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ENERGY-RELATED CHALLENGES AND OPPORTUNITIES IN REMOTE AND RURAL AREAS OF THE UNITED STATES

HEARING

BEFORE THE

COMMITTEE ON ENERGY AND NATURAL RESOURCES UNITED STATES SENATE

ONE HUNDRED FIFTEENTH CONGRESS

SECOND SESSION

APRIL 19, 2018

Printed for the use of the
Committee on Energy and Natural Resources

Available via the World Wide Web: http://www.govinfo.gov

U.S. GOVERNMENT PUBLISHING OFFICE
30–280 WASHINGTON : 2020

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ENERGY-RELATED CHALLENGES AND OPPORTUNITIES IN REMOTE AND RURAL AREAS OF THE UNITED STATES

THURSDAY, APRIL 19, 2018

U.S. SENATE,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Washington, DC.

The Committee met, pursuant to notice, at 10:08 a.m. in Room SD–366, Dirksen Senate Office Building, Hon. Lisa Murkowski, Chairman of the Committee, presiding.

OPENING STATEMENT OF HON. LISA MURKOWSKI, U.S. SENATOR FROM ALASKA

The CHAIRMAN. Good morning, everyone. The Committee will come to order.

Welcome to our witnesses.

I want to just make a quick note that struck me when I was looking at the background of each of you this morning and what you will contribute. The five witnesses today who will discuss rural and remote energy, they come from five different time zones across the country. We used to have five in the State of Alaska, but we decided to be more efficient, and we are now down to just two, but we have folks from five different time zones. So it is a group that can cover a lot of ground, both literally and figuratively.

Robert, Mr. Venables, I don't even think the sun is up in Juneau yet, hopefully it will be a good day there. Mr. Lyons is from Washington State. Mr. Hardy joins us from Montana. Mr. Greek, North Dakota. And Ms. Plowfield is representing home court here on Eastern Time.

This diversity is a reminder that we have rural and remote communities all over the United States. We are here today to focus on their energy challenges and opportunities in the hopes of moving the ball forward on more affordable, more reliable and increasingly clean energy for all of them.

Now, depending on the definition of rural that you adopt, anywhere from 15 to 20 percent of our nation's population lives in a rural area. According to the U.S. Census Bureau, that totaled 60 million people as of December 2016, with nearly 75 percent of our national landmass considered rural.

In Alaska, we paint a pretty extreme picture. We say it is a beautiful picture, but when it comes to rural, it is more than rural, it is "bush"—and rural takes on a truly different connotation.

We have 234 communities that are outside of our "Railbelt" area, which is an area that is a road system that goes up, down, kind of in a triangle. Outside of that Railbelt we have these communities that comprise maybe 20 people. Some of the largest communities that are off the Railbelt are about 8,000 people, so very small populations.

Just over three-quarters of those communities are not accessible by road or the marine highway system, our ferry system. When you put it in context, about 80 percent of the communities in the State of Alaska are not connected by what folks down here would just assume you have to be connected by road, because if you are not connected by road how do you get anywhere? How do you do anything? Well, it makes things just a little bit more expensive, a little bit more complicated.

By one measure, rural Alaskans pay more than twice as much to heat their homes than folks in the Lower 48. Electric rates are so high that the state has implemented what we call a Power Cost Equalization (PCE) program, which helps subsidize energy costs. We have discussions all the time about well, what do you pay in the community of Haines for your energy? The discussion is not so straightforward because if you are residential, and I don't think Haines necessarily is, are they available for PCE? Okay, so, if you are residential, your rate is going to be able to be subsidized through Power Cost Equalization. If you are a commercial entity, like a barber shop, you do not have that. So you can be looking at some pretty considerable differentials in terms of your rates.

We have just under 200 PCE-eligible communities. Their average residential rate is $0.58 a kilowatt-hour. Now compare that to Vermont which understand is about $0.15 a kilowatt-hour. What you have are these communities that are relying on costly diesel fuel for heat and electricity. The cost of the energy carries over to everything else that they do.

And it is not just for those that are off the road system. I met with folks this week about what we call our "Road Belt" area. Within that Road Belt area these systems are not connected, necessarily, to one another. The little community of Chitina is paying over $1 a kilowatt-hour, and they are on the road system. Communities like this are just not sustainable, and I think we recognize that.

In Alaska, Montana, Hawaii, North Dakota, any number of our states, too many people are living on the edge of what Senator Tim Scott and I call "energy insecurity." There is real trouble in too many households when already expensive energy bills just keep piling up.

I have told this story many times, but I was in an interior river community up off of the Yukon River, having a little town hall meeting. A woman came up to me, and she had an infant in her arms that she was providing foster care for—and she gave me a receipt. It was a receipt for $50 for five gallons of home heating fuel. She said, "I had to make a decision as to whether or not I was going to buy heating fuel to keep the house warm or whether I could afford to buy baby formula for the baby." And she said, "I'm just going to have to stretch the baby formula, because it's too cold right now in Aniak."

You look at that, and I carried that receipt around. I still have that receipt, because it is a powerful reminder of the tradeoffs that far too often our families have to make.

Now where there is challenge, there is also opportunity. That is part of the reason why we are seeing innovation bring costs down in many of our rural and remote areas, often by adding locally available resources such as hydropower, wind, geothermal or woody biomass onto our microgrids.

I think we all recognize that rural energy is a priority for so many members on this Committee. I think we all recognize how important it is to tackle the challenges that these Americans face through smart, effective policies.

That is why so many of us support the state energy, the LIHEAP and the weatherization assistance programs. I think we know full well the imperative of these programs for so many families.

It is why so many of us are working on legislation to boost and improve rural energy systems—and that includes the broad bipartisan energy bill, pending on the Senate calendar. Senator Cantwell and I are committed still to advancing this. We have worked hard on this as a Committee, and I think those provisions will benefit our remote communities.

One specific example of that in our energy bill is the effort to open the DOE's loan guarantee program to the states to help provide financing for a larger number of small projects that would otherwise not be considered.

So again, I thank our witnesses for being here this morning, I know you have all come from far away places. I appreciate the perspectives that you will lend to the Committee and appreciate your time.

With that I turn to Senator Cantwell for your opening.

STATEMENT OF HON. MARIA CANTWELL,
U.S. SENATOR FROM WASHINGTON

Senator CANTWELL. Thank you, Madam Chair. Thank you for holding this important hearing today.

I want to welcome Andrew Lyons here from Ellensburg, Washington, and I look forward to what he says.

You are right. This is a broad spectrum of witnesses from across the United States. I wouldn't blame you if we had a hearing just on rural energy costs in Alaska alone.

I think this is such an important issue. I think it is such an important challenge for our nation.

Having toured Alaska with you and other members of your delegation, it literally hurts my heart to see the high cost of energy in an area of the United States of America. We have to do better, and the technology resources are there, I believe, to do better, but I think we have to help you and other members of the Committee who are in similar situations figure out cost-effective ways to do these demonstrations so we can find scalable solutions to these issues. I pledge to you, I am happy to have another hearing focused just on these technology solutions and possibilities for Alaska.

I have pointed out many times, as Alaska's economy grows, so does the Pacific Northwest's. So we have a little bit of interest at hand as well.

That is why it is so hard to sit here and tell the other side of the story, that more than a million Washingtonians who live in rural parts of our state have benefited from one of the most successful federal initiatives in our nation's history. The electrification that came with the legacies of The New Deal have brought us electricity rates at $.03 to $.04 kilowatt-hour rates.

So what happened is the Bonneville Power Administration brought that light to farmers and to rural towns across our state, and it has paid benefits over and over again. It built our economies on various industries, but today companies like BMW go to Moses Lake because of cheap electricity. Our biggest problem today is that bitcoin miners are there to take advantage of the scrambling. Cheap electricity rates are almost overwhelming the utilities. People are putting up bitcoin mining sites in shacks, garages, and houses just to capitalize on that cheap electricity.

So the calling card, the cheap electricity, is still a beacon, and that is why it is so important that we continue to focus on these issues in other parts of our country.

The President's proposal to abandon Bonneville Power transmission issues is not something anybody here, I think, is going to support and obviously, as you pointed out, when you have high energy costs, people skip other things that are so important, whether that is food or medicine.

So we need to focus on energy efficiency programs that are critical to rural communities. I know Mr. Lyons is going to talk about that. You mentioned weatherization, and I am glad that my colleagues continue to support those efforts. I think Mr. Lyons is also going to address that.

Obviously, rural communities need more access to reliable, affordable energy. I know that, as you mentioned, there are various initiatives that you have taken in the Energy bill that we need to get done so we can continue to address this.

The fact that weatherization saves low-income families 23 percent on their energy costs is something, I think, we should continue to focus on how we might, in the short-term, continue to use that as a way to help communities.

Ms. Plowfield, obviously from the DOE perspective, tribal energy programs are so important. I strongly support the technical assistance and competitive matching grants that are used by so many tribes. DOE support ranges from solar panels on the Spokane Indian reservation to coastal resiliency planning grants to places like the Makah Tribe, which is in one of the most remote parts of our state.

I hope that we can learn today how we might be able to use that program in a more aggressive way. As I mentioned on some of these scalability issues, if there are ways that tribes in Indian Country can work with DOE on demonstrating scalable solutions that may not otherwise be able to get the technical assistance, I think that would be a really great avenue for us to work on.

So thank you so much for this hearing, Madam Chair. And thank you to the witnesses. I look forward to hearing what you have to say.

The CHAIRMAN. Thank you, Senator Cantwell.

We will think about a way to profile the issues, the high cost issues, in Alaska, whether it is a hearing here—we had a very successful field hearing in Cordova. I thank you for coming out to that. But again, that was an opportunity to just see a little bit of what microgrids do. Some of my colleagues, I know Senator Daines and some others, had an opportunity to go with us out to Oscarville, just outside of Bethel, and see, along with Secretary Moniz at the time, some of the challenges, but again, the opportunities that are out there. I look forward to exploring that with you.

Senator CANTWELL. I know you wanted us to drive a snowmobile on a frozen river. I know that——

The CHAIRMAN. It was safe at that time. It is now spring, so I am not going to advise that we do that.

I did have an opportunity to learn a little bit more about the fascinating and the very great history in your state and the contributions of other Washingtonians. Homer T. Bone—I was a recipient of an award from the NWPPA, the Northwest Public Power Association, and we got a little bit of a history about his involvement as a Senator from Washington and a good reminder of what went on there that has provided enduring benefit for the people in the region. It is really a great story about American energy initiative and ingenuity.

With that, let's begin with our witnesses. I would like to welcome you all.

Ms. Carole Plowfield will begin our testimony this morning. She is the Director——

Senator HOEVEN. Madam Chair, if I may, could I do an introduction before you have the witnesses testify?

The CHAIRMAN. Yes, yes.

Senator HOEVEN. At the proper time.

The CHAIRMAN. I was going to let you introduce Mr. Matt Greek.

Senator HOEVEN. Perfect.

The CHAIRMAN. Let me begin with just noting Ms. Plowfield is the Director of the Office of Indian Energy Policy and Programs (OIE) there at DOE. We appreciate you being here.

I will have Senator Hoeven introduce Mr. Greek, but let me skip over and just do the others here quickly.

Mr. Hardy is with us as the General Manager of Central Montana Electric Power Cooperative. We like to have the co-ops here, getting their perspective. We appreciate all that you do.

I think between what we have in North Dakota and what we have in Montana and the impact of our cooperatives, there are more than 900 cooperatives in 47 states serving about 42 million Americans. I think the challenges for the co-ops are pretty unique, but we will hear a little bit from you folks this morning.

Mr. Lyons was introduced a little bit by Senator Cantwell. He is the Weatherization and Energy Assistance Program Manager of HopeSource in Ellensburg, Washington.

Mr. Robert Venables has been before the Committee on previous occasions. He is the Executive Director of Southeast Conference from Juneau, formerly from Haines, formerly all over Southeast Alaska. I know you rack up your Alaska Airlines miles and this trip is just another example. We appreciate your leadership here.

Senator Hoeven, I would ask you to introduce your constituent from North Dakota.

STATEMENT OF HON. JOHN HOEVEN, U.S. SENATOR FROM NORTH DAKOTA

Senator HOEVEN. Thank you, Madam Chairman.

I am very pleased this morning to welcome Mr. Matt Greek as one of our experts providing testimony this morning. He is the Senior Vice President for Research and Development at Basin Electric.

You mentioned the cooperatives. Basin Electric is actually a generation and transmission cooperative that is owned by the rural electrics collectively and serves about three million, or probably more than three million, customers in about nine states. They are very innovative and creative so you have the right person here with Matt, because they are not only doing leading edge technology development in coal-fired electric, they also have gas and they also have a lot of wind and transmission which is a huge issue as both you and the Ranking Member are so well aware.

So they are really doing some exciting things. You will get to hear about it a little bit today. The Allam cycle, which is carbon capture and sequestration.

Basin also owns the Dakota gasification facility which takes coal mined in North Dakota, converts it to liquefied natural gas, puts it in the pipeline, captures the CO2 and puts that in a pipeline and sends it out to the oil fields for secondary oil recovery in addition to making many different byproducts, krypton, xenon and many other things.

And most recently, they just built a half billion-dollar fertilizer plant to make urea and hydro from their natural gas so that we don't have to get it from Indonesia which shows the confluence of energy, agriculture and technology development all together.

I will stop there, but I do have to go to a Defense Appropriations hearing. I do want to come back and ask a few questions of this outstanding panel, but thanks so much to Matt for being here and to you, Madam Chairman, for allowing me to make that introduction.

The CHAIRMAN. Absolutely, thank you.

With that, we will begin the testimony. I would ask you to try to keep your comments to about five minutes. Your full statements will be included as part of the record, but again, we welcome each of you.

Ms. Plowfield, if you would like to begin.

STATEMENT OF CAROLE M. PLOWFIELD, DIRECTOR, OFFICE OF INDIAN ENERGY POLICY AND PROGRAMS, U.S. DEPARTMENT OF ENERGY

Ms. PLOWFIELD. Thank you, Chairman.

Chairman Murkowski, Ranking Member Cantwell and distinguished members of the Committee, I appreciate the opportunity to discuss the Office of Indian Energy Policy and Programs at the Department of Energy and our efforts to implement energy development in Indian Country as you evaluate rural energy issues.

The Office of Indian Energy Policy and Programs serves all federally-recognized Indian Tribes, Alaska Native Regional Corpora-

tions and Village Corporations and Tribal Energy Resource Development Organizations. The Office's mission is to maximize development and deployment of energy solutions for the benefit of American Indians and Alaska Natives.

In consultation with tribal and other stakeholders, the Office of Indian Energy achieves its mission by promoting Indian energy development, electrifying Indian Country and helping to reduce the cost while increasing reliability of Indian energy.

Our office addresses the challenges that tribal communities face, many of them rural, through our three-pronged approach of financial assistance, technical assistance and education and capacity building.

Competitive grants are offered periodically for the deployment of energy infrastructure on tribal lands. Federal staff provide technical assistance upon the request of a tribe regarding a specific energy topic or project concept. Education and outreach activities include monthly webinars, a college student seminar or, excuse me, a college student summer internship program, periodic workshops, presentations at conferences and other engagement activities outlined on the Office of Indian Energy's website, where our staff inform tribal members of all the opportunities we have available to them.

Between 2002 and 2017, DOE invested nearly $78 million in 250 tribal energy projects implemented across the contiguous 48 states and in Alaska. These projects, however, are valued at over $150 million as they are leveraged by over $73 million in cost share paid by the recipient tribal groups.

The Office of Indian Energy is currently working on three significant issues: Our funding opportunity announcement, supporting the Tribal Energy Loan Guarantee Program, and reviewing the organization of our office to ensure that we are delivering our services as effectively and efficiently as possible.

DOE announced on February 16, 2018, up to $11.5 million in new funding to deploy energy infrastructure on tribal lands. Coincidentally, this announcement is closing today, April 19th, and we are excited to review the range of grant applications we will receive since this is the first time that Indian Energy has issued a funding opportunity announcement on an entirely fuel and technology neutral basis which will expand the potential for tribes to use the particular resources that are available to them. And our selection should be made by August of this year.

We are also working to support the development of DOE's Tribal Energy Loan Guarantee Program which would help address current barriers that tribes face regarding access to capital for energy development.

The FY 2018 Omnibus funding bill enacted on March 23, 2018, states that the Department of Energy's Loan Programs Office retains all loan authority, and earlier this year Secretary Perry delegated to the Loan Programs Office to administer the program. They have completed some listening sessions as part of an ongoing process that the Office of Indian Energy is supporting and more are planned.

We are also reviewing the organization of our office to ensure that we are delivering our services as effectively and efficiently as

possible. I asked our team in December to rethink how we are delivering our technical assistance to tribes, and we're currently expanding our network of service providers to ensure that we are being good stewards of taxpayer dollars.

In conclusion, I am honored to be here today representing the Department of Energy. And I'm grateful for the hard work the dedicated staff of the Indian Energy Office, all of them, dedicated public servants.

I would like the Committee to know that although we are a small office, our goal is to make a big difference to the tribal communities that we serve.

I would also like to take this opportunity to introduce to the Committee our new Deputy Director, Kevin Frost, who is behind me. He brings with him a wealth of knowledge and experience as a former tribal council member with the Southern Ute Tribe who are known for being on the forefront of tribal energy and economic development issues. And we're happy to have him.

So we've made a lot of progress, but there is still much more to do. Secretary Perry, our DOE team, the Office of Indian Energy and all of the tribal partners we serve look forward to working with this Committee to provide affordable, reliable and resilient energy to tribal communities and to maximize the development and deployment of energy projects that add new generation capacity and provide cost savings to tribal members.

Thank you again for the opportunity to appear before you today and I look forward to your questions.

[The prepared statement of Ms. Plowfield follows:]

Written Testimony of Carole M. Plowfield, Director

Office of Indian Energy Policy and Programs

U.S. Department of Energy

Before the

Committee on Energy and Natural Resources

U.S. Senate

April 19, 2018

Chairman Murkowski, Ranking Member Cantwell, and distinguished Members of the Committee, I appreciate the opportunity today to discuss the Office of Indian Energy Policy and Programs at the Department of Energy (DOE), and our efforts to implement energy development in Indian Country as you evaluate rural energy issues.

The Office of Indian Energy Policy and Programs (IE) serves all federally-recognized Indian Tribes, Alaska Native Regional Corporations and Village Corporations, and Tribal Energy Resource Development Organizations. The Office's mission is to maximize the development and deployment of energy solutions for the benefit of American Indians and Alaska Natives. In consultation with tribal and other stakeholders, IE achieves its mission by promoting Indian energy development, electrifying Indian Country, and helping to reduce the cost while increasing the reliability of Indian energy. IE implements these objectives through our deployment programs, policies and facilitating partnerships between tribes and private industry.

IE offers various types of programs to Indian tribes and Alaska Natives consistent with its authorities in section 217(b) of the Department of Energy Organization Act, as amended (42 U.S.C. § 7144e(b)), and section 2602(b) of the Energy Policy Act of 1992, as amended (25 U.S.C. § 3502(b)). Our Office addresses the challenges that tribal communities, many of them rural, face through our three pronged approach of financial assistance, technical assistance, and education and capacity building. Competitive grants are offered periodically for the deployment of energy infrastructure on tribal lands. Federal staff provide technical assistance upon the request of a tribe regarding a specific energy topic or project concept. Education and outreach activities include monthly webinars, a college student summer internship program, periodic workshops, presentations at conferences, and other engagement activities outlined on IE's website[1], where IE federal staff inform tribal members of the opportunities available.

[1] https://www.energy.gov/indianenergy/office-indian-energy-policy-and-programs

According to a 2013 Department of Energy (DOE) report, Indian lands[2] in the contiguous 48 states have the technical potential to produce about 1.1 billion megawatt hours (MWh) of electricity for wind energy—3.4 percent of total U.S. technical potential.[3] Indian lands also have the potential to produce about 14 billion MWh of solar energy - 1 percent of total U.S. generation potential.[4]

Numerous factors burden Indian tribes interested in developing their vast energy resources. Energy and infrastructure development in Indian Country is limited due to inadequate financial and human capital and a complicated legal and regulatory structure governing Indian lands.

Between 2002 and 2017, DOE invested nearly $78 million in 250 tribal energy projects implemented across the contiguous 48 states and in Alaska, through funding provided by the Office of Indian Energy and its predecessor program. These projects, however, are valued at over $150 million, as they are leveraged by over a $73 million cost share paid by the recipient tribal groups.

IE maximizes the development and deployment of strategic energy solutions to advance tribal energy development in Alaska, where the high cost of electricity is of particular concern to Alaska Natives. Since 2002, IE and its predecessor program has invested over $22 million in 56 energy development and efficiency projects in Alaska, with over $30 million contributed in tribal cost share. During this period, project impacts include reducing demand for diesel and fuel oil by almost 600,000 gallons per year, and providing Power Cost Equalization assistance to over 40 Native villages at a savings of more than $600,000. More than 175 Alaska Native villages rely almost exclusively on diesel fuel for electricity and oil for heat. In some communities, electricity costs exceed $1.00/kilowatt-hour, more than eight times the national average[5] .

In the past three fiscal years (2015-2017) IE has obligated $31.3 million to tribal grants and completed over 300 technical assistance requests. Approximately $21.3 million, or 68.1% of all grant awards, have been obligated to energy infrastructure projects, including microgrids, which are localized distribution networks that can disconnect from the traditional grid to operate autonomously and help mitigate grid disturbances to strengthen grid resilience. The remaining

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[2] Indian land means any tract in which any interest in the surface estate is owned by a tribe or individual Indian in trust or restricted status and includes both individually owned Indian land and tribal land. 25 C.F.R. §162.003.

[3] DOE's National Renewable Energy Laboratory, *Geospatial Analysis of Renewable Energy Technical Potential on Tribal Lands,* DOE/IE-0013 (Washington, D.C.: February 2013).

[4] DOE, Developing *Clean Energy Projects on Tribal Lands, Data and Resources for Tribes*, DOE/IE-0015 (Revised April2013).

[5] Schwabe, P. (2016). Solar Energy Prospecting in Remote Alaska: An Economic Analysis of Solar Photovoltaics in the Last Frontier State (No. NREL/TP-6A20-65834; DOE/IE-0040). NREL (National Renewable Energy Laboratory (NREL), Golden, CO (United States). https://energy.gov/sites/prod/files/2016/02/f29/Solar-Prospecting-AK-final.pdf

31.9%, $10 million, to support tribal efforts to build internal capacity to understand and navigate energy projects. In fiscal year (FY) 2017, 65% of IE's budget was committed to energy grants.

During FY 2017, IE obligated a total of $10.43 million in funding for 32 tribal energy projects, consisting of 13 hardware deployment awards and 19 planning grants. The hardware deployment awards will install 6.3 megawatts (MW) of new energy generation for more than 3,000 tribal buildings and homes across the nation, saving more than $2 million each year. Building on these investments, IE released a Notice of Intent on November 12, 2017, to issue a Funding Opportunity Announcement (FOA) for the deployment of energy infrastructure on tribal lands.

The U.S. Department of Energy announced on February 16, 2018 up to $11.5 million in new funding to deploy energy infrastructure on tribal lands. The funding announcement is sent to all federally-recognized tribes, and made available to the public on IE's website.[6] Coincidentally, this announcement is closing today, April 19th, and we are excited to continue our work to support Native American and Alaska Native communities interested in harnessing their vast undeveloped energy resources.

The FOA closing today builds on efforts to strengthen tribal energy, economic infrastructure resource development, and electrification on tribal lands. This is also the first time that IE issued a FOA on an entirely fuel and technology neutral basis. This FOA will expand the potential for tribes to use the particular resources available to them.

We are also currently working to improve our service and outcomes by meeting approved metrics of newly installed generation capacity and cost savings throughout Indian Country. Our performance goals are to install approximately 25MW of cumulative new generation capacity on tribal lands between FY 2019 and the end of FY 2022, and to achieve cost savings of $550 million for tribal communities during the same period. We are committed to delivering innovative solutions to ensure our energy infrastructure remains affordable reliable, and resilient, while being good stewards of taxpayer dollars.

Conclusion

In conclusion, I am honored to be here today representing the Department of Energy, and I am grateful for the hard work of the dedicated staff of DOE's IE office. I would like the Committee to know that although we are a small office, our team of 7 federal employees is currently managing 59 projects across the nation valued at over $62 million and IE's investment of over $30 million. The caliber of our team is impressive, including three engineers, two military veterans, and individuals with years of experience on tribal energy issues, all of them dedicated public servants.

We have made progress, but there is still much more to do. Secretary Perry, our DOE team, IE, and all of our tribal partners who we serve, look forward to working with this Committee to continue to provide affordable, reliable and resilient energy to tribal communities, and maximize

[6] https://www.energy.gov/indianenergy/office-indian-energy-policy-and-programs

the development and deployment of energy projects that add new generation capacity, and provide additional cost savings to tribal members.

Thank you again for the opportunity to appear before you today, and I look forward to your questions.

The CHAIRMAN. Thank you, Ms. Plowfield.

Mr. Greek, welcome.

STATEMENT OF MATT GREEK, SENIOR VICE PRESIDENT OF RESEARCH, DEVELOPMENT AND TECHNOLOGY, BASIN ELECTRIC POWER COOPERATIVE

Mr. GREEK. Good morning Chairman Murkowski, Ranking Member Cantwell and members of the Committee. As Senator Hoeven mentioned, my name is Matt Greek. I'm Senior Vice President of Research, Development and Technology at Basin Electric Power Cooperative headquartered in Bismarck, North Dakota. I'm also a member of the National Coal Council, the Lignite Energy & Research Councils, the Carbon Utilization Research Council, a director of the Missouri Slope Areawide United Way and a registered professional engineer.

Thank you for the invitation to speak this morning about rural energy. Basin Electric is a generation and transmission cooperative that provides wholesale electricity to 141 rural electric cooperatives who serve three million consumers across nine states.

Basin Electric has a diverse generation portfolio consisting of over 6,000 megawatts of coal, natural gas, wind, recovered energy, oil, nuclear power and market purchase agreements. Our generation resources participate in both the MISO and SPP regional transmission organizations.

Basin Electric and its members have invested billions in capital in recent years in fossil-based generation, transmission and related infrastructure. I'd refer the Committee to my written testimony for additional details on our facilities. Basin Electric is actively engaged in ensuring that these assets can continue to operate and add value in the carbon-constrained future.

Basin Electric supports commonsense carbon management regulation that recognizes improvements already made to existing plants, sets a standard that is achievable with cost-effective technologies that can be applied to the facility itself, and allows for maximum flexibility to achieve.

With respect to technology, Basin is the host site for the Integrated Test Center (ITC) that is nearing completion at our Dry Fork Station. This test facility will provide space for researchers to turn CO2 into a marketable commodity. The State of Wyoming invested in this facility and will oversee its operation. Last week the finalists that will participate were announced, 10 teams from several different countries will compete for the $20 million Carbon XPRIZE. Five of those using flue gas from coal will compete at the ITC.

In addition to the ITC, Basin has been exploring options to commercialize Allam cycle technology for future power generation. Again, I would refer Committee members to my written testimony for details of this technology and our partners.

However, I would like to take this opportunity to express our support for DOE's Fossil R&D program and stress its importance in helping to deploy carbon capture technologies. The DOE's continued support is critical to help prove out the Allam cycle and other technologies.

Finally, to this end we appreciate members of this Committee and others for bipartisan support of the 45Q Carbon Capture Tax Credit that was recently expanded and improved with passage of the bipartisan Budget Act earlier this year. This tax credit will go a long way toward closing the cost gap for potential carbon capture projects.

We also support introduction of the Utilizing Significant Emissions with Innovative Technologies Act. This legislation will provide further assistance to relieve the regulatory and financial barriers to carbon capture, utilization and sequestration technology development.

Basin Electric owns and/or maintains thousands of miles of transmission across several states, much of which crosses federal lands. Increasing regulatory requirements have added complexity, time and cost to transmission line sighting, construction and maintenance. We appreciate the Committee's efforts to advance vegetation management and liability relief legislation which was included as part of the Omnibus Appropriations bill.

However, as generation continues to be built in response to resources and transported to load, as is the case with most renewable generation, it is important that federal laws such as the National Environmental Policy Act, appropriately respond to the effects of transmission and infrastructure development and not serve as a barrier.

As I've discussed, Basin Electric is heavily invested in both coal and natural gas generating assets. The development of competitive, wholesale markets has provided both challenges and opportunities for Basin Electric and its members. However, it has become increasingly apparent that power markets could be improved to fairly compensate all generation for the services that it provides.

While Basin Electric believed that the DOE proposal on grid resiliency was too broad in scope and would have negative market impacts, we support the Federal Energy Regulatory Commission's efforts to further explore this issue and develop equitable market rules for dispatchable generation sources.

In closing, serving rural America with affordable and reliable electricity is not without its challenges. However, the cooperative model continues to evolve to serve its mission.

Thank you for the opportunity to discuss our thoughts. I would be happy to answer any questions you might have.

[The prepared statement of Mr. Greek follows:]

Testimony of Matt Greek, Senior Vice President of Research, Development and Technology, Basin Electric Power Cooperative
Before the Senate Committee on Energy and Natural Resources
April 19, 2018

Introduction

Good morning Chairman Murkowski, Ranking Member Cantwell, and members of the committee. My name is Matt Greek, I'm the Senior Vice President of Research, Development and Technology at Basin Electric Power Cooperative (Basin Electric) headquartered in Bismarck, North Dakota. I'm also a member of the National Coal Council, the Lignite Energy & Research Councils, the Carbon Utilization Research Council, a director of the Missouri Slope Areawide United Way and a registered professional engineer.

Thank you for the invitation to speak this morning about rural energy. Basin Electric is a generation and transmission cooperative that provides wholesale electricity to 141 rural electric cooperatives who serve three million consumers in nine states across a high voltage transmission system over 2,349 miles (owned and maintained). To put this in perspective, the Washington D.C. metro area has a population of approximately six million people. Basin Electric serves half of that population across nine states stretching from the Canadian to the Mexican border, right through the heart of America. Basin Electric has a diverse generation portfolio consisting of approximately 6,698 megawatts of coal, natural gas, wind, recovered energy, oil, nuclear power, and market purchase agreements. Our generation resources participate in both the Midcontinent Independent System Operator (MISO) and Southwest Power Pool (SPP) regional transmission organizations.

In North Dakota, Basin Electric operates two, two unit coal-based power plants, the Antelope Valley Station and Leland Olds Station. Our subsidiary, the Dakota Gasification Company, operates the Great Plains Synfuels Plant that produces synthetic natural gas from lignite coal, and a number of co-products including anhydrous ammonia, and a newly-commissioned urea plant that began operation earlier this year. The facility is also one of the largest carbon dioxide sequestration projects in the world, capturing nearly 35 million tons of CO^2 since 2000. The CO^2 is shipped via pipeline to the Weyburn oil field in Saskatchewan and utilized for enhanced oil recovery. Basin Electric subsidiary PrairieWinds has also developed nearly 300 megawatts of wind generation since 2009. We also have power purchase agreements for over 1,000 megawatts of additional wind power.

To meet the demands of the rapid development in the Bakken oil fields in Western North Dakota, Basin Electric just completed deployment of approximately 500 megawatts of natural gas-fired electric generation and over 200 hundred miles of 345-kV transmission infrastructure. As a result, we now own and operate simple cycle natural gas turbines and reciprocating engine generation at the Pioneer Generation Station, along with simple cycle natural gas turbines at the Lonesome Creek Station. It is this oil and natural gas development in the Bakken field that is playing a critical role in the nation's drive for energy independence.

In Wyoming, Basin Electric is a member of the Missouri Basin Power Project that owns the Laramie River Station in Wheatland and is operated by Basin Electric. We also operate one of the

newest additions to the coal-based fleet, the Dry Fork Station outside of Gillette, which commenced operation in 2011. Basin Electric also built and operates a simple cycle natural gas turbine at the Culbertson Station in Montana.

Finally, Basin Electric also placed the Deer Creek Station - a 300 megawatt natural gas combined cycle plant near Elkton, South Dakota - into service in 2012. We also operate a two unit simple cycle natural gas turbine at the Groton Station.

Carbon-Constrained Future

As I've described, Basin Electric and its members have invested billions in capital in recent years to secure its fossil-based generation. In addition to new facilities, such as Dry Fork and Deer Creek, Basin Electric has and continues to invest in up-to-date environmental controls for its existing facilities. At the same time, we have sought to diversify our portfolio with renewable generation and low-cost power purchase agreements enabled by the renewable Production Tax Credit (PTC).

Going forward, Basin Electric is actively-engaged in ensuring that these assets can continue to operate in a carbon-constrained future. One of the biggest factors driving our long-term planning involves what the Environmental Protection Agency (EPA) ultimately does about carbon dioxide (CO^2) regulation. The Clean Power Plan would have been devastating to rural electric cooperatives. Basin Electric has been involved with other utilities and our national trade association in supporting commonsense carbon management regulation that recognizes the improvements made to existing plants, sets a standard that is achievable with cost-effective technologies that can be applied to the facility itself, and allows for maximum flexibility to achieve a unit-based standard. We filed comments with the EPA to that effect and look forward to working with the agency as it moves ahead with this process.

Looking further into the future, Basin Electric has expanded its interest in developing carbon capture solutions to help "crack the code" with respect to cost-effective clean coal technologies that capture, utilize, and sequester CO^2. Basin Electric is a partner with the Integrated Test Center (ITC) that is nearing completion at our Dry Fork Station. Using flue gas provided by Dry Fork, this test facility will provide space for researchers to explore new and innovative solutions to turn CO^2 into a marketable commodity. The State of Wyoming invested in the design and construction of this facility, and will oversee its operation. Just last week, the finalists that will participate in the ITC were announced - five teams from several different countries will have a chance to compete for the $20 million Carbon XPRIZE.

In addition to the ITC, Basin has been exploring options to commercialize Allam Cycle technology for future power generation. The Allam Cycle, developed by NET Power, is a new power cycle that utilizes oxy-fired natural gas to produce supercritical CO^2, which is then used as the working fluid in a turbine to generate power with near-zero emissions. Given Basin Electric's long history with coal gasification at the Great Plains Synfuels Plant, and our interest in continuing to utilize North Dakota's vast lignite reserves, we are optimistic that this technology can be deployed with gasified coal. At this point, Basin Electric, and its partners - ALLETE Clean Energy, the Lignite Energy Council, North Dakota Industrial Commission, and the Energy and Environmental

Research Center (EERC), have been conducting research on syngas combustion and feasibility while NET Power continues construction on its demonstration facility near Houston, Texas.

The EERC was recently awarded funding by the U.S. Department of Energy (DOE) under phase I of the Fossil Fuel Large-Scale Pilots program that was announced in August 2017 to support this research. I would like to take this opportunity to express our support for the DOE's fossil R&D program, and stress its importance in helping to deploy carbon capture technologies. Basin Electric remains a committed partner, but the investment we and our members can make is limited when the risk is high and other options are available for power generation. Simply put, unless DOE can help make the economics work, utilities cannot move forward with these kinds of projects.

As a not-for-profit electric cooperative, Basin Electric has a fiduciary responsibility to its members to provide electric generation at the least cost. Basin Electric has worked to achieve this goal by diversifying its portfolio with wind and market purchases. Basin Electric has a vested interest in generation sources with long-term fuel certainty, such as coal, that provide affordable power and serve as the backbone of the electric grid. However, in the near-term historically-low natural gas prices continue to drive new generation decisions while regulatory uncertainty makes new coal construction a cost-prohibitive option. The DOE's large-scale pilots program and other support provided through the National Energy Technology Laboratory is critical to help prove out the Allam Cycle and other technologies, mitigate the risk of uncertainty, and allow for commercial deployment by Basin Electric and other utilities.

Finally, to this end, we appreciate members of this committee and others for the bipartisan support of the 45Q carbon capture tax credit that was recently expanded and improved with passage of the Bipartisan Budget Act earlier this year. This tax credit will go a long way towards closing the cost gap for potential carbon capture projects. We also support introduction of the Utilizing Significant Emissions with Innovative Technologies (USE IT) Act. This legislation will provide further assistance to relieve the regulatory and financial barriers to carbon capture utilization and sequestration technology development.

Other Challenges with Providing Rural Energy

Basin Electric owns and/or maintains thousands of miles of electrical transmission (2,349 miles) across several states, with portions crossing federal lands controlled by the United States Forest Service (Forest Service), Bureau of Land Management (BLM), and the United States Army Corps of Engineers (US COE). In addition, our member electric cooperative systems have significantly more miles of distribution infrastructure crossing federal lands. Increasing regulatory requirements have added complexity, time, and cost to transmission and distribution line siting, construction, and maintenance. Today the cost to construct a new high-voltage transmission line can range from $1 to $1.5 million per mile. In addition, it has become increasingly difficult to manage existing rights-of-way across federal lands.

Generally speaking, many electric co-ops extend service to the "last mile" for people in the most remote and rugged areas, and co-op lines often cross federal lands managed by the Forest Service and BLM. Therefore, Forest Service and BLM reviews are often required for co-ops to do routine

power line maintenance and vegetation management – including required tree trimming, as well as system upgrades to improve reliability. Delays in application reviews and renewals can keep co-op projects on hold for several months to over a year and add tens of thousands of dollars in costs.

Such delays also create unnecessary liability risks for electric co-ops, which can be held responsible for damages if a hazardous tree or other vegetation comes into contact with a power line and causes a fire before the Forest Service or BLM give the co-op approval to address the problem. Forest Service and BLM efforts to address the lack of uniformity in their standards, review processes and decisions led to some improvements. We appreciate the committee's efforts to advance vegetation management and liability relief legislation, which was recently included as part of the omnibus appropriations bill.

However, as generation continues to be built in response to resource availability and transported to load - as is the case with most renewable generation - it is important that federal laws such as the National Environmental Policy Act, Endangered Species Act, and Migratory Bird Treaty Act are implemented to appropriately manage the impacts of transmission and infrastructure development, and not serve as a barrier.

Market Challenges Impacting Rural Energy

As discussed above, Basin Electric is heavily-invested in both coal and natural gas generating assets. Due to the challenges associated with serving rural electric cooperatives over vast areas, large generating plants provide the most efficient means of serving load. The development of competitive wholesale markets has provided both challenges and opportunities for Basin Electric and its members. However, as the renewable Production Tax Credit has driven market prices down, it has become increasingly apparent that power markets could be improved to fairly compensate all generation for the services that it provides. While Basin Electric supports development of renewables, the large saturation of wind in the SPP market does create new dynamics on the grid, and therefore more reliance on other forms of generation to provide power when wind is not available.

With the volatility of wind generation, there is uncertainty for daily resource operation in the marketplace. Unlike our natural gas generation, our coal units were not designed to regularly cycle on and off, and potentially need days of notice to come on and offline. So when loads are moderate or low and wind is significantly high on a given day (resulting in very low or negative market prices for energy), coal units are backed down to their minimum generation levels (which may still be a relatively high rate of production) and incur financial losses.

These units, however, cannot be taken off line because they may be needed to supply energy in the market the very next day when wind drops to very low levels or loads increase. While wind is subsidized through tax incentives, the market provides no compensation for coal generation to remain on stand-by as an offset to the losses incurred when the wind blows. Additionally, wind levels can change abruptly throughout the day, forcing other generation, primarily fossil fuel-based, to start up or "ramp up" from lower generation levels.

Last fall, the DOE issued a notice of proposed rulemaking to require compensation for these generation sources. While Basin Electric believed that the DOE proposal was too broad in scope, and would have had negative market impacts, we support the Federal Energy Regulatory Commission's efforts to further explore this issue and develop equitable market rules, and some form of standby or ramp compensation for coal and other dispatch able generation sources.

Conclusion

In closing, serving rural America with affordable and reliable electricity is not without its challenges. However, the cooperative model was started to specifically address those challenges and continues to evolve to serve its mission. Basin Electric has undergone a number of changes in recent years and believe that we are well-positioned to serve our members to the end of the line now and well into the future.

Thank you for the opportunity to discuss our thoughts on providing energy to rural America and the role the Federal Government can continue to play. I would be happy to answer any questions you might have.

The CHAIRMAN. Thank you, Mr. Greek.

Mr. Hardy, welcome to the Committee.

STATEMENT OF DOUG HARDY, GENERAL MANAGER, CENTRAL MONTANA ELECTRIC POWER COOPERATIVE

Mr. HARDY. Thank you.

Good Morning Chairman Murkowski, Ranking Member Cantwell and the other members of the Committee.

My name is Doug Hardy. I'm the General Manager of Central Montana Electric Power Cooperative based in Great Falls.

First, I want to thank you for the honor of testifying before this Committee. As well I'd like to thank Senators Cantwell and Risch and several members who signed a letter to OMB opposing the sale of the PMA assets. It's critical to us. My last thanks is the action that was taken recently on vegetation management. It's a big deal to the Montana Co-ops. We appreciate that.

I'll discuss a few of the challenges in serving the rural, and in some cases, the frontier areas of Montana, not the bush but the frontier areas of Montana, and challenges of serving those areas as well as the importance of hydropower in enabling us to have affordable electricity at the end of the line.

Central Montana is a co-op of co-ops. Our purpose is to hold the contracts, manage the contracts and arrange for the delivery of power from Western Area Power, one of our main sources of power, WAPA, and other suppliers. We do that to a third of the co-ops in Montana, 25 co-ops there.

And some of the things that are difficult for my member systems is the fact that if you look at what it takes to deliver in Montana alone, if you take the power lines the co-ops own in Montana and connect them end to end, you would have a line long enough to go around the world at the equator, two times. Now in my written testimony I had a half in there. Strike that half. It's over two times. That was an error on typing on a plane, sorry. But still, to go around two times for just a few people that we serve in Montana creates some infrastructure that's very expensive that we have to pay for.

If you look at the area of just four of my members, it's a geographic area that's larger than the states of Connecticut, Delaware, New Jersey, Massachusetts and one other state in there. We'll add Connecticut. That much geographic area to serve just 10,000 member consumers.

But my message in that is there is so much infrastructure it takes in a rural area compared to in the city and that's compounded. The challenge is compounded by the fact of two things.

One of them is that in the rural areas our farmers and ranchers have had to get bigger. They've had to take multiple farms and put them into one ownership to even get enough to pay for the equipment to farm it which means we have fewer people in the rural areas to pay for the infrastructure. It also means that some of the small communities in the rural areas, schools have consolidated eliminating that infrastructure in those communities. There's a lot of communities that have empty buildings and that's all that's there now.

And that adds one more level in doing that, unlike serving in the urban area where you have a lot of commercial load, it's a wonderful asset to have commercial and residential load because it gives a broader base to spread those fixed costs, your power lines and infrastructure over. So, that's, kind of, a double whammy by serving mainly just small farms, ranches and homes increasing the challenge which that challenge is met partly with the power we get from Western Area Power, in my co-ops' case.

If you think about that when my four predecessors entered contracts to buy the federal power, it was above what they could buy other sources for. They looked at that federal power as something that they could enter into in a long-term basis. Right now, we're contracted through 2051 for that power because it's such a critical affordability issue for our rural communities. They may have $0.09 worth of poles and wires charge. We have to get a fairly low-cost power to go on that to keep them in business because those members at the end of the line can ill afford many increases.

So when we look at that hydro, at how that works for us, you can see why we strongly oppose FY'19 budget proposal to sell off the PMA assets. There just isn't that room. Those people are struggling at the end of those lines and those rural areas right now. They don't have the head room. And we can think about other things, whether it's—there's a lot of different ways you can add costs on to PMA power. And we're, kind of, at the limit of what people can afford out in the rural areas and anything that's added on adds up and decreases that affordability and hurts those people at the end of the line.

We paid for the assets of those federal power in our alliance because, through our rates, in all it pays for the poles and wires and transmission that the PMAs had. It pays the return, the amortized, with interest, assets of the both the Corps of Engineers and Bureau of Reclamation and a portion of the dam is allocated in those costs. All of that goes in. We feel we have a covenant with the PMAs that has served the government extremely well because it's our money that pays for those and served our members very well because it helps their rates be affordable.

In closing, I thank you for the opportunity to testify. I look forward to any questions you may have.

[The prepared statement of Mr. Hardy follows:]

U.S. Senate Committee
on Energy and Natural Resources

Testimony of Doug Hardy,
General Manager,
Central Montana Electric Power Cooperative

April 19, 2018

Good Morning Chairman Murkowski, Ranking Member Cantwell, and members of the committee. My name is Doug Hardy. I am the General Manager of Central Montana Electric Power Cooperative, in Great Falls, Montana.

Thank you for the honor of testifying before the committee.

I will discuss some of the challenges of serving the rural areas and communities of Montana along with the importance of the hydropower we purchase from the federal power marketing administrations, in our case, the Western Area Power Administration.

Central Montana is a co-op of co-ops whose primary responsibility is to ensure we have the electricity and transmission services to deliver power to about one-third of the 25 distribution cooperatives in Montana. The distribution cooperative member systems of Central Montana provide approximately 70,000 Montanans with affordable electricity and related services at competitive, locally regulated rates. Prior to managing Central Montana, I managed a distribution cooperative serving a portion of south central Montana. My entire career has been spent doing all I can to ensure our consumer-members have safe, reliable and affordable electricity.

Delivering power in a state like Montana that is mostly rural and, in some ways, even frontier-like in its vastness, requires a tremendous amount of power-system infrastructure. Our electric co-ops provide power in parts of all 56 Montana counties. If you connected the individual co-op lines in Montana end to end, the resulting line would be long enough to circle the earth at the equator. In fact, this line would be long enough go around the world 2½ times.

The challenges of serving these rural areas are great. These challenges include high, fixed costs of the power lines and the associated power system infrastructure, across vast distances, with fewer customers per mile of line to pay those costs. Compared to cities, rural electric co-ops have few commercial power loads to help spread the fixed costs of the power-system infrastructure.

Keeping electricity costs affordable in the face of little or no demand growth in rural areas also presents a challenge. Many co-op members are farmers and ranchers who, to stay in business, must consolidate and farm or graze livestock on more and more acres. This increases the challenge for many of the cooperatives as small towns shrink or close

down completely, further reducing the number of consumers to pay the fixed costs of the system.

Thank goodness cooperative leaders in the 1950s and '60s saw the merit in contracting for power from the federal dams. At the time, the cost of the federal power was higher than other options at the co-op I used to manage. However, the leaders felt it better to partner with the U.S. Army Corps of Engineers and the Bureau of Reclamation, and later the Western Area Power Administration (WAPA), for cost-based electric generation.

Electric co-ops and other WAPA customers have paid for all the generation-related costs, the transmission lines and a good share of the dams themselves as amortized with interest. The Western Area Power Administration has been essential to keeping power somewhat affordable east of the Continental Divide in Montana. West of the Continental Divide, Bonneville Power Administration serves that same role in Montana and other Northwest states. Other federal hydropower agencies do the same elsewhere in rural America.

It is the lower cost of this cost-based electricity provided by the Western Area Power Administration that I pass through to my distribution cooperatives. This power is vital to these distribution co-ops and the rural consumers they serve. That's particularly true given that half of the distribution cooperatives I provide the power to have less than one member per mile of line.

Another challenge of hydropower in rural areas is maintaining a balance between affordable power and protecting fish and wildlife. I am one of the stakeholders of the Missouri River Recovery Implementation Committee (MRRIC) representing hydropower and am proud that we are nearly complete with the most comprehensive adaptive management program to protect endangered species on the Missouri River. It is my hope that with this comprehensive 10-year process, we will have a plan that can allow the continued generation of electricity at the dams and have a science-based, peer-reviewed environmental protection process into the future.

In closing, I have a few requests and thank-yous related to keeping electricity affordable for the people struggling at the end of the lines in our rural areas. Cooperatives are not-for-profit entities and the rates we charge our member-consumers are our only source of revenues to pay for electricity and the infrastructure to deliver power.

We are strongly opposed to the Administration's fiscal year (FY) 2019 budget request to sell the transmission assets of three federal Power Marketing Administrations (PMAs) and the Tennessee Valley Authority (TVA). We are equally opposed to the Administration's companion proposal to change the current cost-based rate structure for all four of the PMAs. We have paid the rates that in turn have repaid, with interest, the power portion of federal projects, and we also have entered into long-term contracts as well as helped to prefund improvements in the transmission and generation system. The Administration's proposal would interrupt a long and productive history between PMAs and their preference customers that is one of the country's most successful relationships.

To sell any of the transmission assets to the highest bidder would not only raise costs to rural America, it could also affect reliability. It's also worth noting that, in Montana, many of the power-line easements cross the many Indian reservations we serve and, to our knowledge, these assets are nontransferable.

To go to market-based rates on assets we have paid for through rates is, on its face, unfair. It's also unwise – from the standpoint of how it impacts rural Montana and other parts of the country relying on cost-based PMA hydropower.

Raising electricity prices on rural Americans to raise revenue for the government has been rejected several times in previous debate on this issue and we believe Congress has acted for all the right reasons.

Finally, on behalf of rural electric co-ops, we thank you for the recent passage of improvements in vegetation management for our lines on federal lands. Managing vegetation on rights of way so that we can prevent fires will help keep power affordable. Thank you again for providing me this opportunity to testify before the committee and I would be pleased to answer any questions you may have.

The CHAIRMAN. Thank you, Mr. Hardy. We are glad you are here.

Mr. Lyons, welcome.

STATEMENT OF ANDREW LYONS, WEATHERIZATION/ENERGY ASSISTANCE MANAGER, HOPESOURCE

Mr. LYONS. Chairman Murkowski, Ranking Member Cantwell and members of the Committee, thank you for the opportunity to testify regarding the role of weatherization in energy assistance programs in rural areas in the United States.

For the past ten years I've had the honor of working with these programs and the privilege of seeing how they change family's lives. I work for HopeSource, a community action council that serves Eastern Washington.

I was introduced to the concept of weatherization early on in my life while growing up in a rural Eastern Oregon community that was 75 miles away from the nearest grocery store and 25 miles away from school. I graduated with a class of four and that gives you an idea of how rural it really was.

As the youngest of six children we had limited financial resources. We lived in a drafty, turn of the century home with no insulation. To stay warm in the winter we burned over ten cords of wood which, I can tell you from personal experience, is a lot of wood to cut, haul, split and stack on a yearly basis which is maybe why my parents had six children. I'm not sure.

I tell you that story simply to demonstrate some of the unique energy challenges in rural communities. Much of the existing housing stock is not energy efficient and tends to be older and more dilapidated.

This is further compounded by systemic poverty and higher energy rates. Combined, these factors make home weatherization and energy assistance programs highly relevant when discussing energy challenges facing rural America.

The number one goal of a weatherization program is to reduce energy in the home. A fully weatherized home can save between 20 and 30 percent in energy costs. And for low-income households, those savings mean a lot because their energy burden is often five times that of a non-low-income family.

Weatherization is often seen strictly as an energy efficient program, yet, it's impacts go much further than that. Weatherization programs ensure that once a home is weatherized, it's also a healthier and safer place to live.

Recently we completed a project that illustrates the multifaceted benefits of energy assistance in weatherization programs. Kim is a single parent whose home was heated with electric baseboards and an old wood fireplace. Every day she struggled to keep the house warm for her two boys. She couldn't afford to use the electric baseboards so she was using a fireplace instead and worried that it would cause a chimney fire. Fortunately, she was able to receive energy assistance at HopeSource and our AmeriCorps member, Savannah, was able to provide her with some in-home, energy conservation education. We then determined that Kim was a perfect candidate for our weatherization program. We were able to replace her wood stove with an energy efficient ductless heat pump, add

attic insulation and air seal the home. When we finished our work, Kim sent us a letter. She said, I quote, "I have renewed hope living here with my kids. I don't feel embarrassed to have others over and my kids can play comfortably in the living room without blankets and covers. I appreciate and will remember this always."

As a nation we reap enormous benefits from the low-income weatherization program and dollars saved on energy assistance, health care costs, homeless services and the maintenance of the country's affordable housing stock.

Oak Ridge National Laboratory found that for every Department of Energy $1 spent, it resulted in nearly $2 in energy savings and close to $3 in health-related benefits. Looking at our current nation's energy and health care costs, the savings potential as a result of weatherization programs is substantial.

Federal funds provide the backbone of the weatherization programs across the country. Because of our program's structure, we're able to leverage those federal funds to receive matching funds from other state, utility and private resources.

This year the weatherization program at HopeSource, where I work, we've been able to leverage close to $3 from other funding sources for every federal $1 received.

I've spent my entire life in rural communities that these programs serve. Every day I see the dramatic impact they have on families.

My written testimony gives details and statistics on the impact of such programs, but I can assure you that the support you've given of weatherization and energy assistance programs is making a difference in my community and the communities that you represent.

As you know, independence is integral to the character of rural communities. I'm extremely proud to live in a country that seeks energy independence in part through energy conservation. But I am even prouder that, collectively, we are willing to give that same opportunity of energy independence to rural Americans who need it the most.

[The prepared statement of Mr. Lyons follows:]

Testimony of
ANDREW LYONS, WEATHERIZATION/ENERGY ASSISTANCE MANAGER
HOPESOURCE

Before the
UNITED STATES SENATE
COMMITTEE ON ENERGY AND NATURAL RESOURCES

Hearing to Examine Rural Energy Challenges and Opportunities
April 19, 2018

Testimony of Andrew Lyons
Weatherization/Energy Assistance Manager – HopeSource
April 19, 2018

Chairman Murkowski, Ranking Member Cantwell and Members of the Committee, thank you for the opportunity to testify regarding the role weatherization and energy conservation programs play in the energy challenges and opportunities in rural and remote areas of the United States. My name is Andrew Lyons and I have lived the vast majority of my life in rural communities throughout Oregon and Washington. I grew up in a community of less than 50 people, and for the past 9 years I have had the amazing opportunity to manage low income weatherization and energy assistance programs for HopeSource, a community action council that serves several rural counties in Eastern Washington.

During my time in this field, I've noticed that the emphasis and regulation for energy issues is often on how energy is created and distributed as opposed to how energy is consumed. Nearly 22% of the energy in the United States is used in the home. Recent changes in building codes have allowed for the building of more energy efficient homes, but much of our existing housing stock is not energy efficient. More than 40% of homes in the US were built before 1970, when home energy efficiency was barely a concept.[1] This is exacerbated in rural communities where the housing stock tends to be older and more dilapidated. Rural homes are more likely to be in substandard condition. In fact, nearly 6% of rural homes are either moderately or severely substandard, with leaking roofs, rodent problems and inadequate heating or plumbing systems.[2] Inefficient housing stock in rural communities is further compounded by higher rates of, and more systemic, poverty.[3] Rural citizens, on average, also pay higher energy rates. Combined, these factors make home weatherization and energy assistance programs highly relevant when discussing energy opportunities and challenges in rural America.

The specific points I would like to address:

- Multifaceted impact of low income weatherization programs
- The critical role federal funding plays in the low income weatherization program
- The ongoing need for weatherization services

[1] HUD American Housing Survey, 2013. https://www.census.gov/programs-surveys/ahs/data.2013.html
[2] Housing Assistance Council, "Taking Stock: Rural People, Poverty, and Housing in the 21st Century,", 2012. http://www.ruralhome.org/storage/documents/ts2010/ts_full_report.pdf
[3] USDA Economic Research Service, "Rural Poverty and Well-being," 2018. https://www.ers.usda.gov/topics/rural-economy-population/rural-poverty-well-being/

Testimony of Andrew Lyons
Weatherization/Energy Assistance Manager – HopeSource
April 19, 2018

Multifaceted Impact of Low Income Weatherization Program

Numbers Served

The low income weatherization program has had a substantial impact since its inception in 1976. Since then more than 7.4 million homes have been weatherized in the US. Over the past six years, the Washington state program has served 18,725 low income households.

Energy Conservation

The primary focus of a weatherization program is to reduce energy consumption in the home. A fully weatherized home in cold weather states can provide 30% in energy savings, according to an Oak Ridge National Lab evaluation.[4] On average, a family saves $283 in energy costs each year after weatherization, and many households report much higher savings. Individual weatherization projects that combine a new efficient heating system with additional insulation and air sealing can achieve savings upwards of 40% or more. This savings is realized on an annual basis for 10-30 years depending on the life of the energy-saving measure installed in the home. This savings is critical for low income citizens who have a much higher energy burden. Families eligible for weatherization services pay 16.3% of their income on energy costs, compared to 3.5% for everyone else.[5]

Energy consumption in a home is based on two basic components: the physical building and the behavior of people living in the building. Weatherization programs seek to address the building by making it more energy efficient through the installation of measures that are shown to have a positive savings to investment ratio, meaning the cost of the measure will be paid back in energy savings over the life of the measure. Typical energy conservation measures include air sealing, adding insulation, and replacing inefficient heating or cooling systems.

Behavior of people living in the home is addressed through conservation education programs. At HopeSource, we utilize an AmeriCorps member to teach workshops where participants can clearly see the relationship between their actions and the energy bills they pay. The AmeriCorps member also provides in-home assessments, which allows participants to receive a personalized energy analysis of their home so they will know best how to save energy.

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[4] Oak Ridge National Lab, "Weatherization Works - Summary of Findings from the Retrospective Evaluation of the U.S. Department of Energy's Weatherization Assistance Program," 2014.
https://weatherization.ornl.gov/Retrospectivepdfs/ORNL_TM-2014_338.pdf

[5] Oak Ridge National Lab, "Weatherization Assistance Program Technical Memorandum Background Data and Statistics On Low-Income Energy Use and Burdens," 2014.
https://weatherization.ornl.gov/pdfs/ORNLTM2014_133.pdf

A recent HopeSource project that illustrates the benefits of weatherization services was captured by one of our AmeriCorps members, Savannah Kisling:

"Jenny's home was heated with electric baseboards and a single wood stove. She struggled daily to keep the house warm enough for her and her two boys, all the while battling fear of the fire that was heating her home.

The day I visited Jenny's home it was 15 degrees outside. The house was barely warm from the fire she had started a few hours before. Jenny no longer had the financial resources or ability to secure firewood to last her through the winter, and she was concerned that the chimney would catch fire given the age of the home and fireplace. The wood smoke also exacerbated her respiratory issues. Luckily Jenny's home was an excellent candidate for the weatherization program that helps make homes more efficient, comfortable and safe to live in. We were able to replace her wood stove with an electric ductless heat pump that would be energy-efficient and totally fire-free. We also provided in-home energy conservation education that helped her change some ingrained habits to lower her energy bill.

For every home project we finish we give a short questionnaire to the resident to check on his/her experience. At the end of her questionnaire Jenny left a note: 'I have renewed hope living here with my kids. I don't feel embarrassed to have others over, and my kids can play comfortably in the living room without blankets and coats.' This gave me insight that our program does more than just save people from chimney fires and cold toes. It can change how people live in their homes, and it gives them confidence in ways that few things can."

By addressing both the building and the behavior, the low income weatherization program has had a dramatic impact on conserving energy in rural communities across the United States.

Healthy Homes

Weatherization has long been seen strictly as an energy efficiency program, yet its impacts go much further. Guided by building science and treating the home as a system, weatherization programs ensure that once a home is weatherized it also is a healthier and safer place to live. Rural citizens of the United States benefit from increased health and safety through means such as improved air quality and repair of electrical hazards. Citizens become more self-sufficient as their energy expenses decrease, allowing them to stay stably housed for the long term. The nation also reaps enormous benefits from this program in dollars saved on energy assistance, health care costs, homeless services and maintenance of the country's affordable housing stock. Oak Ridge National Laboratory found that every Department of Energy dollar spent resulted in $4.50 in benefits -- $1.72 in energy savings and $2.78 in health and safety. Looking at our nation's healthcare costs, the savings potential as a result of weatherization programs is substantial.

Testimony of Andrew Lyons
Weatherization/Energy Assistance Manager – HopeSource
April 19, 2018

A recently completed HopeSource weatherization project illustrates additional benefits of having a home weatherized:

"Debra Herrick believes in angels, but not the kind with wings. She says they walk the earth with tape measures and hammers, making her house a true home again.

Debra lives in a tidy older mobile home in Ellensburg, enjoying life with her elderly dog, Choo-Choo. But it wasn't always that way. She's been a store manager, machinist, cook and waitress, moving between the Pacific Northwest and Alaska. Debra's a survivor on many levels: a work accident left her with a crippled back, difficult relationships, financial setbacks, widowhood and heart attacks. As she said, at one point 'I lost my marbles.' She started hoarding, to the point her rooms were filled floor to ceiling with just a walkway to navigate through the house. 'I became a real hermit,' she said, socially withdrawing from the world.

That was seven years ago. She's struggled to come back from that low point with help from a mental health counselor who 'saved my life.' After she felt better, she started tackling her home, which had a leaking roof ('it was raining inside'), plumbing leaks and electrical issues. Extension cords snaked through the rooms to provide electricity to the washer and dryer. It was also costly to heat with an electric furnace and wood stove. So she reached out to HopeSource to see what the community action agency could do.

'I always wondered what HopeSource was all about,' she said. 'When I walked in the door the first day, I was treated so respectfully.'

The weatherization team evaluated her home, determining Debra would save on her energy bills in the long run by providing more insulation in the crawl space and air sealing the heating ducts. In order to protect that investment, repairs were also made to the roof and plumbing. Because she lives on a small fixed income, she qualified for the free service, which is funded with grants from the state and federal government and the Kittitas Public Utility District.

The work has changed her life, she said. She's already cleared out the main areas of the home and is reducing clutter in the bedrooms. There's energy in her attitude and optimism for her future. 'Like they say, we're the captains of our own ships, and I'm gonna sail, I'm not gonna sink.'

In a bit of an ironic twist, repairing her home has also encouraged her to get out more and re-engage with the world.

'I did something special for myself last week. I actually took myself out for dinner at a restaurant. I haven't done that for years. Just knowing that there's people out there who care, you've uplifted my life. You are true angels on earth.' "

Critical Need for Federal Funding

Federal funds still provide the backbone of weatherization programs across the nation. One of the strengths of the low income weatherization program, specifically in Washington state, has been our ability to leverage funds received from the Department of Energy and LIHEAP (Low Income Home Energy Assistance Program) with state, local and private funds. On a national level, for every $1 invested by DOE and LIHEAP, the program leverages almost $2 in other non-federal, state, utility, and private resources.[6] In the weatherization program I manage for HopeSource the number is even higher. For every $1 in federal funding we have been able to leverage an additional $2.91 from additional funding sources, including utilities, state Matchmaker funds, and local governments. We also partner with other non-profits like Habitat for Humanity to ensure our services complement one another.

If the federal weatherization program were eliminated, the projected impacts for Washington state are as follows (figures based on 2016 funding levels):

- Washington state would lose $15,464,541 in LIHEAP and DOE weatherization dollars
- This number is expected to rise beyond $20,464,541 when we add the loss of potential leveraged dollars
- Washington would lose at least 235 full-time jobs
- Washington would lose the ability to weatherize more than 2,062 homes in the coming program year. This equates to 2,062 families going without much needed work done on their homes, scraping to pay their energy bills and maintaining financial solvency.
- $977,250 in direct annual benefits would be lost for low-income families
- Federal funding cuts would result in the loss of more than 27,337 MBTUs of first-year annual energy savings
- The state's ability to preserve existing affordable housing stock through the weatherization program would be affected

Ongoing Need for Weatherization Services

Will we run out of low income homes to weatherize? It is difficult to estimate the remaining need for weatherization due to the challenges of available and compatible data sets. The Washington State Department of Commerce recently completed an assessment for the state legislature. The assessment determined that in Washington state:

[6] NASCSP, "Weatherization Assistance Program PY 2016 Funding Report," 2017. http://www.nascsp.org/data/files/weatherization/publications/nascsp%202016%20wap%20funding%20survey%20final-web%20display.pdf

- More than 686,000 households are financially eligible (at or below 200% of the Federal Poverty Level) to participate in the low income weatherization program
- It is estimated that 58% of those households (about 398,000 homes) live in homes that can potentially be weatherized
- Since 1995, 79,000 households have been weatherized through Washington state's Low-Income Weatherization Program
- This represents a penetration rate of approximately 20% of potential homes. Penetration rates vary by housing type, market segment and heating fuel.

Although overall demand may decrease over time, the assessment showed that there is an immediate and ongoing need for low income weatherization services.

Conclusion

Thank you again for the opportunity to testify regarding the relevance of energy conservation/weatherization programs in looking at the energy challenges and opportunities in rural America. Hopefully I have been able to demonstrate the impact and ongoing need for low income weatherization programs. Not only in how these programs assist rural citizens in need, but also the vital role they play in moving the country to greater energy independence. As a part of the Washington state weatherization network we look forward to being a resource for Committee members in the future to ensure low income weatherization and energy assistance programs continue to deliver cost-effective results that support our economy and make a difference in the lives of the most vulnerable in our rural communities.

The CHAIRMAN. Thank you, Mr. Lyons.

Mr. Venables, welcome.

STATEMENT OF ROBERT VENABLES, EXECUTIVE DIRECTOR, SOUTHEAST CONFERENCE

Mr. VENABLES. Thank you, Chairman Murkowski, Ranking Member Cantwell and members of the Committee for the opportunity to be part of this conversation today.

I'm Robert Venables, Executive Director for Southeast Conference, which is the federally-recognized economic development district in Southeast Alaska. I've been privileged over the years to work with the Alaska Energy Authority and tribes and communities throughout the state on addressing some of these challenges.

As the Chair mentioned earlier, we're a land of extremes. Extremely large, extremely beautiful, but extremely expensive to live and a gallon of milk in some of these most rural communities can be $13 a gallon. It's stifling. But the opportunities are equally great, and we're a very resilient bunch of folks.

One thing I'd like to point you to, because I really do appreciate the interest the Ranking Member expressed for some of the solutions that we found, because whether it's in Kotzebue where their wind turbines have saved $40,000 for a local hospital or the 11 communities in the Northwest Arctic Bureau who above the Arctic Circle has installed solar panels to save over $190,000, it is incredible.

The story that I want to tell you about is from Southeast with the Southeast Island School District and how biomass has paid an extremely incredible community a life-changing experience down there.

In your packet you see some artwork that was provided for you today.

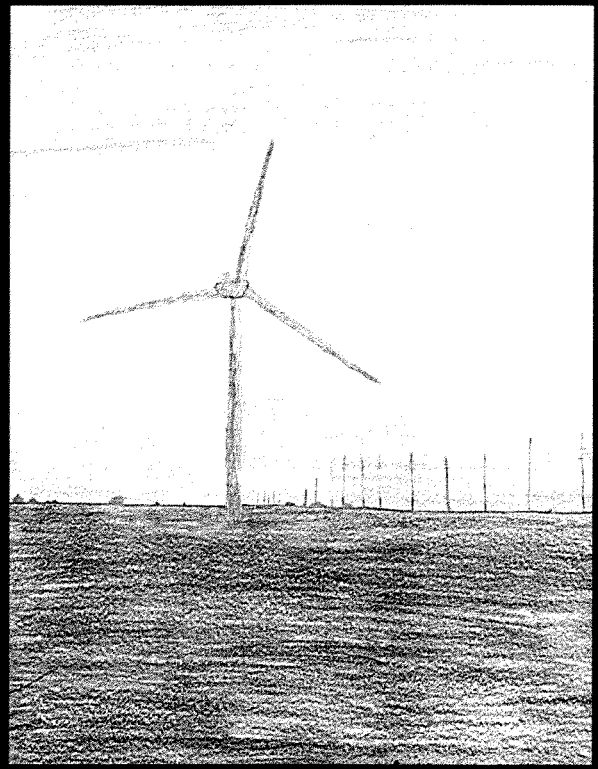
[The information referred to follows:]

ALASKA RURAL ENERGY CONFERENCE

Innovation, Inspiration, & Opportunity

We asked students in grades 5-8 across Alaska to design the 2018 REC program cover by answering this question with artwork:

What do you want your community's energy system to look like when you are 50 years old?

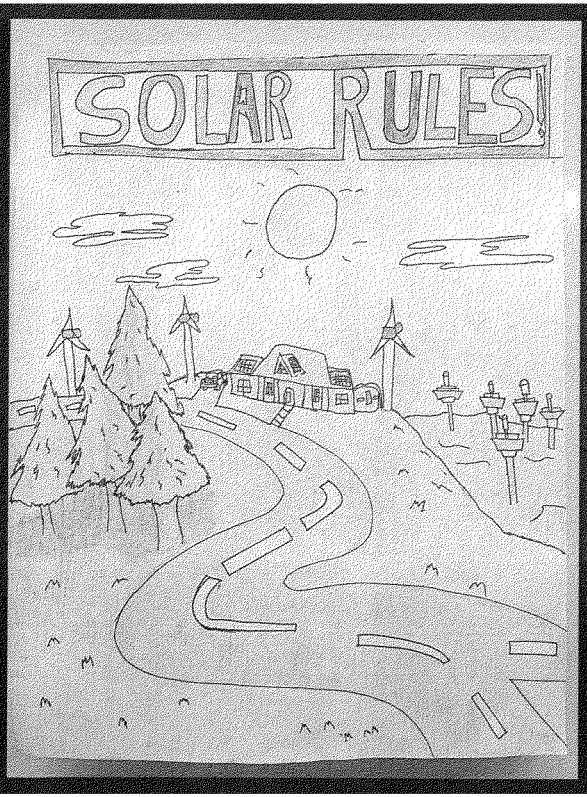


Adin Griechen
Pilot Point

Aidan Haward McGrath

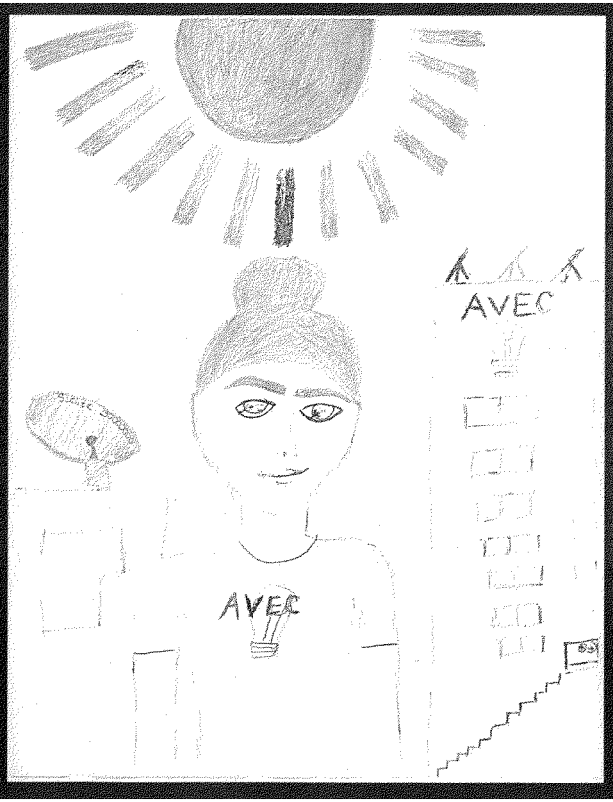
Alayssa Wise
Pilot Point

Amelia Miller
Metlakatla



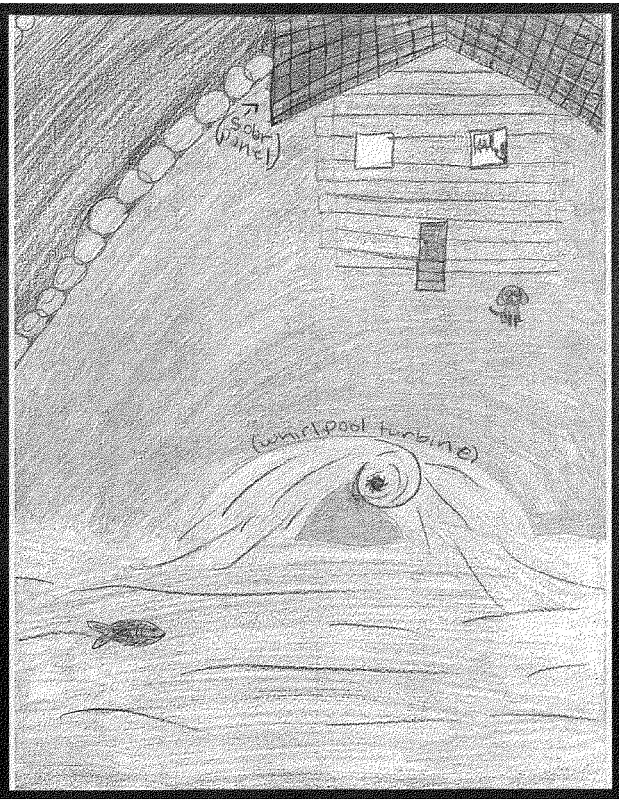
Luther Bragonza (artist)
Jayvee Polintan (color editor)
Anchorage

Corbin Steik
McGrath



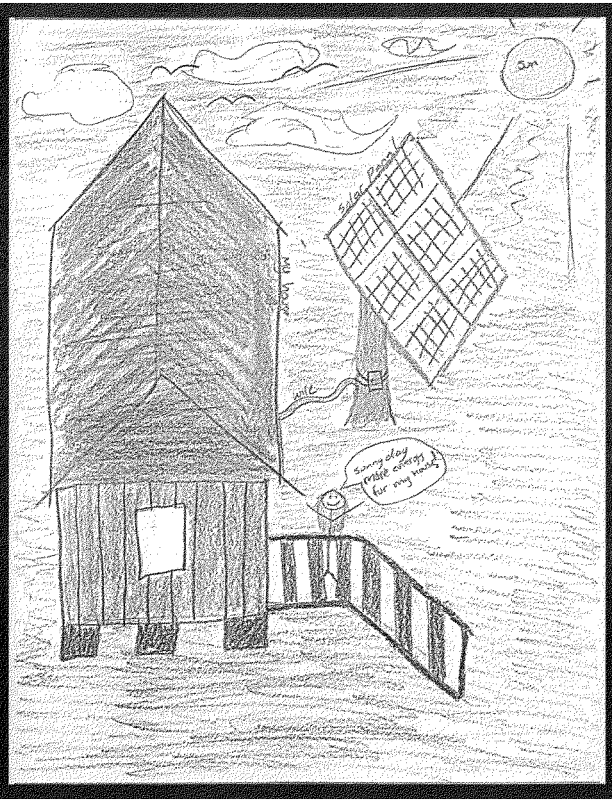
Courtney Richardson
Anvik

Daniel Lyman
McGrath



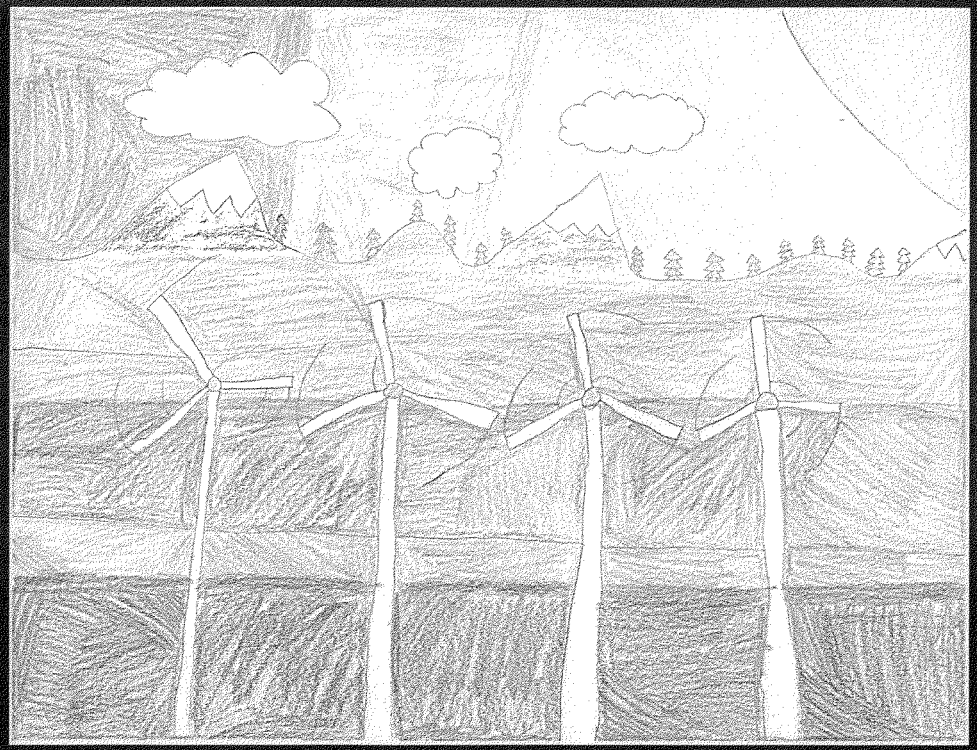
Elizabeth Edwards
Allakaket

2nd Place



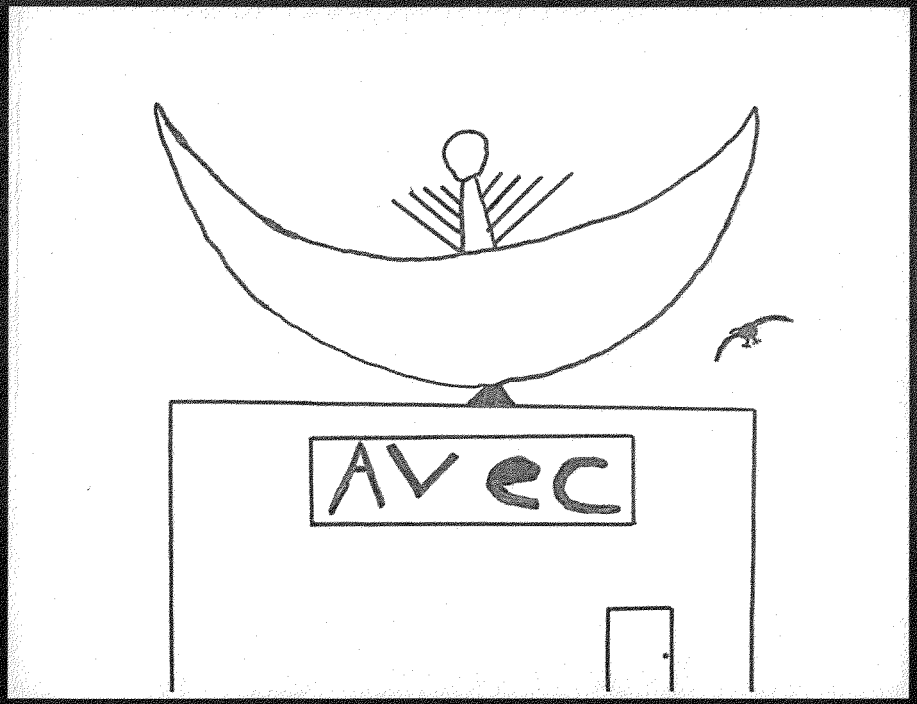
Grace Moses
Allakeket

Hazell Vanderpool
McGrath

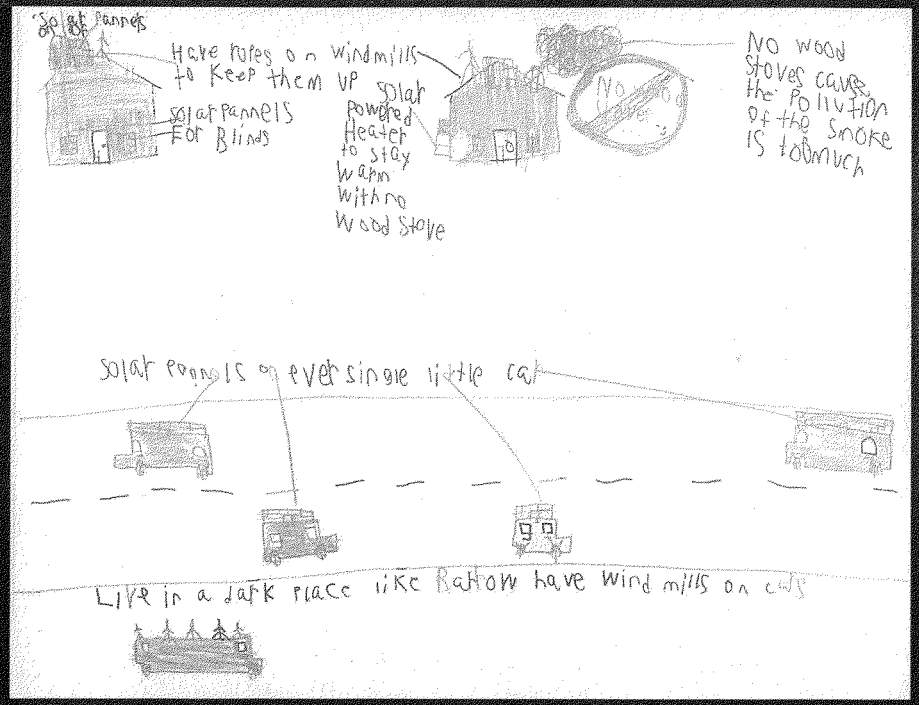


Joseph Dale McGrath

3rd Place



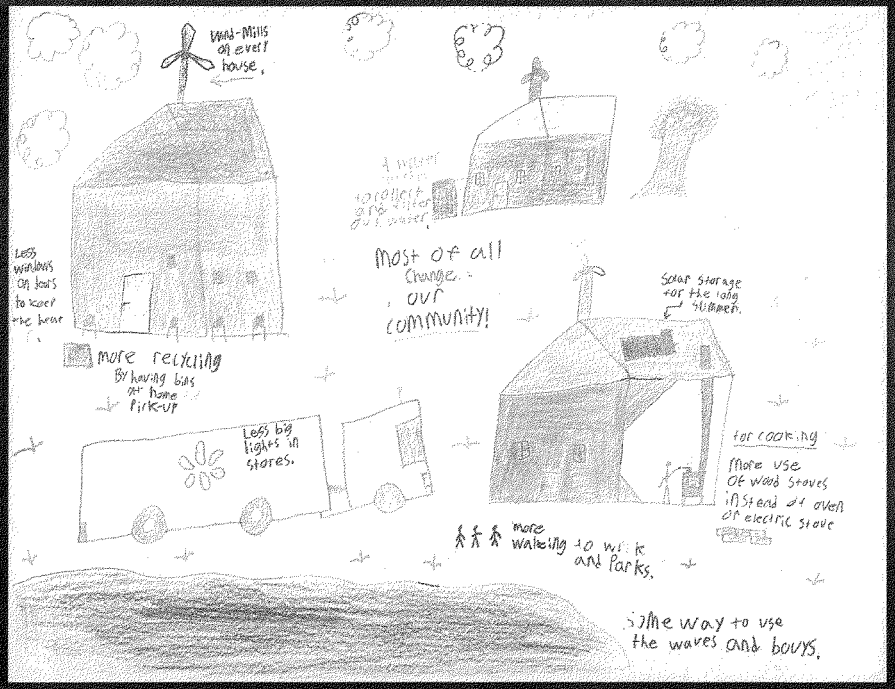
Michael Maillelle
Anvik



Nicholas Hecht
Kodiak

Nick Curiel
McGrath

Noemi Balderrama Mcgrath



Zachary Hecht
Kodiak

1st Place

Last week we had the Rural Energy Conference where close to 400 people gathered from across rural Alaska to address these issues. And in preparation for that and the theme of innovation, inspiration and opportunity, we asked children in grades five through eight, what it is that you want? What is the community's energy system? What should it look like when you're 50 years old? Of course, the children had to wrap their minds around being 50 years old for starters, but you see pictorially before you some of those interpretations of what they see as opportunities that surround them with their resources.

And yes, we have those challenges of access where there's, I'm sure, recited before you, many times, all the different challenges we have. I put some of that in my written testimony as well.

But down in Southeast, just displacing diesel at one school with biomass, they save enough money for an entire teacher's salary for the year. And it didn't stop there. They installed greenhouses on the site of the schools. They'll allow the food program to have fresh vegetables that are grown right there onsite fueled by renewable wood energy.

It didn't stop there. The children then see as part of the curriculum the sciences, the math, the economics, the technology in running the systems as well as just growing the food. And so, then they become part of the system there of taking responsibility in caring for the system and for the plants. By the time those students actually graduate, there's a whole different caliber of student there.

They've learned real world economics. Students actually ran a restaurant in town. We're using the local produce that they've grown in the local greenhouse during school, learning the math skills, the economic skills and then having the school lunch program featuring the fresh vegetables that are grown there.

So it's a real incredible opportunity when given access to the resources that surround you to be able to solve some of the extreme challenges that we have in our great land of extremes.

I think that one of the real issues is trying to push the agencies that are there to really reach potential of their mission.

You represent our landlord because Southeast Alaska is over 96 percent federally-owned. We only have 1 percent of the land in Southeast that's in private hands.

So I applaud the work that this Committee does, individually and collectively, on addressing these issues and glad to be part of the conversation and the work as we go forward.

Again, thank you and I'm prepared for any questions you might have.

[The prepared statement of Mr. Venables follows:]

Written Testimony
Submitted to the
United States Senate
Committee on Energy and Natural Resources

On

Energy-related challenges and opportunities in remote and rural areas of the United States

April 19, 2018

Respectfully Submitted by Robert Venables
Executive Director
Southeast Conference

Testimony of J. Robert Venables
Executive Director, Southeast Conference

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SOUTHEAST ALASKA REGIONAL DEVELOPMENT ORGANIZATION

Chairman Murkowski, Ranking Member Cantwell, and Members of the Committee, thank you for the opportunity to testify on the energy-related challenges and opportunities in remote and rural areas of the United States.

My name is Robert Venables, Executive Director for Southeast Conference, the federally recognized Economic Development District for southeast Alaska and the State of Alaska's Regional Development Organization (ARDOR) for that region. I have worked for many years on energy challenges facing rural Alaska and collaborated with many of the state and federal agencies committed to the cause of reducing the cost of energy to rate payers. I have also served as an "Energy Ambassador" for the Department of Energy's Indian Energy Office and provided technical assistance for many of their programs including the most recent RACEE competition that supported community goals of energy efficiency.

The Southeast Conference mission is to help develop strong economies, healthy communities and a quality environment in Southeast Alaska. Our vision for Southeast Alaska is to reduce, to the maximum extent possible, the use of imported diesel as a primary fuel source for the generation of electricity, space heat and transportation.

Our organization was formed over 50 years ago in response to the region's need for improved transportation and was an advocate for the formation of the ferry system. Since then, our member communities have worked through Southeast Conference on issues ranging from transportation, economic development, timber, fisheries, mining, environment, health care, tourism and energy. Our energy committee first gathered in 1997 as the Intertie Committee and produced the study in 1998 called the Southeast Alaska Electrical Intertie System Plan, which this committee's predecessor and the 106th Congress (1999-2000) endorsed, authorizing up to $384 million to be spent with a 20% local match). To date no funds have been appropriated and the region struggled to implement the most economic portions of the intertie system which has saved millions of dollars in displaced diesel consumption. That study has been the guiding document for the concept of a region-wide interconnected intertie system that could provide energy security and electrical redundancy for the communities of Southeast.

However, as construction costs for proposed interties continue to escalate, and time passes, our focus is turned toward the resources at hand and the extreme need that still exists in many communities such as: Kake, Angoon. Metlakatla and Hoonah. But, Southeast Alaska is resilient

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and has a plan. Each of our communities have short-term and long-term objectives that, if constructed, can go a long way toward meeting the needs of our region.

At the peak of energy prices, the unsubsidized cost of heating oil was as high as $9 per gallon in some regions of Alaska, while electricity reached $1.50 per kilowatt hour in some of the state's remote communities. In southeast Alaska prices in our rural villages reached approximately two-thirds of those costs.

One of the many success stories in rural Alaska is how the Southeast Island School District (SSID) took a tree from the Tongass and turned that renewable energy resource into a child nutrition program and school lunches while displacing diesel, creating more sustainable communities and economies and growing the best crop in the nation – our youth!

The plentiful energy resources in our region are primarily hydro from our perched lakes and mountain streams which is utilized for electrical generation whenever possible. However, the greatest energy burden in rural Alaska is heating our homes and facilities. Schools are often the largest energy consumers in the community.

In 2007 SISD built two new schools on Prince of Wales Island, in Naukati and Coffman Cove and chose a biomass cordwood system due to the abundant supply of wood and the simplistic nature of operations and maintenance.

The Coffman Cove conversion was very successful in more ways than anticipated. The school saved money – BUT the social benefit soon became the major selling point. The school began purchasing cordwood from local firewood suppliers, including students and their families. This was money that had been leaving the community to fossil fuel companies Outside. The district

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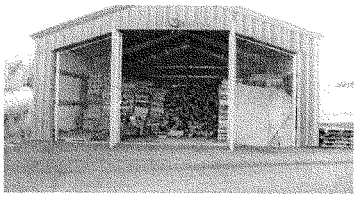
paid $200 per cord and bought as much fire wood as possible. They soon had a 3-year supply, which was about $30,000 infused directly into the local economy.



The second thing that happened was that the district needed to hire a local person to put cordwood into the boiler. This was a part time job but needed to be done daily. The district hired a local girl that had been in a car accident and needed a low stress job while she recovered from her head injury. This also helped to gain the district support from the entire community.

Riding on the success of Coffman Cove, the School District next installed cordwood boilers in the other schools on the Island. The Thorne bay school displaces 9,000 gal. diesel per year and helps parents and students raise money for activities by splitting and stacking wood.

Not only does the biomass heat the school, a greenhouse was constructed to utilize excess heat and be used as part of the school curriculum, teaching science, math and economics. The students take responsibility to grow the vegetables which are then served in the school lunch program with the extra produce sold locally.

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There are many community and economic benefits with wood energy. The following is excerpted from a USFS briefing paper and lays out many key points: Community economic benefits of wood energy are compelling from multiple perspectives and explain why it is the nation's fastest growing renewable energy source for heating.

1. Competitive – Locally-sourced wood fuel competes strongly with other energy sources on a cost basis.
2. Captured Dollars – Money spent on wood fuel remains in the community rather than leaving the local economy.
3. Economic Impact – Community economic benefits induced by using local wood are more than double the direct financial benefits of fuel cost savings. The benefit of additional jobs in forestry, processing, transportation, and other activities cascade throughout the local economy.
4. Rural Relevance – Wood energy for heating is especially attractive in rural Alaska communities where jobs may be scarce, local economies are often more fragile, energy costs are higher, but local wood resources are abundant.
5. Forest Management Tool – Timber harvest for wood fuel can serve as a tool for improving local forest health.
6. Fire Prevention – Reducing excess hazardous forest fuels surrounding communities to avoid local economic devastation from wildfires cannot be emphasized enough, as demonstrated by the tragic wildfires in California, other western states, and Canada.

Northeastern states have a long history of promoting wood energy conversations and also studying related economic impacts for communities and local economies. In Alaska, wood energy is particularly relevant with the high and turbulent cost of competing fuels, remote communities, and harsh climates, although additional studies related to the economic impacts are still forthcoming.

The Northeast States of Maine, New Hampshire, and Vermont have been particularly active in studying the economic consequences of converting to wood energy.

1. 116 New Hampshire public and commercial buildings heat with wood. The direct annual fuel savings are $11.8 million and $5.8 million in energy money is fed back into the economy through buying locally-sourced wood fuel. The total economic activity, direct and induced, is $35.9 million (source: New Hampshire Wood Energy Council).

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2. Vermont (highest penetration of wood energy in US) sees about $100 million in economic benefits annually from displacing heating oil with wood heat. They estimate 1.45 FTE jobs in the wood fuel supply chain per 1,000 tons of wood fuel – this does not include the jobs created from installing and operating the heating systems (source: Biomass Energy Resource Center)

Another example project in the town of Harney, Oregon demonstrates local benefits: This district energy system, fueled by locally-sourced wood chips, will serve nine of the largest buildings in town. In additional to eliminating the expense of each building operating and maintaining its own heating system, the direct fuel savings are $135,000 annually.

Alaska differs significantly from Lower 48 state because the climate is harsher, communities are more isolated, heating fuel prices are higher, and jobs are often scarce. Small economic benefits have much larger community impacts.

1. A 2008 University of Alaska study found that while a typical affluent household in Anchorage spends less than 2% of household income on residential energy (i.e., heating and electricity), low income households in remote communities spend as much as 47% of household income for the same services.

2. High residential energy costs in some of the more rural regions in Alaska contribute to household overcrowding levels 12 times the national average. This can lead to adverse outcomes for health and childhood education.

3. Downstream benefits of increased energy security and enabling infrastructure such as swimming pools and greenhouses also have positive, albeit largely unquantifiable, impacts for rural communities including affordable produce availability, childhood nutrition, and STEM education opportunities.

4. While each Alaskan community is unique, several communities have observed quantifiable economic benefits from transitioning to wood energy. Galena, a rural village in interior Alaska, highlights community wood energy impacts:

a) Galena (population: 488) is in one of the poorest regions of the state, where household incomes are about half of the Alaska average. The community recently fired up a large district heating system that serves a school campus, fueled by locally-produced wood chips.

i. $330,000 is directly retained in the local economy as a result of reduced heating oil usage annually.

ii. One fulltime and 5 to 7 part-time system operator, forestry technician, and heavy equipment operator jobs have been created.

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iii. Using an established economic multiplier of 2.1 (source: Northern Forest Center), the annual community economic benefits are approximately $693,000. That is equivalent to about $1,475 per local resident, or to put it into a more familiar Alaskan metric, nearly one and a half times the value of the annual permanent fund dividend that each Alaskan resident receives.

iv. Additionally, the harvest of the wood has allowed the Gana-A 'Yoo Limited Native Corporation to enhance local wildlife habitat and browse to improve subsistence harvest of game. A greenhouse is being contemplated as well. These yield economic benefits beyond those typically experienced in the Lower-48.

This is just one example among many great opportunities in rural Alaska. However, the vast forests that surround our communities are not under local control and access to resources is often difficult. The federal government owns and controls over 96% of southeast Alaska land. And for too many years our region has faced the hurdles of regulatory barriers and administrative rule making that diminishes the opportunities that abound.

Over the past two decades more and more areas of the natural resources (energy, timber, mining) have become off limits, extremely difficult to access or permit, or when permitted, become uneconomical to pursue and utilize. The Tongass land Management Plan is problematic on many fronts – especially when decisions are being made in D.C rather than locally.

There are two main Tongass land management layers, adversely affecting the timber, the mining, and the renewable energy industries and Southeast Alaska transportation, that need to be removed: 1) the Transition Plan; and 2) the Roadless Rule.

Timber: The Tongass Transition Plan and Roadless Rule are interlocked. It will do no good to remove one without removing the other. Each prohibits the harvest of old growth timber in the unroaded portions of the Tongass. Over 15 years the Transition Plan phases out the harvest of old growth timber on the roaded portions of the Tongass. The Roadless Rule and other set asides already prohibit old growth harvest on unroaded portions of the Tongass.
Mining: The Tongass Transition Plan and Roadless Rule create practical access problems to mining claims and hydro projects. Even though the Roadless Rule specifies: "Reasonable rights of access may include, but are not limited to, road construction and reconstruction, helicopters,

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or other non-motorized access (FEIS Vol. 1, 3-329 to 3-350),[1] the experience of the mining community is that Special Use Permits permitting road access in or near Roadless Areas are very difficult to obtain. For example, in 1977 the Forest Service denied a Special Use Permit to U.S. Borax to construct a road for a bulk sample of 5,000 tons of ore at the Quartz Hill Project, requiring access to be by helicopter. *SEACC v. Watson,* 697 F.2d 1305 (9th Cir. 1983). Reasonable access has to be defined as road access.

Renewable Energy: Chapter 5 of the EIS states: "When a written proposal is submitted, beyond the initial stage, for a renewable energy project, the Chapter 5 plan components [Renewable Energy Standards and Guidelines] take precedence if there is a conflict with management direction in Chapters 3 and 4." However, Chapter 5 also specifies "consideration of the LUD," which indicates that Chapters 3 and 4 have precedence. The total effect is circular reasoning that is resolved through discretion of the Forest Service "on a case by case basis" rather than through some sort of predictable, repeatable, and objective process. This often leads to permitting requirements that result in projects becoming uneconomic.

Thus, the new Renewable Energy Direction for areas outside IRAs leaves all decision-making power in the Forest Service without criteria for deciding. Saying that suitability as a renewable energy site "is only an indication that the use might be appropriate," cannot be interpreted in any other way.

Southeast Transportation: Chapter 5 of the 2016 Tongass Transition Plan removed the Transportation Utility System (TUS) Land Use Designation (LUD), which formerly allowed roads and powerlines that crossed numerous land classifications to be processed and approved under a single review standard. Without the TUS LUD, the Forest Service reviews each segment of a development proposal under the restrictions for every land classification (including Roadless Areas) through which the facility may pass, which only serves to increase the probability of rejection of the proposal. Restoring the TUS LUD would provide more certainty in Forest Service decision-making on power transmission lines for renewable energy projects and on road building to construct and maintain those projects.

It is heartening to see the more positive posture this Administration has taken in recent months. However, we anxiously await the transition from "positive posture" to enacted policies

[1] 66 Fed. Reg. 3244, 3264 January 12, 2001.

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and action. There is no apparent conflict with the law – it is the interpretation of the law by federal employees and agency administrative actions that is the issue.

Another example of unintended barriers and energy-related challenges to rural Alaska is the interpretation of "Indian Land" and the intent of the law to enable agencies to fulfill their mission. Our colleagues at the Tlingit Haida Regional Housing Authority articulated the issue in the following white paper issued on February 24, 2018:

Encouraging Small Hydro Projects and Efficient Home Heating in Southeast Alaska by:

- ***Removing the "Indian Land" Limitation of DOE's Tribal Energy Program; and***
- ***Adequately Funding Key Tribal and Rural Energy Programs***

1. The Home Heating Challenges in Southeast Alaska Villages

The Tlingit Haida Regional Housing Authority ("THRHA") owns or manages 543 assisted housing units in Southeast Alaska. THRHA's mission is to provide *affordable* housing to our region's Tlingit, Haida and Tsimshian residents, and it is thus of paramount concern that our homes be heated in the most energy efficient manner feasible.

In 2015, and through a U.S. Department of Energy ("DOE") grant, THRHA performed regionwide audits aimed at "[r]educing household energy consumption through...energy upgrades..." One principal finding of this audit was that modern air-source heat pumps ("ASHPs") were up to 4-times more efficient in heating homes than either of the two other widespread regional options for home heating (electric resistance and diesel fuel). [2]/

For that reason, the hydroelectric Southeast communities of Sitka, Juneau, Wrangell and Petersburg have offered incentives for homeowners to convert to ASHPs.

For heat pumps to become a viable village option, the village needs a substantial, dependable and affordable electric power source to run the pumps. With the high rainfall, steep topography, and the lack of any large electric grid linking our isolated island communities, small local hydroelectric generation plants are the most cost-effective means of providing clean, renewable and low-cost electric power in SE Alaska. There is no natural gas or coal available

[2] / A heat pump operates in this way: through modern refrigerant technology using a compressor and condensers, a heat pump extracts heat from one place (like the air outside a building) and transfers it to another place (like the air inside a building), similar to a modern refrigerator in reverse. There are various types of heat pumps: air source heat pumps, ground source heat pumps, and water source heat pumps, depending on the source where they draw their heat. All types of heat pumps use electricity to operate.

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for heating in our region. And while heating oil has traditionally been the most common source of energy for heating, it must be imported by barge from the "lower 48" at extremely high cost. The McDowell Group's 2016 survey of Southeast Alaska energy needs found that, while 95% of Southeast's electricity was hydropower generated, virtually all of the remaining 5% represent diesel generation in Native villages. [3]/ Even today, the Native villages of Angoon and Yakutat generate 100% of their energy through diesel generators. And, while Kake and Hoonah have recently expanded their hydro capabilities, neither generates sufficient power to handle the load associated with heat pump conversion.

Besides diesel's vulnerability to wild oil price swings, delivery and storage challenges, and environmental damage, the cost of reliance on oil heat substantially exceeds the cost of hydropower. The McDowell Report, for example, noted that:

- Ketchikan, which also provides power to the Native village of Saxman, and which relies exclusively on hydropower, reported residential rates of $.10/kwh; while
- The Inside Passage Electric Cooperative ("IPEC"), which serves villages that substantially rely on diesel, reported rates of $.59/kwh. [4]/

The actual village consumer cost of diesel reliance is reduced by Alaska's Power Cost Equalization program. PCE subsidies begin when rates exceed $.22/kwh—or twice Juneau's or Ketchikan's rates. This means that the economic burden of villages' reliance on diesel is felt both by the villagers themselves, and by Alaskans as a whole through the PCE program.

2. The Difficult Current Funding Environment

Our villages' ability to continue the conversion to hydropower and heat pumps is cloudy. Two examples:

- Although Angoon's Thayer Creek project is far along the regulatory process, it is stalled for the want of $7-8 million in additional funding. The dam would produce enough power to allow all of village homes to convert to heat pumps. Kootznoowoo, Inc., the Angoon ANCSA village corporation, projects that the hydro project, coupled with the resultant conversion to residential heat pumps, would halve Angoon residents' home heating and electrical costs.

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[3] / http://www.mcdowellgroup.net/wp-content/uploads/2016/09/Southeast-Energy-Update.pdf

[4] / The IPEC sets its rates according to the blended cost of providing electricity to all of its client villages. Some of those villages have access to hydropower (*i.e.* Klukwan), while others rely exclusively on diesel (*i.e.* Angoon). If a rate were separately established for the diesel-only villages, that rate would be considerably higher than $.59/kwh, since the blended rate is driven down by hydropower generation.

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As the next section discusses, one formidable barrier to grant funding for Thayer Creek is the limitation of the Department of Energy's Tribal Energy Program grants to projects on "Indian land." Thayer Creek is located on U.S. Forest Service land; and

- THRHA has, and hopes to continue, an aggressive program of installing air source heat pumps in Native-owned village homes. A heretofore significant source of funding for the program has been Alaska's state-funded weatherization program. However, that program has been ensnarled in Alaska's larger budget controversy, and the program has been omitted from the Governor's proposed FY 2019 capital budget.

THRHA had hoped to apply for grant funding under DOE's most recent Notice of Availability ("NOA") of Tribal Energy Program grant funds. [5]/ However, the NOA is subject to the same "Indian Land" limitation that disqualifies Thayer Creek. The homes receiving heat pumps under THRHA's plan would be owned by tribal members living in a Native village; however, the individual owns the home, not the Tribe.

3. Steps to Encourage Efficient Energy Generation and Home Heating in our Region

THRHA respectfully requests our delegation to consider the following steps to help our region's villages achieve energy security and affordability:

A. Repeal DOE's "Indian Land" Limitation

DOE's Office of Indian Energy Policy and Programs" was created by the Energy Policy Act of 2005. Sec. 502, P.L. 109-58; 42 U.S.C. §7144e. The stated duties of the Office extended beyond benefitting Indian land projects, and included the duty to:

bring electrical power and service **to** Indian land and **the homes of tribal members located on Indian lands or acquired, constructed, or improved (in whole or in part) with Federal Funds.** *Id.,* 42 U.S.C. §7144e(b); *emphasis added.*

Thus, the Office was charged to bring electricity **to** Indian lands, whether or not the project was **on** Indian lands. And, separately, the Office was tasked with providing power to federally-funded (in whole or part) Tribal members' homes—again, whether or not the project was on Indian land.

A principal means for discharging that broadly-framed duty was the grant statute found at Section 503, P.L. 109-68; 25 U.S.C. §3502(b). Disregarding the Office's broader purpose, that statute limits grant authority to projects "on Indian land." In essence, there is a

[5]/ Energy Infrastructure Deployment On Tribal Lands - 2018 . Funding Opportunity Announcement (FOA) Number: DE-FOA-0001847, February 16, 2018.

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disconnect between the Office's goals and the means that Congress has given the Office to achieve those goals.

The "Indian lands" limitation:

- is arbitrary. What possible difference does the underlying land ownership of a hydroelectric dam make in electrifying Indian country;
- renders DOE's Tribal Grant Program of limited utility in Alaska, and especially in Southeast Alaska. In THRHA's region, village corporation ANCSA land selections are limited to 23,040 acres, which must be in compact contiguous tracts neighboring the village. 43 U.S.C. §1615(b). The likelihood of finding a suitable hydropower site within that geography is slim; and
- is especially debilitating to Angoon. In ANILCA, Kootznoowoo traded away most of its Admiralty Island selection rights. Section 506, P.L. 96-487. In that same trade legislation, Congress granted the corporation the right to construct a hydroelectric facility specifically (and only) at Thayer Creek. *Id.* at §506(a)(3)(B). Angoon simply has no other hydroelectric alternative within the Admiralty Island National Monument.

B. Assure Adequate Funding for Rural/Tribal Energy Grant Programs

i. USDA's High Energy Cost Program.

Because of Alaska's high rural electricity costs, Native Alaskan organizations have vigorously participated in this program. [6]/ Funding for this program is via a carveout from the appropriation for USDA's Rural Water and Waste Disposal Program Account. That carve-out has been flatlined at $10 million/yr. for several years; and, the carveout does not appear at all in the House agriculture bill. *See* H.R. 3268, pp. 43 *et seq.*

ii. DOE's Tribal Energy Program.

With the removal of the "Indian lands" limitation, this program will provide an important tool for Alaska village energy projects. As part of ensuring adequate funding for this program, THRHA recommends that the authorization for appropriations for grants under this program be amend to cover the years FY 2019—FY 2029. [7]/

iii. Denali Commission

The Denali Commission has historically played a critical role in addressing village infrastructure needs. THRHA supports the proposed $15 million FY 2018 appropriation in the Senate energy

[6] / *See* *https://www.rd.usda.gov/newsroom/news-release/16-million-high-energy-cost-grants-alaska* ("16 Million in High Energy Cost Grants for Alaska"), June 23, 2016.

[7] / The current law covers the years 2006-2016. 25 U.S.C. §3502(b)(6).

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and water development budget bill (S. 1609). [8]/ And, we support both houses' resistance to the administration's proposal to abolish the Commission. Indeed, we believe that Alaska's interests are disserved by forcing the Commission to waste limited resources in preparing a shutdown plan in response to the administration's position.

iv. HUD's Indian Community Development Block Grant Program

Currently, THRHA is engaging in extensive home renovation in its Native villages through $3.6 million in ICDBG grant funding. Among the projects is the installation of air source heat pumps in 46 more village homes. That undertaking is indicative of the cornerstone role that IHDBG grants play in providing Alaska's villages with decent and affordable housing.

While, again, the administration has proposed eliminating this program, THRHA is heartened by the $60,000,000 Indian set aside for this program provided for in both the House (H.R. 3354) and

Alaskan Road Belt Inter-Tie Project

Another opportunity for rural Alaska is the Alaskan Road Belt Intertie Project (RBIT). There are approximately 30 communities along the Road Belt Intertie Project route that currently are on a series of small, diesel generated microgrids. Communities along the proposed project route currently pay between 300% to 700% more than the national average for electricity ($0.36/kwh to $0.88/kwh) for the unsubsidized residential rate. Commercial rates for small businesses run between (.48/kwh to .88/kwh). Most communities fall far below the Federal poverty level and have unemployment as high as 54%.

The Military has multiple installations and bases that would strategically benefit from a redundant electrical loop and cheaper energy costs. Mining, timber, pipeline and other natural resources, accessible by the road system, would be feasible to develop with the abundant and cheaper energy. Economic and small businesses development would flourish and emerge with the new found inexpensive energy according to the Regional CEDS (Comprehensive Economic Development Strategy), U.S. EDA. This project has been vetted and listed as the number one priority of the Regional and Statewide Energy Plan, Alaska Energy Authority(AEA), the number one priority for Tanana and Ahtna Tribal Energy Plans, DOE-OIE, and a priority for the Alaska Statewide CEDS, U.S.EDA.

[8]/ The House bill, H.R. 3266, would reduce the Commission's budget from FY 2017 levels ($15 million) to $11 million. THRHA believes that any reduction in the Commission's budget is unwarranted.

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This proposed project encompasses an area approximately the size of Montana around the road system of the interior of Alaska. The primary phase of the project would run high voltage line (138kV-245kV) would span approximately 134 miles from Sutton, AK to Glennallen, AK; continue north to Delta Junction, AK (approx. 152 miles) along the Alyeska Pipeline Corridor. Secondary stage of project would be Sub-Transmission lines (45-60kV) connecting Gakona, AK to Tok, AK (approx. 120 miles) and Delta Junction to Tok (approx. 107 miles) would also be run along the existing ROWs. These ROWs with existing lines have approximately 100 miles total in gaps between them. These locations will complete a bus loop around the road system of interior Alaska and connect to the existing "Rail Belt" electrical transmission line.

Historically, this project was considered and studied in the late 1980s and mid-1990s with much of the ground work for this transmission line done. Many of the earlier studies can be found at http://www.cvea.org/aboutUs/projectreports.htm . RBIT has regained momentum with a culmination of stakeholders. Support for the RBIT continues to grow. Currently RBIT has the support of APA (Alaska Power Association), Copper Valley Electric Association, Golden Valley Electric Association, Matanuska Electric Association, Alaska Power and Telephone, Chitina Electric, Ahtna, CIRI, Doyon (3 ANSCAs), and many more (see attached list of current Supporters).

Dryden and LaRue, an engineering firm specializing in transmission line design and environmental engineering has submitted an estimate for the Reconnaissance/ Engineering Report for $1.4 million. This engineering report will be critical in reviving earlier studies, ascertaining an accurate calculations of equipment/ supplies needed, mitigation of any environmental concerns, and other tailored needs for the project. A current Recon Report is needed to move the project forward for shovel ready, hard cost implementation.

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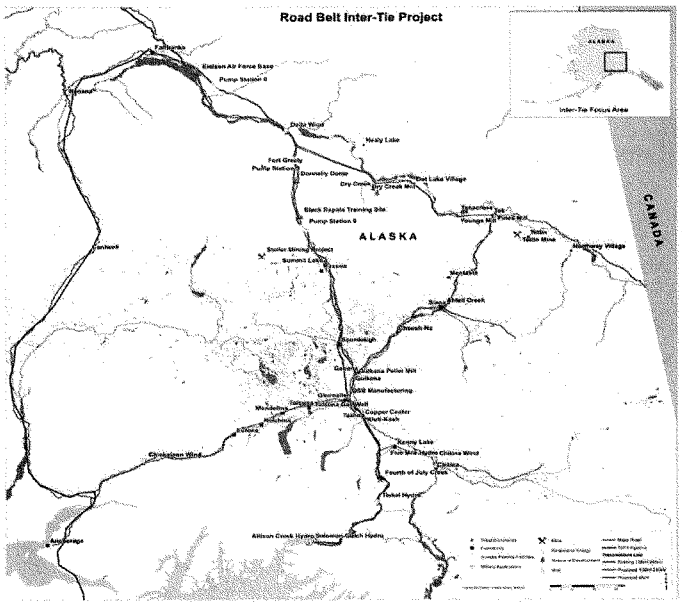


Thank you again for the opportunity to share some of the energy-related challenges and opportunities in the remote and rural areas in our part of the United States.

The CHAIRMAN. Thank you, Mr. Venables, for putting that into context and reminding us all that when we work with our kids early on, allow them to view the energy solutions not as what we have today, but what we can be doing tomorrow. I think the outlook is pretty good for us with a lot of innovation going on.

I am going to start off the questions here, some pretty quick ones, hopefully, for you, Ms. Plowfield.

You mentioned the fact that within the Office of Indian Energy you are a small office, but you are working on good things. I recognize that you are small, but I also recognize that we are really, really small in Alaska.

We have had this conversation before. I had received a commitment from the previous Administration that we would double the size of the Indian Energy Office in Alaska. We would go from one to two. We actually wanted three but we were not successful with that.

Now I understand that commitments made in the prior Administration don't necessarily carry over, but my question to you is what do you intend to do to make sure that the Office of Indian Energy is as effective as possible in the State of Alaska given the very severe limitations that we have? Again, a lot of ground that we have to cover. I am hoping that you are going to be able to come up to the state to visit with many of our tribes and understand what more can be done, but just very quickly what are the plans?

Ms. PLOWFIELD. Thank you, Senator.

My plan for the office is to make it more effective as part of a broader plan of modernization efforts for the Department as a whole. And as I mentioned in my opening statement, in December I did ask our team to rethink how we provide our technical assistance services more effectively utilizing provider networks, localized as you know, in 2016, we made grants to seven Alaska entities to provide technical assistance and we want to incorporate them. I've spoken to folks at the Denali Commission. I've spoken to folks at AEA about helping us with that so that we're positioned to provide technical assistance locally and expand our capacity in that way.

And I do appreciate, Senator, I understand the history and it's unfortunate that the prior Secretary did not keep that promise. I can tell you that the Office of Indian Energy under this Administration, we don't intend to make promises that we can't keep.

And we look forward to working with you to continue to make our staff as effective as possible.

The CHAIRMAN. Well, again, I would urge you to come up yourself so that you have that opportunity to gain that appreciation and understanding.

Ms. PLOWFIELD. Thank you, Senator. I have been up to Anchorage and we are planning some more trips in the future. And I also understand that the Secretary is very much looking forward to his trip with you in a few weeks.

The CHAIRMAN. Yes, yes. We are pleased that he is going to be out there. We would like to get you out into some of the villages.

Let me ask you about the Tribal Loan Guarantee Program. You indicated that you have had some listening sessions already, and you are planning on doing some additional ones. Do you have any idea when and where you might have additional listening sessions?

Ms. PLOWFIELD. Thank you.

Yes, we do. The first one that we had was out in the Reservation Economic Summit a few weeks ago in Las Vegas. It was very helpful. They got a lot of good feedback. The additional sessions planned are for actually next week in New Orleans at the National, excuse me, Native American Finance Officers Association and then NCAI is meeting in Kansas City. We have an upcoming Indian Country Energy Infrastructure Working Group in Albuquerque in May. And I've spoken to, coincidentally, folks from both Ahtna and Tanana Chiefs that were in town this week for the AFN Alaska Day. I've asked for their input as to where and when is best in Alaska and it would be either probably in the fall at AFN or BIA and obviously we would welcome the input from your office as the best time to do that.

The CHAIRMAN. Well, I was going to suggest possibly AFN or the BIA Providers Conference, so we are all on the same track there.

Ms. PLOWFIELD. Yes.

The CHAIRMAN. But I think that would be an ideal opportunity for that.

Let me ask you one more question, and then I will have a chance for a second round here for others.

I mentioned the Road Belt and the fact that in some of these communities the costs are just sky high. I believe you are familiar with this proposed Road Belt Inter-Tie Project.

It is aggressive in what they are trying to do because you are connecting about 30 different rural communities, all of which rely on diesel-generated microgrids. I mean, these are small, but if we can figure this out, it is substantial in terms of the opportunities for them.

It is a big project though. They are estimating it is about a $500 million project. But the first step to this is pretty modest. An updated engineer's report is estimated to require something more in the lines of $1 million.

Given OIE's mission, given that your budget actually increased by a couple million dollars this year, are there any opportunities or any tools that OIE has where projects like the Road Belt Inter-Tie Project should be looking? I just met with these folks this week and they are very keenly interested in moving quickly to get some movement on this engineer's report.

Ms. PLOWFIELD. Thank you, Senator.

Yes, I actually met with Jason Hoke myself——

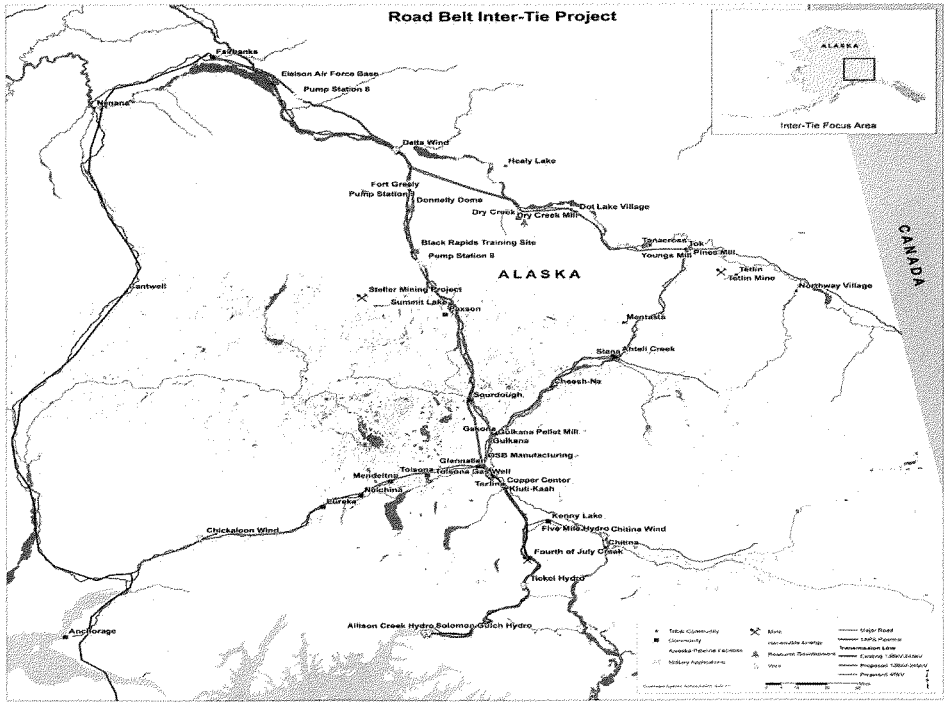
The CHAIRMAN. Okay, good.

Ms. PLOWFIELD. ——this week from the Intertribal, the Ahtna Intertribal Resource Commission. We had a very collaborative and productive meeting about what we can do. I do happen to have a map of the Road Belt Inter-Tie Project on the wall in my office.

The CHAIRMAN. We have one right here.

[The information referred to follows:]

Road Belt Inter-Tie



Ms. PLOWFIELD. There you go.

The CHAIRMAN. Amazing, isn't it?

[Laughter.]

Ms. PLOWFIELD. And you know, we were discussing, as you said, some of the gaps in the service there and what we could do.

We're currently, actually, helping them with technical assistance. We're getting them connected to some subject matter experts to help them establish a tribal utility, and we agreed to continue these discussions in the future.

My recollection is the estimate he gave me, and I will check on this, was $1.5–$2 million for the study. And some of the options we were thinking about was what other groups we can get involved and have a group of folks that all put in some money because that is a significant amount and——

The CHAIRMAN. It is significant.

Ms. PLOWFIELD. ——although we do appreciate the extra $2 million that was in our budget this year.

And if I can make one other point to your, the issue of the high cost of electricity. I really appreciated what you said about it being a powerful reminder of the tradeoffs in your opening statement.

You've talked to many more people up there than I have, but soon after I came onboard the first AFN meeting I always keep in the forefront of my mind a story from a woman, Jessica, in a rural Alaska village who talked about how she had to go out and pick extra berries and do extra fishing because they couldn't afford their grocery bill because she had to pay her mother's electricity bill.

And between that and I also keep in the front of my mind on the high cost of energy issues is when you were kind enough to invite me to your office last fall and you showed me the picture of the laundry detergent that costs about $50.

So I'm keenly aware of those issues and I keep them in the forefront of my mind as we're trying to solve these problems.

The CHAIRMAN. Let's keep working together.

Thank you.

Ms. PLOWFIELD. Thank you.

The CHAIRMAN. Senator Cantwell.

Senator CANTWELL. Thank you, Madam Chair.

Ms. Plowfield, I know the President's budget wanted to slash your program 37 percent, but thank God Congress had a different view of that. And as the Chair was mentioning an increase, I think it is about 13 percent.

In looking at these projects, both in Alaska and Washington, is there some summation here about what we have learned? Obviously in Alaska it is a lot more focused on energy efficiency. In my state it is a little more focused on renewables and biomass.

Ms. PLOWFIELD. Thank you, Senator.

I think what I've learned in the time that I've been there is that everything is up to the tribes and the resources that they have, and that all the tribes are different. We can't take a cookie cutter approach.

There's large tribes, small tribes, tribes that have resources, tribes that don't. Tribes that are in Alaska have unique challenges from the Lower 48.

So what I've been doing in the office and the team that I work with have been making sure that we listen to the tribes and what do you want? They come to us and tell us what resources they have access to and we assess how we can best help them.

Senator CANTWELL. So, you haven't seen anything that's scalable on energy efficiency that you think we should be doing more aggressively?

Ms. PLOWFIELD. Not that I can think of off the top of my head, but I will ask the technical assistance team and we will get back to you with an answer on that.

Senator CANTWELL. Would you? Because the Chair visited a company with me in Seattle that was doing energy efficiency, so she had a good picture of building monitoring and, in this case, they were servicing a lot of different school districts and understanding how to control their school district costs.

To me, efficiency is one of the big challenges. I noticed just in looking at the Alaska applications, in the past they have all been around that. So to me, the Indian Energy Program should be helping us with scalable solutions.

I love the technical assistance. I love bridging that gap, but to me we also should be learning from that what works and what ways we can implement that.

Obviously, our energy bill, by and large, is about energy efficiency. We are all gung ho on that, but I think having some solutions in Indian Country—whether it is just applying something on a broader basis, for say, all the school districts or all the public buildings or something of that nature—to me, would be a kind of a grand scale idea that we would love to see if there are numbers you guys could apply to that, given your past experience. If you could help us with that, that would be great.

Ms. PLOWFIELD. Absolutely.

Senator CANTWELL. Mr. Lyons, thank you for your moving testimony. You talked about how, through weatherization, every $1 invested results in a $4.50 benefit. In fact, the majority of these benefits are not even energy savings, they are health and safety savings as well.

What are some of the issues that you think we should be addressing to increase weatherization investment? What do you think are some of the ways that we could communicate these other energy savings and security issues?

Mr. LYONS. I think part of that is, as I said that you know, typically weatherization is seen as strictly energy efficiency and we don't want to get away from that. That is very important to the program.

But I think part of it is just what we've tried to start doing in the weatherization industry in the last five years is really talking about healthy home programs. Washington State recently did the matchmaker fund and was able to give us money that is a weatherization plus health. And so, one, two different things.

One is looking at what are those health benefits and how can we actually document those, I think, in better ways because once we do that, I think, we enter a whole new world of looking at social determinants of health and figuring out the impact that weatherization has in people's homes. We know that people spend a lot of

time in their home. In looking at those health care costs it makes sense that we address that in the home in addition to other areas where people are at.

Senator CANTWELL. Yes.

I know my time is almost expired, but I would love to get from you the economic impact of job creation. I note as I have seen some of these numbers from Spokane, but there is a huge economic benefit from job creation from more weatherization investment.

Mr. LYONS. Right.

Senator CANTWELL. Because obviously it is a win-win situation. We make the investment and they help in the modernization and weatherization of these homes. The homeowner saves money, and we are also putting people to work as they implement this. If you could share that data with us for the record, I would so appreciate it.

Mr. LYONS. Yeah. DOE gives numbers, you know, 8,500 jobs that are—have been able to be created through the weatherization program.

I can just tell you, locally we probably have, I work with five different contractors that are electricians and plumbers and insulators. And so, we provide jobs for all those people in addition to our own staff that we are able to do.

But yes, that is a strong component of the program as well is that we are putting people to work to actually do this which is often very difficult work. It's hard, that's one of the struggles we actually have with the program is finding people that are willing to go in crawl spaces and attics and spend eight hours there and actually be able to do the work.

Senator CANTWELL. Thank you.

The CHAIRMAN. When I left the house this morning my husband was up in that crawl space coming down to all kinds of the insulation.

[Laughter.]

I am not going to volunteer him, though.

[Laughter.]

Senator Smith.

Senator SMITH. It has been a long time since I have seen my husband up in any crawl space, Senator Murkowski.

[Laughter.]

Madam Chair and Ranking Member Cantwell, thank you so much for organizing this Committee hearing, and I appreciate it.

I want to just start by saying I appreciated the conversation about the Tribal Energy Loan Guarantee Program. That is very important in Minnesota. I suspect I am not the only one on this Committee that was disappointed when the President did support a cut to this program. I would really welcome the opportunity to work with you, Ms. Plowfield, on this in Minnesota where it is very important.

Also, Mr. Lyons, the issue of LIHEAP and weatherization assistance is extremely important in Minnesota. I appreciate your comments about the connection between home and health which is just an integral connection.

In other committees, we have many conversations about how you can't be healthy if you don't have a healthy place to live, if you

don't have a safe place to live. This is, I think, especially an issue in rural Minnesota where the housing stock is older than it is in many and, you know, kind of more in the suburban and metro parts of the state. Is that your experience too?

Mr. LYONS. Yes, absolutely.

I mean, one of the things, mobile or manufactured homes are much more prevalent in rural areas and they don't stand up over long periods of time. And so, but people will continue to live in them until they literally fall apart.

I can tell you from personal experiences, I was just in a crawl space on Monday and there's some horrible situations that people are experiencing in their homes.

Senator SMITH. Yes.

Well this is, again, a reason why I think, why I and I suspect others and I know others on this Committee were really opposed to the Trump Administration budget proposal for 2019 which would have eliminated the Low Income Home Energy Assistance Program and the Weatherization Assistance Program.

Maybe I will just take a minute more.

Mr. Hardy, how are you? Good to see you.

Mr. HARDY. Good to see you. Thank you.

Senator SMITH. I am very interested in this question of what should happen with the Western Area Power Administration, with WAPA, which is extremely important to co-ops in Minnesota as a source of what we are all seeking which is affordable, reliable, and clean energy.

I am wondering if you could just talk a little bit about your thoughts about, kind of, what should happen with WAPA, whether it is a good idea for it to be privatized or not and kind of how you see it coming—what role it plays for rural electric?

Mr. HARDY. Thank you.

Well, we believe it would have a very bad outcome for us, personally.

When we look at that, if you sell transmission lines, there's all sorts of things that concern me from a standpoint of cost. If somebody is buying it and somehow able to put more levels of greater return in that, that just increases costs. And you know, there's not a dollar that I spend or my distribution co-ops spend that doesn't come out of the member's pocket at the end of the line, when not for profit, that's how it works. So the cost of that is one thing.

And from a reliability standpoint, we go through many of the reservations in Montana and as I understand it from all my discussions the easements for those transmission lines that are a sole source of supply in part of our systems goes across those lands, goes across a lot of federal lands. Some of the reasons that lines were built by BPA in Montana were strictly because it took a federal PMA to get the rights-of-way and maintain them through federal lands. So on that front we see it as bad. As far as going to market rates, that stability that it provides. We do funding so that helps. We work with them about which projects. Some of your people are on those committees with me.

And we have a way of saying is this cost effective to make this investment, to rewind this turbine, to how do we prioritize that with the Corps and the Bureau? It works wonderfully. To lose the

ability to have the funding stream that we're able to create for that is, for us, frightening because at the point in time that it goes to market rates, you don't know. Right now, markets are pretty low, maybe lower than some of the PMA power in certain cases.

But one thing, and I've been doing this from the time I was an energy auditor in '79 to as a general manager and I've seen markets go this way and this way and this way. One thing we know is however we think the markets are now, history has proven it, that we're going to be wrong if we think that's where they will be in the future. And to have that ride, even the repayment of this, as we make those investments we know we're going to be the ones repaying those costs.

So when we make the investments in energy efficiency improvements and to turbines rewinds, we know that that's going to cause rate creep, but we know it's important to do. To just take it to market, you may not get enough money in to cover the cost of those assets, you may over recover.

Senator SMITH. Yes.

Mr. HARDY. We're very fearful of it.

Senator SMITH. Thank you. I appreciate your comments on that.

I know I am out of time. I just want to say that in Minnesota we are so aware when so much of the geography of our state has electricity provided by rural co-ops who have such a high fixed cost with transmission lines per household served. I think keeping this the way it is makes a lot of sense to my rural co-ops.

Thank you very much.

Mr. HARDY. Thank you.

The CHAIRMAN. Thank you, Senator Smith.

Senator Stabenow.

Senator STABENOW. Thank you, Madam Chair. Welcome and thank you to all of you for your testimony today.

As the Ranking Member of the Agriculture Committee, I am working with Senator Roberts right now on writing up a bipartisan Farm bill. And as you know, the Farm bill programs provide critical assistance to rural energy systems through USDA Rural Development, particularly the case for Rural Utilities Service (RUS) which provides capital, capital electric co-ops use to build and improve and harden their energy systems.

So I want to specifically ask about that. Mr. Greek and Mr. Hardy, if you could share your experience with the role that the USDA Rural Development and, particularly, the Rural Utilities Service has in assisting electric co-ops and providing much needed electricity and other services to rural communities. I would also welcome your thoughts on how RUS might be able to partner with your members to help protect rural electric infrastructure from cyberattacks and EMPs and natural disasters and other threats.

Mr. Greek?

Mr. GREEK. Thank you, Senator.

So, I'll talk from, kind of, the generation and transmission perspective, and I'll let Mr. Hardy talk about the member perspective.

We have been founded for many years on RUS financing. We do not use RUS financing now, but it was an important part of building the cooperative to be what it is today and, honestly, the cooper-

ative would not be what it is today without having had that support.

We provide the wholesale power, for the most part, to members, like Mr. Hardy and the consumers that he represents. And our work there is facilitated by their being able to successfully receive what we deliver and our, obviously, needing to deliver what it is that they need. And RUS, as I think Mr. Hardy will point out, plays a critical role in that. So I will let Mr. Hardy talk from there.

Senator STABENOW. Thank you.

Mr. HARDY. Yeah, many of my members and the co-op I managed for years and years before this was key. It was a source of capital, just like power markets, interest rates, I'm sure you kind of know, goes up and down.

It was a source that did two things. It not only gave us access to capital to make the improvements to maintain the lines that wear out, it also gave us standards. Right now, if I send one of our crew or our members send the crew ten states away there are fairly standardized construction things, there are materials that are going to work in many areas of the country. The standardization was an important part. And even though some have bought out of RUS, having that back stop there is a critically important thing to us.

Senator STABENOW. Great. Thank you very much.

Mr. Venables, you mention in your testimony the importance of the USDA Rural Development High Energy Cost Program. I wonder if you could talk more about the financial assistance this program provides for projects that assist rural communities with home energy costs that exceed 275 percent of the national average, and I would also welcome any thoughts you might share about how we might improve that program.

Mr. VENABLES. Thank you, Senator.

The USDA Rural Development agency has been a very important part of the Alaska utility community. Right now, our organization's accessing two different programs to do energy efficiency work and also to deploy renewable energy assets into communities and assist the business community there. It's been a very important part of capital as well to many of the members, most of which are co-ops in our communities as well. So, those are programs that are very much needed for sources of capital and for program support throughout rural Alaska.

Senator STABENOW. Well, thank you. If you have thoughts as we move forward now on the Farm bill, certainly we would welcome your input.

Madam Chair, thank you. This, as we move forward in the Farm bill, we are going to have important work to do together on these issues.

So thank you.

The CHAIRMAN. I appreciate your leadership on that, Senator Stabenow.

Senator Heinrich.

Senator HEINRICH. Thank you, Madam Chair.

Ms. Plowfield, I didn't catch exactly what you said, but in some of your earlier responses you mention that this Administration intends to keep its promises in Indian Country and that has not al-

ways been the case in the past. I want to ask you, how do you square that with the Administration's proposed FY'19 budget that takes your program from $18 million back down to $10 million? It just seems to me it is going to be very hard to keep any promises with those kinds of funding levels.

Ms. PLOWFIELD. Thank you, Senator.

I think that with the effectiveness and the efficiency that we are working on in the office that we can still deliver what Indian Country needs.

Senator HEINRICH. I would just tell you, I hope that those of us on this Committee vehemently disagree with that. The need does not begin to be met even at the $18 million funding level. So to say you are just going to be more efficient with half of that, I think, just doesn't recognize the scale of the problem.

Mr. Greek, I wanted to ask you. I was looking at a map of your service territory, and part of it looks a lot like Tri-State and I know there is some relationship there. What is the nature of the legal relationship with Tri-State?

Mr. GREEK. Tri-State is one of our members.

Thank you for the question, Senator.

And we have a, what amounts to a power purchase agreement and a long-term wholesale supply agreement with them, and that's the nature of our relationship.

Senator HEINRICH. Gotcha.

You know, one of the frustrations in New Mexico with some of our member co-ops with Tri-State has been the limitation on how much renewables they can bring on, particularly in a distributed fashion within their own service territories. And so, we have literally had because Tri-State limited co-ops to five percent solar penetration. For example, we have had recently a member co-op elect to leave because they wanted to be responsive to their own customers who wanted to see that number dramatically increased.

Is that a practice that Basin also engages in, and what are your thoughts on it?

Mr. GREEK. So, Tri-State has its own set of policies and approaches to issues like that.

Senator HEINRICH. Sure.

Mr. GREEK. Basin does as well.

We do have all requirements contracts with our members, the basic principle upon which we're founded is that we all throw in to together and we all do for the whole. Sometimes that works directly to your advantage. Sometimes it does not. There's sort of a cooperative element to the cooperative structure.

The challenge that we face, and I won't speak for Tri-State, but the challenge that we face sometimes is that there are desired new developments that don't necessarily meet a specific need that we have today. And so, there's a little bit of, you know, are others willing to subsidize an investment that maybe doesn't have to be made at this point in time or in a technology that others might say is not as cost effective as the other options out there. I think that's the debate in the conversation, and I think that's what you're referring to.

Senator HEINRICH. Obviously, there is an interstate piece to this as well, but at a time when the rest of the state was moving to-

ward portfolio standards that were substantially higher, there were a lot of you in the state that when you have a co-op that is willing to step up and invest in their own generation and, particularly clean generation, that should be supported.

I wanted to ask you a little bit about energy storage, because it is going to be playing an increasingly important role in grid reliability as well as resilience. We have seen battery storage prices, at least lithium-ion, decline by 80 percent between 2010 and 2017.

The indications we have from a lot of the energy industry journalists and industry websites out there are saying that gas-fired peaker plants will no longer be competitive in four to five years and in some places they are actually being outcompeted today by that technology.

I wanted to ask you broadly, with regard to just the utility industry and then also with regard to co-ops, is storage something that is just now being, as a matter of course, integrated into integrated resource planning? So when you are looking at various different ways to solve a problem, is storage something that you run the numbers on?

Mr. GREEK. Thank you, Senator.

Yes, we do run the numbers on storage. Typically, the economics are not such that it gets brought up on occasion. We do share the view that somewhere in the future we do believe that that will be the case, that that will continue to be a declining cost technology.

We would certainly agree that renewables and other forms of non-dispatchable power need to have a partner. That partner today is primarily gas-fired generation. We certainly believe there will come a point where storage will compete competitively with that. We don't see that we're at that point today, though.

Senator HEINRICH. Okay, thank you.

The CHAIRMAN. Thank you, Senator Heinrich.

Senator Barrasso.

Senator BARRASSO. Thank you very much, Madam Chairman.

Mr. Greek, in your testimony you highlight Basin Electric's efforts to ensure that its fossil fuel power generation assets continue to operate in what you term a "carbon constrained future."

In order to preserve these assets while reducing emissions you expressed support for bipartisan legislation such as the Future Act, the Use It Act, that will relieve the regulatory and the financial barriers to the development of carbon capture, utilization and sequestration (CCUS) technologies. Could you please explain in a little further detail how the expanded deployment of these carbon capture technologies are going to benefit the electric co-ops?

Mr. GREEK. Well, thank you, Senator.

First, I would just make mention that as a cooperative, we do own the Dakota Gasification Company. We do sequester CO2 through enhanced oil recovery now and have for a number of years.

We do see benefit to being able to expand that technology to include fossil-fired power plants. There are some technical hurdles to overcome and some cost hurdles to overcome.

We believe that a continued focus with DOE in the Fossil Energy Group on trying to resolve those challenges will get us to a point where we can all agree that coal-fired assets, and even at some point, natural gas-fired assets, can and should be a part of our fu-

ture. And we think that would be in the long-term best interest of our members and our consumers.

Senator BARRASSO. Great.

Mr. Hardy, welcome. I know you currently live in Montana, but I know you spent your formative years in Cody, Wyoming, living down the street from former Wyoming Senator Al Simpson, who many people will remember, but even his father, Milward Simpson, who was a U.S. Senator, and this guy Don Hardy, who was Al's Chief of Staff for a long, long time. Do you know of him and have you heard the name?

Mr. HARDY. Yeah, I call him my oldest brother.

Senator BARRASSO. Oldest. And he wrote the book with Al, with Al Simpson.

The thing about Milward that is interesting is years ago when Milward was Governor and then U.S. Senator, Milward was asked about coal. He said, "we will not let that coal sit in the ground and rot," as only Milward or one of the Simpsons could say it. So I want to thank you for being here to discuss rural energy challenges which exist.

In your testimony you note your strong opposition to proposals to sell off the assets of the Power Marketing Administration, PMAs. You explain that the PMAs provide rural electric cooperatives across the nation with reliable, low-cost power at no cost to taxpayers and the Federal Government.

Could you speak about your cooperative's contribution to the operations, the management, the maintenance and the improvements of the electric transmission and generation facilities at the federal dams?

Mr. HARDY. Yes, thank you for the question.

If you look at how WAPA gets the money, they do a repayment study. And government accounting is obviously very different than what I'm used to at my co-op. But they do a repayment study of what, how much revenue they have to take in and included in that repayment is how they pay the maintenance, how they take care of running their system, the poles and wires and the Corps and the Bureau's costs in the generation. We pay that. We work with them on that and collaborate as far as making sure that we agree with what they're doing. And in that, the only place of revenue that they have is what we pay. And we have been paying for centuries, not centuries, for decades.

We also work with them into the future on trying to get financing options ahead, at least in the WAPA Upper Great Plains and Rocky Mountain which would be the Wyoming/Montana/Minnesota and that area, Pick-Sloan off the Missouri. In doing that, through the accounting system we can front money that then we know will go on our rates. We know we will pay for it with interest, yet it's in the interest and we forward that money. And it's a very, very good private partnership with the government, private being nonprofit.

Senator BARRASSO. Thank you.

Mr. Greek, Basin Electric is a partner in the Wyoming Infrastructure Authority's Integrated Test Center (ITC), which to me is a very important research initiative outside of Joliette, Wyoming, at Basin Electric's Dry Fork Station. The ITC is going to allow re-

searchers to use flue gas from the power plant to study potential commercial uses for carbon dioxide.

Could you talk a little bit about Basin's support for this Integrated Test Center and how there is the research at that facility that is going to promote the long-term use of coal and other critical natural resources?

Mr. GREEK. Thank you, Senator.

Yes, as you know, we produce CO2 anytime we burn a fossil fuel and we believe it's important to have commercial uses for that CO2 much like we've developed to go to gasification. And as part of that we agreed to be the host site for the Integrated Test Center there outside of our Dry Forks Station, a relatively new coal-fired facility that we believe is one that has a bright future to the extent that CCUS and other commercial applications of CO2 can be developed and that's our primary mission in supporting the State of Wyoming in that effort.

Senator BARRASSO. Thank you.

Thank you, Madam Chairman.

The CHAIRMAN. Thank you, Senator.

Next, let's go to Senator King.

Senator KING. Thank you, Madam Chair.

First, I want to thank you again for inviting me to Alaska a couple of years ago when we were talking about this very subject. Going to those remote communities, I have shared with friends in Maine my experience of driving on a river to get to a community. I have never done that before. That was quite an experience, seeing cars going both directions. And it was not that deep in the winter, as I recall.

It seems to me that we are in an energy revolution, and rural areas and islands are Bunker Hill. We are talking about dramatic changes.

If we had been having this hearing 25 or 30 years ago about rural telephone service, we would be talking about wires and poles and infrastructure and all of that. Now we know that is unnecessary. I think we need to start thinking about that in terms of rural areas, particularly things like islands and these little communities in Alaska where it is impossible to build a grid.

To me, what I want to focus on, and I hope you are discussing this in your areas, is microgrids, distributed generation, the combination. I mean, all of the stars are now aligning with dramatically lower costs for solar, dramatically lower costs for battery storage, improved software to integrate them and things like heat pumps and thermal, electrothermal storage and heating. All those things can work in a local area.

Mr. Venables, you are doing a lot of this kind of work. What we really need, it seems to me, is we need the private sector to come up with a rural electric system in a box that can be scaled, whether it is solar, wind, biomass and scale for a community of 80 or a community of 800. Tell me about what you are doing in Alaska.

Mr. VENABLES. Thank you, Senator.

You know, the Alaska Center for Energy and Power and many of our private sector folks are really working toward that end. Alaska is a perfect test case because we have, I mean, all across the

state are various different types of climate and lack of infrastructure.

Senator KING. Yes, you have communities that are, in effect, islands. They are just surrounded by mountains and trees instead of the ocean.

Mr. VENABLES. That is correct and sometimes the ocean as well.

That's what Alaska is, it's really just one series after another of microgrids. So there's opportunities for a nationwide test site. That's what Alaska really provides and for various applications.

So that is an ongoing exercise that I think the field hearing also in Cordova really focused on last year as well. And I think that as those projects come to bear, they'll provide a lot of——

Senator KING. But are you seeing, are tests being run? Are communities doing this? Is it happening or are we just still talking about it?

Mr. VENABLES. No, sir. It's actually happening. They're designing, you know, the battery banks, the integrated wind, the solar and finding out the ways to effectively bring the resources that surround each community into a sustainable microgrid.

Senator KING. Because when you are talking about a community and there are islands, but the islands in Maine, by the way, are very, very similar. Power costs of $.30, $.40, $.50 a kilowatt-hour. Diesel generators and having to ship in the diesel. I mean, it is the same kind of problem.

It just seems to me if you are talking $.30 or $.40 a kilowatt-hour that gives you a lot of running room for alternatives which would look expensive maybe in Boston but are dirt cheap in Cordova, Alaska, or Isle au Haut, Maine.

Mr. VENABLES. Yes, sir.

We're actually, our goal is to get it down to $0.30 or $0.40 in many of the communities. It's two and three times that amount in many of the communities where you have to fly diesel in because there are no roads unless, until they freeze up.

Senator KING. But again, the big deal is this dramatic decline, just in the last four or five years, of solar panels, battery storage and really creative software that can integrate it and then other things like heat pumps and electrothermal storage. You can have an integrated system.

You are smiling, Mr. Herds, am I on the right track?

I'm sorry, Mr. Hardy.

Mr. HARDY. Yeah, I'm responding from a standpoint of, I mean, you pick Alaska. That's been the islanded system test bed for years and at that, at the prices that some of those are, absolutely. We look and think about this a lot, whether we're changing poles, whether we're buying a high-quality cable. How long are we going to need those distribution lines?

Now it's my belief, we're going to need them a long time. It's my belief that they will be coupling together different, whether it's microgrids, whether it's different types of——

Senator KING. Sure. The grid itself, if it is there, can be the battery, to some extent.

Mr. HARDY. Well, yeah, it can be the battery. It can also be the backup because right now, if you look in Montana——

Senator KING. That is what I mean, backup.

Mr. HARDY. Pardon?

Senator KING. That is what I meant, the backup, when I said the battery. The battery is the backup.

Mr. HARDY. Yeah, absolutely. It'll be the backup, but also needs generation to go with it to do that backup because you get in our area, you can be 20, 30 below for a week long without any air movement, particularly, and a fairly overcast scene. We need other generation because I don't see the future that close to us that batteries would be able to bridge that far. Within the hour, within the day, that's going to come a lot closer. And I think that ability to backup and tie together all these is going to be important.

Senator KING. I think the point you make is very important is that there is absolutely no one-size-fits-all in this area. I mean, in Maine, on the islands, we've got wind all the time, but in your area, you may not have that, so it has to be a tailored solution. But the point I want to make is technological developments in the last few years have really given us a set of tools that we just never had before.

Mr. HARDY. I agree completely.

Senator KING. On that note, I think I will sit down and shut up, as they say.

[Laughter.]

Thank you.

The CHAIRMAN. Thank you, Senator King.

I was just talking to Senator Heinrich here. We are going to look too to put together yet another field trip for an opportunity to see some of these islanded systems.

I think it is important to note that we have more microgrids, stand alones, in Alaska than anywhere in the world. So we are pioneering. Some of them are pretty small, but these communities are pretty small too.

When you think about the application to your islands and being able to get off diesel, these are significant from an affordability, from a livability, from an environmental perspective. Doing this is just the right reason for what is happening here.

Senator KING. And the time is right.

The CHAIRMAN. The time is absolutely right.

Senator KING. We have opportunities now that we never had before.

The CHAIRMAN. Yes, you are right. It is transformative.

Senator KING. Thank you.

The CHAIRMAN. Senator Cortez Masto.

Senator CORTEZ MASTO. Thank you, Madam Chair, for this hearing and count me in on the field trip to Alaska. I would love to go back. I have been there before. I love the excitement as well of my colleague because I absolutely agree with Senator King.

One thing I also want to highlight: I have found, because I just met with our Nevada Rural Electric Association, in Nevada we have many rural communities, actually 17 of our 19 counties are rural. And I have found that the co-ops are the most innovative because you have to be. Right?

That is what is exciting about this and what I intend to continue, and I think we all, to allow you to innovate and give you the tools you need to bring those services.

But one thing I would love for you to talk about which I think is also missed are your members. Those people, your customers, are considered members and how it benefits them because they are really part of this electric co-op, unlike you see in some of our urban areas. They really get a benefit out of here and they are part, an integral part, of what you are doing. Do you mind talking a little bit about some of your members and the benefits and how you look to incorporate them into this electric process or your generation?

Mr. HARDY. Thank you for the question.

Yeah, I've worked for the people at the end of the line whether I'm working for the distribution co-op, it's the people at the end of the line. Every one of those members that I care about, that I'm extremely protective of the affordability and reliability for them.

We've looked at ways that we can allow them to make the decisions they want to on, even with our all requirements contract, if they want to put in a renewable aspect that is greater than their loads and such, we have ways that we purchase it and our power supplier being Basin, actually uses a point of delivery for us.

So we've tried to work that in in ways that it can. It's not as cost effective for where we sit right now in most of the places, but that doesn't mean that they want to spend the money that we haven't found ways to let them do that and push the envelope.

Some of our co-ops have put in where they had long lines going out to just a stock well, they use virtually no electricity. They've worked with them to, rather than putting thousands of dollars into changing those lines out, they've gone with voltaics. It's a nice marriage because it has some storage with the water and it's worked well. But everything we do, there's a member at the end of the line.

My board is comprised of board members of my members, and I have a tribal council member that runs her own ranch, alone. And the people that sold it, the Earth people that form our members, we're only there because somebody else didn't serve them. We're not there because we went out and took territory from somebody. They weren't served. That's why we went out. We expand and try to find ways to compromise. It's a compromise between the impact of existing members and the new members. Every decision we make is a balance of how it affects the total membership.

Senator CORTEZ MASTO. Right.

What I have found, and I know I am running out of time, but what I have found is that those members actually have a say, right? They are involved in their energy, in the cost and the resources and the technology. And it goes back to the technology. This internet of things and smart meters and storage, battery storage, allows your members to actually actively participate in the use of their electricity and whether they want to sell it back or be involved in this process, correct?

Mr. HARDY. That is correct.

And each of those members elect our governing bodies, those members, their neighbors, elect people to be our boards of directors. It's not like some company somewhere else puts people in there. It's themselves, a democratic process of electing.

So, if I, as a manager, am not representative of my membership, I have a nice path out the door.

Senator CORTEZ MASTO. Yes.

Mr. HARDY. And that, I have seen with boards when you have a board that gets a little outside the interest of their memberships, you know——

Senator CORTEZ MASTO. It is a great business model and that is why I support them.

So let me jump really quickly because I am running out of time here. A couple of things.

In Nevada, we also have large Indian tribal communities, and in Nevada many of the tribes have plans to expand businesses on reservations in order to provide jobs for their members. And some of the business activity includes opening their land to renewable energy projects such as the Moapa Band of Paiutes. I was just visiting with them. They currently have a solar facility created in partnership with First Solar, and this generates energy to serve the needs of about 111,000 homes per year.

Ms. Plowfield, what is DOE's Office of Energy's plan to further enable electric facilities to be constructed for our unserved and underserved tribal homes and businesses?

Ms. PLOWFIELD. Thank you, Senator, appreciate the question.

As I said, we just finished a funding opportunity announcement and I'm not sure if any of the tribes in your state have applied to do that, but that's exactly what those are meant to do.

And in addition to that, in addition to these opportunities being able to help provide their own tribe, they can also end up selling it to other places and provide themselves income through that method.

Senator CORTEZ MASTO. Can I ask you, when you say the funding opportunities that means that is out of your existing budget, but if there is a decrease in the budget, that decreases their opportunities to participate. Is that right?

Ms. PLOWFIELD. Yes, it would.

Senator CORTEZ MASTO. Okay.

I know I am running out of time, but with your indulgence, one quick question because I do have concerns about the Indian Energy Loan Guarantees that the Chairwoman talked about as well. Just a quick question.

It is my understanding DOE never promulgated rules as to how the program would be implemented. Is that true?

Ms. PLOWFIELD. Thank you, Senator, just if I could just go back to the last question on the budget.

Obviously, Congress plays a role in the budget and DOE would carry out any final budget based on Congressional action with regard to the percentage of the budget. The Loan Program Office is actually responsible for administering the Tribal Energy Loan Guarantee Program, and my understanding was that there was no new rule that needed to be promulgated, that they're using an existing rule that——

Senator CORTEZ MASTO. So that wouldn't hinder you appropriating the funds or letting the funds that have been appropriated for the program. Correct?

Ms. PLOWFIELD. Correct.

Senator CORTEZ MASTO. Okay, great. Thank you.

Ms. PLOWFIELD. Thank you.

The CHAIRMAN. Thank you, Senator.

Senator Hoeven.

Senator HOEVEN. Thank you, Madam Chairman. Again, thanks to all the witnesses for being here today.

Matt, I want to ask you about the Allam cycle and where you are in that process of getting that up and going and how it can really crack the code in terms of carbon capture and sequestration. And then, the things that you need to really move forward with it.

Mr. GREEK. Thank you for the question, Senator. Thank you for the gracious introduction earlier.

For those who don't know, the Allam cycle is essentially a super critical CO2 cycle and it offers the opportunity to address two of the key issues that we have relative to carbon capture, utilization, and storage. Those being leaps in technology and in cost effectiveness.

What is different about the Allam cycle is that it allows us to use a fossil fuel and produce a high-pressure CO2 stream that is essentially ready coming out the back door for sequestration or EOR or other usage. That is important to us because right now there's a pretty good impediment to using carbon capture systems that require refinement of flue gas into CO2. So the ability to do that at a technical level would substantially improve the cost effectiveness of such a cycle.

Now the CO2 enters into the conversation in terms of getting you a higher efficiency cycle that will give you a lower overall cost of production. Where it is today? There's natural gas demonstration being conducted in Houston, Texas. We expect that to be complete here within the next 12 months or so.

At the same time, we're doing research on looking at combusting coal in a way that would allow us to use it as feed stock for that same cycle.

Senator HOEVEN. Right, but what are the key things that, you know, you have a group, a consortium, Basin, Elite Energy, Energy Environmental Research Center, that is working to advance this project to actually, instead of just talking about carbon capture and sequestration, doing it and doing it in a way that is not only technically viable but commercially feasible which is what needs to happen in order for this technology to become ubiquitous using it, not only here in our country, but around the globe which is the real, our way, to address the issue. What are the things that you need help with from state and local government levels to make it happen?

Mr. GREEK. Well, thank you, Senator, and thank you for your support to this point that this helps us to do that work.

There is quite a bit of ground yet to cover in terms of piloting the technology, taking the technology to scale. That all presumes that the work we're doing today gives us a successful outcome. It doesn't have to be retested and refined.

If we do have to, you know, recycle back then that will be an opportunity for support and work with Fossil Energy at DOE as well.

Those are, sort of, the technical challenges we still have in front of us and would expect that we probably have another, oh, five years, six years, maybe as many as ten years of work to be able to deploy this on a commercial scale.

Senator HOEVEN. So you need assistance from the DOE Fossil Energy program. What other things would be helpful to you?

Mr. GREEK. Well, the other things that we need and some of them we're getting, is the ability to do sequestration without long-term liabilities. We did get primacy recently from the Federal Government for North Dakota that opens up some doors and gives us a pretty good avenue to do sequestration.

There are other challenges along the way. So, as you certainly are aware, we have the Bakken shale in North Dakota. We would like to be able, at some future point, to be able to use enhanced oil recovery in that shale. There's technical work to do to advance that science and get to the point where that's true.

So, those are some of the other areas that I would highlight as needing additional work.

Senator HOEVEN. Well, I am glad to hear that. We worked very hard to get the regulatory primacy. I am glad that is an important step and we know it is, but we are trying to work on the additional steps to truly make your partnership successful.

Switching gears a little bit. Talk to me about how we should address baseload generation in regard to the transmission grid because you are a great example of a company that has both baseload power, coal-fired electric, but you also have gas and wind. How do we make sure that we have a transmission grid that works in a way that we have power all the time, even at peak demand time?

Mr. GREEK. Well, thank you for the question.

Obviously we put a fair amount of investment into our transmission grid over the last ten years owing to member growth, particularly in North Dakota around the Bakken. Having the ability to finance and execute that work, having the ability to site it and go through the process of getting the permits that you need is critical. Siting can be a delay.

One of the projects I worked on personally, we ended up taking what amounted to about a six-month delay, you know, it didn't change any of the permitting criteria, but there was, sort of, a late set of questions that held the whole process up. And you might say, well, what's six months? Well, in North Dakota six months is critical because the winters in North Dakota are a little different than the summers and a lot of work that could have been done in the summer ended up being done in the winter. It's important to be able to execute with certainty any time we're doing major capital work. And so, there's an opportunity. And we appreciate the work that's been done to this point, but there continues to be an opportunity to improve that regulatory reality as well.

Senator HOEVEN. So as far as saying what about making sure that baseload has access to the grid?

Mr. GREEK. Well, obviously we have to be able to participate as a whole partner in the grid. We have organized markets in a portion of our service territory. We have areas that do not serve, are not served, by organized markets.

It's a set of work there, maybe to do, as you're probably aware, we're trying to be part of a more organized market on the west side of our system. Those steps are critical to ensuring appropriate access for the generation that we have.

Senator HOEVEN. Okay.

Thanks to you and to all of our witnesses for being here today.

Thank you, Madam Chairman.

The CHAIRMAN. Thank you, Senator Hoeven.

Senator Daines. Know that your constituent from Montana has done a wonderful job educating us on the co-ops out there, but it is good to have you here.

Senator DAINES. Glad to be here.

Thank you, Chairman Murkowski, for holding this important hearing. Rural America has been a focus of this Committee, and I think that it stems from some of the states that we have on this Committee. You don't get much more rural than Alaska, Montana, Wyoming, and I will add North Dakota to that list here too.

I do first want to thank Mr. Hardy for coming all the way out to DC yet again. He was just out here with a great group of Montanans representing our electric co-ops last week. And I can tell you, having a Montana voice speaking of the unique circumstances in a rural state like ours is very, very important to bring that voice to Washington, DC.

Most of Montana's energy is generated from coal or hydropower. That balance of affordable and reliable energy has served our state very well. However, threats to both of these sources have been growing for years. Licensing and relicensing of hydro assets are taking longer and longer and they have, at times, been so long that Congress has had to step in to relicense certain dams. Furthermore, fringe litigation has caused projects to be delayed or shut down. In effect, it has resulted in the eminent closure of Colstrip Units 1 and 2.

I believe it is extremely important that we streamline permitting processes to give security to these rural communities, some certainty to them. They rely on these jobs and the electricity produced from both coal and hydro.

Mr. Hardy, welcome, it is good to have you here. You mentioned in your testimony, briefly, how rate hikes and changes can have major impacts on rural Montana. Rural communities depend on affordable, reliable energy. We have a lot of seniors that live on fixed incomes. They see their property taxes going up. They don't want to see their utility bills going up. The smallest changes can have big consequences.

What are some of the current threats to Central Montana that could cause rate hikes in Montana?

Mr. HARDY. Thank you.

On the hydro side, anything that stacks costs on top of the Western Area Power is a concern. It drives Central Montana as far as the lower cost resource that we can go in. On the other side of our power supply, about half of it comes from the combination of renewable and other facilities that, in our case, Basin Electric has, and anytime they build something, you don't put in assets in the utility world that last five years. They better not.

But with the capital costs of whether it's going and doing wind generation, solar, coal or anything, you need to be able to know with certainty that if you build it, you're able to run for the life cycle of that cost. And you need to be able to have the permitting go through in a seamless way.

We worked hard in our state to get, for instance, a Sage-Grouse plan, as did Wyoming and some other states, to where we could work, protect the species and at the same time keep it from being delisted and not harm it while we had development to the degree that we have to redo permits.

Some of our projects don't get done as quick as you wish for different reasons to the degree you have to go re-permit it with a variety of agencies. It takes a lot of time and, again, to what Mr. Greek said, our construction season, especially on the high line, is extremely short. You go from mud season to a few months of construction season to frozen earth season in a hurry in Montana.

Senator DAINES. Yes, the rumor is we are going to plan to have a summer on August 15th this year in Montana, and if it is snowing, we are going to move it indoors. We will see how that goes.

Mr. Greek, I understand that nationally, rural areas served by electric co-op utilities rely on coal for a big percentage, 41 percent, in fact, of their capacity. A question for you is how important is coal to rural electric co-ops like yours and can you give some insight into how important it is to have good variety of power generation for customers to ensure they receive reliable, resilient electricity at an affordable price?

Mr. GREEK. Thank you, Senator.

Well, coal is very important. It still constitutes for Basin Electric the majority of megawatt hours that we provide to our members. In addition to the direct benefit to our members, it also provides local benefits in employing folks in the mining operation and the production operation and in the operation of the power plants. Moving away from that in some significant degree would be devastating to the communities that rely on it as their primary source of income.

In terms of reliance and resilience, reliability, our members request us, generally pretty straightforward—it's reliability first and it's low cost power second, and you better not trade two for one or one for two. And part of that is having dispatchable power that's available to you, 24/7/365.

Coal is one of those technologies that provides that, both in terms of the technology itself and in terms of the way we can manage inventory. As you know, it is difficult to store electricity. And while there have been advances in the battery front, that is still not a commercially viable option for us and for our membership.

And there will always be, in my mind, a need for dispatchable power. Fossil fuels, including coal, are the foundation upon which that dispatchable power is built today.

Senator DAINES. Thank you, Mr. Greek.

The CHAIRMAN. Thank you, Senator Daines.

I have a couple more questions, and I would like to go to you, Mr. Venables.

We talk about some of the policies here that can help really advance some of our more clean, more affordable energy solutions. It is good that we focus on this, but we also have policies that we put in place that actually make it harder, in fact, in times almost impossible to make those advances toward cleaner, more affordable, renewable energy sources.

In Southeast Alaska, we are blessed with extraordinary hydropower resources. We know that. We have some great assets there. It is one thing to have the resource in an area, but you have to be able to move that power. You have to have the ability for transmission.

We have a situation in the Tongass where we have in place a roadless rule which affects 9.5 million acres of land within this area. You pointed out in your testimony, Robert, that you have less than about one percent of land that is privately held in Southeast in the Tongass. This has an impact on our ability to not only build out an economy, it puts us in a situation where we are not able to do more when it comes to development of our renewable opportunities when it comes to energy. This costs jobs, it increases energy costs, and it costs us opportunities to grow. Can you speak just briefly about the impacts that the roadless rule has had on building, not only a sustainable economy, but what it has meant to energy prices as a direct result of the roadless?

Mr. VENABLES. Thank you, Senator, for the question.

Briefly, maybe.

The CHAIRMAN. Yes.

[Laughter.]

Mr. VENABLES. All day, for sure.

The CHAIRMAN. Yes, yes, yes, I know.

Mr. VENABLES. It's really the cannonball approach to killing a fly. It rarely hits the fly and it causes a lot of damage. And the damage is really at many levels because it puts so much of the lands unaccessible. There's just not access to whether it's biomass, whether it's hydro or you know, whatever the resource is, and not just to the industry because there's, you know, and it really has very little, contrary to a lot of the politically charged characterizations of the roadless rule, the removal of that does not mean that there's roads all over the 17 million acres of the Tongass. That is not at all the case. It really denies, the roadless rule denies the commonsense approach to best management practices where logging is appropriate and should occur as a renewable industry. They don't have access to it, just maybe because it's 65 feet off of the wrong marker.

Even though the household level, I was just impressed as well as last month in talking to the folks that, as I referenced in my earlier remarks about the school districts and the biomass heat there, well, instead of sending their check to the Lower 48 for the fuel company, what they do is they spend money on the local people, that one of the families that want to bring in a quart of firewood at a time to the school, they get paid their money. Well, a lot of times where they get that is from the logging sales that still have a lot of fallen timber that are laying there available for firewood. And now, not only are roads not allowed, they're digging up the ones that exist and that's denying families an opportunity to develop their own household income. And the logs that are laying there produce, you know, much more noxious gases than carbon dioxide. So it's a very futile approach to try and manage the forest that we have there.

It really is indicative of, I think, the fatal flaw in a lot of the programs agencies have is that the rulemaking that they make is not

following the guidance they have from Congress, it's just administratively what is politically, you know, comfortable for the day and it does incredible damage from afar. If they would empower people on the ground in the state that would be much more effective management approach, but instead it gets micromanaged from afar.

Even putting in a simple transmission line for the community of Kake, which has high energy costs, $0.58 a kilowatt-hour. We were able to get it permitted but because of all of the kaleidoscope of different land use designations and the rulemaking that goes into each different one, the cost of that, of constructing that, was going to be between $50 and $60 million for just a small segment. It was only like 11 miles of new road that would have to be built. And so, it just makes the project impossible to construct and then they would mandate helicopter maintenance which is impossible to maintain for a community——

The CHAIRMAN. So when you think about that—$50 to $60 million to construct for a 10, 11 mile——

Mr. VENABLES. Yes, Senator, it is. It's about 60 miles in total, but there's only about 11 miles of new road.

The CHAIRMAN. Eleven miles of new road, and the community of Kake is how many folks?

Mr. VENABLES. 500.

The CHAIRMAN. 500.

Pretty tough to make something like that pencil out. The sad irony of all of this is you want to try to help this community get off diesel and the way to do it is to allow for this small connect, but you can't pencil the project out so you don't get the cleaner power source. You don't get, ultimately, the cheaper power source. You basically condemn a small community to a continuation of diesel power generation.

It is one of the real frustrating realities of what goes on around here. We have a push to say well, you cannot put a road in a national forest whether it is for timber harvest or whether it is to allow for maintenance of a transmission line.

So in an effort to be environmentally pure and not cutting down a tree, we are condemning people to an energy reality that is dirty, inefficient, expensive, and it is just wrong.

My question to you, obviously, was very purposeful. I think both of us could talk about this for a long while, but I think it is important to recognize that the roadless rule is not just about a timber harvest within the country's largest national forest. This is about communities that are a part of this extraordinary area that have been held back from an economic perspective, held back from the ability to really have much of an economy if we cannot get them to better energy solutions. And it is not just the economy, but it is the ability to develop other resources that may be there whether it is mineral opportunities or the like. It is a challenge for us and it is one, as you know, we continue to work and work aggressively.

I wanted to ask you another question, Robert, about some of the successes that we have seen. You mention change out for some of our schools, changing out from diesel boilers to our woody biomass alternatives and some of the good things that we have seen there. What do you consider to be the biggest barriers to adding more efficiency solutions in the state? Where is our holdup right now?

I want Ms. Plowfield to be listening carefully here because I think that we should be able to make some headway through the Office of Indian Energy, but where are we not doing as much as we need to be doing?

Mr. VENABLES. Senator, thank you.

You know, tied right into the whole issue with the roadless rule and the impacts of, you know, how federal policies are maintained. The same applies for the opportunities for tribes to develop the alternatives for the energy. With the extreme levels of turnover at a lot of the agencies and constrained budgets, it's hard for them to do anything other than find the lowest common denominator within the comfort zone of administrating their programs.

But the majority of projects we have on the forefront right now in Southeast that would benefit the tribes are denied even eligibility to respond to the notice of funding that was referenced earlier in testimony because either the land is not outright owned by the tribe, even though it's serving tribal communities and members and served by a co-op that's primarily a tribal entity. It's just, it denies them an opportunity to attract the funding that they need to get.

In one instance, like in Angoon, the Kotzebue folks there, they traded away a lot of their lands with the establishment of the Admiralty National Monument, federally-owned, and in return they were given the rights to hydro to develop for their community which is desperately needed because there's a microgrid, there's no hope for getting any economic dispatch from some other places. There's no roads. There's no transmission line. Even if you look at a map, it shows a reserve for that project. But yet, that land is forest service land. But they're not eligible, even though the community is 100 percent Tlingit, it's a tribal community. It's serving Indian Country, but it's not considered Indian land and now they do not have access to funds.

So I think just pushing agencies, whether it's the Forest Service or DOE or, you know, whatever the federal agency is, to really look at the goals of their missions that they're statutorily enabled to do by law to make some exceptions for some exceptional cases.

The CHAIRMAN. Well, the example that you have given of Angoon is a pretty compelling one. Of course, in that community I am pretty sure that their costs are over $0.50 a kilowatt-hour. Yes?

Mr. VENABLES. Yes.

The CHAIRMAN. Yes.

Mr. Lyons, let me ask you a similar question in terms of barriers to doing more with what we have directed when it comes to weatherization and efficiencies because I believe, as you have cited, that there is still plenty of opportunity to do more. Is it just a matter of funding and resourcing or do you also see some policy initiatives that we need to, kind of, weed through or sort through that would allow us to do more on the efficiency and the weatherization side?

Mr. LYONS. Obviously funding is a critical part of that, to be sure, but I think also there is that matter of regulation as well.

When we had our funds, we were able to ramp up and do some amazing work with those funds, but of course, the way that works, right, is that you receive the funds and they came back and looked

at it and they found some discrepancies in how some of the funds were used.

But I would say that most of those discrepancies happen in states that were simply starting their weatherization program. And so, they were working from a ground level. States like Alaska and Washington and Montana that have been doing weatherization for a long time had established programs and our error rates and discrepancies were much lower and, I would say, relatively insignificant.

So with that change that they came back, there were a number of changes to the program that, I think, it makes it a more bureaucratic program. There are just a lot of rules and regulations that we have to make sure that we implement as part of providing weatherization services. Some of those are good, in terms of quality control. Some of those, I think, are unnecessary. We have, I would say, the weatherization services that the lower income program provides is the most comprehensive weatherization services being provided in the nation. We have separate auditors and inspectors that look at every single project that we do. And so, there is a lot of admin and program support that is required as part of the program, partly due to regulation.

I would say the other thing, the barrier that we definitely have that I mentioned earlier is the ability to get trained workers, both in the terms of from my side, actually auditing buildings, and then also the physical work to be able to do it.

We have good training centers. I've been trained by people from Alaska, actually, that have their own unique weatherization issues, as you can imagine. But to provide, to get people actually into the workforce and pay them wages that makes it worthwhile over time.

In Washington State we had a unique situation in that we have a prevailing wage requirement on the part of the State Department, I mean, part of the state, but at the same time, they are not willing to create a prevailing wage category for weatherization. And so, that's made the implementation of tracking prevailing wage in the weatherization industry extraordinarily difficult.

The CHAIRMAN. Interesting.

Now I know, certainly within Alaska, we had several of our tribes lead with the weatherization training. I think it was Tlingit Haida was very involved with that. Being the weatherization auditors, I guess, was the terminology.

I would challenge all of you and certainly for those that are part of our co-ops, we are doing a lot of just working with the Administration and the agencies on trying to identify those regulations that may be redundant or just outdated, unnecessary, considered to be unduly burdensome. We are trying to move through some of the things that are holding us back.

I think particularly when it comes to rural energy and the opportunities there, you mentioned, I think, both Mr. Greek and Mr. Hardy mentioned, the vegetation issues that we have been working on. We have made some good headway there that was reflected in the Omnibus bill.

So things like this, I think, we can look to and we can make some headway there. But let us know if there are areas where within your region, in the areas that you are working, where you

have some good suggestions for us that we can share with the different agencies in terms of how we can do more by just cutting through some of the clutter of the regulation. It is not that we are trying to eliminate a permitting process. It's not that we are trying to avoid environmental process, but I think we recognize that there are efficiencies that we can gain if we look for them.

And you all are in a much, much, much better position to help us identify what those are because you are living with them day in and day out. So I would invite you to stay in touch with the Committee here and provide us your feedback in these areas as we move forward.

You have given us good information here today. It puts an important perspective on the reality of energy and how our energy assets are distributed. I think the reality is that much of what is generated, where we get our power from, it comes from rural America and we have just got to get it to the folks that want to live in places like Washington, DC.

So you are where it is all happening, and we appreciate that a great, great deal.

But oftentimes, it seems that where the resource comes from often bears most of the burden in the sense that we are still paying high costs, we might not see the full benefit play out. We need to make sure that we are doing right by our rural communities, by our families, who are part of rural America. Let's make our energy system a more equitable system. I appreciate the efforts that you are doing in that regard.

With that, I thank you for your time today and the Committee stands adjourned.

[Whereupon, at 12:11 p.m. the hearing was adjourned.]

APPENDIX MATERIAL SUBMITTED

U.S. Senate Committee on Energy and Natural Resources
April 19, 2018 Hearing
Energy-Related Challenges and Opportunities in Remote and Rural Areas of the United States
Questions for the Record Submitted to Ms. Carole M. Plowfield

QUESTIONS FROM RANKING MEMBER MARIA CANTWELL

Q1. I'm interested in OIE's priorities with respect to investing in energy efficiency versus new generation. During the hearing on April 19, I noted OIE's investment in energy efficiency, especially in Alaska

Q1a. What energy efficiency solutions developed in Alaska or other areas are scalable and could provide a template for effective OIE investment in energy efficiency in other states?

A1a. Energy efficiency solutions deployed by the Office of Indian Energy in response to requests from tribes, whether in Alaska or other states, are proven, commercial, off-the-shelf technologies.

As a means of promoting information transfer and project replication, the Office of Indian Energy conducts periodic, collective Program Reviews which are open to the public, where active grant recipients present the status of their projects. These presentations are posted on the Office of Indian Energy website, along with project summaries, updates, and final reports. Program Reviews help build a network among tribes for the purposes of tribes' developing their own energy resources, and increasing the probability that deployment of a particular energy project will be successfully replicated by other tribes.

Q1b. What level of investment in these energy efficiency solutions do you think is appropriate?

A1b. Energy efficiency proposals should be evaluated from an economic perspective, considering the return on investment and the opportunity cost. Tribes are best positioned to meet their communities' needs, and each tribe determines their level of investment. For example, as a result of a $68,000 grant from DOE and a matching $68,000 from the Nez Perce Tribe, the tribe installed energy efficiency retrofits in five tribal buildings exceeding 54,000 square feet. These retrofits are estimated to reduce energy use by 35% and save the tribe $13,800 per year, based on current data.

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QUESTIONS FROM SENATOR BERNARD SANDERS

Q1. Rural communities face particularly serious geographic and demographic threats from climate change. Physical isolation, limited economic diversity, higher poverty rates, and aging populations make rural communities particularly vulnerable to the negative impacts of climate change. These risks are even more acute for Native American communities that are historically deeply integrated into their local ecosystems and heavily dependent on the use of fish, wildlife, and native plants. In fact, the UN Intergovernmental Panel on Climate Change reported that indigenous communities in northern Canada and Alaska are already "experiencing constraints on lifestyles and economic activity from less reliable sea and lake ice, loss of forest resources from inset damage, stress on caribou, and more exposed coastal infrastructure from diminishing sea ice." Additionally, the Isle de Jean Charles band of Biloxi-Chitimacha-Choctaw Tribe is in desperate need of help relocating from their sinking home of Isle de jean Charles, Louisiana. The tribe is known as the first American climate refugees.

Q1a. Given the scientific consensus that burning fossil fuels is one of the primary drivers of climate change, and your office's stated commitment to "maximize the development and deployment of energy solutions *for the benefit* of American Indians and Alaska Natives," please describe your plan, including timeline, for reducing the use of fossil fuels on tribal lands and increasing the use of renewable sources of power like wind and solar.

A1a. Historically, all projects funded by the Office of Indian Energy have been exclusively renewables. Indian tribes and Alaska Natives may now request assistance from the Office of Indian Energy to develop and use their energy resources according to their own choices. Consistent with the policy of promoting tribal self-determination, the programs which the Office of Indian Energy offers are now fuel and technology neutral.

As seen through technical assistance requests, a concern for many Alaska Native villages is the reduction of their dependence on expensive imported diesel fuel for electricity. In response to these requests, the Office of Indian Energy provides technical assistance to improve the efficiency of existing diesel generators, as well as to explore the availability of local energy options.

Q1b. Please highlight any ways your office plans to help tribes prepare for the impacts of climate change on their energy systems.

A1b. Each tribe determines their own strategic energy plan and requests technical assistance from the Office of Indian Energy to meet their particular needs. The Office of Indian

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Energy provides technical assistance to: (1) identify the impacts on energy production and use of extreme weather and natural disaster events on tribal lands; (2) conduct resilience action planning; (3) evaluate critical facilities; and (4) address energy issues related to past extreme weather and natural disaster events.

For example, after two seawall breaches and associated disaster declarations, the Quinault Indian Nation (WA) is working to develop a master plan to move the villages to safer locations. To assist with that goal, DOE's Office of Indian Energy hosted a two-day strategic resilient energy workshop with the Quinault Indian Nation in Taholah, Washington, June 1–2, 2016. This work builds upon past DOE investments in helping the Quinault Indian Nation explore energy solutions, including a comprehensive biomass strategic planning project grant in 2011 and a renewable energy feasibility study grant in 2004.

As a second example, in 2017, the Office of Indian Energy competitively awarded $734,000 to four tribes [Karuk Tribe (CA), Lac du Flambeau Band of Lake Superior Chippewa Indians (WI), Makah Tribe (WA), and Samish Indian Nation (WA)] to develop resiliency plans to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and rapidly recover from energy disruptions.

Finally, this year's funding opportunity announcement solicited applications to install energy system(s) for autonomous operation to power (1) a single or multiple essential tribal load(s) during emergency situations or to power (2) a substantial number of essential tribal loads for tribal community resilience. Specifically, "energy system(s)" are being sought to provide power for essential tribal load(s) and may include, energy generating system(s), energy storage system(s), or controls and management system(s).

Q1c. Given the scientific consensus that burning fossil fuels is one of the primary drivers of climate change, and your office's stated commitment to "maximize the development and deployment of energy solutions *for the benefit* of American Indians and Alaskan Natives," please describe how proposing to cut DOE renewable energy and energy

efficiency programs by 65 percent in the Fiscal Year 2019 budget meets the goals of the Office of Indian Energy Policy and Programs.

A1c. Indian tribes and Alaska Natives decide how to develop and use their available energy resources to meet their particular needs. Consistent with the policy of promoting tribal self-determination, the programs which the Office of Indian Energy offers are now fuel and technology neutral. As such, the fuels and technologies the tribes choose to pursue is at their discretion.

Beginning with the Fiscal Year 2019 Budget, the Office of Indian Energy developed two performance measures: By 2030, install new electricity generation systems in Indian Country that (1) will produce at least 100 MW of new capacity and (2) will save communities $2 billion over the life of the equipment. These performance measures were based on the FY 2019 Budget request of $10 million for the Office of Indian Energy. The Office of Indian Energy will continue to strive to offer the most effective and efficient services to address the needs of Indian Country.

Q2. In his QFR responses for his nomination hearing, Secretary Perry committed to hearing viewpoints "during the entire process when it comes to energy development which affects (Native communities') territory."

Q2a. Please list the Native communities with which either you or Secretary Perry met since President Trump took office, including all the people with whom either you or Secretary Perry met and each of those person's affiliations, regarding the decision to request a Fiscal Year 2019 budget that would eliminate the Tribal Energy Loan Guarantee Program.

A2a. Budget formulation is an inherently governmental function. As such, the Department does not seek public comments on budget formulation. Additionally, earlier this year, the Secretary delegated to the Loan Programs Office his authority to provide loan guarantees on loans made to Indian tribes for energy development.

Since September 2017, I have met with many tribal representatives during events such as: DOE's Indian Country Energy and Infrastructure Working Group, 2017 BIA Providers Conference, and 2018 Reservation Economic Summit. Additionally, I have had multiple meetings with individuals representing many tribes and tribal organizations, including:

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the Calista Corporation, the Navajo Nation, the Seminole Tribe of Florida, the Ute Mountain Tribe, the Tanana Chief's Conference, the Ute Indian Tribe of Uintah & Ouray Reservation, the NANA Regional Corporation, the Tolowa Dee-Ni' Nation, and the Alaska Federation of Natives.

Q3. During this hearing, you told Senator Heinrich that your office can still deliver "what Indian country needs" through "effectiveness and efficiency" despite DOE's request for a Fiscal Year 2019 budget that would cut your office's budget by 37.5 percent. Congress rejected the Administration's proposal to cut the Office of Indian Energy Policy and Programs budget, funding it $8 million higher than the Administration's Fiscal Year 2019 proposal.

As you may know, Native communities continue to face staggering challenges related to energy development. Native communities pay some of the highest electricity costs in the country, and the Energy Information Administration estimates that 14 percent of households on Native American reservations have no access to electricity. To my mind, the severity of these problems means that the Office of Indian Energy Policy and Programs budget should increase, not be cut.

Q3a. Given that your previous budget was clearly insufficient to deliver "what Indian country needs" in terms of reducing fossil resources, and the cost of, and access to, electricity, please describe your plan, including a timeline, for reversing the Department of Energy's proposed cuts to your office's budget, including a plan for formulating a proposal for increased funding consistent with the Fiscal Year 2018 omnibus to ensure that Native communities are truly getting what the need in terms of energy assistance.

A3a. Indian tribes and Alaska Natives develop and use their available energy resources in accordance with their particular needs. Consistent with the policy of promoting tribal self-determination, the programs which the Office of Indian Energy offers are now fuel and technology neutral. Beginning with the Fiscal Year 2019 Budget, the Office of Indian Energy developed two performance measures.

By 2030, install new electricity generation systems in Indian Country that (1) will produce at least 100 MW of new capacity and (2) will save communities $2 billion over the life of the equipment. These performance measures were based on the FY 2019 Budget request of $10 million for the Office of Indian Energy.

The Office of Indian Energy will continue to strive to offer the most effective and efficient services and to accordingly address the needs of Indian Country.

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QUESTIONS FROM SENATOR MAZIE K. HIRONO

Q1. The President's Budget for Fiscal year 2019 proposes cutting the funding for the Office of Indian Energy by 37 percent, including cutting funding for financial assistance from $12.4 million to $6.8 million.

Q1a. Can you describe what a nearly 50% cut in assistance funding will mean for your office's ability to assist tribes and Alaska Native communities in developing more affordable, local sources of energy? Which projects would you have to cut?

A1a. Beginning with the Fiscal Year 2019 Budget, the Office of Indian Energy developed two performance measures: By 2030, install new electricity generation systems in Indian Country that (1) will produce at least 100 MW of new capacity and (2) will save communities $2 billion over the life of the equipment. These performance measures were based on the FY 2019 Budget request of $10 million for the Office of Indian Energy. As with any budget modification, both the amount of new technical assistance the Office is able to provide may be affected, as well as the ability to provide new financial assistance for energy infrastructure installation. However, projects awarded in prior years are fully funded, and would not be affected.

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Questions from Chairman Lisa Murkowski

Question 1: The committee has allocated substantial time over the past few months to issues surrounding vegetation management, and in our work, we commonly hear reports of inconsistent practices and procedures by federal land managers at the local level – a lack of uniformity that can lead to planning difficulties for utilities and delays in clearing vegetation. In fact, we recently enacted legislation to require a better federal approach on these issues.

- Considering potential liability issues and the problems of delay in receiving federal approval, would you say that federal managers are imposing unreasonable standards for vegetation clearance?

  Laws such as NEPA and ESA serve an important purpose to ensure that impacts to the environment and species are addressed when transmission or other development takes place. While NEPA was intended for federal agencies to take a "hard look" at the environmental impacts of a proposed action, it can really turn into analysis paralysis, particularly when multiple agencies are involved, and dramatically increases costs and time, or stop a project altogether in the worst cases. The threat of frivolous litigation affects the approval process by forcing agency staff into being risk adverse in providing timely, reasonable, and practical decisions, thus making it a significant contributing factor to increasing time and cost.

  If we can reduce duplication of efforts, promote consistency between agencies, stick to timelines, reduce the threat of frivolous litigation, and otherwise ensure the law is being implemented appropriately, it would go a long way to balancing the intent with the infrastructure needed to provide rural energy.

- What has been your experience with the consistency of federal managers in handling requests related to vegetation management?

  Basin Electric does not have extensive experience related to transmission and vegetation management across federal lands. However, with respect to transmission line development and siting, we have experienced varying applications of NEPA and other federal laws from different agencies.

- Do you have any concerns about how federal land managers handle potential conflicts between your local requirements for maintaining power lines and federal law? Are NERC standards ever implicated?

  We appreciate the bipartisan work of the committee to include language in the recently-passed FY18 omnibus addressing our challenges on federal land rights-of-way. Specifically, the language provides co-ops with better access to clear hazard trees near our rights-of-way. It also implements guidance for agency field staff, addresses strict

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liability issues, and minimizes the need for case-by-case agency approvals. Implementing this new policy will improve our ability to maintain grid reliability, prevent catastrophic wildfires, and ensure public safety.

Question 2: I imagine some of the biggest challenges facing rural utilities, especially G&T co-ops such as Basin, revolve around the size, location, and distance your infrastructure covers. What technologies and devices do you use to ensure your grid is functioning safely and reliably?

Since the Northeast Blackout in 2003, FERC has designated the North American Electric Reliability Corporation (NERC) as the electric reliability organization. NERC, with the approval of industry, has implemented more than 100 mandatory reliability standards which consist of over 1,300 requirements. These mandatory reliability standards help ensure that the Bulk Electric System (BES) is planned, operated, maintained, and secured in a reliable fashion. Basin Electric has implemented numerous policies, programs, procedures and processes to ensure the reliability of our cooperative-owned Generation & Transmission BES facilities and equipment. Specific examples would include the following: 1) Physical and electronic security measures at all cooperative-owned Generation and Transmission facilities; 2) Review of all system disturbance(s) and/or event(s) with corrective action plans; 3) Robust system planning and spare equipment strategy; 4) Comprehensive equipment maintenance strategy(s); and 5) Improved communications and training.

Question 3: In your testimony, you describe how some of your power plants, especially your coal-powered plants, need to run at minimum levels for the very purpose of being available when the wind isn't blowing. When the wind is blowing, it can turn market prices heavily against coal plants, but those plants need to continue operating just in case the wind stops blowing. This almost sounds like a subsidy, where one type of power plant is being forced to run at prices where they would normally shut down merely because another type of power plant - a wind plant – can't be available in certain weather conditions.

- Do you think some of your plants are implicitly subsidizing wind?

  We believe that our dispatch-able generation is not sufficiently compensated by the market for operating and incurring financial losses in anticipation of needing to be available to run when wind generation is not available. Large facilities like coal-powered plants cannot operate reliably while cycling on and off daily. The markets should look multiple days ahead when making unit commitment decisions. The details of this can be accomplished in a number of different forms including multiday commitment, standby compensation or a ramp compensation product.

- Is FERC near to adopting any market solutions for this problem?

  FERC opened a new docket in response to the DOE's NOPR last fall. It sought comments from the RTOs/ISOs that were due March 9. Basin Electric submitted reply

comments to FERC on May 9, a copy of those comments has been included with this response.

- Do you have any market solutions to propose?

  Basin Electric believes broad changes to electricity markets could have negative impacts. We support FERC's efforts to further explore this issue and develop equitable market rules, and believe some form of standby or ramp compensation for coal and other dispatch-able generation sources is warranted. Wind tax subsidies have created incentives for wind build out that were not the result of normal supply/demand forces in an efficient market. As a result, the electricity markets must adapt to these external forces and structure rules that still allow for efficient, reliable and cost-effective market operation.

Question 4: As stated in your testimony, Basin Electric power plants participate in two FERC markets, the Midcontinent Independent System Operator (MISO) and the Southwest Power Pool (SPP). It is my understanding that "seam issues" is the term of art for issues arising when the rate and tariff issues of one FERC-organized market differ from that of another FERC-organized market. To what extent is Basin Electric experiencing seam issues? Are they costly for consumers? What can be done to reduce these costs?

Basin Electric has experienced issues with the seam running between MISO and SPP along its entire service territory. Essentially, there are times where power is wheeled between the two RTOs and for which the use of those poles and wires is not tracked or billed appropriately. In other words, a MISO member may sometimes push load into SPP and vice versa. A cost associated with this issue is that the RTO customers have to recover this "residual load" that is not accounted for by RTO members through market uplift that is charged to the market participants.

The RTOs can take measures to increase consistency and accountability these seam transactions. For example, SPP currently has a revision request pending. However, any market rules to address seam issues are best left at the regional level with the RTOs involved.

Question 5: We've heard that some of the smaller co-ops and municipal utility systems are sometimes at a disadvantage in negotiating with other stakeholders to improve the FERC markets.

- Are you finding yourself at a disadvantage when you negotiate in MISO and SPP meetings?

  Basin Electric has not experienced any disadvantage when negotiating in MISO and SPP meetings.

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- What can be done to make these market discussions fairer to everyone?

  FERC and the RTOs/ISOs have existing processes for handling disputes that have proved adequate in our experience.

Question 6: I understand Basin and similarly situated rural utilities use wireless communications networks to supply real-time data and situational awareness regarding your infrastructure. These communications networks are also critical for grid modernization and smart grid technologies. Can you give us insight into how you use your communications system and how essential it is to your operations?

Basin owns and operates a large multi-state microwave radio system that provides primary communications for protective relaying of its transmission and generation systems. This system is loop protected for reliability and provides 99.995 percent availability for critical communications. Basin also owns, leases and shares fiber optic communication infrastructure to provide failover protection for the microwave system. Secondary use for this communications infrastructure includes security, supervisory control and data acquisition (SCADA), telemetry and networking communications to its plants, substations and other facilities as well as mobile radio communications for dispatching and outage-related hand held and vehicular communications.

Questions from Senator John Barrasso

Question 1: In your testimony, you highlighted several factors that create unreasonable costs and delays in electric infrastructure development. Among these factors are regulatory burdens associated with permitting and siting transmission and distribution lines on federal lands. You specifically mentioned the National Environmental Policy Act, Endangered Species Act, and the Migratory Bird Treaty Act as laws that need to be updated to ensure that our regulatory framework does not serve as a barrier to responsible infrastructure development.

What improvements are needed to ensure that electric infrastructure permitting on federal lands is done in a responsible and efficient way?

Laws such as NEPA and ESA serve an important purpose to ensure that impacts to the environment and species are addressed when transmission or other development takes place. While NEPA was intended for federal agencies to take a "hard look" at the environmental impacts of a proposed action, it can really turn into analysis paralysis, particularly when multiple agencies are involved, and dramatically increases costs and time, or stop a project altogether in the worst cases. The threat of frivolous litigation affects the approval process by forcing agency staff into being risk adverse in providing timely, reasonable, and practical decisions, thus making it a significant contributing factor to increasing time and cost.

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If we can reduce duplication of efforts, promote consistency between agencies, stick to timelines, reduce the threat of frivolous litigation, and otherwise ensure the law is being implemented appropriately, it would go a long way to balancing the intent with the infrastructure needed to provide rural energy.

Question 2: In September 2017, the Mountain West Transmission Group announced its intent to join the Southwest Power Pool competitive wholesale energy market. Members of this group include Basin Electric and other utilities that serve a large portion of Wyoming. In your testimony, you expressed some concern with how these markets compensate coal-fired power generation, and you state that you support the Federal Energy Regulatory Commission's efforts to develop equitable market rules.

Please explain how the competitive wholesale market rules should be changed to ensure that coal-fired generation is compensated for the value that it provides to the grid.

FERC opened a new docket in response to the DOE's NOPR last fall. It sought comments from the RTOs/ISOs that were due March 9. Basin Electric submitted reply comments to FERC on May 9, a copy of those comments has been included with this response. While Basin Electric believed that the DOE proposal was too broad in scope, and would have had negative market impacts, we support the FERC's efforts to further explore this issue and develop equitable market rules, and believe some form of standby or ramp compensation for coal and other dispatch-able generation sources is warranted.

Questions from Senator Bernard Sanders

Question 1: As you may know, rural communities face particularly acute geographic and demographic threats from climate change. Physical isolation, limited economic diversity, higher poverty rates, and aging populations make rural communities particularly vulnerable to the negative impacts of climate change. Mainstream science tells us that burning of fossil fuels is one of the primary drivers of climate change, and that unless we drastically slash our carbon pollution emissions, we can expect the already-disastrous effects of climate change to become even worse. Therefore, the impacts from continuing to burn fossil fuels represents a particularly significant risk for rural communities.

Given this dire need to drastically reduce carbon pollution emissions and therefore reduce fossil fuel use, please describe what the federal government does or can to do to support programs like the PrairieWinds® - Energy in Motion program your cooperative supports to help other cooperatives make an affordable transformation away fossil fuels and towards clean, renewable sources of power like wind and solar.
Basin Electric and its members have invested billions in capital in recent years to ensure environmentally-responsible operation of its fossil-based generation. At the same time, we have sought to diversify our portfolio with renewable generation mainly thru low-cost power purchase

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agreements enabled by the renewable Production Tax Credit (PTC). Going forward, Basin Electric is actively-engaged in ensuring that these assets can continue to operate in a carbon-constrained future. Basin Electric has expanded its interest in developing carbon capture solutions to help "crack the code" with respect to cost-effective clean coal technologies that capture, utilize, and sequester CO_2. Basin Electric is a partner with the Integrated Test Center (ITC) that is nearing completion at our Dry Fork Station. In addition to the ITC, Basin Electric has been exploring options to commercialize Allam Cycle technology for future power generation. The Allam Cycle, developed by NET Power, is a new power cycle that utilizes oxy-fired natural gas to produce supercritical CO^2, which is then used as the working fluid in a turbine to generate power with near-zero emissions. Basin Electric is also participating in DOE's CarbonSAFE Project which is a multiyear initiative designed to result in commercial-scale carbon capture and storage (CCS) projects by 2025. In Wyoming we are participating in the University of Wyoming's Phase I CarbonSAFE Project evaluating carbon storage potential near our Dry Fork Station. Additional we are participating in the Energy and Environment Research Center's CarbonSAFE Phase II Project evaluating sequestration characteristics in North Dakota,

Support for the DOE's fossil R&D program is critical to help to deploy CCS technologies. Basin Electric remains a committed partner, but the investment we and our members can make is limited when the risk is high and other options are available for power generation. Simply put, unless DOE can help make the economics work, utilities cannot move forward with these kinds of projects.

As a not-for-profit electric cooperative, Basin Electric has a fiduciary responsibility to its members to provide electric generation at the least cost. Basin Electric has worked to achieve this goal by diversifying its portfolio with wind and market purchases. Basin Electric has a vested interest in generation sources with long-term fuel certainty, such as coal, that provide affordable power and serve as the backbone of the electric grid. The DOE's large-scale pilot program and other support provided through the National Energy Technology Laboratory is critical to help prove out the Allam Cycle and other technologies, mitigate the risk of uncertainty, and allow for commercial deployment by Basin Electric and other utilities.

Finally, the 45Q tax credit will go a long way towards closing the cost gap for potential carbon capture projects. We continue to assess our options for utilizing this credit. We also support introduction of the Utilizing Significant Emissions with Innovative Technologies (USE IT) Act. This legislation will provide further assistance to relieve the regulatory and financial barriers to carbon capture utilization and sequestration technology development.

Questions from Senator Joe Manchin III

Questions: Please tell me how we ensure rural America does not get left behind our large urban areas that are increasingly adopting more advanced energy technologies than rural areas.

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What doesn't work? What does work?

Basin Electric believes that rural America will continue to provide the energy that urban areas depend on, and we believe that while renewables will play a growing role, coal and natural gas-generation will continue to be needed for firm power generation into the foreseeable future. What we do know is that for both of these generation sources to be a viable option in a carbon-constrained future is cost-effective technology to capture, utilize, and sequester CO_2. Basin Electric is a partner with the Integrated Test Center (ITC) that is nearing completion at our Dry Fork Station. In addition to the ITC, Basin has been exploring options to commercialize Allam Cycle technology for future power generation. The Allam Cycle, developed by NET Power, is a new power cycle that utilizes oxy-fired natural gas to produce supercritical CO_2, which is then used as the working fluid in a turbine to generate power with near-zero emissions. Basin Electric is also participating in DOE's CarbonSAFE Project which is a multiyear initiative designed to result in commercial-scale carbon capture and storage (CCS) projects by 2025. In Wyoming we are participating in the University of Wyoming's Phase I CarbonSAFE Project evaluating carbon storage potential near our Dry Fork Station. Additional we are participating in the Energy and Environment Research Center's CarbonSAFE Phase II Project evaluating sequestration characteristics in North Dakota,

Support for the DOE's fossil R&D program is critical to help to deploy CCS technologies. Basin Electric remains a committed partner, but the investment we and our members can make is limited when the risk is high and other options are available for power generation. Simply put, unless DOE can help make the economics work, utilities cannot move forward with these kinds of projects. The DOE's large-scale pilots program and other support provided through the National Energy Technology Laboratory is critical to help prove out the Allam Cycle and other technologies, mitigate the risk of uncertainty, and allow for commercial deployment by Basin Electric and other utilities.

Technology development is key to determining what doesn't work about as often as it tell us what does. It is important that the DOE maintain its focus on helping the private sector with this learning process as well as help build-out those technologies that are going to make the "leap" into advanced generation that will serve rural areas in the future.

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Questions from Chairman Lisa Murkowski

Question 1: We have heard from many witnesses over the past few years about permitting challenges. What has been your experience working with the federal government, including agency field offices, to permit projects? What reforms would you suggest to improve this process?

Over the years I have had very different experiences even with the same agency, depending on the personnel involved. A change of district ranger can change the level of cooperation within a district. There was a time I was told we needed to survey an entire valley before we were permitted to change failing poles. This survey request was only lifted through the involvement of the District Ranger.

In another situation, three of my electric distribution cooperatives were asked to serve pumping stations of a pipeline. These very rural cooperatives have very little electricity load other than residential and small farms. The pipeline would have allowed a portion of their system's high fixed costs to be spread over two or three times the load. The tax base provided by the pipeline would have significantly lowered the property taxes of co-op property and that of the member consumers in those taxing jurisdictions. I began working on the supply side of this project in early 2009 and after millions spent; a presidential permit was not issued until recently. The BLM related plans for the co-ops were completed only after Senator Daines became involved. But these plans could not be formalized until the presidential permit was signed. Although from the Cooperative Manager's perspective the BLM district office was difficult to work with several years ago, the experience with a different district manager and through coordination with the state BLM office the issues seem to be resolved. We are optimistic a plan will be approved. Everything could begin more quickly if the Sage Grouse plans were not an issue. Construction may not affect the sage grouse population. We did, however, support the state sage grouse plan because it was critical to preventing federal listing of the sage grouse as a threatened or endangered species. Listing and federal enforcement would have likely shut down many activities over a large area.

In answer to suggestions regarding reform to improve the process, interagency and intra-agency communication should be made from the top down and bottom up that the role of federal agencies is to assist entities in meeting federal requirements as explicitly set into law by Congress. Federal agencies should do all in their power to promptly provide permits if criteria are met. If mitigation is required for species, it should be limited in scope and no mitigation that is not specific to the species should be requested.

My colleague, Mark Hayden, stated the answer to this question better than I in his 9-6-2017 testimony to the U.S. House of Representatives Small Business Committee. Mr. Hayden, general manager of Missoula Electric Cooperative, based in Missoula, Montana testified: **"We need** ***streamlined, expedited procedures that allow for timely implementation of projects to protect the long-term health of our forests, our small businesses, and the overall economies of***

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the communities we serve. The best way to accomplish that is to provide consistency, flexibility, and accountability into the federal permitting and permit amendment processes, especially when system reliability and fire prevention are driving factors. We believe this can be done without abrogating the intent of federal regulations".

Question 2: You effectively detail the challenges with providing electricity service to rural areas of Montana – especially in areas where your co-ops serve less than one member per mile of line. Outside of the sheer distance between customers that you serve, what other challenges do you encounter in keeping electricity affordable for your ratepayers?

Our electric cooperatives serve in an area of extreme annual weather conditions. The consequence is that the time period to construct anything is compressed. Frozen ground with deep snow turns to mud in the spring and early summer. In some areas we serve, construction periods are further restricted to avoid mating or brood rearing seasons for various animal species. An example is sage grouse. If permits are held up a few months prior and into the limited time of year construction can occur, the actual construction delay can be a full year. Or, in other cases, these restrictions can result in very high construction costs if work must be done amidst adverse weather, assuming construction is even possible at those times. If construction crews on a large project have to begin and shut down during portions of the year the mobilization and demobilization costs soar.

The affordability of the generation is affected to a high degree by federal policy. In the late 1970s we were prohibited from generating with natural gas and had the option of coal and nuclear. When maintenance activities and efficiency upgrades are leveraged to trigger new source review the costs add up quickly. If changes in federal policies prohibit new plants of any form from being built, our existing generating plants built before additional restrictions were adopted should have the option of being run to their full depreciable and useful life prior to any mandated shut down. Otherwise, the impact is a decrease in the affordability of electricity for our ratepayers.

We understand the value that distributed generation can have. But distributed generation should not be imposed in a manner that shifts costs to other member consumers. These cost shifts unnecessarily increase the costs to other member consumers, making their power less affordable.

Question 3: The committee has allocated substantial time over the past few months to issues surrounding vegetation management, and in our work, we commonly hear reports of inconsistent practices and procedures by federal land managers at the local level – a lack of uniformity that can lead to planning difficulties for utilities and delays in clearing vegetation. In fact, we recently enacted legislation to require a better federal approach on these issues.

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- Considering potential liability issues and the problems of delay in receiving federal approval, would you say that federal managers are imposing unreasonable standards for vegetation clearance?

That definitely has been the case in the past. It is certainly true more so with some Rangers or districts than others even though they were supposed to be implementing the same policies. We are very encouraged by the passage of the vegetative management provisions in the recent Omnibus bill. The degree and timing that the new language will help depends on both its implementation and its application. We could easily pass the upcoming fire season prior to its initial implementation and hope we do not experience some areas being very slow to implement compared to others and some make implementation much more difficult than others. How full the implementation is communicated and implemented will determine the benefit.

- What has been your experience with the consistency of federal managers in handling requests related to vegetation management?

It has been my experience and the opinion of my colleagues that a change of managers or the staff implementing on the ground even in the same district can make a tremendous difference in our ability to be responsible stewards. Please refer to the previous questions answer

- Do you have any concerns about how federal land managers handle potential conflicts between your local requirements for maintaining power lines and federal law? Are NERC standards ever implicated?

I do have concerns due to experiences with some managers that had little regard for the ability to maintain and repair lines. I have worked with other personnel that I felt fully respected our needs balanced against their agency obligations. Not all have appeared to be concerned with a balance to find workable solutions. A utility with bulk transmission must meet NERC standards. If there are delays obtaining permission to maintain a line that results in violations of the reliability standards the utility is in an impossible position. I do not have specific examples I am personally aware of as many of our lines however important, are not bulk transmission under NERC. A utility having to choose between actions on federal lands prior to permission or remaining in violation of NERC standards would be a very difficult decision that could be likened to choose between economic sanctions or fines and potential jail.

Question 4: We've heard that some of the smaller co-ops and municipal utility systems are sometimes at a disadvantage in negotiating with other stakeholders to improve the FERC markets.

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- Are you finding yourself at a disadvantage when you negotiate in MISO and SPP meetings?

I do not have personal experience as market participant, only exposure working though our generating supplier, Basin Electric Power Cooperative, though my committee work.

- What can be done to make these market discussions fairer to everyone?

It is my hope that stakeholder informal groups will resolve more issues in their zones and know that the issues quickly become complex. Some entities are more professional and successful in finding equitable compromise than others.

Question 5: As preference customers, your co-op purchases much of its hydropower through the Western Area Power Administration.

- How have increased costs for fish and wildlife mitigation affected the services you provide your ratepayers?

Anything done to reservoir levels, releases and other activities ultimately affects the cost of the power we receive because the federal power is cost based. Water flows above the capacity of generators is lost opportunity and increased fossil fuel use is the result. Also, the time of day and year when the water goes through the turbines makes a difference as any excess power generation is sold to fund the purchases that have to be made when the obligations are higher than the generation.

- Do you feel you have a clear accounting of what those costs truly are?

I do not have an accounting within the Upper Great Plains and Rocky Mountain regions of the Pick Sloan power we are purchasing from Western Area Power Administration (WAPA). We have been fortunate not to have the magnitude of these mitigation costs that other regions have experienced. After ten years of work by the Missouri River Recovery Implementation Committee, an adaptive management plan is being implemented that will have impacts on humans as one of its considerations. The results will certainly affect future costs. Just the range of cost impacts to our hydro power costs alone between the six alternatives studied in the DEIS were calculated to be over $9,000,000 per year. We believe that number would increase dramatically as the generation mix in the region changes and capacity costs ultimately increase due to the retirement of more thermal units and addition of more wind.

- What balance needs to be found to protect fish and wildlife and provide low-cost power to rural ratepayers?

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The relatively low cost of power we purchase from WAPA is near recent market prices and the cost we pay towards the multi-purpose projects are significant. I do not think it is a function of power production to bear the burden of costs related to wildlife if there is little or no regard for the cost effectiveness or proven science of these wildlife programs. As stated, these are multipurpose projects serving multiple public purposes. As we embed into WAPA rates the costs of efficiency improvements, retrofits, upgrades and maintenance of all the WAPA marketed generation facilities of the Corp of Engineers and Bureau of Reclamation facilities, our WAPA rates will exceed current market costs. The good news is that WAPA rates likely will not be as volatile as market rates can be. I do not propose that flood control and other project purposes should pay, only that protecting fish and wildlife needs to be done in the most cost effective manner possible and natural flows should be fully utilized to advance the science and that society should pay those costs not just hydropower users.

Questions from Senator Joe Manchin III

Question 1: Please tell me how we ensure rural America does not get left behind our large urban areas that are increasingly adopting more advanced energy technologies than rural areas.

What doesn't work? What does work?

In terms of utilizing advanced meters with ability to communicate with the utility, rural areas have often led the industry. This is due to the high cost of meter reading in sparsely populated areas. To the degree meter reading could be eliminated, funding could be shifted to implement the advance metering. When savings in infrastructure or operating costs can be realized rural areas often can react quickly. Whether rural or urban, the determination of what technologies are cost effective often depends on the type of electricity load. Rural areas of eastern Montana provide a good example of the situation. In these areas, the electricity load consists mostly of residential and small farms. There are irrigation loads but most of it is electricity being used to pump water from ditches. With ditch irrigation, irrigators tend to have to pump when the water is there. By comparison, irrigation utilizing water wells allows water to be pumped whenever it's convenient.

In rural areas, over half of the electric substations' highest load levels are measured in the hundreds of kilowatts not megawatts and often cell phone or broadband is not near the substations. The relevance of this is that data management from these locations in not nearly as cost effective as it is in areas of large loads. Management gains in terms of storage options may be less available. In large commercial facilities, there may be large concrete floors that can store energy that do not exist in the more rural areas. The point here is that the many factors that make advance technologies cost effective will vary from area to area. The one factor that will help rural areas is affordable, reliable data acquisition whether from power line carrier technology or broadband the flow of secure data is critical. Of course the cyber security issues skyrocket the more advanced the rural grid becomes.

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What does not work is shifting costs from one group of consumers to another group. Also, applying use of power management technologies for larger loads that are plentiful in urban areas to the rural areas that are primarily small farm/residential may not have similar returns on the investment.

Question 2: From what I understand, coal still dominates electric cooperatives' retail fuel mix, which in 2016, was over 40 percent – according to the American Electric Cooperative Association. Would you be able to provide your approximately 70,000 customers with affordable and reliable energy without coal?

The difficulty we would face if coal-fired power plants were removed from the mix prior to their useful life would be largely economic in our area as currently it would require construction of natural gas generation and certainly decrease tax base and many high paying jobs with good benefit packages that coal mining and coal fired generating plants provide. We have been aggressively installing large-scale wind. This is because, in our area, wind generation is significantly more economic than solar. How the stranded costs of coal-fired generation that is prematurely shut down would be paid would be a big factor in economic impact. If our members had to pay for the remaining cost of the coal generation that would be shut down plus the additional wind/gas/solar generation, the costs become significant. If we could buy capacity on the market and energy from renewables, we would still have the cost of the retired plants plus the new facilities. However the period of capacity at affordable prices in some areas may be limited. In fact, this is what we as members of Basin Electric Power Cooperative are finding in RFPs Basin Electric issued this past month. Although battery storage has come down in price, I do not see a path to an affordable, renewable / storage only option considering that, at times, our winter peak loads occur when there is a very large high or low pressure system. These weather patterns drive temperatures well below zero for an extended period days with little wind and reduced sun. The economics of large-scale wind or solar generation brings significantly greater savings than smaller, distributed generation projects. If we can pass through the costs of large-scale wind-generated energy, which cost less than two cents per kWh as opposed to the higher-cost smaller projects, we help the affordability in the rural areas.

There is no certainty that current low cost natural gas will be available into the future if fracking is restricted. That is one reason we are anxious to find cost affective beneficial use of carbon from coal as it is an abundant resource and having multiple fuel choices may be very good for future affordability and reliability.

In summary, if affordability and fairness are a factor, a relatively quick transition away from coal would require a funding mechanism other than requiring certain rural consumers to pay the cost of coal generation that can no longer be utilized, plus new renewable/storage/gas generation. Although distributed generation plays a role, the economics and reliability (especially with wind), favor larger scale projects.

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Question from Senator Tammy Duckworth

Question: In remote areas, access to electricity often faces challenges due to infrastructure and servicing issues. For households in these areas, distributed energy resources like on-site renewable energy plus energy storage could be a good solution, but this is out of reach for most property owners' budgets. This is especially true in Puerto Rico, where numerous remote communities lost power for months after Hurricane Maria, unable to reconnect to the grid. These issues are ongoing: as recently as April 18, 2018, Puerto Rico experienced an island-wide blackout. We should be encouraging investment in new distributed energy resources in remote and rural areas to promote resiliency and sustainability for the communities that need it most.

Mr. Hardy, in what ways are you helping your members build more distributed energy resources?

The short answer is access and education. Well ahead of such concepts as net metering, in 1982 I connected our first member-owned wind generation. The member-consumer used as much of the output as his home consumed and we purchased the excess and supplied the needs when the wind was not available. I also connected several high-head small hydro projects, wheeling the power to a neighboring utility. This utility was prepared to pay several times our power costs, making these projects feasible. The answer to your question today is similar to what it was for those projects about 35 years ago. We have worked hard on policies to facilitate interconnection of small, distributed generation with the caveat that we implemented the policies to be relatively revenue neutral for the remaining member consumer. This was done through cost-based policies. Had these interconnections not been relatively revenue neutral we would have had to raise costs for those who did not interconnect small, distributed generation.

The co-op I managed was Park Electric Cooperative. This co-op is located directly north of Yellowstone National Park. In this scenic mountainous area there were many remote properties far from power lines. A few of the individuals in this area did not want to be served by the co-op, choosing instead to be independent from the grid by using wind, propane, solar and batteries. However, I am only aware of a handful that did not request central station service from the co-op. They requested this service because of the convenience and reliability of the co-op distribution system. These individuals paid most of the cost for the lines and were interconnected in a manner that allowed them to also continue to utilize their own renewable generation. I do believe as costs of solar and batteries continue to decline, more distributed generation will be interconnected. Our electric co-ops will certainly work to accommodate the interconnection of these technologies. However, I also believe that, especially with the climate we have in our area, the value of being interconnected to the co-ops lines will continue. Distributed generation will lower our energy purchases from traditional sources. But the

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ability of the co-op power system to provide capacity to meet power demand when energy storage and renewable generation is not adequate will continue to bring great value.

The question of how much should be invested to promote resiliency and sustainability of our co-op utility systems in rural communities is one we have addressed for years. We have done this through power line design and determining the numbers of power lines needed to provide reliable power to our communities. An investment in distributed generation and storage in these communities would be given the same consideration. It would be considered in terms of how much to spend to increase resiliency (depending on the definition of resiliency). Whether it is power lines and storage and/or distributed generation, the cost increases significantly the greater the level of resiliency that is desired. The cost of distributed generation in rural areas also faces challenges of scale. When the nearest solar installer is hundreds of miles away and the closest electrician 60 miles away, the costs of distributed generation will logically be significantly higher. When there are many miles between small communities the economics of storage changes as well. We have been in discussions in our area for over a year on the role storage will play and the costs of storage and benefits of storage and what offsetting cost savings the storage may bring. Clearly the value of distributed generation and storage varies with its cost and varies depending on environmental considerations, such as whether you are in areas vulnerable to tornadoes, hurricanes or frequent ice storms.

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Question from Chairman Lisa Murkowski

Question: *Your written testimony addresses an interesting question: will we run out of low-income homes to weatherize? And the answer seems to be "no" in Washington state, although ideally, overall demand for low-income weatherization assistance will decrease over time. You also point out that 79,000 households have been weatherized in your state through the low-income weatherization program since 1995 – about 20 percent of potential homes. What are your ideas to leverage future funding and increase that percentage moving forward?*

One of the most important strategies to increase the percentage of homes weatherized in the future is to provide consistent federal funding for the Weatherization Assistance Program, as opposed to fluctuating appropriations and continuing resolutions. Although we have adapted and are fairly nimble as an industry, as proven by our ramp up and performance during ARRA, the weatherization program is complex and requires a substantial amount of investment in personnel and infrastructure. The program prides itself on "getting it right" by providing quality services to those in need that are cost effective and ultimately improve, not harm, the home and the client. This, however, take time and training to ensure we meet the right standards. Consistent funding also affects our ability to successfully leverage other funding sources. If federal funding is based on a longer term, multi-year funding commitment then we can more easily seek out additional funding sources to match or supplement our current budgets.

It is also important to continually seek ways to make the program more effective. As I mentioned during my verbal testimony, the evaluation of ARRA spending resulted in additional regulations for the program. Some of these changes were positive and help ensure the quality of the services we are providing, but others added to an already complex program and interfere in our ability to serve people in the most effective manner possible. I believe there is a fine line between ensuring that we deliver consistent quality services and making a program so bureaucratic that it is difficult to administer. Some specific improvements that Washington state weatherization task forces have recommended are:

- Currently the Department of Energy requires a Quality Control Inspection (QCI) on every unit and provide separation between the auditor of the unit and the quality control inspector. This means the same person performing the audit on a home prior to work may not perform the QCI at the conclusion of the work. This is extremely difficult for weatherization programs in rural areas who often only have one energy auditor/inspector for the program. Our task force looked at not requiring QCI/auditor separation. Since this requirement has been implemented there has been no documented improvement in the quality of the work performed; as such, the requirement may not be necessary for our agencies. We are working toward not requiring this for non-DOE dollars in order to expedite production and ease wait time for completion of units.
- We would like to establish a "deemed measures" list which would enable agencies to choose work from a list based on housing stock and measure information rather than working individual projects through a cumbersome and time-consuming energy software program. It would save time and increase production.

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- DOE currently requires re-weatherization be lowest priority and is not allowed on homes weatherized after 09/30/1994. Changing these rules for non-DOE funds is connected largely to multi-family units that are difficult to complete in under a year due to size and scope of projects and, perhaps more importantly, a landlord's ability to contribute funds to a given project. If we are able to weatherize in phases and have a clear understanding of how to count these units in a way that honors the ongoing improvements that are happening to homes (perhaps as a unit each year?) we would be giving a better picture of the work that is being done. When considering how DOE might loosen these restrictions, updating the re-weatherization date would help. Additionally lessening the pressure on units produced and highlighting additional impacts of thorough and complete work (health and housing outcomes) would allow the program to assist more low-income families in a more holistic fashion.
- The Low Income Weatherization program leads the nation in weatherization technology, but we struggle with trying to incorporate regulations for new construction into older housing stock. It is much more expensive per unit to meet certain regulations as part of a retrofit weatherization project than it is for new construction. The fact that we have to meet ASHRAE ventilation standards as part of a weatherization project is a perfect example of the type of regulation that is burdensome, costly and not overly effective.

Lastly, it is important to create a trained workforce that is capable of performing weatherization work. Just recently, it took me more than 4 months to find and hire a qualified energy auditor. Training and technical assistance are key to making this happen, but perhaps more importantly, the acknowledgement that we have to pay competitive wages given the trade work available due to a construction/housing boom. Greater monetary investment that is consistent is needed to create a more stable and trained weatherization work force.

Question from Ranking Member Maria Cantwell

Question: *I understand DOE estimates the economic benefits of weatherization activities to be 8,500 direct and indirect jobs across the U.S. What are the economic benefits in terms of job creation in the HopeSource service area both directly and indirectly resulting from your weatherization efforts?*

The HopeSource Weatherization program serves a rural county in eastern Washington with a population of 40,000. We estimate that our program alone supports about 6 full-time jobs. In Washington state the Department of Commerce estimates the weatherization program supports around 300 full-time jobs.

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Questions from Senator Mazie K. Hirono

Questions: *Your testimony included compelling examples of the people whose homes and lives have been improved through the work of your organization. You described the impact that the people of Washington state would feel from the elimination of the Weatherization and Low Income Energy Assistance Programs proposed in the President's budget, a harm that would also be felt in Hawaii and around the country. If Congress continues to fund the assistance programs, how many more people do you think you could help? If there were additional funding beyond current levels, how would you hope to expand the efforts of HopeSource to assist people?*

Since its inception in 1976, WAP has weatherized more than 7 million homes. If Congress continues to fund the low income weatherization program, it will serve an additional 40,000 homes a year with current DOE funds. That number is around 100,000 a year if you include other leveraged funding sources. However, a 2014 Oak Ridge National Lab Report (ORNL/TM-2014/133) found 39.5 million households in the United States were federally income eligible for WAP. The number of households that are suitable candidates to receive WAP is slightly lower because of a number of factors (home is already energy efficient and/or home is too dilapidated or unsafe to weatherize without additional funds), but the demand clearly exists into the foreseeable future.

If additional funding was available, HopeSource would have the ability to weatherize additional homes. The Weatherization Assistance Program workforce is a proven delivery network and stands ready to weatherize more homes if more resources were available. We would also be able to defer fewer homes if more funds were allocated to making health-related repairs and improvements. Another Oak Ridge Lab report (ORNL/TM-2014/364) examined causes for deferral throughout the network. The top five reasons weatherization auditors had to defer homes were: (1) excessive mold or moisture; (2) unsanitary conditions; (3) excessive repair that is beyond the scope of WAP; (4) structurally unsound or dilapidated unit; and (5) unsafe electrical, plumbing or mechanical equipment. As I mentioned in my verbal testimony, the long-term health impact of repairing and weatherizing homes is dramatic, but additional funds are needed to do this work.

U.S. Senate Committee on Energy and Natural Resources
April 19, 2018 Hearing
Energy-Related Challenges and Opportunities in Remote and Rural Areas of the United States
Questions for the Record Submitted to Mr. Robert Venables

Questions from Chairman Lisa Murkowski

Question 1: Energy efficiency has provided plenty of success stories across our state, but I'm interested in your perspective on the unique challenges that you face in your work around Southeast Alaska. You have dabbled in everything from construction costs of proposed interties to helping schools change out diesel boilers for woody biomass alternatives. What have you found to be the biggest barriers to efficiency gains in our state?

- **Answer:** Efficiency is critical at every phase, be it generation, transmission or consumption. The biggest barriers for efficiency gains are two-fold. First, the human behavior and habits of use require education and outreach. Consumers who pay their own energy bills are generally more motivated to function more efficiently, but even they often lack the information and tools to alter consumption. Secondly, there are significant infrastructure issues with housing and facilities across rural Alaska. Many of the existing structures are poorly constructed and needed retrofits are very costly.

Question 2: The human capacity factor plays a major role in the energy use discussion no matter where in the country you are, but in Alaska, the importance of training and understanding on the local level cannot be overstated. What have you learned about the importance of winning local buy-in from the start and communicating effectively with the actual people living in the communities you are trying to change for the better?

- **Answer:** Local buy-in and capacity building are the most critical aspects of community development. Southeast Conference and many others are focused on how to create sustainable solutions through empowering individuals with increased skills and knowledge, while also building capacity at the organizational and community level. Embracing a one-size-fits-all solution policy makes management "from afar" fail all too often. Cultural and geographical differences mandate a localized approach to training and understanding. One of the most promising programs started this year by Southeast Conference and REAP is H.E.L.P. – the Home Energy Leadership Program. A local energy "champion" is identified and trained – then equipped to work in their own community helping their neighbors both understand and retrofit/implement the basic energy efficiency measures. We hope to perpetuate this model throughout the state, and it could also be implemented nationwide.

Question 3: We have heard from many witnesses over the past few years about permitting challenges. What has been your experience working with the federal government, including agency field offices, to permit projects? What reforms would you suggest to improve this process?

- **Answer:** Southeast Conference has worked directly with federal agencies to permit energy infrastructure in the region as have many of our members. The common thread throughout is that permitting agencies are constrained due to staffing levels, lack of

funding and political mandates at the federal administrative level. Very few significant decisions are made in the region on a localized basis. In theory, the USDA Tongass National Forest Regional Forester should be able to make these determinations but all too often the permits are sent to D.C. for decisions. Administrative rules, such as the Roadless Rule, denies access to resources, forces a "cookie-cutter" approach to project development and disallows common sense from the equation (because a project "can be" serviced by helicopters doesn't mean other lower costs options shouldn't be explored).

What reforms could improve this process? First, removing administrative rules that handcuff good decision making that should take place at the regional and local level. There has been considerable staff turnover and much of the institutional knowledge for managing resources is no longer employed. Strong consideration should be given to forming a team of experts from regions across the nation where good administrative practices have led to successful forest management and bring them into this region (perhaps other regions too?) to institute reforms that are known to work in the USFS. This may also help to resolve the growing number of multiple use conflicts between entities from various economic sectors. Also, the inability to process permits in a timely manner is a project-killer. Project approval timeline uncertainty could be lowered by establishing review deadlines.

Questions from Senator Mazie K. Hirono

Questions: People in Hawaii have a lot in common with the people you work to help in Alaska. Both are trying to find ways to reduce their dependence on expensive imported diesel fuel as their main energy source. How does your organization reach out to rural communities to determine their particular energy goals and needs? Does the Southeast Conference share the lessons it has learned on community outreach with other regional development groups?

- **Answer:** Southeast Conference is responsible for developing a Comprehensive Economic Development Strategy (CEDS) for Southeast Alaska designed to identify regional priorities for economic and community development. The CEDS 2020 Southeast Alaska Economic Plan is a strategy-driven plan developed by a diverse workgroup of local and regional representatives from private, public, and nonprofit sectors. Over the course of 12 months, 27 workshops and strategic planning meetings Southeast Conference members developed an overall vision statement, a list of 6 goals, 47 objectives, 8 priority objectives, and regional and industry specific SWOTs analyses. More than 400 people representing small businesses, Tribes, Native organizations, municipalities, and nonprofits were involved in various elements of the planning process.

  Southeast Conference works collaboratively throughout the state and country and is pleased to share lessons learned with partners in Hawaii and elsewhere. Our CEDS program has been recognized nationally as one of the best in the nation. Feel free to share my contact information to your constituent, as desired.

AMERICAN PUBLIC GAS ASSOCIATION

April 19, 2018

The Honorable Lisa Murkowski
Chairman
Energy and Natural Resource Committee
304 Dirksen Senate Building
Washington, DC 20510

The Honorable Maria Cantwell
Ranking Member
Energy and Natural Resource Committee
304 Dirksen Senate Building
Washington, DC 20510

Dear Chairman Murkowski and Ranking Member Cantwell:

On behalf of the American Public Gas Association (APGA), we appreciate this opportunity to submit testimony to this important hearing addressing the challenges and opportunities facing our rural communities and their 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. The overwhelming majority of the municipal gas utilities in the United States serve rural communities. 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.

Natural gas should be a foundation of our energy future. As this Committee begins to address our rural communities' energy infrastructure needs, we encourage the Committee to support dynamic federal programs that allow communities to choose how best to meet their energy needs without establishing any bias or embedded preferences.

Energy cost has a substantial impact on rural and agricultural communities and the commodities they produce because so many areas do not have access to multiple energy resources. The impact of energy cost is felt across many rural economic sectors, such as manufacturing, agriculture, and farming. APGA Members are experiencing high demand for natural gas in many agricultural sectors including crop drying and processing, poultry farming, and greenhouse operations. Farmers in these sectors recognize the value of low cost energy for their operations and some of these farmers have been fortunate enough to be in close proximity to a natural gas distribution system. APGA Members have been unable to meet some of these requests for gas service due to farming locations. We believe increasing natural gas access in rural communities will lower energy bills for both homeowners and businesses, while alleviating potential delivery interruptions often associated with propane, oil and electricity. Among other things, the stable cost of natural gas improves the ability of farmers and agricultural producers to budget future energy costs more accurately.

As the Committee discusses future energy infrastructure needs for America's rural communities, the Committee should not overlook the fact that the direct use of natural gas in America can and should play a critical role in the reliability, resiliency, efficiency, and security of any size energy system.

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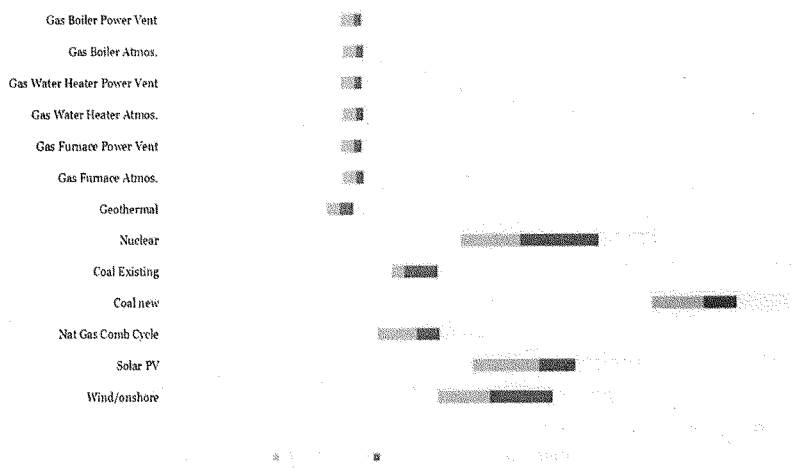
Natural gas is currently distributed to approximately 75 million homes and businesses nationwide; however, many rural and agricultural communities do not have access to this energy resource. The direct use of natural gas appliances in homes and businesses frees up critical capacity and increases flexibility for the electric grid while lowering overall energy 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 Study,[1] the direct use of natural gas has significantly lowered levelized costs to consumers when compared to any of the electric generation technologies.



The direct use of natural gas for manufacturing, heating, hot water, and cooking provides relief for congested and stressed electrical infrastructure, as well as primary energy for on-site, back-up generators during grid outages. Additionally, technologies such as combined heat and power systems, allow for natural gas to be used directly in on-site power generation. Often lost in the dialogue about the nation's energy resiliency is the fact that not everything needs to be "electrified." Diversity of delivery mechanisms (natural gas pipelines and electric transmission) and fuel sources is key to ensuring overall system reliability.

A fresh example is the current prolonged winter season, including, in particular, the extreme cold 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,

[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.

forty-two percent of the natural gas delivered to American 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. Natural gas energy delivered to consumers on January 1 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.

As the United States continues to benefit from historically low natural gas prices, expanding natural gas direct-use will benefit the nation in several ways. First, natural gas will reduce the negative impact on communities from the tremendous costs associated with the build-out of additional electric generation and transmission assets. Consumers also will benefit from lower monthly utility bills when operating natural gas appliances as compared to electric alternatives.

The Committee should explore increasing gas 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 communities by upgrading and expanding service to new areas. In many instances, upgrades and expansions are 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 the effort to lower the initial infrastructure cost for end users – also known as "last mile" programs. Due to state and local laws and policies, natural gas utilities must recoup all of the costs associated with expanding into new areas. Buildout can be more difficult in rural areas where lower population density increases the cost per customer. The Committee should explore how the federal government might be able to help lower these front-end costs 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 (attached to this Testimony) provides an overview of the beneficial impact "last mile programs" have on dramatically lowering businesses' and underserved communities' energy bills.

APGA believes that any infrastructure discussion must include an objective, comprehensive assessment of the benefits of direct use of natural gas, especially in rural communities. Moreover, promoting fuel and delivery diversity is essential to the reliability, resiliency, and security of the nation's energy system. 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 energy issues.

Sincerely,

Bert Kalisch
President & CEO

HPBA®
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May 2, 2018

The Honorable Lisa Murkowski
Chairman
Committee on Energy and
Natural Resources
United States Senate

The Honorable Maria Cantwell
Ranking Member
Committee on Energy and
Natural Resources
United States Senate

RE: Hearing Entitled "Energy-Related Challenges and Opportunities in Remote and Rural Areas of the United States"

Dear Chairman Murkowski and Ranking Member Cantwell:

As the trade association representing manufacturers, retailers, distributors, and servicers of wood and pellet stoves and inserts, fireplaces, hydronic heaters, wood furnaces, gas fireplaces and stoves, in addition to other sectors of the hearth, patio, and barbecue industries, we are writing to thank the committee for discussing energy needs and opportunities in rural areas, which was reviewed by the Senate Committee on Energy and Natural Resources on April 19, 2018 during the hearing entitled, "Energy-Related Challenges and Opportunities in Remote and Rural Areas of the United States."

HPBA and its members have worked for decades with rural communities to address rural heating needs. The energy needs of rural America present an enormous opportunity for biomass heating systems as many areas of the United States are rich in sustainably managed biomass resources from forests and farms. Many of these areas do not have access to pipeline natural gas and, consequently, homeowners and businesses are left with few choices other than fuel oil – which has high price volatility – and propane. In rural areas, for example, nearly 40 percent of all energy consumed is for heating buildings: homes, offices, schools, and businesses small and large.[1]

The Northeast, for example, is a region entirely dependent on the importation of fossil heating fuels (oil, natural gas, propane) from other regions of the U.S. or from foreign countries. In this area of the country, biomass can sustainably meet an estimated 10-15 percent of all residential and commercial heating needs, thereby bringing a measure of energy independence and catalyzing economic development. Particularly in rural forest- and farm-dependent communities, increasing deployment of high efficiency biomass thermal heating systems creates jobs and helps sustain our working forests.

The Northeast is not the only region with high heat energy costs and abundant biomass. The Intermountain West and Rocky Mountain states, the Pacific Northwest, the North

[1] U.S. Energy Information Administration. (2009). *Residential Energy Consumption Survey (RECS) 2009.*

central states, and the central Appalachian states all are cold, heat dependent regions with underutilized biomass resources. Dozens of changeout programs have been implemented in the northwest to replace older, non-certified woodstoves with EPA-certified models. In Washington State alone, there are currently seven ongoing changeout programs.[2] We commend HopeSource for offering a rebate between 2015 and 2017 to residents of the Cle Elum Ellensburg airsheds to purchase and install a new wood or pellet stove, gas stove, or ductless mini-split system heat pump to replace an existing older wood stove or insert. A statewide changeout program in Washington is expected to begin within a year. In Alaska, a state with many heating and clean air challenges, an important changeout program continues in Fairbanks.

Further, during the April 19 hearing, Mr. Robert Venables (Executive Director of Southeast Conference) mentioned an investment made by Southeast Island School District (SISD). SISD started by purchasing two wood boilers for the school in Coffman Cove. Before purchasing these two wood boilers, the school district paid about $45,000 annually for fuel oil. Now, they're spending between $15,000 to $20,000 annually for cordwood fuel and labor to keep the heaters fueled.[3] Although there was a significant up-front cost to purchase these boilers, grant money was able to cover most of the investment. Without that grant money, the school district likely would have been unable to make this investment for years, if at all.

The main hurdle precluding homeowners and businesses from converting to biomass thermal systems is the relatively high up-front capital costs of conversion. By granting a modest investment credit, Congress can break down that barrier and accelerate the deployment of these advanced wood heating technologies. The Biomass Thermal Utilization Act (S. 1480/H.R. 3161) is pending in both chambers to address this issue. The bill simply adds biomass heating equipment to the list of renewable energy technologies that currently qualify for investment tax credits.

On a smaller scale, Congress has enacted (but failed to extend) a tax credit for the purchase of wood and pellet stoves for home heating. The credit, part of Section 25(C) of the tax code, would provide a tax credit of $300 for purchasing a biomass stove that is at least 75 percent efficient. Again, with the abundance of wood available in rural and remote areas, a policy incentivizing homeowners to purchase heating systems that operate on this abundant, affordable and clean fuel sources will benefit consumers in these areas and drive economic activity up and down the biomass value chain—from forest owners to loggers to fuel and appliance producers.

Thank you again looking to address the challenges and opportunities in rural areas related to energy and heating needs. Through federal, state, and private partnerships, creative solutions can be found to address the unique and complicated factors affecting

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[2] Hearth, Patio & Barbecue Association. (2018). *Ongoing Changeout and Incentive Programs*. Accessed May 1, 2018. Retrieved from https://www.hpba.org/Promotional-Campaigns/Woodstove-Changeouts/What-is-a-Woodstove-Changeout/Ongoing-Changeout-and-Incentive-Programs

[3] U.S. Department of Agriculture. (2015). *Community Biomass Handbook: Volume 2: Alaska, Where Woody Biomass Can Work*. Retrieved from https://www.fs.fed.us/pnw/pubs/pnw_gtr920.pdf

rural areas. We appreciate your consideration of our comments and we hope to be a resource to you and your staff as these discussions continue.

Sincerely,

Rachel Feinstein
Senior Manager – Government Affairs
Hearth, Patio & Barbecue Association

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April 19, 2018

Utilities Technology Council
Statement for the Record
Senate Energy and Natural Resources Committee

Hearing to Examine Rural Energy Challenges and Opportunities

The Utilities Technology Council (UTC) thanks Senate Energy and Natural Resources Committee Chairman Murkowski and Ranking Member Cantwell for the opportunity to submit these comments for the record in the above-referenced hearing. Established in 1948, UTC is the global trade association representing energy and water providers on their needs related to the deployment of reliable and resilient Information and Communications Technology (ICT) systems. Electric, natural gas, and water providers use ICT networks as the backbone for the infrastructure that delivers safe, reliable, and secure energy and water services. These networks are essential for the reliability, safety, resiliency, and security of utility services.

UTC commends the Committee for focusing on rural energy challenges and opportunities. Our membership consists of energy and water entities of all sizes and ownership types, from large investor-owned utilities to small publicly and cooperatively-owned utilities often located in rural areas. Such diversity means each of our members face their own challenges in providing reliable electric, gas and water services.

This is a timely hearing. Your commitment to ensuring that the energy needs of rural America are not ignored is laudable; UTC stands ready and willing to assist Committee Members and staff in any way we can to facilitate the deployment of affordable and reliable energy services in these areas. Utilities in rural locations can face unique challenges compared to those serving urban and suburban areas, most notably the large geographic service territories and vast distances between customers. We are pleased you have invited Basin Electric Power Cooperative to testify. Basin Electric is one of our more than 200 core utility members.

In order to ensure affordable, reliable electric service, rural utilities must deploy their infrastructure over imposing terrain and long distances. This infrastructure must also be resilient and able to withstand the same numerous risks impacting utilities all over the country, such as regular weather fluctuations, natural disasters, vandalism, physical and cybersecurity attacks, and much more. Rural utilities, no matter their size or ownership structure, meet these challenges every day.

All utilities, whether rural, urban, or suburban, have deployed extensive ICT networks throughout their infrastructure. Indeed, these ICT networks are so embedded into utility infrastructure that they can often be taken for granted. These systems operate on both the bulk power system, regulated by the Federal Energy Regulatory Commission (FERC) and subject to North American Electric Reliability Corporation (NERC) reliability standards, and the distribution level overseen by state and/or local entities. Although necessary to fulfill the promise of the "smart grid" and other grid modernization initiatives, utilities have been building, operating, and maintaining their own ICT networks on the bulk-power level for decades as they are essential to the reliability and resiliency of their systems.

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More specifically, electricity and natural gas 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
• Substation automation

Utilities rely on both wireless and wireline technologies to run their ICT networks. Given the provision of service over long distances, and the expense of laying fiber to these remote locations, rural utilities are often more reliant on wireless communications over greater geographic areas than their urban and suburban counterparts. Like any wireless network, utility ICT systems need radio spectrum to function. Therefore, access to adequate and interference-free spectrum is a requirement if these networks are to work as intended. Spectrum, while naturally occurring, is managed as a commodity, a highly sought-after one. Yet despite rural utilities having secured licenses in spectrum bands to meet their needs to ensure the reliability of their systems, those licenses and the spectrum in which they operate mission-critical communications are continually threatened by actions at the Federal Communications Commission (FCC).

The impact of the FCC's spectrum allocation policies is noteworthy within the electric utility industry because this industry is subject to the mandatory NERC reliability standards at the bulk power system level; these standards carry significant penalties. Electric utilities design and operate their systems ensure more than just compliance with these standards, but also to provide extremely high levels of reliability. The FCC, the primary federal entity responsible for spectrum allocation, does not consider these reliability requirements in its decision-making. Therefore, as this Committee investigates rural energy issues, we ask that it include spectrum access into its deliberations. Because the FCC is overseen by the Senate Commerce, Science, and Transportation Committee, we recognize that this issue crosses jurisdictional boundaries. As we have noted above, the deployment of ICT networks is interwoven into the deployment of electric service – after all, what is the "smart grid" if not communications devices provisioned on the electric system?

These jurisdictional overlaps speak to the growing interdependencies between the telecommunications and energy sectors. Not only is spectrum needed for day-to-day reliability on the bulk power system, but it is essential for "smart grid" and utility of the future applications on the distribution level as well. For example, utilities use ICT networks to incorporate new resources such as energy storage, rooftop solar, and smart meters. As the use of these resources grows, utilities will need more spectrum to continue the reliable operation of their systems. If the transition to a more consumer-centric, distributed utility industry is going to be realized, a clear recognition of these jurisdictional overlaps must be understood and collaboration across government and congressional lines must occur regardless of boundaries.

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On behalf of our members, we urge the Senate Energy and Natural Resources Committee to acknowledge the growing interdependencies and encourage the FCC and FERC, over which this committee has jurisdiction, to hold regular meetings. Such meetings would build understanding between the two regulatory bodies and the industries they regulate, which is especially crucial as the energy and telecommunications sectors become more interdependent. We have also sent this request to members of the Senate Committee on Commerce, Science and Transportation.

We also ask that Committee members consider passing a Sense of Congress resolution officially stating its recognition of the spectrum needs of the energy sector. Such a resolution would declare the importance of interference-free, reliable, and reasonably-priced spectrum to the energy industry, sending a strong signal to government agencies about how critical spectrum is to our nation's electricity future.

All utilities are committed to providing their customers with reliable and affordable electric, gas, and water services, no matter where they live. Rural utilities face unique challenges and opportunities in providing their services. By considering the above recommendations and paving a path for conversations to occur across jurisdictional lines, this Committee can make a tremendous impact benefiting rural utilities in their delivery of reliable energy services. We thank the Committee for holding this important hearing and focusing on the needs of rural utilities; UTC stands ready to assist the Committee in any way as it continues its oversight.

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