erie a bit at the big coal-fired plant or in all of the consumers' gas-powered plants, et cetera to get the electricity to the lines and ITC and others. We appreciate the work you do.

I want to ask you to give us some examples, if you could, or ideas how we can expand access to apprenticeships. But I would preface it by saying I was greatly excited with what our governor was proposing in Michigan last week called the Marshall Plan for talent and, specifically, as he talked about pushing means toward short-term certification programs, education programs, whether it's the community college level or apprenticeships, et cetera.

The PROSPER Act that we passed out of the House Education and Workforce Committee just a couple months ago that reauthorized the Higher Education Act has a one-loan one-grant one-work study program that can be done for that very purpose—those Pell grants, et cetera, that can go towards short-term training opportunities as well in the professional trades, as we are calling now in Michigan. I know they're skilled but they're professional as well and we want to give that idea out to our students that could look to fill spots that can be an asset to what we have.

The SKILLS Act we passed several years ago and was signed by President Obama, again, pushed education for real-world jobs back to the states and the local communities and private entities like yourself. So we want to build on that.

What would be the best way to do this, to expand recruiting and apprenticeships for the next generation of electric workers as well as how can the U.S. encourage more individuals pursue these programs?

Mr. ROSS. I think we should start by introducing the trades earlier on in school. When I came through school you were introduced in shop class or you had to go to electrical class just to introduce individuals to those programs, and there's not much vocational training, at least I haven't seen much, in the high schools anymore. They've gone away from that and certainly guidance counselors have gotten away from trying to push individuals to our industry—the trades.

Unfortunately, not everyone is cut out for college or even community colleges, in some cases. We take individuals with basically a high school education, at a minimum, and for an electrician basically high school algebra is a bare minimum for us and we train them to be electricians.

We certainly need to do a better job of promoting that program to individuals out there and, quite frankly, we need to do a lot better than what we have been.

And I think reintroducing them in the high schools would certainly be a starter—even earlier in junior high—to get them exposed to what the trades are—have them hands-on. We also have pre-apprenticeship programs out there that our electrical training alliance has developed to put high school graduates into those pro-

grams. It gets them exposed to what's expected of them when they become selected as an apprentice. So some of those programs we are trying to promote.

Mr. WALBERG. That's great. The push to encourage people toward their sweet spots—it would be a waste of time for some to go the university or 4-year college route.

We would waste the skills and the talents that they have, and if we think about professional skills these are jobs like you're talking about that are careers—that are good paying and can continue to expand. I wish you well on that. We need the juice.

[Laughter.]

We need the electricity to our homes.

Mr. Slocum, earlier this Congress with the help of this committee we passed H.R. 1109. This was legislation that was introduced to reduce red tape on both industry and FERC to free up resources and lower utility bills. This made a simple fix to Section 203 of the Federal Power Act and harmonized the language in that particular section.

We know there needs to be serious permitting reform. Simple or technical fixes such as 1109 that Congress can pass to remove red tape and reduce burdensome paperwork—other low-hanging fruit ideas as well. What would you have to move us forward to get past this red tape and bureaucracy?

Mr. SLOCUM. Thank you, Congressman, and we appreciate the work that was done there to make things more efficient with respect to that 203 process.

And I think, as mentioned in my testimony, I talk about some changes that could be made to the NEPA process that seems to have a level of agreement and seems to make some straightforward sense as far as making sure that we can get through the permitting process in a timely manner but we can do that efficiently. And so that would be one of the biggest things that I would see that would be a low-hanging fruit type opportunity.

Mr. WALBERG. My time has expired. I yield back.

Mr. HARPER [presiding]. Gentleman yields back.

The chair will now recognize the gentleman from West Virginia, Mr. McKinley, for 5 minutes.

Mr. MCKINLEY. Thank you, Mr. Chairman.

This now is the thirteenth we've had out of those—2 hours ago we heard this is the forty-seventh hearing we've had on infrastructure and this is the thirteenth dealing with grid resiliency regarding the infrastructure. We've heard a lot of good solutions over those 47 and, clearly, we have a growing problem with the adequacy of our energy infrastructure and the grid being at risk.

But, unfortunately, I can tell you, I am not sure the messages are being heard because just a few years ago we had with the Polar Vortex we came within just minutes of having a blackout through the PJM. PJM was reporting that. And now ISO is just—New England has just come out with a very well-documented report that says the possibility of the power plants in the New England area won't have or be able to get the fuel they need to operate, and their quote was, "This is the foremost challenge to a reliable power grid in New England."

And then further in the report it says New England has a better than 80 percent chance of a blackout in the next bad weather storm. But in the meantime, New England is becoming increasingly reliant on Russian LNG to be able to satisfy their energy demands instead of using American energy.

So if we are truly committed as a country for energy dominance, what are we doing about it? Are we listening to the hearings that have been taking place?

And then one that particularly disturbs me is that New England is apparently importing subsidized Canadian electricity at the expense of American jobs—80—or 73 gigawatts of power coming in from Canada. I've got to think that the impact of that—instead of having the jobs that we could have as a result of that, nearly a hundred coal-fired or nuclear or wind or solar—the equivalent of power plants, we could have those in America instead of importing from overseas or from Canada.

I don't understand why the governments in the New England area are withholding permits to be able to build pipelines so that we could use American resources to be able to do that. As a result, we seem to be prematurely closing a lot of our coal and nuclear power plants unnecessarily so. So I think we have to be careful and I hope that these hearings will underscore that because what we've talked about is a couple weeks ago we passed a 45Q, which was a tax credit.

We need to give more people the chance to use that 45Q to find out if we don't get carbon capture with this tax credit that we were able to pass. And then working with Congressman Tonko, we keep pushing the efficiency idea with turbines. We have capabilities of doing this but it doesn't look like there's a commitment to do it.

The fuel security is, I believe, a national security and that's what these two reports are saying. So if government is—both sides of the aisle—really serious about all-of-the-above energy resources instead of just empty rhetoric, isn't it about time that we paint or get off the ladder? Think about that.

So Mr. Ross, I know you have got a connection back to Parkersburg. What's your response to the fact that we are importing electricity from Canada rather than creating American jobs and using American ingenuity and American efficiency and American clean environment?

Mr. ROSS. I hate to say too much to our brothers in the north because we represent IBEW members out there. So the powerline I talked about earlier on would be done with IBEW. So I understand where you're coming from. There's plenty of resources here in the United States we can use if we could just get the permitting process sped up and create the national grid that we need.

Mr. MCKINLEY. Can any of you explain why the pipelines are being held up so that we can use American resources to create American jobs?

Mr. SLOCUM. I will just say I can't speak to pipelines but certainly with the electric transmission infrastructure I think it's a lack of that interregional planning where you can get buy-in to a project and the reasons for the project and then from there you can move forward with the permitting and get something that's actually an interregional project built.

Until you have the impetus behind the project, it becomes very difficult to cross state lines, especially multiple state lines, where there's going to be winners and losers between those two areas unless you have a project that has some sort of ultimate approval that's going to proceed and move forward.

Mr. MCKINLEY. I know my time is over. But I find it just offensive that, according to this Bloomberg article that we are importing natural gas from Russia instead of using our own supplies, especially with all the gas that we have discovered in America that makes us such a large producer. I hope that we can reverse that. I yield back.

Mr. HARPER. Gentleman yields back.

The chair will now recognize himself for 5 minutes.

And Dr. Hellyer, I would like to ask you a few questions and certainly you know very well how the energy landscape of the United States is constantly changing. And according to the U.S. Department of Labor, the average age of the U.S. energy workforce is over 50 and the energy sector will need more than 100,000 new skilled workers by 2024 just to replace those retiring workers, and by some estimates more than twice as many workers are expected to retire as are currently involved in the apprenticeship or certificate programs, and degree completion and engineering has remained relatively stagnant since the 1980s.

So from your perspective, what incentives are needed to expand community college access and apprenticeship programs?

Ms. HELLYER. One of the conversations we had mentioned earlier was around Pell, and Pell is an important component for all students of higher education, specifically community college students. And there are 2.7 million community college students using Pell. From our standpoint and in my community, 75 percent of the students are first generation to college. About 75 percent are also going part time, and if you dig into our ISDs they are about 70 percent economically disadvantaged.

And so Pell does play a critical role. I think it's what Mr. Ross said earlier also is that awareness around those jobs, which is something that we have really done well in our region trying to build that awareness much younger and then putting that all together and allowing the resources to be put in place, the industry partnerships to build the apprenticeships.

We have registered approved apprenticeships at San Jacinto College and we have unregistered programs and, again, designing them based on what the industry partner needs but realizing that it's a combination that's going to be needed.

Mr. HARPER. So how do you communicate to these students that these are the types of jobs in the energy and manufacturing sector that they can have a good life, support their family on? How is that communication made to the students?

Ms. HELLYER. In our region what we are doing is first we are engaging in sixth graders, bringing them onto campus and seeing hands-on around what happens in our petrochemical plants, what's happening in the maritime industry so having that hands-on, re-engaging them again in eighth grade.

In eighth grade in Texas, students decide an endorsement—an area of study—and so we are engaged with them around that proc-

ess. Again, how does this tie back to the jobs in our community, and then we also have a speakers bureau, which is led by industry with community colleges going in to the eighth grade and then the high schools.

Those conversations are directed at parents, teachers, counselors, and students. You need that broad awareness and, to be honest, just as Mr. Ross said, there hadn't been that kind of awareness in our communities for a lot of years and so we are building that pipeline.

But when you can talk that a process operator will make \$100,000 or a welder \$70,000 with the proper credentials, that starts speaking. And those students need to hear it from people that are younger than me. They need to hear it from people who went to their high school and that are reengaging and that's what industry has done.

They bring in those people working in their plants back into the high schools where they can get a role model and then get their questions answered. And then it's us putting in place the support systems at the college—having industry partners at the table, being real clear what the expectations are, defining how's the safety culture built in—what's the work ethic and reinforcing that in all your programs. Our industry partners at the table with us are the critical factors.

Mr. HARPER. That's great. What we observed is students just by nature, when they're in high school, the earliest time that they are able to opt out of math and science classes they try to do that and get it done and then you lose those skills.

So are you seeing any connection with that to where you're seeing more and more students maintain the STEM curriculum in high school so they don't opt out of those possible job opportunities?

Ms. HELLYER. So, again, it's working with our high schools and with the industries but also with the universities because some of those jobs do require university and so how do you have that pipeline. And then for us in higher education we can redesign math a little bit. We are not directing all students to college algebra.

If you're moving in to a business degree you're doing more statistics. If you are going into process technology it's more of a technical math and showing how that reinforces with what you're going to do—welding, more geometry. And so we try to redefine some of that.

We take the same approach with English. Our operators need English. They need the math skills. They need more of a technical English and so how do you redesign that and being very prescriptive again, take math early, take the sciences early because it does reinforce the rest of the courses in your degree program.

Mr. HARPER. Thank you, all of you, for being here. It's provided a lot of important insight to the committee. And seeing that there are no further members wishing to ask questions I would like to thank all of our witnesses again for taking the time to be here today.

Before we conclude, I would like to ask unanimous consent to submit the following letters for the record: One, the Utilities Technology Council letter, and the second is the American Public Gas Association.

[The information appears at the conclusion of the hearing.]

Mr. HARPER. Without objection, those are so entered and I will ask if Mr. Rush has any similar documents.

Mr. RUSH. Mr. Chairman, I would ask the unanimous consent to enter into the record different letters, one from the Center for American Progress, these are statements, one, and the American—the Center for American Progress has a statement debunking the false claims of the environmental review component. Additionally, there's the Center for American Progress statement on Trump's infrastructure scam that will gut the environmental protection to benefit corporate polluters. And we have a series of others—BlueGreen Alliance entitled, "The Right Way to Repair America's Infrastructure"—the Earth Justice statement, which is entitled, "Congress Should Support an Infrastructure Plan that Builds Infrastructure, Not Gut Health and Environmental Protection." And lastly, a New York Times article that's entitled, "Trump's Infrastructure Plan Puts the Burden on State Environment Money."

[The information appears at the conclusion of the hearing.]

Mr. HARPER. Without objection.

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

Without objection, the subcommittee is adjourned.

[Whereupon, at 12:24 p.m., the committee was adjourned.]

[Material submitted for inclusion in the record follows:]



1129 20th Street NW | Suite 350 | Washington, DC 20036
 202.872.0030 Phone | 202.872.1331 Fax
www.utc.org

Feb. 27, 2018

The Honorable Fred Upton
 Chairman, House Energy and
 Commerce Committee Subcommittee
 On Energy
 2138 Rayburn House Office Building
 Washington, D.C. 20515

The Honorable Bobby Rush
 Ranking Member, House Energy and
 Commerce Committee Subcommittee
 On Energy
 2188 Rayburn House Office Building
 Washington, D.C. 20515

The Honorable Greg Walden
 Chairman, House Energy and
 Commerce Committee
 2185 Rayburn House Office Building
 Washington, D.C. 20515

The Honorable Frank Pallone
 Ranking Member, House Energy and
 Commerce Committee
 237 Cannon House Office Building
 Washington, D.C. 20515

Re: Feb. 27 Subcommittee on Energy Hearing on State of the Nation's Energy Infrastructure

Dear Subcommittee Chairman Upton, Ranking Member Rush, Committee Chairman Walden, and
 Ranking Member Pallone:

I am writing on behalf of the Utilities Technology Council (UTC) regarding the Subcommittee on Energy's Feb. 27 hearing on the "State of the Nation's Energy Infrastructure." Established in 1948, UTC is the global association representing energy and water providers on their needs related to deployment of reliable and resilient information and communications technology (ICT). Energy providers use ICT networks as the backbone for the infrastructure that delivers safe, reliable, and secure energy services. These networks are essential for reliability, safety, resilience, and security.

UTC applauds the Subcommittee on Energy for holding this important hearing. As Subcommittee Chairman Upton so aptly noted in his announcement of this hearing, "Modernizing the nation's energy infrastructure should play an integral role in any sort of infrastructure plan moving forward."

Much of this hearing's focus will likely revolve around the transmission grid, resilience, and grid modernization, and rightfully so. A critical piece of this discussion must be centered on the ICT networks embedded throughout the grid. Indeed, electric infrastructure and the ICT networks that underpin them are essential to the reliable flow of electricity. More specifically, electricity providers use these networks for the following essential functions:

- Real-time monitoring of medium- and high-voltage networks (distribution and transmission, respectively)
- Protective relaying
- Energy management
- Outage management
- Distribution management
- Smart metering





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 202.872.0030 Phone | 202.872.1331 Fax
www.utc.org

- Substation automation

Utilities began building out telecommunication networks as their service territories expanded in the post-World War II years. Because of the need for electricity to flow reliably nearly 100% of the time, electric utilities could not rely on communications networks built by commercial providers, which did not provide the level of reliability necessary to run electricity infrastructure. As they developed their networks, utilities recognized the need to deploy both wired and wireless technologies.

Over time, utilities began adding new technologies to these networks to improve real-time situational awareness, providing data from the power lines in the field to the more centralized substations and control rooms. These networks run the supervisory control and data acquisition (SCADA) systems that are essential to reliability. While the term “smart grid” is relatively new, utility ICT networks have long provided a level of automation and efficiency. Importantly, ICT networks are critical to grid modernization as they enable utilities to integrate intermittent generation resources such as solar and wind, accommodate demand response regimes, smoothly transition between battery storage technologies and the grid, and provide the infrastructure needed to deploy electric vehicles, among other exciting advances empowered by technology and now sought by customers.

Because these networks often rely on wireless devices to communicate, radiofrequency spectrum is a key element to their success. Spectrum is allocated by the Federal Communications Commission (FCC), under which the full Energy and Commerce Committee has jurisdiction. Spectrum is a limited and sought-after commodity that is needed for wireless communications of all kinds, including smart phones, laptops, any WiFi-enabled device, and much more. The FCC is charged with allocating spectrum in the public interest.

As utilities built and maintained these networks, however, they noticed a disconnect in how their services are valued by the FCC in contrast to other government agencies. Specifically, the Department of Homeland Security, the Department of Energy, many in Congress and at the White House (under several Administrations) consider the electric sector to be among the most critical of all critical industries. Our members meet, and often exceed, strict reliability requirements to keep the power on safely and reliably while at the same time planning for natural disasters and other hazards such as physical and cybersecurity attacks that could result in operational challenges.

Unfortunately, the FCC historically has not acknowledged this criticality in its spectrum allocation policies. As the demand for spectrum has increased exponentially due to the increased use of smart phones, drones, and many other wireless devices, the FCC’s policies have crowded utilities out of, or forced them to share, spectrum in bands that are essential for the reliable flow of electricity. As policymakers discuss infrastructure proposals, we encourage members of this Subcommittee to consider the critical nature of energy providers and ensure they have access to suitable spectrum. Doing so will enable the country to realize its digital future while ensuring safe, secure and reliable delivery of energy services.

This could be done in the following ways:

FCC-Federal Energy Regulatory Commission (FERC) Meetings: Electric utilities meet and exceed requirements and standards for reliable service approved by FERC at the Bulk Power System (BPS) level.





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 202.872.0030 Phone | 202.872.1331 Fax
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Utilities rely on the aforementioned telecommunications systems and networks to provide these extremely high levels of reliability, and spectrum is the key ingredient to operating these networks. With the FCC overseeing a central element to the reliability of our nation's electricity system, Congress should direct the FCC and FERC to meet on a regular basis to discuss issues of shared interest and jurisdiction. This is especially critical as utilities implement new technologies, such as smart grid, that rely on communications and information technologies and will result in a cleaner, more efficient energy delivery systems. We encourage Congress to direct FERC and the FCC to enter into a Memorandum of Understanding that would establish a format for these regular meetings and create a "joint spectrum team" consisting of a commissioner and staff from each agency. The joint spectrum teams would discuss each agency's authorities and hold technical conferences on how spectrum policies impact the energy industry.

Sense of Congress on the Spectrum Needs of the Energy Industry: Congress should consider passing a Sense of Congress Resolution officially stating its recognition of the energy sector's spectrum needs. Such a resolution would declare the importance of spectrum to the energy industry, sending a strong signal to government agencies about how critical spectrum is to our nation's electricity future.

The full Energy and Commerce Committee has jurisdiction over both FERC and the FCC. Members of this Subcommittee therefore have a unique opportunity to facilitate these discussions and analyze the growing interdependencies between the energy and telecommunications sectors. UTC stands ready to assist in this effort. Our organization has resources and subject-matter experts willing to provide Subcommittee members with any information or resources they need.

Again, UTC thanks the Subcommittee for holding this hearing. We appreciate the opportunity to submit this letter and look forward to working with all of you going forward.

Sincerely,

A handwritten signature in black ink, appearing to read 'Joy Ditto', written over a horizontal line.

Joy Ditto
 President, CEO of the Utilities Technology Council





AMERICAN PUBLIC GAS ASSOCIATION

February 26, 2018

The Honorable Fred Upton
Chairman
Energy and Commerce Committee
U.S. House of Representatives
Washington, DC 20515

The Honorable Bobby Rush
Ranking Member
Energy and Commerce Committee
U.S. House of Representatives
Washington, DC 20515

Dear Chairman Upton and Ranking Member Rush:

On behalf of the American Public Gas Association (APGA), we appreciate this opportunity to submit testimony to this important hearing addressing the future of this country's energy infrastructure.

APGA, the national association for municipal natural gas utilities, is in a unique position to offer testimony on this matter because of its members' proximity to the consuming public. APGA represents over 730 public gas systems across the country. Our members are retail distribution entities owned by, and accountable to, the citizens they serve. They include municipal gas distribution systems, public utility districts, county districts, and other public agencies that own and operate natural gas distribution facilities in their communities.

As the debate on our energy future continues, it is clear that natural gas should be a foundation for our energy future. As this Committee begins to address our energy infrastructure needs, we would like to see this Committee support dynamic federal programs that allow communities to choose how to best meet their energy needs without establishing any bias or imbedded preferences.

As our nation discusses our future energy infrastructure needs, the Committee must not overlook the fact that the direct use of natural gas is a critical factor in the reliability, resiliency, efficiency, and security of the overall U.S. energy system. The direct use of natural gas today provides relief for our congested and stressed electrical infrastructure, as well as primary energy for on-site, back-up generators during grid outages. Often lost in the dialog about the nation's energy resiliency is the fact that diversity of delivery mechanisms (pipelines and electric transmission) and fuel sources and fuel reliance is key to ensuring overall system reliability. A fresh example is the current winter season, in particular the extreme weather of January 2018. According to the American Gas Association, local gas utility preparation and the diversity of gas supply met an extreme challenge. On January 1, 2018, forty-two percent of natural gas delivered to consumers was sourced from underground storage infrastructure. Domestic production of natural gas sustained 72 billion cubic feet (Bcf) per day, which was supplemented with Canadian imports as high as 8 Bcf per day. Bottom-line: The natural gas energy delivered to consumers on January 1st was equal to about 1700 giga-watts (GW) equivalent electricity. To put this in perspective, total generation capacity in the U.S. today is only about 1000 GW. Natural gas is indeed foundational to our nation's energy resiliency.

Natural gas is currently distributed to approximately 75 million homes and businesses nationwide. The use of natural gas appliances in homes and businesses frees up critical capacity and increases

201 Massachusetts Avenue, NE
Suite C-4
Washington, DC 20002

202.464.2742 (tel)
202.464.0246 (fax)
www.apga.org

flexibility for the electric grid while lowering costs, improving overall efficiency, and reducing emissions. Similar to electricity conservation, natural gas appliances reduce the strain on the electricity grid while minimizing the need for the construction of additional generation plants and transmission lines. According to APGA's Levelized Cost of Energy Study¹, the direct use of natural gas has significantly lower levelized costs to consumers when compared to any of the electric generation technologies.

Expanding natural gas direct-use will benefit the nation in several ways. First, natural gas will reduce the impact on consumers from the tremendous costs associated with the build out of additional electric generation and transmission assets. Consumers will also benefit from lower monthly utility bills when operating natural gas appliances as compared to electric alternatives.

The Committee should explore increasing utilities' ability to expand their distribution capabilities. The expansion of a community's natural gas service is a key component to local and regional economic revitalization. Natural gas provides stable and low-cost energy to manufacturing and industrial businesses -- an invaluable benefit that can attract investment and provide increased economic activity across the country.

Our members have continued to look for ways to better serve their community by upgrading and expanding service to new areas. In many instances this is driven by the agricultural sector and the desire to provide farms and other agribusinesses with low cost energy.

One of the biggest challenges to serving rural communities is lowering the initial infrastructure cost for end users -- also known as "last mile" programs. Natural gas utilities must recoup all of the costs associated with expanding into new areas and this can be difficult in rural areas where lower population density increases the cost per customer. The Committee should explore how the government can help lower these cost for farmers and other agribusinesses that are often high energy users. A 2017 National Association of Regulatory Utility Commissioners Task Group on Natural Gas Access and Expansion Report provides an overview of the impact "last mile programs" have on dramatically lowering businesses' and underserved communities' energy bills.

APGA believes that any infrastructure discussion must include assessing the benefits of direct use of natural gas, a domestic resource, and evaluating how best to assure a resilient energy system, not just a resilient electric system. Preserving fuel diversity is essential to the reliability, resiliency, and security of the nation's energy system. In considering the reliability of the electric grid, Congress should take into account how low priced, domestic natural gas has changed the energy sector. APGA believes that the direct use of natural gas can and should play an important role in providing consumers a reliable, diverse, resilient and secure energy system now and well into the future. We stand ready to work with the Committee on these and all other natural gas issues.

Sincerely,



Bert Kalisch
President & CEO

¹ APGA published the "Levelized Cost of Energy: Expanding the Menu to Include Direct Use of Natural Gas" study in August 2017 to look at the levelized cost of electricity generation options and the direct use of natural gas.

Center for American Progress



Debunking the False Claims of Environmental Review Opponents

By Kevin DeGood

May 3, 2017

Talk is cheap and infrastructure projects are expensive. This helps explain why as a candidate, Donald Trump repeatedly called for spending \$1 trillion to rebuild U.S. infrastructure, but as president, he has flipped to pushing state and local governments to “maximize leverage”—in other words, take on extremely expensive private equity capital through public-private partnerships.¹

It turns out that the hardest part about infrastructure spending is the spending. And in Washington, D.C., when a campaign promise falters, the best thing to do is blame an old standby: regulation. With near religious zeal, the Trump administration has taken to dismantling decades of hard-fought regulatory progress. The latest regulation to come under heavy fire is the National Environmental Policy Act, or NEPA.

Congress enacted NEPA in 1969 following years of growing public concern and political pressure to address the social and ecological damage caused by infrastructure projects and other forms of economic development. NEPA requires state and local project sponsors to engage in an environmental review intended to discover any significant impacts prior to starting construction.² These impacts could include anything from the loss of wetlands and a decrease in soil quality to the destruction of historic buildings and damage to the socio-cultural character of a neighborhood.³ In other words, NEPA defines the term “environment” to include both natural and human environments.

The overall goals of NEPA are to empower local communities through greater transparency and to provide a framework for informed governmental decision-making.⁴ NEPA requires project sponsors to carry out significant public outreach, allowing residents to voice their concerns about how the project could result in social or ecological harm. Where possible, the project sponsor must adopt changes to the design or operation of the facility in order to mitigate the identified negative impacts. In effect, NEPA transforms the theoretical idea of public engagement into a substantive reality. If the project sponsor does not follow NEPA’s procedural requirements, residents may seek legal remedy.

1 Center for American Progress | Debunking the False Claims of Environmental Review Opponents

At its core, NEPA is a procedural statute that helps coordinate all environmental review and permitting requirements mandated by federal law. In the absence of NEPA, project sponsors would still have to comply with underlying environmental statutes, such as the Endangered Species Act and Clean Water Act, among others. The difference is that the process would become disjointed, as project sponsors would have to apply separately to each agency asserting jurisdiction.⁵

Like any complex administrative process, NEPA is not perfect. The most recent surface transportation authorization bill—Fixing America's Surface Transportation, or FAST, Act—included an entire title dedicated to reforming NEPA.⁶ These changes—often controversial—built on prior reforms to NEPA included in other transportation bills, as well as executive orders signed by the Obama administration. The major reforms included in the FAST Act, along with the executive orders of the previous administration, require time for full implementation and study to determine their overall effectiveness at expediting project approvals while ensuring substantive protection of the environment.

With that said, the massive budget and staff cuts that the Trump administration has proposed for the Environmental Protection Agency as well as other departments reveal that any talk of NEPA reform is a hollow gesture on the way to evisceration.⁷ Unfortunately, gutting environmental review will do little to improve the state of our infrastructure but will lead to more projects that unnecessarily harm our human and ecological environments. For two powerful examples of past harms, see “Build First, Ask Questions Later: How Weakening Environmental Review Will Hurt Our Communities and Natural Habitats.”⁸

In support of the idea that NEPA saddles state and local governments with an overly burdensome administrative requirement, the Trump administration has pointed to a recent report by Common Good titled “Two Years Not Ten: Redesigning Infrastructure Approvals.”⁹ The report makes wildly inaccurate and often unsubstantiated claims about the costs associated with environmental review. In fact, the assumptions that inform the calculations of projected savings from rolling back NEPA are so shoddy that they undermine the overall validity of the report and its conclusions.

Before addressing the specific claims of the Common Good report, it's helpful to lay out two crucial facts about environmental review. First, the average project review is far shorter than opponents lead the public to believe. According to the Government Accountability Office, the average time to complete a full environmental impact statement, or EIS, is 4.6 years.¹⁰

Second, the principal restraint facing state and local governments contemplating megaprojects is money, not environmental review. In fact, state and local governments often begin environmental review with the hope that this will help build the political

momentum necessary to secure the funding for construction. For example, the Gateway Project is a series of interrelated major rail improvements, including two new tunnels under the Hudson River connecting Weehawken, New Jersey, to Lower Manhattan. The preliminary estimated total cost is more than \$23 billion.¹¹ The political challenges of securing this much money are daunting. Environmental review is not the obstacle preventing completion.

Assessing the claims of Common Good

Claim: "No legitimate public goal is served by years of delays."

Truth: This claim is troubling on both a practical and a philosophical level. On a practical level, major projects require extensive study due to their scale and complexity. The Common Good report arbitrarily defines delay as any review that takes more than two years. This artificial, one-size-fits-all deadline is completely disconnected from the reality of complex projects. For example, should the federal government issue a permit to construct a novel nuclear reactor design in two years regardless of unanswered questions? The answer is clearly no; the government should take the time necessary to ensure public safety and security.

On a philosophical level, this claim demonstrates that hardcore opponents of environmental review consider federal laws that protect the environment fundamentally illegitimate even if those laws are the result of decades of Americans expressing their collective political will.

Claim: Lawsuits should be "limited to legal violations, not policy decisions."

Truth: NEPA does not permit lawsuits on policy grounds. NEPA is a procedural statute. And when a state or local government does not follow basic procedural requirements, including conducting a substantive alternatives analysis or appropriately scoping the environmental review, then it has violated the law.

Claim: "The Federal Highway Administration estimated that the average time for approval of major highway projects was over six years."

Truth: This claim is based on projects that completed an environmental impact statement and received a record of decision from the Federal Highway Administration, or FHWA, between fiscal year 1999 and FY 2011.¹² For projects that completed the EIS process between FY 2012 and FY 2016, the average review time has fallen to 3.6 years.¹³ This substantial improvement is due to NEPA reforms passed by Congress, beginning with the 2005 surface transportation bill—the Safe, Accountable, Flexible, Efficient Transportation Equity Act—and subsequent transportation reauthorization measures.¹⁴

Beyond using outdated numbers, the report gives readers the impression that lengthy review is the norm. In reality, only 4 percent of highway projects—typically major new construction or expansion—require an EIS.¹⁵ Yet most of the work that states undertake is maintenance and incremental improvements within the existing right of way. These projects either qualify for a categorical exclusion or a much simpler environmental assessment, or EA. For example, data from Ohio show that large-scale projects are not the norm. Of the 1,657 highway projects included in the current Statewide Transportation Improvement Program, only two have a total cost of more than \$1 billion; with another six projects costing more than \$200 million.¹⁶ These projects represent less than half of 1 percent of Ohio's total. The average project cost is \$9.2 million.¹⁷

Claim: "Delay prolongs bottlenecks, which waste time and energy, causing America to lag behind global competitors." Additionally, the report claims that the total savings from eliminating six years of delay in building roads and bridges is \$427.8 billion.

Truth: Highway congestion reduces America's productivity and adds uncertainty to supply chains. However, the estimates in the second section of the report rely on many questionable assumptions. First, the report points out that approximately 45 percent of all highway congestion and delay is recurrent—meaning due to excess travel demand as opposed to an accident or inclement weather. Without any basis in fact, the report assumes that speeding up environmental review would eliminate all recurrent congestion. According to the EHWFA's 2015 Conditions and Performance Report, even a substantial increase in highway spending would improve average vehicle speeds from 43.9 mph to 44.3 mph—an increase of just 1.4 mph, or 3 percent.¹⁸

TABLE 1
Average EIS completion time for
highway projects receiving a record
of decision, FY 2012 to FY 2016

Fiscal year	Median completion time, in months
2012	41
2013	42
2014	46
2015	45
2016	44
Average	43.6

Sources: Results provided by the House Committee on Transportation and Infrastructure based on data from the Federal Highway Administration; for additional information on the permit lengths, see <http://bit.ly/185p3p3>; "Key House Democrats Blame Infrastructure Weakness on Funding, Not Permits," *Bloomberg BNA*, April 8, 2017.

TABLE 2
Actual savings from artificially short-
ening environmental review,
in billions

Category	Claim	Truth
Congestion costs of delay	\$270.00	\$4.80
Environmental losses	\$6.00	\$0.11
Increase in rebuilding costs	\$151.80	\$8.90
Total	\$427.80	\$13.80

Sources: Results based on authors' calculations from Federal Highway Administration and Federal Transit Administration, "2015 Status of the Nation's Highways, Bridges, and Tunnels: Conditions & Performance," U.S. Department of Transportation, 2016, available at <https://www.fhwa.dot.gov/policy/2015sep.pdf>; 2017 Sep. rep. Amy Pollock, "New Federal Demographic Data Infrastructure Woes on Funding, Not Forming," Bloomberg BNA, Apr. 6, 2017, <http://www.bna.com/news/story.asp?CID=1&tid=198&fid=198&aid=3276026>; Cost Index (CPI) data available at <https://www.bls.gov/charts/gov-purchasing-inflation/cpi.html>, last accessed April 2017; Economic Policy Institute, "National Wage Tracker," available at <http://www.epi.com/national-wage-tracker/> (last updated April 2017).

Second, the report assumes that all highway projects other than basic repair would require state and local governments to undertake a full EIS. As previously noted, only 4 percent of highway projects require a full EIS. Furthermore, the report assumes that these projects would have a review that lasts at least eight years. Yet recent data from the FHWA shows that the actual average for a full highway EIS is 44 months, or 3.6 years.¹⁹ Thus, at the outside most, 4 percent of highway projects could save 1.6 years.

Third, the report assumes 5.1 percent annual cost inflation for materials and labor. Without providing a citation, the report claims that the cost of materials accounts for 70 percent of total project costs, with a 3 percent increase each year, while labor accounts for 30 percent of costs and rises at 10 percent each year. Data from the federal government show otherwise. According to the FHWA's National Highway Construction Cost Index, prices for highway materials in March 2016 increased 7.3 percent from the baseline in March 2003. This translates to an average annual cost increase of half of 1 percent.²⁰ Data from the U.S. Bureau of Labor Statistics show that nonfarm wages have been rising at a nominal rate of approximately 2.5 percent per year.²¹ Thus, a more accurate inflation number is 1.1 percent.

Fourth, the congestion savings put forward by the report assume static travel demand. In other words, the report assumes that after the state expands highway capacity, drivers would take the same number of trips and experience dramatically less congestion and delay. In reality, most highway congestion occurs in large metropolitan regions with a high degree of latent demand. This means that because roadways are often heavily congested, drivers choose to take fewer trips. Highway capacity expansions only temporarily provide congestion relief as drivers begin taking additional trips. As a result, congestion rises until it reaches a point of equilibrium roughly equivalent to the pre-expansion level.²²

Using assumptions based on federal data, the actual value of savings from artificially shortening environmental review drops from \$427.8 billion to \$13.8 billion.

Claim: "Freight bottlenecks resulting from insufficient rail capacity cost the economy over \$200 billion a year, according to the ASCE [American Society of Civil Engineers]."

Truth: While freight bottlenecks cause delay, this claim omits the important fact that freight railroad infrastructure is owned and financed by private rail companies—excluding the Northeast Corridor, which is owned by Amtrak. The National Environmental Policy Act only applies to significant federal actions, which federal law defines as "projects and programs entirely or partly financed, assisted, conducted, regulated, or approved by federal agencies."²³ For many infrastructure projects, using federal funding triggers the application of NEPA. Aside from a very few exceptions, the freight rail industry is responsible for financing infrastructure improvements without relying on federal grants, loans, or loan guarantees.

Importantly, funding is not the only trigger for an environmental review. A rail infrastructure project may require an EIS due to the need to secure certain federal permits. Yet the Common Good report provides no data on the percentage of freight rail projects that require an EIS or on the average length of those reviews. This lack of data does not stop the report from making calculations on the assumption that all capital projects require an EIS that lasts eight years. Furthermore, the report assumes—also in the absence of any data—that all delay caused by bottlenecks would be eliminated by shortening environmental review. These assumptions are simply not credible.

Claim: “Total costs of six-year delay in rebuilding transmission and distribution networks: \$819 billion.”

Truth: The estimates in the section rely on numerous questionable assumptions. First, the report states that at current market prices, the value of lost electricity due to inefficiency is \$25 billion annually. Without providing any citation, the report assumes that electricity transmission and distribution modernization projects require environmental review lasting at least eight years. Yet under current regulations, many of the repair, rehabilitation, and construction activities required to upgrade electricity transmission and distribution systems qualify for a categorical exclusion.²⁴ Specifically, federal regulations list the following exclusions: upgrading and rebuilding existing powerlines; construction of powerlines; and electric power substations and interconnection facilities, among others.²⁵ This means that companies could modernize a substantial share of the 642,000 miles of transmission lines and 6.3 million miles of distribution lines without undertaking an environmental review.²⁶

Second, the report argues that enhancing transmission and distribution efficiency would result in the closure of coal-fired power plants, but this argument obscures several important aspects of the U.S. electricity market. The growth rate in electricity demand has fallen each decade since the 1950s, and the architecture of the grid is changing rapidly as more distributed generation and advanced management models enter operation.²⁷ These changes, along with other market forces, affect the generation mix to a greater degree than transmission and distribution efficiencies. For these reasons, there is no guarantee that efficiency gains would lead to the replacement of coal-fired generation.

Third, the report assumes that all the electricity lost due to transmission and distribution inefficiencies comes from coal. This is an odd assumption to make, since America’s energy mix is not a mystery. According to the U.S. Energy Information Administration, only 30 percent of electricity production comes from burning coal.²⁸ This substantially reduces the social and environmental cost from emissions generated by electricity production. Generally, transmission and distribution planning, as well as siting, account for reliability, demand, and generation type. Thus, increasing the efficiency of existing—or constructing new—transmission and distribution infrastructure does not guarantee the retirement or addition of one power source over another.

Fourth, the report assumes that 75 percent of the total cost of rebuilding transmission and distribution infrastructure "would be directly affected by environmental review." The report provides no citation to support this claim. As previously noted, existing federal regulations contain a broad list of categorical exclusions. Additionally, the report uses an unsubstantiated assumption of 5 percent annual cost inflation and then assumes that projects would have their environmental review shortened by six years.

Fifth, the underlying premise of the electricity section is that grid modernization is the most effective means of reducing electricity losses due to inefficiency. While modernization is important, the 2015 Quadrennial Energy Review and 2015 Quadrennial Technology Review by the U.S. Department of Energy reveal that the most effective way to improve energy efficiency is by adopting higher-performing end-use technologies, such as LED lighting; increasing the installation of distributed generation along with additional energy storage to avoid hub-and-spoke grid architecture; and adopting smart grid management techniques and technologies that enable better insight into grid functioning and allow for more sophisticated demand management, reducing the number and severity of disruptions. Importantly, these types of investments often reduce the need for new electric lines altogether.³⁹

Taken together, the numerous baseless assumptions in this section of the Common Good report call into question the validity of the cost savings assumed from weakening environmental review.

Claim: "In 2009, America had the money (over \$800 billion in the economic stimulus package) but few permits. In its five-year report on the stimulus, released in February 2014, the White House revealed that a grand total of \$30 billion (3.6 percent of the stimulus) had been spent on transportation infrastructure."

Truth: This is perhaps the most disingenuous claim in the report, as it makes it seem as though Congress enacted \$800 billion for infrastructure but only a small fraction had been spent. In reality, the stimulus act contained only \$48 billion for transportation infrastructure—meaning that state and local governments spent 63 percent of transportation funds within five years.⁴⁰ This share may seem low, but it's worth remembering that in response to a massive drop in tax revenues due to the Great Recession, state and local governments furloughed thousands of public employees at the same time the federal government was pushing them to plan and implement an even larger volume of infrastructure projects.⁴¹

Claim: "Upwards of two million jobs can be created."

Truth: This calculation only has validity if all the underlying assumptions throughout the report are accurate, which they are not.

Claim: "Environmental review has become a litigation quagmire, as supporters and opponents argue over thousands of pages of details."

Truth: Each year, approximately 50,000 major federal actions require an EA, and another roughly 500 projects require full environmental impact statements.³³ Yet only around 100 NEPA cases are filed.³³ This means that only two-tenths of 1 percent of federal actions are subject to litigation.

Claim: "To cut the Gordian knot of multiple permits, the White House needs authority to resolve disputes among bickering agencies."

Truth: Once again, the report fails to accurately represent basic aspects of environmental law and regulations. Under Code of Federal Regulations, 40, 1504, the Council on Environmental Quality and the president of the United States have the authority to resolve interagency disputes regarding a proposed federal action.³⁴

Claim: "Without desalination plants, the aquifers in California will be further depleted."

Truth: Statements such as this show the critical value of NEPA and the alternatives analysis requirement. California faces real water challenges. Local, regional, and state water authorities have the responsibility to ensure that residents and businesses have clean, reliable water. However, desalination is only one of many possible options for meeting water demand. For example, Southern California faces spreading contamination within the San Fernando Groundwater Basin, or SFB, aquifer, which serves as a major source of groundwater.³⁵ Additionally, spring rains can cause the Los Angeles River to discharge vast quantities of fresh water into the Pacific Ocean. It may be the case that decontaminating the SFB aquifer and capturing, storing, and treating stormwater and wastewater are more cost-effective and less environmentally harmful than desalination. The only way for government officials and the public to engage on such a complex set of choices is through the detailed study required by environmental review.

Claim: "Law is supposed to be the framework for a free society, not an impediment."

Truth: It is unclear if there is a dictionary that defines a dirty environment and communities torn apart by poorly designed infrastructure facilities as "freedom."

Conclusion

The hard work of rebuilding America does not have any shortcuts. Imposing artificial deadlines for completion of environmental review will save the country little while substantially increasing the likelihood that state and local governments as well as the private sector will construct major facilities that cause unnecessary harms—potentially requiring hundreds of millions or billions of dollars in remediation later.

The United States needs to make major investments in infrastructure based on smart policies that ensure federal funds are targeted to projects that increase access to opportunity, provide support for communities most in need, protect the environment, and improve economic competitiveness. National progress and protecting the environment are not mutually exclusive. By engaging in thoughtful planning based on robust community outreach, project sponsors can deliver needed facilities with minimal impact on natural habitats and local communities.

Kevin DeGood is the Director of Infrastructure Policy at the Center for American Progress.

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Trump's Infrastructure Scam Will Gut Environmental Protections To Ben... <https://www.americanprogress.org/issues/green/news/2018/01/28/445496...>

Center for American Progress



ENERGY AND ENVIRONMENT

Trump's Infrastructure Scam Will Gut Environmental Protections To Benefit Corporate Polluters

By Christy Goldfuss and Alison Cassady | Posted on January 28, 2018, 8:59 am



Mandel Ngan/Getty

President Donald Trump steps off Air Force One upon return to Andrews Air Force in Maryland, January 18, 2018.

In his first State of the Union address, President Donald Trump is expected to announce a long-awaited plan to upgrade the nation's infrastructure and call on the U.S. Congress to work with his administration on related legislation. Leaked versions of the infrastructure proposal, however, show that this is not a plan to put Americans to work rebuilding crumbling infrastructure. Instead, it's a full-scale gutting of environmental protections to benefit corporate polluters and steamroll American communities.

As detailed in the leaked proposal, the Trump administration's plan would require fundamental changes to no fewer than 10 bedrock environmental laws that protect the nation's clean air, clean water, wildlife, and national parks. The plan would hollow out the National Environmental Policy Act (NEPA), the law that requires federal project sponsors to consult with stakeholders who would be affected by new projects and identify ways to reduce their impact on the environment, public health, and cultural resources. The Endangered Species Act is also in the crosshairs, as several provisions would prioritize new development over the protection of wildlife that is on the brink of extinction. The Trump administration proposes significant changes to the Clean Air Act and Clean Water Act to make it easier for corporations to break ground and avoid inconvenient air and water quality protections. The proposal even includes some mystifying provisions, such as one to give Secretary of the Interior Ryan Zinke unilateral authority to site natural gas pipelines in national parks.

The Trump administration will attempt to brand these environmental attacks as an effort to improve the infrastructure permitting process. In actuality, they are attempting to steamroll hardworking Americans by silencing or disregarding communities' voices in determining where pipelines, highways, and other large projects should be built. Example after example shows the foolishness of that approach for the environment and public health. One only needs to look at certain communities that were built 50 years ago—before NEPA and other environmental laws existed—to see the detrimental impacts of this type of decision-making. In a particularly stark example, a low-income community in Orlando, Florida, continues to suffer the consequences of short-sighted transportation policy decisions that left the neighborhood surrounded by highways, isolated from the rest of the city, and trapped in a haze of air pollution.

While the Trump administration is proposing measures to sell out our air, water, and national parks to corporate polluters, it is ignoring tangible steps that it could take without gutting environmental protections. An important first step would be to implement laws already on the books. In 2012 and 2015 respectively, Congress enacted two pieces of legislation—the Moving

Trump's Infrastructure Scam Will Gut Environmental Protections To Ben... <https://www.americanprogress.org/issues/green/news/2018/01/28/445496...>

Ahead for Progress in the 21st Century Act (MAP-21) and Fixing America's Surface Transportation (FAST) Act—that contain provisions aimed at expediting the permitting process that are not fully implemented, such as measures to reduce duplication; track the progress of project delivery; integrate mapping and other data tools with fiscal management systems; and facilitate efforts to align historic preservation regulations. Congress also created the Federal Permitting Improvement Steering Council to manage the permitting process for certain complex projects.

Implementing new laws takes time, and layering new provisions only makes it harder. In March 2017, the Department of Transportation's (DOT) inspector general found that DOT delayed implementing a significant number of MAP-21's reforms because they had to stop midstream and comply with additional provisions mandated in the FAST Act. Rather than understanding and deploying the tools it already has, the Trump administration has jumped to the nuclear option—radical environmental rollbacks that grease the process for corporations at the expense of air and water quality and wildlife.

The best way for the Trump administration to speed up permitting without sacrificing environmental protection is to adequately fund the relevant federal agencies involved in the permitting and environmental review process. Without funding, the federal agencies cannot hire and train staff to complete environmental reviews or invest in technology that provides efficiencies. In DOT's "how-to" guide for environmental reviews, the agency notes that limited budgets and staff resources preclude many regulatory and resource agencies from assigning staff to work on reviews when they may already be strained to process pending workload in a timely manner. Instead of funding these professionals to provide the best information to make informed decisions, the Trump administration has proposed slashing agency budgets and undertaken the greatest assault that has ever been seen in the history of this country on these agencies that protect clean air, clean water, wildlife, and national parks.

With such a public record of promoting the interests of corporate polluters over communities and the environment, no one should be fooled by Trump's infrastructure scam. It is little more than a Trojan horse designed to gut the environmental protections that are necessary for the clean air, clean water, wildlife, and national parks that truly make America great.

Christy Goldfuss is the senior vice president for Energy and Environment Policy at the Center for American Progress. Alison Cassady is the managing director for Energy and Environment Policy at the Center.



**BLUEGREEN
ALLIANCE**

THE RIGHT WAY TO REPAIR AMERICA'S INFRASTRUCTURE

Last year, BlueGreen Alliance released our Making the Grade 2.0 report outlining how a robust investment in America's infrastructure could create millions of quality jobs and protect the environment. We outlined three key elements to achieve that goal:

- A robust and broad public investment;
- Strong labor and procurement standards; and
- Forward-looking planning that delivers environmental benefits and builds resilient infrastructure systems.

Unfortunately, the infrastructure plan released this week by President Trump falls far short on all three counts. It passes the buck to states and local governments to carry the weight of investment, mentions little to assure workers that jobs created will be quality jobs, does not guarantee that projects will be required to use American products, and fails to consider the added strain climate change will put on our infrastructure in the future.

A Robust and Broad Public Investment

First, this infrastructure plan largely passes the buck to state and local governments (<https://www.nbcnews.com/politics/donald-trump/trump-rolls-out-infrastructure-plan-opening-door-private-investment-n847161>) and private entities to come up with the funds to make the infrastructure improvements our nation so desperately needs. But the truth of the matter is many state and

local governments are already financially strapped and are struggling to provide for even the most basic of needs, like education. The federal government has been neglecting our nation's infrastructure for too long, and the scope of the problem is too large to pass off to the states or cities that are already doing their fare share.

Moreover, Trump's plan doesn't actually provide any new funding at all—it's simply a re-packaging of existing funding. This "new" infrastructure funding will be offset by cuts (<https://www.npr.org/2018/02/11/584940681/trump-to-unveil-long-awaited-1-5-trillion-infrastructure-plan>) to things like transit funding and Transportation Investment Generating Economic Recovery (TIGER) grants (<https://www.transportation.gov/tiger/about>)—a successful grant program that allows the U.S. Department of Transportation to target investments across modes and regions where they will have the most impact.

A strong infrastructure package begins with a robust, public investment and must address the full scope of our infrastructure needs, including our buildings, electric grid, roads and transit systems, airports, water systems, and schools.

Strong Labor and Procurement Standards



The president's plan also does nothing to ensure that any jobs created by it would be good, family-sustaining jobs. Despite Trump's pledge during the State of the Union that infrastructure improvements would be made with "American heart, American hands, and American grit," (<https://www.cnbc.com/2018/01/30/trump-state-of-the-union-a-new-american-moment.html>) his new plan fails to make a simple pledge that these improvements would be made with

American products. Any infrastructure plan should include Buy American provisions that incentivize the use of American-made products and materials and, ultimately, spur domestic manufacturing.

Repairing the nation's infrastructure is a big job, and hard-working Americans will complete it. For an infrastructure plan to truly benefit American workers, it must include Davis-Bacon provisions—which ensure workers are paid prevailing wages on public works projects—and should use project labor agreements and community benefits agreements that can help ensure projects are completed effectively and on time, that communities and workers have a voice in project development, that people in low-income communities and communities of

color have the opportunity to get these jobs, and that returns on investment are maximized in the communities where these projects occur.

Not only does the infrastructure plan released this week offer no assurance that policies like Buy American and Davis-Bacon will be included, it actually proposes a number of exemptions that could weaken these critical protections—shifting funding for projects away from the federal government and creating potential loopholes around existing requirements.

A strong infrastructure package begins with a robust, public investment and must address the full scope of our infrastructure needs, including our buildings, electric grid, roads and transit systems, airports, water systems, and schools.

Forward-looking Planning & Resilient Infrastructure Systems

Finally, a modern infrastructure system should be built with the future in mind. Last year's historic storm season devastated communities in Texas, Florida, Puerto Rico, and the U.S. Virgin Islands. Wildfires are tearing through the West, and our nation's coasts are shrinking. Yet the President's plan does not make the connection between these impacts and how we should be investing in our communities (<http://www.businessinsider.com/trumps-infrastructure-plan-climate-change-environment-2018-2>). It does us no good to repair our infrastructure systems if they're only going to be destroyed again in months or years as stronger storms and severe weather impacts from climate change continue to grow.

To safeguard our investment and ensure our communities are more resilient moving forward, we need to build and rebuild in a climate-smart way. Any infrastructure package should

follow processes that ensure effective environmental review and public participation in infrastructure decisions while also prioritizing the resources needed to ensure these projects move forward swiftly and deliver benefits to communities and workers quickly.

The Bottom Line

Ultimately, we need an infrastructure plan developed with the best interests of American workers and communities in mind, and we need it soon. Congressional Democrats in both chambers released infrastructure plans that achieve our three goals: they put real federal dollars—\$1 trillion to be exact—on the table and prioritize the kinds of policies, including Davis Bacon and Buy America, that maximize benefits to workers and communities. Plans like these will ensure our infrastructure will be built to last, jobs created can sustain a family and boost local economies, and the systems we rely on every day are safer, cleaner, and more efficient.



Unfortunately, that is not the plan President Trump released. The difference between the proposals is more than just money; it's fixing water systems to avoid the lead poisoning we saw in Flint, Michigan; repairing your local bridges to prevent them from falling apart; stopping transit systems from breaking down and stranding riders; knowing our children are learning in healthy schools; and having our infrastructure systems ready for the next Hurricane Harvey, Irma, or Maria.

It's what America needs.

RELATED TOOLS & RESOURCES

Gauging Growth – The Freight Rail Supply Chain and Job-Creation Potential

(<https://www.bluegreenalliance.org/resources/gauging-growth-the-freight-rail-supply-chain-and-job-creation-potential/>)

Making the Grade: How Investments in America's Infrastructure Benefit Our Economy and Environment (<https://www.bluegreenalliance.org/resources/makingthegrade/>)

Members of BlueGreen Alliance Call on Congress to Pass Hurricane Relief Aid
(<https://www.bluegreenalliance.org/resources/members-of-bluegreen-alliance-call-on-congress-to-pass-hurricane-relief-aid/>)

Clean Infrastructure ([https://www.bluegreenalliance.org/resources/?s-issue\[\]=2](https://www.bluegreenalliance.org/resources/?s-issue[]=2))

High Road Investment in Public Infrastructure ([https://www.bluegreenalliance.org/resources/?s-issue\[\]=7](https://www.bluegreenalliance.org/resources/?s-issue[]=7))

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CONGRESS SHOULD SUPPORT AN INFRASTRUCTURE PLAN THAT BUILDS INFRASTRUCTURE — NOT GUTS HEALTH & ENVIRONMENTAL PROTECTIONS

“Americans demand protections for their health and environment and want infrastructure projects built in a smart, resilient and safe manner.”



The U.S. Capitol building in Washington, D.C.

PHOTO BY ARCHITECT OF THE CAPITOL

“

Our communities do not have to choose between solid infrastructure and healthy communities. They know we can have both, but Trump's proposal offers neither.

— Raul Garcia
Senior Legislative Counsel, Earthjustice

FEBRUARY 11, 2018

Washington, D.C. — In response to President Trump's infrastructure plan, **Raul Garcia, Senior Legislative Counsel at Earthjustice**, issued the following statement:

"This isn't an infrastructure plan; it's a cheap excuse to gut health and environmental safeguards that protect communities from dangerous, ill-conceived and poorly constructed projects. Americans demand protections for their health and environment and want infrastructure projects built in a smart, resilient and safe manner. Our communities do not have to choose between solid infrastructure and healthy communities. They know we can have both, but Trump's proposal offers neither.

"Trump's infrastructure plan is a scam that fails to provide actual investment in infrastructure, sells out to wealthy corporations and destroys safeguards that keep our communities safe. Similar to other actions by his administration, it disproportionately harms disenfranchised communities, leaving them without a voice in how, when or where infrastructure projects are built. It also bulldozes the very safeguards that make our national transportation, energy and security systems more resilient. In effect, Trump's plan would actually make our infrastructure more dangerous and likely to crumble in the near future.

<https://earthjustice.org/news/press/2018/congress-should-support-an-infrastructure-plan-th...> 2/27/2018

"We will continue to push Congress to reject this plan and support a commonsense plan that actually invests in the infrastructure we need without tearing down health and environmental protections Americans want."

CONTACTS

Raul Garcia, Earthjustice, (202) 797-5251

"Silence and inaction are breeding grounds for injustice, and Earthjustice will not stand by while this reality continues."

— TRIP VAN NOPPEN

President, Earthjustice. In response to President Trump's executive actions to target immigrants and refugees.

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The New York Times | <https://nyti.ms/2BTWC5l>

BUSINESS DAY

Trump's Infrastructure Plan Puts Burden on State and Private Money

By PATRICIA COHEN and ALAN RAPPEPORT FEB. 12, 2018

President Trump's \$200 billion plan to rebuild America upends the criteria that have long been used to pick ambitious federal projects, putting little emphasis on how much an infrastructure proposal benefits the public and more on finding private investors and other outside sources of money.

Unveiled on Monday, the infrastructure program that Mr. Trump has championed since the campaign is intended to attract a huge amount of additional money from states, localities and private investors. The goal is to generate a total pot of \$1.5 trillion to upgrade the country's highways, airports and railroads.

Those financial priorities are crystallized in the new guidelines established by the White House. The ability to find sources of funding outside the federal government will be the most important yardstick, accounting for 70 percent of the formula for choosing infrastructure projects. How "the project will spur economic and social returns on investment" ranks at the bottom, at just 5 percent.

4 In this new competition for federal funds, a plan to, say, build a better access road for a luxury development — a project with the potential to bring in

ARTICLES REMAINING

more dollars from private investors — could have a strong chance of getting the green light. By comparison, a critical tunnel overhaul that has trouble getting new money might not be approved.

“Instead of the public sector deciding on public needs and public priorities, the projects that are most attractive to private investors are the ones that will go to the head of the line,” said Elliott Sclar, professor of urban planning and international affairs at Columbia University. “Private investors will become the tail that will wag the dog, because they’ll want projects that will give returns.”

Proposals intended to serve more impoverished communities that require more state and local money, including improving drinking water in a place like Flint, Mich., could be given short shrift. Financial investors may not see a big profit in such a project.

“A private corporation has a fiduciary obligation to make a profit. The government is supposed to be providing a public service,” Mr. Sclar said.

The president’s plan recasts the federal government as a minority stakeholder in the nation’s new infrastructure projects. Half of the \$200 billion promised over 10 years will be used for incentives to spur even greater contributions from states, localities and the private sector. Mr. Trump also wants to speed up the approval process.

The White House budget, separately released on Monday, also gives federal agencies the authority to sell assets that would be better managed by state, local or private entities in cases where a sale would “optimize taxpayer value.” The budget suggests that Ronald Reagan Washington National and Dulles International Airports could be among the assets ripe for new owners.

Coming up with the \$200 billion in federal funding will not be easy. Republicans have already ballooned the deficit in last week’s spending agreement and with their tax cuts. Democrats are unlikely to go along with cuts that would offset the cost of Mr. Trump’s plan.

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With his infrastructure framework, the president is rethinking Washington's role.

Economic development has been the justification for federal involvement going back to the country's efforts in the early 1800s to improve harbors and rivers for navigation. It animated the 1902 Reclamation Act that funded irrigation projects that developed the western United States.

"National economic development benefits were the cornerstone of federal support," said Debra Knopman, a principal researcher at the RAND Corporation. "That was the point."

Public health, safety and national defense were added in the 20th century as core values, when the government developed the national highway system and passed the Clean Water Act.

"Now, they're putting out incentive programs that don't have to generate national or regional economic developments," said Ms. Knopman, the lead author of a new 110-page RAND report on transportation and water infrastructure in the United States. "It may happen, but that's not what they're interested in and that's not the way they're screening these projects."

The math for the infrastructure plan also relies on a lot of unknowns.

Along with private investors, cities and states are being counted on to put up significant funds. They have a need. States have been struggling for years to rejuvenate creaky roads, bridges and ports. And even if the plan appears to put much of the onus on them to finance projects, any additional federal funding is welcome.

"States won't look down their nose at adding more money for infrastructure," said John Hicks, executive director of the National Association of State Budget Officers. "It's seen primarily as a positive, because it continues to shine light on a shared need of infrastructure improvement."

4 But cities and states are not necessarily flush with cash for new infrastructure projects.

ARTICLES REMAINING

Congress has thrown their finances into upheaval, with local lawmakers still trying to come to grips with the effects of the \$1.5 trillion tax overhaul that was passed last year. Many states have already expressed concern that it will be hard for them to increase state and local taxes, because deductions on them have been limited.

Some are considering other ways, such as gasoline taxes, to raise funds, but it may not be enough to fund new infrastructure projects. A report released last month by Fitch, the ratings agency, found that many states could see their tax revenue fall from the changes to the individual and corporate taxation laws.

David Damschen, Utah's treasurer, said his state faces many infrastructure challenges as it works to accommodate a growing population, expand its stock of affordable housing and improve the transportation system. He said Utah was already looking for new sources of tax revenue to fund projects because sales tax and gas tax revenue had been declining.

But Mr. Damschen also noted that public-private partnerships do not tend to work well in his state. "When things roll out, you'll find what the market will do with these ideas," he said. "Sometimes creative ideas don't always have the level of acceptance in the marketplace as you hoped."

The amount of federal funds — \$20 billion a year — will be spread very thin when stretched across the entire country. It is also unclear how much new money, as opposed to repurposed funds, the federal government is actually supplying.

One analysis by the Penn-Wharton Budget Model at the University of Pennsylvania said that other pieces of the White House budget could end up reducing federal infrastructure spending by \$55 billion over 10 years — despite the president's new plan.

Douglas Holtz-Eakin, former director of the Congressional Budget Office and the president of the conservative American Action Forum, complimented

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aspects of the president's initiative that dealt with streamlining regulations

ARTICLES REMAINING

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ONE HUNDRED FIFTEENTH CONGRESS
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Majority (202) 226-2927
Minority (202) 225-3641

March 20, 2018

Mr. John J. Devine
Senior Vice President
HDR Inc.
970 Baxter Boulevard
Portland, ME 04103

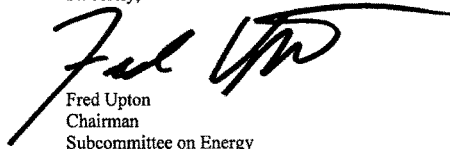
Dear Mr. Devine:

Thank you for appearing before the Subcommittee on Energy on February 27, 2018, to testify at the hearing entitled "State of the Nation's Energy Infrastructure."

Pursuant to the Rules of the Committee on Energy and Commerce, the hearing record remains open for ten business days to permit Members to submit additional questions for the record, which are attached. To facilitate the printing of the hearing record, please respond to these questions with a transmittal letter by the close of business on Tuesday, April 3, 2018. Your responses should be mailed to Kelly Collins, Legislative Clerk, Committee on Energy and Commerce, 2125 Rayburn House Office Building, Washington, DC 20515 and e-mailed in Word format to kelly.collins@mail.house.gov.

Thank you again for your time and effort preparing and delivering testimony before the Subcommittee.

Sincerely,



Fred Upton
Chairman
Subcommittee on Energy

cc: The Honorable Bobby L. Rush, Ranking Member, Subcommittee on Energy

Attachment



March 30, 2018

Mailed and E-mailed (WORD format) to: Kelly Collins, Legislative Clerk, Committee on Energy and Commerce, 2125 Rayburn House Office Building, Washington DC 20515;
Kelly.collins@mail.house.gov

The Honorable Fred Upton
 Chairman Subcommittee on Energy
 House of Representatives
 Committee on Energy and Commerce
 2125 Rayburn House Office Building
 Washington DC 20515-6115

RE: Letter of March 20, 2018 With Additional Questions for the Record Regarding the U.S. House of Representatives Committee on Energy and Commerce, Subcommittee on Energy, February 27, 2018 Hearing: "State of the Nation's Energy Infrastructure"

Dear Chairman Upton,

It was an honor to testify on behalf of the National Hydropower Association (NHA) at the House Energy Subcommittee hearing on our nation's infrastructure on February 27, 2018. I am in receipt of additional questions forwarded from the Subcommittee, and I respectfully provide responses below.

1. Mr. Devine, you stated in your testimony that current market policies do not adequately compensate hydropower and pumped storage projects for the environmental and grid benefits that they provide.

a. What should Congress consider when it comes to valuing hydropower?

Response: In addition to the clean, renewable generation hydropower brings to the grid itself, it is also capable of a wide variety of services required to maintain the reliability and flexibility of the transmission grid. These services include system regulation and supply/demand balance, voltage and frequency support, stability, and black start capability. Hydropower can also have the flexibility to rapidly and efficiently ramp generation up and down in response to changes in the balance between electrical loads and generators, facilitating the integration of variable generation, such as wind and solar. Pumped storage provides many of the same grid services described above and is also being used more frequently as an integrator of new renewable generation.

hdrinc.com

970 Baxter Boulevard Suite 301 Portland, ME 04103-5346
 (207) 775-4495

Chairman Fred Upton
 Page 2
 March 30, 2018

These benefits are rarely considered when Congress debates, and ultimately when it enacts, energy and environmental policy. For example, hydropower is not currently fully recognized as a renewable energy resource in federal procurement policies and other renewable energy policies throughout the federal government. In addition, the tax credits for hydropower have currently lapsed, while those for other electricity resources have been extended for the long term or are permanent in the tax code. Simply said, while the growth of renewables in many cases depends on and directly benefits from hydropower's capabilities, the industry continues to receive unequal tax treatment at the hands of Congress. Finally, the Congress should take a more active role in highlighting the role of hydropower and pumped storage in our national electricity portfolio and in directing the administration, the Federal Energy Regulatory Commission, and other regional policymakers (e.g. independent system operators and regional transmission organizations) to adopt market policies that do not pick winners and losers.

The industry supports policy development that evaluates energy technologies for their abilities to provide supporting services to the overall electric grid, particularly when taking into consideration project lifecycle costs and performance. If done so, the industry expects that the contribution of hydropower and pumped storage to grid planning and operations would increase. NHA would welcome the opportunity to work with the Committee further on specific policy proposals and recommendations on hydropower valuation.

2. Mr. Devine, HDR has worked on projects in just about every corner of the energy industry from transmission development to wind, LNG export terminals to solar, biogas to hydroelectric.

- a. Based on these experiences, what would you identify as the greatest challenge to modernizing and expanding energy infrastructure?**
- b. What are some ways that Congress can help?**

Response: This is a transformative time for energy industries with many disruptive trends impacting markets and business models. These trends include but are not limited to:

- Lack of load growth of electric demand and usage
- Increasing influence of Energy Efficiency (EE) programs and Distributed Energy Resources (DER)
- Shale gas availability which lowers competitive power prices impacting legacy assets (coal & nuclear) and challenges renewable implementation
- Customer changes – “prosumers” versus consumers and future digitization impacts

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- Energy politics versus energy policy - historically environmental policy drives energy policy
- Uncertainty in economic policy, tariffs, and subsidies and the associated impacts to new asset development

As such the challenges with modernizing our energy infrastructure are broad based as we transition to a clean, digital and distributed system, while at the same time the importance and vulnerability of the interconnected grid remains paramount. The pace of technology change and solution innovation is outpacing regulatory change. The challenge is for regulators to offer stakeholder options and flexibility to competitively integrate the variety of energy sourcing technologies and alternatives and meet customer demands while also identifying effective policies to support the transition of the utility business model. The decoupling of revenue from sales volume (kWh's) and/or asset development as currently designed for the traditional centralized electric delivery model while transitioning to a service focused revenue model is fundamental to the future.

Technology advancements will continue to force legal and regulatory changes which in turn will lead to market and industry transformations. The greatest obstacle to innovation is the existing regulatory model and rate structure and finding the resources to deal with these changes at state and local levels is key. The parallels to the 1970's regulated telecommunication industry is striking as that structure of 40 years ago no longer exists owing to the many changes that began with technology advances and disruptive market forces.

I hope this addresses the additional questions, and I remain at your service to provide further information to the House Subcommittee.

Sincerely,
HDR

[REDACTED]

John J Devine PE
Senior Vice President Hydropower

cc: The Honorable Bobby L. Rush, Ranking Member, Subcommittee on Energy
cc: Jeff Leahey, National Hydropower Association

GREG WALDEN, OREGON
CHAIRMAN

FRANK PALLONE, JR., NEW JERSEY
RANKING MEMBER

ONE HUNDRED FIFTEENTH CONGRESS
Congress of the United States
House of Representatives
COMMITTEE ON ENERGY AND COMMERCE
2125 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, DC 20515-6115
Majority (202) 225-2927
Minority (202) 225-3641

March 20, 2018

Mr. Brian Slocum
Vice President, Operations
ITC Holdings Corporation
27175 Energy Way
Novi, MI 48377

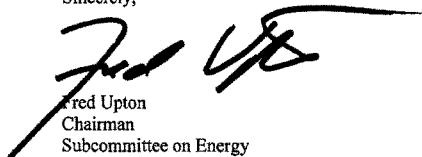
Dear Mr. Slocum:

Thank you for appearing before the Subcommittee on Energy on February 27, 2018, to testify at the hearing entitled "State of the Nation's Energy Infrastructure."

Pursuant to the Rules of the Committee on Energy and Commerce, the hearing record remains open for ten business days to permit Members to submit additional questions for the record, which are attached. To facilitate the printing of the hearing record, please respond to these questions with a transmittal letter by the close of business on Tuesday, April 3, 2018. Your responses should be mailed to Kelly Collins, Legislative Clerk, Committee on Energy and Commerce, 2125 Rayburn House Office Building, Washington, DC 20515 and e-mailed in Word format to kelly.collins@mail.house.gov.

Thank you again for your time and effort preparing and delivering testimony before the Subcommittee.

Sincerely,



Fred Upton
Chairman
Subcommittee on Energy

cc: The Honorable Bobby L. Rush, Ranking Member, Subcommittee on Energy

Attachment



March 29, 2018

The Honorable Fred Upton, Chairman
Committee on Energy and Commerce
Subcommittee on Energy
2125 Rayburn House Office Building
Washington, DC 20515-6115

Re: February 27, 2018 Hearing – Response to Additional Questions for the Record

Dear Chairman Upton,

Thank you for the opportunity to testify before the Subcommittee on Energy of the Committee on Energy and Commerce of the U.S. House of Representatives on Tuesday, February 27, 2018 at the hearing entitled "State of the Nation's Energy Infrastructure," and for the opportunity to address additional questions.

Attached are my responses to those additional questions per your letter dated March 20, 2018. I appreciate the opportunity to support the important work of the subcommittee. Should you have any questions with regard to the attached, please do not hesitate to contact me.

Sincerely,

A black rectangular box redacting the signature of Brian Slocum.

Brian Slocum

cc: The Honorable Bobby L. Rush, Ranking Member, Subcommittee on Energy
Ms. Kelly Collins, Legislative Clerk at U.S. House of Representatives
Jason Stanek, Committee Staff
Richard Kessler, Committee Staff

Attachment: Reply of Brian Slocum, Additional Questions for the Record

Before The
United States House of Representatives
Committee on Energy and Commerce
Subcommittee on Energy

Responses to Additional Questions following Hearing entitled

“State of the Nation’s Energy Infrastructure”
Submitted by Brian Slocum on behalf of ITC Holdings Corporation

March 29, 2018

Responses to the Additional Questions for the Record Posed by the Honorable Fred Upton

1. Mr. Slocum, while much of our nation’s infrastructure depends on federal investments, the private sector needs to step up to make needed investments in our grid.
 - a. In your view, what is the greatest impediment to unleashing more private sector investments?

Response: The private sector stands ready to invest in a robust transmission grid that will support a 21st century economy. While federal funds are not needed to support this investment, policy and regulatory hurdles are currently limiting the type of large scale investments in regional and interregional transmission needed to create the future grid. Chief among these hurdles are: 1) unsettled, potentially inadequate federal returns on transmission investment¹; and 2) policies for planning new transmission projects and assigning their costs that are often overly rigid and reactive to facts on the ground, rather than proactive in anticipating future needs. Without regulatory and policy certainty, ITC believes the United States is in danger of missing opportunities to make needed investments in grid infrastructure that will create jobs, grow the economy, increase access to low-cost generating resources, and lower energy prices for consumers across the country.

As the conversation about national infrastructure continues, the grid must be recognized for its vital role in powering America’s digital economy and enabling other vital infrastructure. Our country needs substantial and long-term investments in the grid in order to expand our economy, grow jobs and compete globally. Despite the urgency of this issue, many regional transmission planning processes fail to fully consider how transmission can facilitate emerging economic and policy trends, and planning between RTOs and ISOs remains largely perfunctory. A more proactive approach to transmission planning is needed to ensure we have the right grid to facilitate the changes we see coming today.

¹ Transmission Investment: Revisiting the Federal Energy Regulatory Commission’s Two-Step DCF Methodology for Calculating Allowed Returns on Equity. Edison Electric Institute. 2017.
<http://www.eei.org/issuesandpolicy/transmission/Documents/ROE%20White%20Paper.pdf>

To be sure, FERC has taken a number of actions over the years to advance the ball on transmission planning and cost allocation, and ITC lauds those efforts. However, the recent slowdown in regionally planned projects, and the absence of inter-regional transmission projects, have demonstrated that more needs to be done.

First, ITC believes policy should empower transmission planners to consider a wide range of future scenarios and drivers for new transmission investments, including: the need for resilience against natural and man-made threats, the ability to efficiently integrate new generation resources, and the need to support a more electrified economy. Second, we must consider the full range of transmission benefits as part of a holistic benefits analysis, as opposed to today's highly fractured analysis in which transmission benefits are considered in isolation rather than seeking to determine the full value of a potential investment. Finally, in addition to the challenges involved with planning, financing, and siting new grid infrastructure, achieving consensus around "cost allocation" (determining who pays and how much) is a difficult process. To the extent FERC can assist the industry in better aligning costs with beneficiaries for transmission projects that create a more robust and integrated grid, investment certainty will increase.

b. What could Congress do to encourage more public private partnerships?

Response: As an independent transmission company, ITC has limited familiarity with public-private partnerships for purposes of funding new infrastructure. However, we appreciate the federal government's role in creating pilot programs for new grid technologies like storage, and its role partnering with the electric industry on grid security issues. For example, the industry is currently working with Department of Energy (DOE) National Labs and through the independent Electric Power Research Institute (EPRI) to research potential threats to the grid and evaluate credible responses.

2. Mr. Slocum, as a representative of a company that specializes in transmission development, what would you say is the average timeframe for the permitting and siting of transmission projects?

Response: The timeframe for permitting and siting of transmission projects varies widely depending on a range of factors, including the length of the transmission line in question, whether it crosses one or more federal or state jurisdictions, and whether new right-of-way is needed. Because there are so many variables involved, it may be misleading to assign an overall average length of time for permitting. In ITC's experience, upgrades to existing lines that do not need new right-of-way and have little to no permitting requirements can usually be commenced and completed within 12-24 months. By comparison, new transmission lines that cross multiple federal or state jurisdictions can take as long as a decade to permit. As a rule, the process is significantly lengthened if permits are needed from multiple state and federal agencies.

a. Is the timeframe different when the project crosses state lines or RTO regions?

Response: Yes. Transmission projects that cross multiple states are subject to unique permitting risks due to the need to receive approvals from permitting agencies in different states where requirements may differ widely. ITC is advancing one such project in Wisconsin and Iowa

designed to reduce congestion and integrate wind energy. The project was approved by the ISO in 2011, but we do not expect to energize the project until 2023. In other cases, multi-state transmission lines may not be approved at all, such as the Northern Pass transmission line in the New England region.

b. What challenges does the length of the timeframe present?

Response: The lengthy federal and state permitting process increases the overall risk profile of transmission investment. From a consumer perspective, regional transmission lines are often approved by RTOs and ISOs because they are expected to provide a suite of benefits to electric customers in those regions, including increased reliability, resilience, market efficiency, and ability to integrate low cost generation resources. Thus, to the extent these projects are subject to permitting delays, the expected benefits of the projects are also deferred, which can impose a significant opportunity cost on electric customers.

c. What are some ways that Congress can expedite siting and permitting processes?

Response: In my testimony, I cited a range of reforms Congress could consider to streamline and shorten the federal permitting process, including aggressive implementation of Title 41 of the FAST Act. These suggested reforms include: requiring concurrent NEPA analysis and environmental reviews by all permitting agencies; requiring cooperating agencies to use the information already contained in the lead agency's NEPA document as the basis for their permit related reviews; and setting a firm deadline on the NEPA process. ITC believes these are best practices that can expedite permitting without weakening NEPA or the environmental review process. In addition, for projects that may encounter difficulty receiving state-level permits, Congress could consider revisiting and refining DOE's ability to designate federal siting corridors by addressing concerns that made backstop siting provisions in the Energy Policy Act of 2005 ineffective.

3. Mr. Slocum, you testified that we need to take proactive steps to reform our procedures for planning and approving new lines.

a. Wasn't that the purpose of FERC's transmission planning rule as laid out in Order 1000?

Response: Order 1000 included provisions designed to facilitate regional transmission planning and cost allocation, particularly in non-RTO regions that previously lacked a requirement to examine regional needs. At the same time, Order 1000 implemented competitive bidding processes for the subset of transmission projects that receive regional cost allocation treatment. While FERC's goals in advancing Order 1000 were laudable, the planning provisions did not go far enough to create truly holistic and forward looking transmission planning. Meanwhile, other provisions have resulted in unintended consequences that may actually be working in direct opposition to a more holistic planning process. Given the recent slowdown in regionally planned projects, and the absence of inter-regional projects, FERC should revisit Order 1000 to ensure its planning and cost allocation requirements are achieving the intended results.

b. Has Order 1000 failed to develop inter-regional lines between RTOs and ISOs?

Response: Yes. While Order 1000 required RTOs and ISOs to coordinate on issues impacting their seams, it did not require regions to conduct formal inter-regional transmission planning. As

a result, the RTOs and ISO's have made only minimal progress in developing joint approaches to resolving seams issues, and no Order 1000 inter-regional lines have been developed. Interregional coordination requirements of Order 1000 have not resulted in projects to resolve congestion, price separation, and other issues between regions. In order to ensure we are taking advantage of opportunities for trade between regions, ITC believes it is necessary for RTOs and ISOs to bridge their borders to create dedicated joint planning and cost allocation procedures. Regions should be required to jointly plan across their seams, while still allowing for regional partners to have flexibility in how they choose to do so.

c. What about intra-regional transmission projects?

Response: In many regions, procedures for planning intra-regional lines remain highly fractured and limited in scope. While Order 1000 implemented certain requirements for intra-regional planning, it has generally not resulted in more holistic procedures. For example, in most cases, an intra-regional transmission line is evaluated based on whether it can provide a *single* benefit sufficient to justify its costs. In practice, however, regional transmission lines almost always provide a wide range of benefits that often shift and multiply as the system evolves. Thus, today's processes are structurally biased to significantly underestimate the potential benefits provided by regional transmission. Reforms are necessary to ensure that the full range of transmission planning drivers and transmission benefits are regularly evaluated as part of a holistic transmission planning process.

GREG WALDEN, OREGON
CHAIRMAN

FRANK PALLONE, JR., NEW JERSEY
RANKING MEMBER

ONE HUNDRED FIFTEENTH CONGRESS
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2125 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, DC 20515-6115
Majority (202) 225-2927
Minority (202) 225-3841

March 20, 2018

Mr. Jim Ross
Director
International Brotherhood of Electric Workers
Construction and Maintenance Department
900 Seventh Street, N.W.
Washington, DC 20001

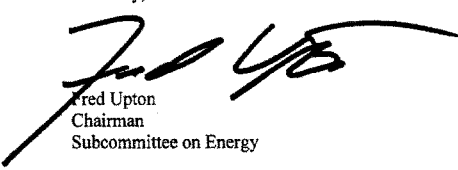
Dear Mr. Ross:

Thank you for appearing before the Subcommittee on Energy on February 27, 2018, to testify at the hearing entitled "State of the Nation's Energy Infrastructure."

Pursuant to the Rules of the Committee on Energy and Commerce, the hearing record remains open for ten business days to permit Members to submit additional questions for the record, which are attached. To facilitate the printing of the hearing record, please respond to these questions with a transmittal letter by the close of business on Tuesday, April 3, 2018. Your responses should be mailed to Kelly Collins, Legislative Clerk, Committee on Energy and Commerce, 2125 Rayburn House Office Building, Washington, DC 20515 and e-mailed in Word format to kelly.collins@mail.house.gov.

Thank you again for your time and effort preparing and delivering testimony before the Subcommittee.

Sincerely,



Fred Upton
Chairman
Subcommittee on Energy

cc: The Honorable Bobby L. Rush, Ranking Member, Subcommittee on Energy

Attachment

Attachment—Additional Questions for the Record

The Honorable Fred Upton

1. Mr. Ross, as the U.S. energy landscape continues to evolve, how important is continuing education and training to success in the industry?
 - a. What steps could Congress take to promote the sharing of information and best practices, particularly as they pertain to new technologies such as distributed energy resources and advanced transmission devices?
2. Mr. Ross, in your written testimony, you referenced the Northern Pass transmission project, which would bring hydropower from Canada to the U.S. As you know, this project has been effectively halted by the state siting commission.
 - a. In your opinion, how can Congress help federal authorities better balance the needs of a region with the interests of individual states?

GREG WALDEN, OREGON
CHAIRMAN

FRANK PALLONE, JR., NEW JERSEY
RANKING MEMBER

ONE HUNDRED FIFTEENTH CONGRESS
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House of Representatives
COMMITTEE ON ENERGY AND COMMERCE
2125 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, DC 20515-6115
Majority (201) 225-2927
Minority (202) 225-3841

March 20, 2018

Dr. Jennifer Chen
Sustainable FERC Project Attorney
Natural Resources Defense Council
1152 15th Street, N.W.; Suite 300
Washington, DC 20005

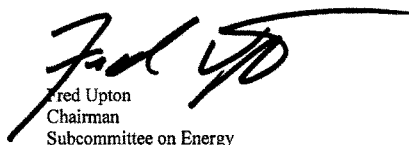
Dear Dr. Chen:

Thank you for appearing before the Subcommittee on Energy on February 27, 2018, to testify at the hearing entitled "State of the Nation's Energy Infrastructure."

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Thank you again for your time and effort preparing and delivering testimony before the Subcommittee.

Sincerely,



Fred Upton
Chairman
Subcommittee on Energy

cc: The Honorable Bobby L. Rush, Ranking Member, Subcommittee on Energy

Attachment

Natural Resources Defense Council
1152 15th Street NW, Suite 300, Washington, DC 20005



April 3, 2018

The Honorable Fred Upton
Chairman, Subcommittee on Energy
U.S. House Committee on Energy and Commerce
2125 Rayburn House Office Building
Washington, DC 20515

Dear Chairman Upton:

Thank you again for the opportunity to testify at the February 27, 2018 hearing on the State of the Nation's Energy Infrastructure before the Subcommittee on Energy.

Attached are my responses to questions for the record posed by the members of the Committee. Please let me know if I can be of further assistance.

Sincerely,

/s/ Jennifer Chen

Jennifer Chen
Attorney, Sustainable FERC Project
Climate & Clean Energy

Attachment

**Responses to Questions for the Record on "State of the Nation's Energy
Infrastructure"**

**Jennifer Chen
Attorney, Sustainable FERC Project, Climate & Clean Energy
Natural Resources Defense Council**

**Before the
Subcommittee on Energy
Committee on Energy & Commerce
United States House of Representatives
Washington, D.C.**

**February 27, 2018 Hearing
April 3, 2018 Responses**



**Natural Resources Defense Council, Inc.
1152 15th St. NW, Suite 300
Washington, D.C. 20005**

From the Honorable Frank Pallone, Jr.

Question 1. Majority witnesses broadly claim that regulatory and permitting requirements lead to delays (hydro says 10 years), but when asked for details, they provided none. Understanding that federal, state, local, tribal review and coordination for complex projects take time, and given the evidence that federal EIS review takes a median of 3.7 years, what do you think is the main driver of delay?

Answer:

Modernizing our nation's energy infrastructure to take advantage of current technologies and low-cost emissions-free energy resources is critical to cost-effectively meeting our nation's energy demands and achieving important public policy goals. If planned right, we could efficiently update our grid to harness American wind and solar power and mitigate manmade and natural threats while creating good jobs. Of the challenges impeding such grid modernization efforts, NEPA analysis and environmental review are not typically among them.

Testimony faulting regulatory review for delays tend to lump together state, local, and tribal review and coordination processes along with federal NEPA or environmental review without specifying the main drivers of delays. Concluding that NEPA needs to be further "streamlined" without examining the broader process to pinpoint the real source of delay risks creating complications while leaving real problems unaddressed.

Causes of delay depend on the type of project. For renewable project development, financing and lack of access to transmission are the main challenges. For multistate transmission development, the main drivers of delay are opposition from state and local governments and stakeholders and multi-jurisdictional coordination and resolution of conflicts. (And this issue is compounded by the fact that few multistate transmission projects make it through the planning process to begin with). For hydro licensing, inadequate funding for state and federal permitting processes may hobble review of 50-year-old projects due for relicensing under a very different environmental framework that did not exist 50 years ago.

In the context of renewables, financing tends to be the most significant challenge. The U.S. Government Accountability Office (GAO) and Department of the Interior, Office of the Inspector General (DOI) investigated whether and how permitting was a barrier to deploying projects and affiliated transmission infrastructure. Neither investigation identified permitting as the most substantial hurdle to deployment. The DOI highlights that "price competitiveness is perhaps the most significant barrier to renewable energy installations. Government can play a supportive role in renewable energy investment through a wide variety of tax incentives, including credits, grant funds, and accelerated depreciation (allowing larger deductions in the earlier years of an energy asset's life)."¹ The GAO also pointed to financing as a key driver for project cancellation.²

¹ DOI Inspector General's Statement Summarizing the Major Management and Performance Challenges Facing the U.S. Department of the Interior (Nov. 2016) at 8, (DOI Report) <https://www.doi.gov/sites/doi.gov/files/2016ER049Public.pdf>.

² "BLM officials we spoke with told us that one reason that some renewable energy projects were withdrawn was that financing was not available because of concerns about whether the

Another key factor the GAO acknowledged as impeding the pace of renewable energy development is the limited access to transmission lines (which are often scarce in areas where renewable energy is abundant).³

The key issues driving delays for multistate transmission projects are multi-jurisdictional coordination and resolution of conflicts as well as state and local opposition. In contrast to renewable energy development, transmission project development generally does not suffer from lack of funding.

Multi-jurisdictional coordination and resolving potentially conflicting approval processes for siting transmission between states and local government takes time. Federal, state, local, and tribal governments must work together to consider and minimize potential impacts on safety and security, as well as on environmental and community resources and resolve conflicting stakeholder interests. States can have incongruent and different approaches to transmission siting: some states have infrastructure authorities that coordinate review for interstate lines while others leave siting decisions up to individual counties, greatly extending the approval time for interstate projects.

To improve coordination at the federal level, the previous two administrations have worked to coordinate the environmental review activities of federal agencies.⁴ Under existing federal policies, agency reviews from departments and bureaus are coordinated under a single entity and done contemporaneously. Title 41 of the FAST Act changed the federal permitting process for major infrastructure and other capital projects to: (1) better coordinate and set deadline for permitting decisions; (2) enhance procedural transparency; and (3) tighten deadlines for litigation challenging permitting decisions. FAST Act Title 41 created a new inter-agency Federal Infrastructure Permitting Improvement Steering Council (FPISC) to set model or presumptive deadlines, facilitate resolution of interagency disputes, and allocate funding and personnel resources to support the overall decision-making process. FAST Act Title 41 also enumerates and strongly encourages use of a suite of NEPA best practices aimed at improving the timing

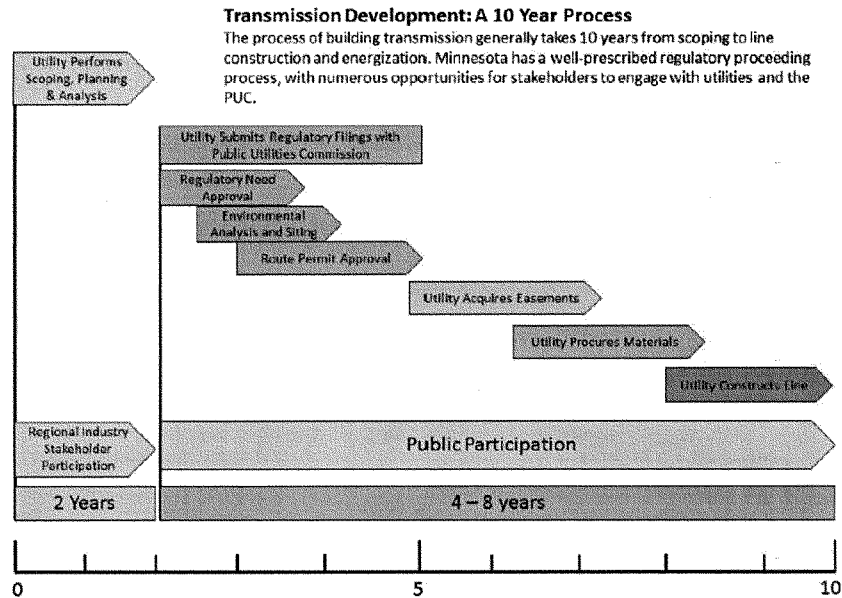
project could repay its investment costs. These officials said that financing for permitting, construction, and other aspects of development is more likely to be available to applicants who demonstrate that demand is sufficient and that the cost of supplying power allows for profitability.” GAO Report to the Ranking Member, Committee on Natural Resources, House of Representatives, Renewable Energy: Agencies Have Taken Steps Aimed at Improving the Permitting Process for Development on Federal Lands (Jan. 2013) at 41, <https://www.gao.gov/assets/660/651362.pdf>.

³ *Id.* at 7-8.

⁴ The Obama administration made the review schedule for high-priority projects more transparent by launching the Permitting Dashboard. The Bush administration created a task force to help move complex projects through the permitting process. NEPA Task Force, “Modernizing NEPA Implementation,” September 2003. <https://ceq.doe.gov/docs/ceq-publications/report/finalreport.pdf>.

and quality of environmental reviews. The FPISC compiles recommendations for best practices annually.⁵

As noted by the FPISC,⁶ regulatory review and permitting can often be done concurrently when it makes sense. The chart below from a University of Minnesota study provides a general picture of how regulatory review fits into the overall process in terms of sequencing and timing.



State or local opposition is also an issue in transmission siting. At the hearing, we were heartened to hear Mr. Jim Ross testify that the IBEW does not support efforts to diminish

⁵ Another way federal agencies are coordinating infrastructure development is through Regional Reviews of the West-wide Energy Corridors designated under Section 368 of Energy Policy Act 2005. The Bureau of Land Management, U.S. Forest Service, and Department of Energy are leading the reviews, which will be completed in 2019. The reviews will recommend improvements to better facilitate infrastructure development while limiting impacts to the environment.

⁶ The Federal Permitting Improvement Steering Council, Recommended Best Practices for Environmental Reviews and Authorizations for Infrastructure Projects for Fiscal Year 2018 on December 1, 2017
<https://www.permits.performance.gov/sites/permits.performance.gov/files/docs/documentati%20on/40856/fast-41fy-2018best-practices-report.pdf> at 7.

current environmental protections but seeks to make the process more efficient.⁷ While IBEW in its written testimony had provided as examples Northern Pass and Clean Line to make the case that “plenty of energy infrastructure projects that have been in the permitting process for years,” Mr. Ross clarified in his oral testimony that both of the projects mentioned were inhibited by *state* and *local* regulatory resistance.⁸ These are examples of delays due to state and local opposition, not federal permitting. When Mr. Ross was asked about permitting delays, he acknowledged the issue but responded that most of the delayed projects have been through the siting permitting process but are being held up because someone understandably doesn't want a power line in their back yard.⁹

Indeed, where there is state or local opposition, early and close collaboration with tribal, state, and local governments is critical, and robust public engagement is essential for the credibility of the siting, permitting, and review process. Such engagement is key to encourage compromise, minimize conflict, and mitigate potential impacts – and is likely to reduce delays in reaching a decision. States and other stakeholders need to know how the proposed projects benefit them, and early engagement is important to bringing them on board.¹⁰

A recent report by the University of Minnesota showcases a good example of early coordination and engagement in successfully addressing local opposition to an eleven-utility, four-state transmission project involving thousands of landholders.¹¹ The project, CapX2020 (short for “Capacity Expansion Needed By 2020”) went relatively smoothly, which report authors attributed to the fact that project sponsors “engaged to an unparalleled degree with

⁷ State of the Nation’s Energy Infrastructure Hearing transcript lines 874-75.

⁸ *Id.* at lines 853-55.

⁹ *Id.* at lines 1444-52.

¹⁰ “BLM respondents identified the quality of coordination between parties involved in permitting individual projects as among the top factors that facilitated the permitting process Such coordination occurs throughout the application process, including the initial request for an application; when key portions of the application, such as the plan of development, are made final; when environmental analyses are conducted and NEPA documentation is prepared; and the issuance of the right-of-way. It also happens among several parties—between the applicant and BLM staff, among staff within BLM, and between BLM staff and staff from other federal and nonfederal agencies.” DOI Report at 35.

Some effort has been made to foster better state coordination. An example is a process coordinated by the Western Governors Association (WGA) in coordination with the Department of Energy (DOE) and other federal agencies. Differing state policies and federal requirements have been collected on a website available for developers to consult so they can better align their activities with these requirements and reduce delays.

¹¹ University of Minnesota Humphrey School of Public Affairs, Center for Science, Technology & Environmental Policy, Transmission Planning and CapX2020: Building trust to build regional transmission (Apr. 2016), http://www.capx2020.com/press/uofm-humphrey_capx2020_final_report.pdf.

landowners, town, city, and county administrators, state utility commissioners, legislatures, and regulators throughout the planning process to bring a new era of transparency and civic engagement to transmission planning, citing, and construction of new high-voltage transmission lines.”¹²

Question 2: Are there drawbacks to requiring concurrent NEPA analysis and environmental review by all permitting agencies?

Answer:

While concurrent NEPA analysis and environmental review by all permitting agencies is a good best practice, and we support requiring it for transmission projects, we hesitate to recommend mandating it in *all* circumstances outside of the transmission project context without better understanding why it is not always done.

Concurrent review is already encouraged, as noted by the FPISC:

Per 42 U.S.C. § 4370m-4, ‘each agency shall to the maximum extent practicable ... carry out the obligations of the agency with respect to a covered project under any other applicable law concurrently, and in conjunction with, other environmental reviews and authorizations being conducted by other cooperating or participating agencies, including environmental reviews and authorizations required under NEPA, unless the agency determines that doing so would impair the ability of the agency to carry out the statutory obligations of the agency.’ NEPA regulations (40 Code of Federal Regulations [C.F.R.] § 1500.2(c)) and CEQ (2012) also encourage integrating and coordinating environmental reviews or planning processes, such that as much of the review as possible can be concurrent rather than consecutive.¹³

¹² *Id.* at xi.

¹³ FPISC, Recommended Best Practices for Environmental Reviews and Authorizations for Infrastructure Projects for Fiscal Year 2018 on December 1, 2017, (FPISC Best Practices) <https://www.permits.performance.gov/sites/performance.gov/files/docs/documentation/40856/fast-41fy-2018best-practices-report.pdf> at 7. Other NEPA regulations provide similar guidance. See 40 CFR §1502.25(a) (“To the fullest extent possible, agencies shall prepare draft environmental impact statements concurrently with and integrated with environmental impact analyses and related surveys and studies required by the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.), the National Historic Preservation Act of 1966 (16 U.S.C. 470 et seq.), the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.), and other environmental review laws and executive orders.”).

The FPISC provided five examples of agency success stories where concurrent review was employed and additional examples of joint applications, but the list is not (and likely not intended to be) an exhaustive documentation of all such examples.¹⁴

We support requiring concurrent NEPA analysis and other regulatory review for transmission infrastructure. But concurrent review may not necessarily make sense in all circumstances. *Requiring* concurrent review could potentially diminish project flexibility or duplicate efforts. For example, requiring concurrent review could foreclose or inhibit information from one review process to sequentially feed into another, making it more difficult to revise a project based on its impacts and alternatives discovered during review before beginning the permit processing. This could predetermine the outcome without the benefit of the results from review. In addition, when permits are processed concurrently, the NEPA analysis may have to be supplemented and/or recirculated because an agency requires new permit terms or changes in the project that were not previously analyzed in detail in the NEPA document, which could then delay processing the permit.

We would like to see agencies and reviewing authorities implement concurrent review when it is sensible as well as many of the other best practices the FPISC recommends.¹⁵ But *always requiring* concurrent review and eliminating the conditional words “to the maximum extent practicable” from section 4370m-4 referenced above may not be advisable without some study of whether concurrent review is always practicable. Given that the FPISC is still relatively new, we recommend giving it time to socialize its best practices to further encourage concurrent review rather than mandating it for all types of projects at this time.

¹⁴ *Id.* at 18-23. The next section covers joint application processes or programmatic approaches among Federal, State, local, and tribal governments with similar authorities to reduce duplicative actions. *Id.* at 24-27.

¹⁵ The FPISC also recommends that “the development and early use of GIS and other tools to assist in identifying potential community, historical, and environmental resources in project areas. Project sponsors can make more informed and strategic siting decisions through the use of GIS and other tools about sensitive resources. The lack of early identification of impacts to sensitive resources often delays or stops projects according to the plan to implement EO 13604 (2012). Agencies should ensure the best available science and information can support fully informed and sound decision making.” FPISC Best Practices at 12.

NRDC has helped develop tools that provide information on environmental and cultural resources and calculators for capital and mitigation costs work as part of a transmission siting strategy. See, e.g., the ARRA-funded [WECC environmental data viewer](#) developed in concert with federal and state land and wildlife managers, utility transmission planners, archaeologists, land and wildlife experts, and tribal and historic preservation experts. DOE and WGA also built a [web tool](#) for developers to sort out conflicting state permit requirements, and in addition, DOE set up the [integrated interagency pre-application process](#) for NEPA planning to facilitate interaction between environmental and cultural resource stakeholders and developers.

Thank you for your questions, and we look forward to continuing to work with the Committee on this important topic.

/s/ Jennifer Chen

Jennifer Chen
Attorney, Sustainable FERC Project
Climate & Clean Energy
Natural Resources Defense Council
1152 15th Street NW, Suite 300, Washington, DC 20005

[REDACTED]
[REDACTED]

GREG WALDEN, OREGON
CHAIRMAN

FRANK PALLONE, JR., NEW JERSEY
RANKING MEMBER

ONE HUNDRED FIFTEENTH CONGRESS
Congress of the United States
House of Representatives
COMMITTEE ON ENERGY AND COMMERCE
2125 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, DC 20515-6115
Majority (202) 225-2827
Minority (202) 225-3641

March 20, 2018

Dr. Brenda Hellyer
Chancellor
San Jacinto College
8060 Spencer Highway
Pasadena, TX 77505

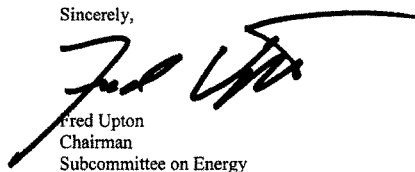
Dear Dr. Hellyer:

Thank you for appearing before the Subcommittee on Energy on February 27, 2018, to testify at the hearing entitled "State of the Nation's Energy Infrastructure."

Pursuant to the Rules of the Committee on Energy and Commerce, the hearing record remains open for ten business days to permit Members to submit additional questions for the record, which are attached. To facilitate the printing of the hearing record, please respond to these questions with a transmittal letter by the close of business on Tuesday, April 3, 2018. Your responses should be mailed to Kelly Collins, Legislative Clerk, Committee on Energy and Commerce, 2125 Rayburn House Office Building, Washington, DC 20515 and e-mailed in Word format to kelly.collins@mail.house.gov.

Thank you again for your time and effort preparing and delivering testimony before the Subcommittee.

Sincerely,



Fred Upton
Chairman
Subcommittee on Energy

cc: The Honorable Bobby L. Rush, Ranking Member, Subcommittee on Energy

Attachment



Office of the Chancellor

April 3, 2018

The Honorable Fred Upton
Chairman, Subcommittee on Energy
Committee on Energy and Commerce
2125 Rayburn House Office Building
Washington, D.C. 20515

Dear Chairman Upton:

Thank you for the opportunity to testify before the Subcommittee on Energy on February 27, 2018 concerning community colleges and the role they play in preparing our nation's workforce as it relates to energy and infrastructure. It was an honor to be invited to speak about the great work taking place in our community college classrooms.

I am writing this letter in response to additional questions for the hearing record from members of the subcommittee.

Questions from the Honorable Fred Upton

1. What incentives are needed to expand community college access and apprenticeship programs?

Although not necessarily the purview of this committee, the greatest incentive is Pell funding. The majority of students attending community colleges are at a financial risk and struggle to afford community college tuition, typically one-fourth the cost of universities. Providing funding for students through financial aid and scholarships will increase access to these programs.

In Texas, apprenticeships are difficult because it is a "Right-to-Work" state and many of our business and industry partners are concerned about the apprenticeship models as they do not want to open the door to an expanded role for unionized labor. With that said, flexibility in the apprenticeship programs to build programs that meet the needs of students, as well as our industry partnerships, will help. We have designed multiple programs based on our partner's needs.

Another area to consider is what we refer to as "externships." For many faculty, the changing technology in industry creates opportunities and the requirement for faculty professional development. Industry "externships," allow faculty members to spend time at the plants to see new processes, new technology, and experience the same "day in the life" they are teaching to students. Funding for grants to create externships would allow

the community college to release faculty for an externship (one to two weeks in length) and still ensure classes are covered while the faculty member is away and would be helpful in making sure faculty are teaching the workforce skills that meet current demands.

Lastly, any workforce grants that can assist community colleges with funding to purchase equipment will help ensure students are getting the appropriate hands on training. Equipment in these programs is frequently in the millions of dollars. Community colleges simply do not have budgets to accommodate these types of purchases, so we rely heavily on grants and philanthropy to ensure we are providing the best equipment needed.

2. How can community colleges better prepare their students for success in four-year engineering programs?

Community colleges across the country are working on an initiative called "Pathways." This initiative is about student success and is helping students reach their educational goals in the shortest time and at the least cost possible, but with maximum preparation and support. This initiative removes barriers for students, streamlines courses in the degree, and then maps the associate to a university degree so students know exactly what will transfer toward the degree.

This effort is engaging faculty across higher education and creating a pathway toward the four-year degree whether in engineering, business, science, technology, or mathematics.

San Jacinto College is part of a national grant offered through the American Association of Community Colleges and is fully engaged in this work. It is transforming the culture of our College and creating seamless transitions for students from community college to a university degree program.

3. What steps does your college take to ensure that your curriculum is teaching student the skills they need to succeed in the workforce?

The College relies on industry partner feedback in all of its training programs. In the case of our Petrochemical, Energy, and Technology programs, we have invited leaders from the petrochemical industry to be a part of our Petrochemical Advisory Council. The Council is tasked with assessing the curriculum, equipment, and planning for the Center.

To ensure we are meeting the industry workforce needs, we also hired a professional with 30 years' experience in the petrochemical field to lead our programs. It was important to our partners that we hire someone of this caliber to ensure the success of these programs and their future workforce.

Partnership is the key. In every one of our workforce programs, we have advisory committees that review the curriculum and provide advice on the equipment needs to keep our programs current.

4. How can schools better partner with industry to develop a workforce that meets the needs of an evolving energy landscape?

Partnerships are critical, and all parties have to be willing to take on the hard work, have honest conversations, and bring resources to the table. The work around apprenticeships, creating new curriculum, and allowing the flexibility to have those types of programs help build those relationships. They create a win-win scenario for students and for the industries hiring them.

Questions from the Honorable Peter Welch

1. In your testimony, you discussed your support of the “Centers of Excellence” concept that was included in H.R. 8, the North American Energy Security Act. Could you provide more detail as to the impact this legislation would have on San Jacinto College and other similarly positioned technical schools?

San Jacinto College first began working on a “Centers of Excellence” initiative nearly six years ago. Community and technical colleges across the country are facing cuts from State Legislatures and are having to try to figure out how to meet the demands for highly skilled workers across the nation as baby boomers leave the workforce. As noted by committee members, industry partners see a skilled workforce as a one of the greatest challenges for expansion and start up efforts.

Already at San Jacinto College, the Domestic Maritime Centers of Excellence legislation that was signed by President Trump in December 2017, is creating partnerships with other community and technical colleges across the country, with the Texas A&M University Maritime Academy, and with community and industry partners. Although the actual Domestic Maritime Centers of Excellence designation is still going through criteria development by the Department of Transportation’s Maritime Administration, it is already creating collaborations. If San Jacinto College is awarded this designation, we believe the designation will assist the College with recruiting efforts for both faculty and students. If grants are awarded, we will use the funding to expand our programs through purchases of equipment so more training can be offered.

Other Centers of Excellence for workforce training will help community colleges across the country in meeting regional workforce needs which will allow business and industry to continue expanding with a highly skilled workforce.

Proposed Energy Workforce Centers of Excellence Act

San Jacinto College would like to recommend that the Committee on Energy and Commerce consider adopting legislation to establish a community and technical college Energy Workforce Centers of Excellence program. The following provides a discussion

of the need, and I am enclosing a draft legislative proposal prepared on behalf of San Jacinto College and others collaborating on efforts to move forward with a national energy workforce agenda – one that harnesses the unique strength and capabilities of community and technical colleges.

The Trump administration has prioritized action on an America First Energy Plan to benefit United States energy interests and to promote economic development and job creation. Building a more robust American energy industry and creating new energy related jobs requires expansion of the training capacity at America's community and technical colleges, which are uniquely positioned to address the energy workforce talent pipeline. The proposed Energy Workforce Centers of Excellence Act would authorize creation of centers of excellence at community and technical colleges in order to expand the nation's capacity to train workers for jobs in a variety of energy industry operations.

Energy sector jobs require well-trained, skilled technicians – yet, many of those workforce positions do not require a baccalaureate degree. Community and technical colleges throughout the nation can play an important role in workforce development and job training. This includes opportunities for enrolled students pursuing degrees, certificates and credentials, and for incumbent workers seeking non-credit training programs that upgrade their skills and help meet the workforce demands of employers. Community and technical colleges offer a cost-effective resource for training, pathways to opportunities for economic independence for Americans, and hope for under-served communities.

Community and technical colleges are uniquely suited to help secure the talent pipeline for energy industry. This includes 2-year public colleges training oil and gas workforce in the Gulf of Mexico and in the shale play regions of the United States – including the Marcellus and Utica shale play areas of the Appalachian region, the San Juan shale in northern New Mexico, the Bakken shale in North Dakota, and the Eagle Ford and Permian Basin shale play areas in Texas. It also includes colleges training technicians for jobs involving geothermal, nuclear, wind, solar and other renewable forms of energy.

In order to boost American energy industry, the United States needs to focus on new opportunities for energy workforce development, and to harness the capabilities of community and technical colleges to provide required technical training. This can be accomplished by supporting investments in community and technical college energy workforce training “centers of excellence,” as is proposed by the Energy Workforce Centers of Excellence Act. The centers of excellence will work in partnership with government and industry to produce a technically skilled workforce capable of helping to achieve the goals of the America First Energy Plan.

It would be helpful in building the workforce if Congress would develop an energy agenda that includes new opportunities for American workers. During the 114th Congress, bipartisan legislation known as the Energy Policy Modernization Act (S. 2012) would have authorized energy workforce grants as well as community and technical college centers of excellence. That legislation was passed by the Senate and House and

had the support of a House-Senate conference committee – but it was not brought to a final vote. It would help to have the 115th Congress work on a bipartisan basis to prioritize action on new energy legislative initiatives, to include the provisions of the Energy Workforce Centers of Excellence Act.

Again, thank you for the opportunity to speak with your committee about the work of community colleges across the country, and for the opportunity to respond to these questions for the hearing record. We consider ourselves to be America's partner in workforce training to grow our national economy.

Sincerely,

A black rectangular redaction box covering the signature of Brenda Hellyer.

Brenda Hellyer, Ed.D.
Chancellor, San Jacinto College

cc: The Honorable Bobby L. Rush, Ranking Member, Subcommittee on Energy

Enclosure: Discussion Draft – Energy Workforce Centers of Excellence Act of 2018

115TH CONGRESS
2ND SESSION

H.R. _____

To authorize the Secretary of Energy to designate community and technical colleges as centers of excellence for energy workforce training and education, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

[DATE]

[SPONSOR] introduced the following bill; which was referred to the Committee on _____.

A BILL

To authorize the Secretary of Energy to designate community and technical colleges as centers of excellence for energy workforce training and education, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the “Energy Workforce Centers of Excellence Act of 2018”.

SEC. 2. ENERGY WORKFORCE CENTERS OF EXCELLENCE.

(a) DESIGNATION AUTHORITY.—The Secretary of Energy (“Secretary”) is authorized to designate community and technical colleges as centers of excellence for energy training and education.

(b) ELIGIBILITY.—To be eligible to receive a center of excellence designation and Federal assistance under this Act, an entity shall be a public community or technical college or a consortium of public community and/or technical colleges that—

- (1) demonstrates experience in implementing and operating job training and education programs;
- (2) demonstrates the ability to recruit and support individuals who plan to work in the energy industry in the successful completion of job training and education programs designed for upstream, midstream and downstream energy workforce; and
- (3) provides students who complete the job training and education program with an industry-recognized credential.

(c) **PRIORITY.**—In selecting eligible entities to receive designation and assistance under this section, the Secretary shall prioritize applicants that—

- (1) provide for oil and gas workforce training in the Gulf of Mexico or in the shale play regions of the United States;
- (2) provide for energy workforce training in the Appalachian Basin and other areas in which coal industry activity has been prevalent;
- (3) train workers for jobs in connection with other energy industries including nuclear, solar, geothermal, wind and other alternative and renewable forms of energy; and
- (4) provide science, technology, engineering and mathematics (STEM) training for students who have traditionally been underrepresented in energy industry, including women and minorities.

SEC. 3. ASSISTANCE TO CENTERS OF EXCELLENCE.

(a) **COOPERATIVE AGREEMENTS.** —The Secretary may enter into a cooperative agreement (as that term is used in section 6305 of title 31) with a center of excellence designated under Section 2(a) to support efforts of the center of excellence to—

- (1) admit additional students;
- (2) recruit and train faculty;
- (3) expand facilities;
- (4) create new energy career pathways; or
- (5) award students credit for prior experience, including military service.

(b) **DIRECT ASSISTANCE.**—In providing support under cooperative agreements entered into in accordance with this section, the Secretary shall provide support for direct assistance including technical expertise, wraparound services, career coaching, mentorships, internships, and partnerships.

(c) **TECHNICAL ASSISTANCE.**—The Secretary shall provide technical assistance and capacity building to community and technical college energy workforce centers of excellence to leverage the existing job training and education programs of the Department.

SEC. 4. AUTHORIZATION OF APPROPRIATIONS.

(a) There is authorized to be appropriated to carry out this section \$150,000,000 for each of fiscal years 2019 through 2024.